

The 11th Asian Conference on Education

# ACE2019

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*Welcome to*

# TOKYO

JAPAN

A large orange sun is the central background element. In front of it is a black silhouette of a suspension bridge with two towers and cables. Below the bridge is a black silhouette of a city skyline with various buildings and a pagoda-like structure on the right. The bottom of the image is a solid black bar.

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***Challenges of Creativity-based International STEAM Camps to Inspire and Motivate Gifted Students***

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**Abstract**

NSTDA is the national science and technology research center in Thailand. One of its missions is to develop and prepare competent human resources in science, technology, engineering, art, and mathematics (STEAM). Organizing STEAM camps for gifted students are among our highlighted activities. We engage and encourage them to express their curiosity, creativity and talents in STEAM. Each year, we organize several national camps and a few international camps. One of camps we organized was at the 15th Asia Pacific Conference on Giftedness:APCG2018 Youth Camp on the theme “Inspiration, Motivation, and Creativity: Leading the way to Giftedness”, Keys to our success in this APCG2018 Youth Camp (STEAM camp) were integration of fun, hands-on, open-ended, and challenging problems in a friendly and non-judgmental learning environment. There were two types of sessions: plenary for all participants, and special activities allowing participants to pick and choose activities that suited their individual interests. Each participant was able to select one session out of six break-out sessions. Results from the survey show that the STEAM camp encouraged and developed creativity skills. Overall, the participants’ satisfactions score was 3.27 of 4.00 (Excellent level). Furthermore, the STEAM camp had motivated students to have positive attitudes in science, technology, engineering, art, and math, showed by the top score of satisfactions of the Creative Gym activity which got 3.50 of 4.00 (Excellent level). Challenges in running STEAM camps for gifted children from multi-cultural background and covering a wide range of age groups will be presented and discussed.

Keywords: Creativity, Gifted students, international STEAM camp

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## Introduction

Asia-Pacific Federation on Giftedness (APFG) was founded in 1990 in Manila, Philippines as the Asia-Pacific Federation (APF) and became affiliated to World Council for Gifted and Talented Children (WCGTC) in 1994. In 2010, APF changed its name to APFG and has become an independent organization. The purpose of APFG is to focus Asia-Pacific attention on gifted and talented children or individuals and their valuable potential contribution to the benefit of humankind. Special education administrators, scholars and teachers in gifted and talented education, special education, psychology, and other fields join together with dedicated parents and graduate students to support the mission of the APFG. Over the years, we have been diligently fulfilling the commitments registered at the Bangkok Declaration approved on August 16, 2002 and working on the development and education of gifted and talented individuals in Asia-Pacific region (National Taiwan Normal University, 2015).

The Asia-Pacific Conference on Giftedness (APCG) is a biennial event in the summer, usually July or August providing opportunity to contribute to the global conversation about gifted and talented education. Every two years the event is held at a different location and brings together hundreds of members and attendees and numerous presentations covering latest trends in the education of gifted and talented children. Previously the conference were held in Manila (1990), Taipei (1992), Seoul (1994), Jakarta (1996), New Delhi (1998), Beijing (2000), Bangkok (2002), Daejeon (2004), Taipei (2006), Singapore (2008), Sydney (2010), Dubai (2012), Beijing (2014), Macau (2016), and Bangkok (2018). Daegu, Korea will host the 16th APCG conference in 2020.

The 15th Asia-Pacific Conference on Giftedness (APCG2018) “Inspiration, Motivation, and Creativity: Leading the Way to Giftedness” The National Science and Technology Development Agency (NSTDA), Ministry of Science and Technology, Thailand, would like to extend our warm welcome to invite you to participate in the international conference “The 15th Asia-Pacific Conference on Giftedness (APCG2018)” which will be organized in Bangkok during 20-24 August 2018.

The camp instructors are high-profile professionals who will encourage the students to express their curiosity and creativity through a range of activities, allowing our participants to display and share their talents in art and science, while fostering friendship and cooperation among the future leaders of the Asia-Pacific region. There are 255 gifted and talented children from 13 economies, including 18 teachers and 10 educators. Totally, there are 283 participants from the Asia-Pacific region who participated in this camp.

The APCG2018 features two types of sessions: Plenary Activities, which are meant for all APCG2018 Youth Camp participants and Break-out Session, which allow APCG2018 participants to follow their individual interests. Each participant will be able to select ONE session of the 6 break-out sessions offered because they will be conducted in parallel.

## STEM education approaches for developing students through design-based learning methods

- The first of all we will be lead in children get inspired to learn by ask question and do the activities when children brainstorm ideas after choosing a problem to work on and students came up with their creations, they would then export them in sketches on paper. After that, they would create a prototype.
- Finally, they would present their creations to the whole group. Ideas for STEAM Camp design-based learning methods are illustrated in Figure 1.



Figure 1. Ideas for STEAM Camp design-based learning methods

### Objective

The conference is designed with the objective to increase public awareness, generate enthusiasm among stakeholders in the government, academia, and private/non-government sector, which hopefully will lead to the development of future knowledge in this field as well as suitable policy and strategy for the education of gifted and talented students. It will bring leaders in gifted education from around the globe to share their knowledge, expertise, and practices.

### The Camp Content

- The activities designed for the Camp were meant to encourage the students to express the curiosity and creativity through various activities.
- Connect the network of gifted students from around the world

The APCG2018 features two types of sessions: Plenary Activities, which are meant for all APCG2018 Youth Camp participants and Special Camp, which allow

APCG2018 participants to follow their individual interests. Each participant will be able to select ONE session of the 6 break-out sessions offered because they will be conducted in parallel (NSTDA, 2017).

## Plenary Activities

### 1. Creativity Gym

**Lecturer:** Mr. Purin Phanichphant, is a San Francisco, California-based interactive artist & designer and a Professor of Visual Communication and Sketching at University of California.

**Objective:** To boost participant's creative confidence by showing them anyone can be a creative problem-solver.

“Creativity Gym”, students experienced the process of idea divergence and convergence. The students benefited a lot through learning how to make their creativity works not only by building on others' ideas but also by working together as a team (Figure 2).

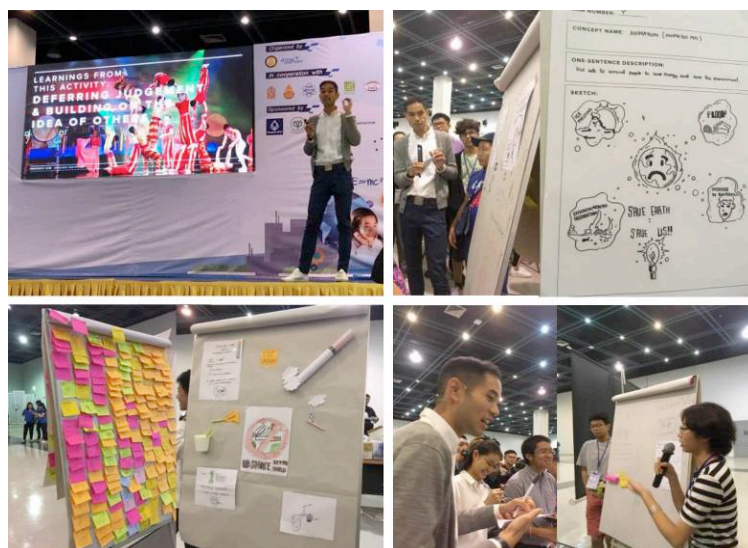


Figure 2. Creativity Gym by Mr. Purin Phanichphant

### 2. The Creative in You

**Lecturer:** Miss Vararom Pachimsawat, is a founder of the Dance Centre School of Performing Arts and the Friends of the Arts Foundation.

**Objective:** To learn and have a better understanding of our mind and body through movement and breathing and to encourage the unlimited the creativity.

“Creative in You”, through this class, students could develop their multiple intelligences and build up their social skills. In case you would like to enjoy students' astonishing creative performances. All exercises will consist of encouraging participants to use their unlimited imagination and creativity includes using some tools that are available (Figure 3).



Figure 3. Creative in You by Miss Vararom Pachimsawat

### 3. Create Art by Applying Math

**Lecturer:** Professor Jin Akiyama, is director of the Mathematical Education Research Center at the Tokyo University of Science, and professor emeritus at Tokyo University.

**Objective:** To help participants know presenting magic tricks with mathematical explanations

“Create Art by Applying Math”, this class make you can design your own mysterious magic-tricks and create artwork like M.C.Escher’s, all while being a young mathematician. Through this magic, the professor explained to the student the idea of binary system. In his class, Professor Jin Akiyama demonstrated the close relation between art and math to make students understand that creativity could be a part in the field of mathematics (Figure 4).



Figure 4. Create Art by Applying Math by Professor Jin Akiyama

## The Break-out Session Summary (Special Camp)

**Special Camp** which allow APCG2018 participants to follow their individual interests. Each participant will be able to select ONE session of the 6 break-out sessions offered because they will be conducted in parallel.

### 1) Learning by Drawing

**Summary:** This activity taught students drawing the process of producing visual representations, which helped encourage students' motivation for learning and understanding science (Figure 5).



Figure 5. Learning by Drawing by Dr. Sasivimon Swangpol

### 2) Tie-Dye Tissue Paper STEAM Workshop

**Summary:** Learn and play geometry with tie-dyeing. To create colorful geometric pattern from natural colors. STEAM education is an integrated the Science, Technology, Engineering, Arts and Mathematics as access points for guiding student inquiry, and critical thinking (Figure 6).





Figure 6. Tie-Dye Tissue Paper STEAM Workshop by Mr. Surat Intasang

### 3) Tiny Khon Mask Making

**Summary:** Learning the history of the Ramayana, performed as a stage production. Participants will make their own delicate Tiny Khon masks (Figure 7).



Figure 7. Tiny Khon Mask by Mr. Phongsathorn Rodjaktuk and team from Khon Village the Salaya

## Design Thinking for Kids

**Summary:** Learning to understand and practice. Design thinking process through the designing of the Universal House. The Key Components of Universal House Design: Accessibility, Connectivity and Emotionality (Figure 8).



Figure 8. Design Thinking for Kids by Mr. Noppadon Thuaksuban and Mr. Varut Luengwattanakit

## 4) Fun Thai Sweets

**Summary:** Learning to make Thai Sweets and the scientific techniques to create specific flavors come from flowers and plants and selecting proper ingredients from natural raw materials. It is made from glutinous rice flour, coconut and sugar for make innovative Bua Loi (Figure 9).



Figure 9. Fun Thai Sweets by Dr. Masubon Thongngam

## 5) Smart Entrepreneur

**Summary:** How to think like an entrepreneur, in terms of target-market analysis and strategy. Learning the concept of customer analysis and trading strategy and how to think like an entrepreneur, in terms of target-market analysis and strategy. The students will be divided into teams of 4 which will form a nest development company in the fictional city (Figure 10).



Figure 10. Smart Entrepreneur by Dr. Panwong Kuntanawat

## Conclusions

A summary of the results of the 15th Asia-Pacific Conference on Giftedness (APCG2018) Youth Camp. There are 242 participants participated to do the surveys in this camp. The types of applicants are 222 children from 13 countries (91.7%), teachers 12 people (5.0%) and educators 8 people (3.3%). There are 109 participants are Male (44.48%), and there are 111 participates are Female (45.90%). Otherwise is not identity gender there are 22 participants (9.10%). There are 54 participants of Grade 5-6 (22.40%). The results of the 242 participants approximately 86% from 283 participants were summarized as follows:

Table 1. General data of participants

Description	Participants (person)	Percent
<b>Type of applicants</b>		
• Teacher	9	5.00
• Educator	8	3.30
• Student	222	91.70
<b>Total</b>	<b>242</b>	<b>100.0</b>
<b>Gender</b>		
• Female	109	45.00
• Male	111	45.90
• Not identify	22	9.10
<b>Total</b>	<b>242</b>	<b>100.0</b>
<b>Education Level</b>		
• Grade 5-6	54	22.40
• Grade 7-9	83	34.40
• Grade 10-12	77	32.00
• Not Identify	28	11.20
<b>Total</b>	<b>242</b>	<b>100.0</b>
<b>Age</b>		
• 10-12 yrs (Primary School)	48	19.80
• 13-18 yrs (High School)	179	74.00
• Not identify	15	6.2
<b>Total</b>	<b>242</b>	<b>100.0</b>

There are 179 participants' ages 13-18 years as a High school level. The percentage is 78.85 and then, ages 10-12 years are 48 participants as a Primary School level. The percentage is 21.15 from 227 participants to do these surveys. The satisfy evaluation of High school get score more than Primary School

The main conclusions of the study may be presented in a Conclusions section, which may include the main findings, the implications and limitations.

This is a criteria of score of **Quality of the overall APCG2018 Youth Camp** are:

Excellent	gets	4 score
Good	gets	3 score
Average	gets	2 score
Need to Improve	gets	1 score

### Solutions

(Maximum score-Minimum score)/Interval of score =  $3/4 = 0.75$

Interval of score	Meaning
3.26 - 4.00	Excellent
2.51 - 3.25	Good
1.76 - 2.50	Average
1.00 - 1.75	Need to Improve

Reference: *Likert, R. (1961). New Patterns of Management. New York: McGraw-Hill Book Company Inc.*

Table 2. Result of Evaluation of Quality of the overall APCG2018 Youth Camp

Descriptions	Frequency ( $\bar{X}$ )	Result
<b>1) Welcome and Reception Summaries</b>		
1.1 Welcome Reception/Orientation	3.26	Excellent
1.2 Open ceremony	3.29	Excellent
1.3 Closing ceremony	2.93	Good
<b>2) Excursion session Summaries</b>		
2.1 National Science Fair Visiting	3.10	Good
2.2 Thai boxing Activity	3.44	Excellent
2.3 Travel to Muang Boran Historical Park	3.36	Excellent
<b>3) Plenary Activity Summaries</b>		
3.1 Creativity Gym (Mr.Purin Phanichphant)	3.30	Excellent
3.2 Creative in You (Ms.Vararom Pachimsawat)	2.88	Good
3.3 Create Art by Applying Math (Professor Jin Akiyama)	3.14	Good
<b>4) Special Camp Summaries</b>	3.50	Excellent
<b>5) Venue Summaries</b>		
5.1 Document-APCG2018 Youth Camp Book	3.36	Excellent
5.2 Sirindhorn Science Home	3.36	Excellent
5.3 Convention Center, Thailand Science Park	3.47	Excellent
5.4 Meals/Refreshment Breaks	3.09	Good
5.5 Staff Support: Quality of service/ service mind	3.56	Excellent
<b>TOTAL</b>	<b>3.27</b>	<b>Excellent</b>

From the table 2 shown data about satisfy evaluation from 242 participants in APCG2018 Youth Camp, with further classification by 5 categories. The most satisfactions in Quality of the overall APCG 2018 Youth Camp was Excellent, the frequency (Mean) is 3.27 out of 4.00.

**Key to our success in the STEAM camp** were integration of fun, hands-on, open ended and challenging problem in a friendly.

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***Ethical Practices in Vocational Technical Education: A Sure Way to Sustainable Vocational Education in Nigeria***

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**Abstract**

Ethics defines good or bad. When applied to institutions, it allows groups to determine fair and appropriate procedures of doing things. Vocational and Technical Education (VTE) is the form of education which is obtainable at Technical Colleges and designed to prepare individuals to acquire technical or practical knowledge/vocational skills, basic and scientific knowledge necessary for production. Despite imparting knowledge, Vocational Education teachers also have it as their responsibility to make sure that students develop a sound character and acceptable societal moral values. Therefore, VTE teachers should be best described as role model to the students and the society at large. The findings revealed that consequences of relegating ethical practices in Vocational Technical Education have manifested in the quality of education delivery in form of; fallen standard in vocational education, relaxed discipline in schools, quasi implementation of school curriculum, increased examination malpractice and struggle to acquire certificate at all cost. All these are at expense of quality VTE. The paper recommends among others that efforts should be geared towards: development, publication and enforcement of clear regulations and minimum benchmarks for VTE programmes; designing and implementation of quality assurance and inspectorate duties to facilitate, encourage and help teachers to professionally perform their duties; prompt identification, isolation and sanctioning of teachers, regulators and inspectors involved in unethical practices etc.

Keywords: Ethics, Vocational and Technical Education (VTE), Apprenticeship, Framework Practice

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## **Introduction**

The need for VTE manpower development to protect and improve industrial and technological development cannot be undermined since VTE has the elements needed to add substantially to national development. Ibeneme (2009) justified that no nation can develop beyond the level of human resources available in that nation. For Nigeria to develop technologically via the industry, it requires amongst others, but most fundamentally, the introduction of ethical principles in VTE policy. Technical and Vocational Education (TVE) has been an integral part of national development strategies in many societies because of its impact on productivity and economic development. Despite its contributions, the leaders of most third world nations have not given this aspect of education the attention it deserves. This is one of the reasons for these nations' underdevelopment.

On the attainment of independence, the Nigerian government and educators suggested for more comprehensive Vocational and Technical Education as a prerequisite for development and productive sector sustainability (Ali, 2000, in Palnam and Unegbu, 2012). The old educational system as a whole was criticized as being remote to the needs and aspirations of the nation with little relevance to the requirements of individuals, firms and the society at large.

Today the Federal Government of Nigeria, having been fully aware of the vital roles which Vocational and Technical Education can play decided that a clear and comprehensive policy should be made on Vocational and Technical Education. This is the underlying principle behind the adoption of National Policy on Education, reviewed, re-reviewed and revised editions. There is no gainsaying that little or nothing maybe achieved if ethical standards are not enshrined in the National policy on Education of the country.

## **The Concept of Vocational and Technical Education**

Vocational and Technical Education has historically been known as “education for work.” It has focused on providing learners with the skills and knowledge needed for successfully transition to the workplace. Therefore, Vocational and Technical Education refers to qualifying education paths that provide individuals with occupation-specific knowledge and practical skills, independent of the place, content, and education provider (Rodríguez-Planas, 2015).

VTE can be classified into three distinct systems: (1) school-based; (2) a dual apprenticeship system combining school training with a firm-based approach; and (3) informal-based.

School-based VTE system provides youths with a combination of general and occupation-specific knowledge, offered either at the lower or upper secondary level. Accordingly, it is integrated into the compulsory schooling as alternative to an academically oriented schooling track, or as part of several education options. However, there might be differences in the degree of transferability across occupations – while the VTE system in some countries transmits skills that are not restricted to one particular occupation, in others it provides vocational schooling for specific types of occupations (Shavit and Müller, 1998).



Dual VTE system aims to combine general, transferable skills acquired during School-based VET with structured on-the-job learning and actual work experience within a training company. Apprenticeship graduates acquire occupation-specific skills that render them employable by the training company or other employers, while the overspecialization and low levels of transferable skills generated by the higher share of firm- and occupation-specific training is counteracted by standardized curricula and examinations.

Informal system refers to a situation where occupational knowledge is transmitted between generations, within a family or clan. For instance the ‘traditional apprenticeships’ system in India and many African countries. Moreover, ‘informal apprenticeships’ are frequently open to apprentices not belonging to a family or clan. Despite taking place in the informal sector, they have some locally standardized structures and duration, and are based on some contractual agreements between the craftsman and trainee. Apprentices receive no or little remuneration during the training period, and might even have to pay a fee to the trainer. While the training is generally and entirely work-based, it may follow an informal training plan. Given the lack of a legal framework to enforce certain training standards, the informality of training may also bear certain risks to the trainee, with particular concerns involving the potential exploitation of children as cheap labourers, gender discrimination based on traditional gender roles, and unenforceable contractual agreements resulting in low training quality or an extension of the apprenticeship duration (Lerche, 2007).

From the definitions above, Vocational and Technical Education is regarded as an education which is designed for any occupation, career or profession that requires specialized manipulative skills, knowledge and attitude and should function within a specified/stated ethics.

### **The Concepts of Ethics**

Decisions about right and wrong permeate everyday life, including our educational system. Ethics should concern all levels of life: acting properly as individuals, creating responsible organizations and governments, and making our society as a whole more ethical. Ethics provides a set of standards for behavior that helps us decide how we ought to act in a range of situations. In a sense, we can say that ethics is all about making choices, and about providing reasons why we should make these choices.

Making good ethical decisions requires a trained sensitivity to ethical issues and a practiced method for exploring the ethical aspects of a decision and weighing the considerations that should impact our choice of a course of action. Having a method for ethical decision making is essential. When practiced regularly, the method becomes so familiar that we work through it automatically without consulting the specific steps. This is one reason why we can sometimes say that we have a “moral intuition” about a certain situation, even when we have not consciously thought through the issue.

According to Bonde and Firenze (2013), the following three ethical decision frameworks may help to guide our ethical decision making: The Consequentialist Framework; The Duty Framework; and the Virtue Framework.

While each of the three frameworks is useful for making ethical decisions, none is perfect—otherwise the perfect theory would have driven the other imperfect theories from the field long ago. Knowing the advantages and disadvantages of the frameworks will be helpful in deciding which is most useful in approach the particular situation with which we are presented.

### **The Consequentialist Framework**

In the Consequentialist framework, we focus on the future effects of the possible courses of action, considering the people who will be directly or indirectly affected. We ask about what outcomes are desirable in a given situation, and consider ethical conduct to be whatever will achieve the best consequences. The person using the Consequences framework desires to produce the most good.

Among the advantages of this ethical framework is that focusing on the results of an action is a pragmatic approach. It helps in situations involving many people, some of whom may benefit from the action, while others may not. On the other hand, it is not always possible to predict the consequences of an action, so some actions that are expected to produce good consequences might actually end up harming people. Additionally, people sometimes react negatively to the use of compromise which is an inherent part of this approach, and they recoil from the implication that the end justifies the means. It also does not include a pronouncement that certain things are always wrong, as even the most heinous actions may result in a good outcome for some people, and this framework allows for these actions to then be ethical.

### **The Duty Framework**

In the Duty framework, we focus on the duties and obligations that we have in a given situation, and consider what ethical obligations we have and what things we should never do. Ethical conduct is defined by doing one's duties and doing the right thing, and the goal is performing the correct action.

This framework has the advantage of creating a system of rules that has consistent expectations of all people; if an action is ethically correct or a duty is required, it would apply to every person in a given situation. This even-handedness encourages treating everyone with equal dignity and respect.

This framework also focuses on following moral rules or duty regardless of outcome, so it allows for the possibility that one might have acted ethically, even if there is a bad result. Therefore, this framework works best in situations where there is a sense of obligation or in those in which we need to consider why duty or obligation mandates or forbids certain courses of action.

However, this framework also has its limitations. First, it can appear cold and impersonal, in that it might require actions which are known to produce harms, even though they are strictly in keeping with a particular moral rule. It also does not provide a way to determine which duty we should follow if we are presented with a situation in which two or more duties conflict. It can also be rigid in applying the notion of duty to everyone regardless of personal situation.

## **The Virtue Framework**

In the Virtue framework, we try to identify the character traits (either positive or negative) that might motivate us in a given situation. We are concerned with what kind of person we should be and what our actions indicate about our character. We define ethical behavior as whatever a virtuous person would do in the situation, and we seek to develop similar virtues.

Obviously, this framework is useful in situations that ask what sort of person one should be. As a way of making sense of the world, it allows for a wide range of behaviors to be called ethical, as there might be many different types of good character and many paths to developing it. Consequently, it takes into account all parts of human experience and their role in ethical deliberation, as it believes that all of one's experiences, emotions, and thoughts can influence the development of one's character. Also, because it emphasizes the importance of role models and education to ethical behavior, it can sometimes merely reinforce current cultural norms as the standard of ethical behavior.

## **Putting the Frameworks Together**

By framing the situation or choice you are facing in one of the ways presented above, specific features will be brought into focus more clearly. However, it should be noted that each framework has its limits: by focusing our attention on one set of features, other important features may be obscured. Hence it is important to be familiar with all three frameworks and to understand how they relate to each other—where they may overlap, and where they may differ.

The chart below is designed to highlight the main contrasts between the three frameworks:

	<b>Consequentialist</b>	<b>Duty</b>	<b>Virtue</b>
<b>Deliberative process</b>	What kind of outcomes should I produce (or try to produce)?	What are my obligations in this situation, and what are the things I should never do?	What kind of person should I be (or try to be), and what will my actions show about my character?
<b>Focus</b>	Directs attention to the future effects of an action, for all people who will be directly or indirectly affected by the action.	Directs attention to the duties that exist prior to the situation and determines obligations.	Attempts to discern character traits (virtues and vices) that are, or could be, motivating the people involved in the situation.
<b>Definition of Ethical Conduct</b>	Ethical conduct is the action that will achieve the best consequences.	Ethical conduct involves always doing the right thing: never failing to do one's duty.	Ethical conduct is whatever a fully virtuous person would do in the circumstances.
<b>Motivation</b>	Aim is to produce the most good.	Aim is to perform the right action.	Aim is to develop one's character.

Table 1: The main Contrast Between the main Frameworks

Because the answers to the three main types of ethical questions asked by each framework are not mutually exclusive, each framework can be used to make at least some progress in answering the questions posed by the other two.

### **Specified Ethical Practices Toward Students, Public, and Education Profession**

Idaho Schools Professional Standards Act (1972) specified the following as ethical practices within the education sector especially towards students, public and education profession.

**Ethical Practices towards the Student** -The educator measures success by the progress of each student toward realization of potential as a worthy and effective citizen. The educator therefore works to stimulate the spirit of inquiry, the acquisition of knowledge and understanding, and the thoughtful formulation of worthy goals. In fulfilling obligations to the student, the educator:

- a. Shall not without just cause restrain the student from independent action in a pursuit of learning, and shall not without just cause deny the student access to varying points of view.
- b. Shall not deliberately suppress or distort subject matter for which the educator bears responsibility.

- c. Shall make reasonable effort to protect the student from conditions harmful to learning or to health and safety.
- d. Shall conduct professional business in such a way that the educator does not expose the student to unnecessary embarrassment or disparagement.
- e. Shall not on the ground of race, colour, creed, age, sex, physical or mental handicap, marital status, or national origin exclude any student from participation in or deny the student benefits under any programme, nor grant any discriminatory consideration or advantage.
- f. Shall not use professional relationships with students for private advantage.
- g. Shall keep in confidence information that has been obtained in the course of professional service, unless disclosure serves professional purposes or is required by law.
- h. Shall not tutor for remuneration students assigned to the educator's classes, unless no other qualified teacher is reasonably available.

**Ethical Practices towards the Public** - The educator believes that patriotism in its highest form requires dedication to the principles of our democratic heritage. The educator shares with all other citizens the responsibility for the development of sound public policy and assumes full political and citizenship responsibilities. The educator bears particular responsibility for the development of policy relating to the extension of educational opportunities for all and for interpreting educational programmes and policies to the public. In fulfilling an obligation to the public, the educator:

- a. Shall not misrepresent an institution or organization with which the educator is affiliated, and shall take adequate precautions to distinguish between personal and institutional or organizational views.
- b. Shall not knowingly distort or misrepresent the facts concerning educational matters in direct and indirect public expressions.
- c. Shall not interfere with a colleague's exercise of political and citizenship rights and responsibilities.
- d. Shall not use institutional privileges for monetary private gain or to promote political candidates or partisan political activities.
- e. Shall accept no gratuities, gifts, or favours that might impair or appear to impair professional judgment, nor offer any favour, service, or thing of value to obtain special advantage.

**Ethical Practices towards Education Profession** - The educator believes that the quality of the services of the education profession directly influences the nation and its citizens. The educator therefore exerts every effort to raise professional standards, to improve service, to promote a climate in which the exercise of professional

judgment is encouraged, and to achieve conditions which attract person worthy of the trust to careers in education. In fulfilling an obligation to the profession, the educator:

- a. Shall not discriminate on the ground of race, sex, age, physical handicap, marital status, colour, creed or national origin for membership in the profession, nor interfere with the participation or nonparticipation of colleagues in the affairs of their professional association.
- b. Shall accord just and equitable treatment to all members of the profession in the exercise of their professional rights and responsibilities
- c. Shall not use coercive means or promise special treatment in order to influence professional decisions of colleagues.
- d. Shall withhold and safeguard information acquired about colleagues in the course of employment, unless disclosure services for professional purposes.
- e. Shall not refuse to participate in a professional inquiry when requested by the commission board.
- f. Shall provide upon the request of the aggrieved part a written statement of specific reason for recommendations that lead to the denial of increments, significant changes in employment or termination of employment.
- g. Shall not misrepresent professional qualifications.
- h. Shall not knowingly distort evaluations of colleagues.

### **Consequences of Relegating Ethical Practices in Vocational and Technical Education**

The ever increasing fallen standard in vocational education, relaxed discipline in schools, quasi implementation of school curriculum, increased examination malpractice, struggle to acquire certificate at all cost, anti-social behaviours, declining civility, deteriorating reading culture, cultism, and cheating in our society today are manifestations of unethical practices in education sector, Vocational and Technical Education inclusive were attributed to the consequences of relegating ethical practices. Hence the urgent need to re-visit the ethical practices (to students, colleagues and regulatory standards in our Vocational and Technical Education institutions across the nation.

### **Recommendations**

To encourage good practice, and promote quality, efficient professional ethics among VTE teachers, the following recommendations have been suggested by the writers:

1. Reintroduction of school inspectors properly trained on all aspect of enforcement of minimum standards in VTE ie properly trained on effective and efficient monitoring mechanisms; and supportive of teachers in enhancing learning outcomes.

2. Strengthening the capacity of regulatory, supervisory and quality assurance agencies in the education system like National University Commission, National Board for Technical Education, and National Commission for Colleges of Education to make them more effective, dispassionate and scrupulous in the discharge of their responsibilities especially in enforcement of minimum standards.
3. Wide publication and circulation of accurate, reliable and easily accessible information on criteria and procedure for enforcement of minimum standards that should include the external and internal quality assurance measures in tertiary institutions.
4. Designing and implementation of quality assurance and inspectorate duties to facilitate, encourage and help teachers to professionally perform their duties without diminishing their freedom and motivation of teachers to take initiatives.
5. Prompt identification, isolation and sanctioning of teachers involved in unethical behaviours.
6. Prompt identification, isolation and sanctioning of regulators and inspectors involved in recommending, facilitating, approving, licensing and accreditation of sub-standard and illegal institutions, programmes and courses.
7. Institute strong legislative and policy frameworks for promotion of ethics, integrity and best practices in examination, assessment and evaluation systems; combating examination malpractice; banning examination “special centres” or “magic centres” which are fronts for organized examination fraud syndicates.
8. Promulgation of strong policies against accreditation scams through which processes of ascertaining whether or not an institution satisfies Benchmark Minimum Standards (BMAS) in a particular field of study are thwarted; backing accreditation reports with sworn affidavits to the effect that the reports are the truth and nothing but the truth so that misrepresentations can be prosecuted for perjury.
9. Developments, codification and wide circulation of best practices policies relating to: integrity in teaching; research; relationship with students, colleagues and communities; compliance with the proper use of property and equipment; conflict of interest and intellectual property rights in addition to regulations defined by the public service rules.

## **Conclusion**

Any country desirous of quality citizenry and effective and efficient manpower for national development must give priority to robust Vocational Technical Education. A realistic part of overhauling the educational sector would demand that stakeholders that include parents, non-governmental organisations and state actors, must fashion out a national goal of VTE based on present experiences and realities. The idea that VTE is basically a meal provider or employment grantor should be disregarded as a motivation for the provision of educational services. Our national ethos, discipline and respect for persons and the lofty ideas of qualitative living are all tied to proper VTE.

Armed with a realistic national goal, modalities for creating objectives towards that goal should be put in place and must be accompanied by ethical practices. And these

must inform the standards by which to judge the quality of our educational system. Thereafter, there should be investment VTE. In terms of action plan, this should be a priority. It is high time stakeholders found a link between TVE and patriotism and moral-ethical citizenry. Anything short of this is mere politicking that takes one to nowhere.



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***Developing a Knowledge Based Economy through Enhancing Management of Vocational and Technical Education in Nigeria***

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**Abstract**

The need to enhance management of Vocational and Technical Education (VTE) and developing a knowledge based economy in Nigeria need not be over-emphasised. A knowledge based economy has four (4) key elements namely; economic and institutional regimes, education and skills, innovation system and Information and Communication Technology (ICT). This paper brings to the fore a realization of the fact that the performance of the products (outputs) of the education system is an index of the inputs into the system. For students to have enterprising and innovative mindset, it is important to expose them early enough to practical development in transiting towards a knowledge based economy in order to adapt to the upgrading of the educational system while in school, this is directed towards achieving a nation that is duly informed about the benefits of providing needed skill training for employment and self-reliance. Moreso, this paper examined those things which are necessary for the achievement of well established technical and vocational education in order to advance to a more knowledge based economy and the development of manpower for easy productivity in the vocational and technical education sphere. With all these in focus and practiced, the Nigerian economy will stand a chance of fighting unemployment and poverty to the barest minimum. Also, the strategies to adopt in enhancing management of vocational and technical education were discussed, and some recommendations were made.

Keywords: Knowledge Based Economy, Management, Vocational and Technical Education (VTE)

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## **Introduction**

The need to ensure that technical and vocational education for transition to a knowledge based economy is to uplift or form a generation that has variety of skills. It is not only in technical skills and knowledge but in producing future leaders for proper management perspectives in upgrading the necessary avenues for a knowledge - based economy. (Umeh and Ikwueze, 2015). As a result of this, technical and vocational education helps to guarantee or develop groups in the sector of the society which will sustain vocational training in different fields of human endeavour.

With adequate implementation of vocational and technical training, one can easily fit into the labour market immediately after studies. This is on the premise that the labour market will be saturated with those who can meet the employers' needs and expectations as well as their access to increase knowledge based economy. No wonder Suriana (2012) defined technical and vocational education and training as "Education and training that prepares individuals for gainful employment ...". This suffices that it refers to deliberate interventions to bring about learning which would make people more productive (or simply adequately productive) in designated areas of economic activity. One can say that technical education has the potential to enhance human capabilities and enlarge peoples' choices in different fields of employment. In line with this, it could be adjudged that people need to be oriented on how best to use vocational and technical education to carry out all sorts of changes which will guarantee a knowledge based economy.

## **Evolving Concept of the Knowledge Based Economy**

There is no universally accepted definition of the knowledge based economy. As a concept, it is very loosely employed and embraces a number of quite different visions of the economy and society. One view, most evident in Organization for Economic Co-operation and Development (OECD) publications, sees it as very much bound up with the high skills/high performance/high value added scenario as the only way for firms to compete in a globalised economy. Another view, found principally in the scientific and technical community tends to view it more narrowly as applying to knowledge intensive industries where knowledge itself is the core competence. The latter is typically found in software and internet companies, computer hardware and chip manufacturers, computer and electronic equipment sectors and health care technology.

Knowledge is seen as a potential generator of productivity improvements in areas as diverse as quality, customer service, variety, speed and technical improvements as well as innovation in products, processes, organizational structure and behaviour. As companies alter the way their organisations are structured (flatter, non-hierarchical, team based, multi-skilled) in order to compete more effectively, so too, workers have need to obtain more complex range of cognitive and intellectual resources. At a general level, there are difficulties in establishing a causal link at firm level between skills and competitive performance. This has been recognised by commentators such as Keep and Mayhew (1999), writing in respect of UK VET policy. The problem with linking training to economic success suggests that a single model of competitive advantage based solely on skill may not accord with present day reality in Britain.

In fact, companies are faced with the choice of product market strategy and with a variety of means of securing competitive advantage in the short, medium and long term. Some of these can be pursued in parallel with attempts to upgrade skills, but others are less incompatible with a high skilled, high wage, high value added approach. The paradigm of the knowledge based economy however, appears to reflect a growing consensus about the nature of wealth-generating enterprises of the future, but nations, and in fact cities and regions, must identify the response to the emerging economy that is most appropriate to them. There is need to look at knowledge, knowledge production and training of workers in new ways. An improved understanding of how the knowledge economy is developing will clarify the role of vocational and technical education and its relationship to the learning need of individual workers, companies, industry clusters and regions (Emezue, Attah, Ogbonna, Iwuagu and Oragwa, 2015).

Malhotra (1998) submits that knowledge management caters to the critical issues of organisational adaptation, survival and competence in the face of increasingly discontinuous environmental change. Essentially, it embodies organisational processes that seek synergistic combination of data and information-processing capacity or information technologies, and the creative and innovative capacity of human beings. The major key concepts of the definition are

- (a) Knowledge – a useful definition is familiarity gained by research and experience. It can include “know what” (knowledge about fact) ‘know why’ (scientific knowledge of the principles and laws of nature) ‘know how’ (skills or the capability to do something) ‘ know who’ (information about who knows what and how to do what)
- (b) Knowledge economy – the economy at the core of a knowledge society, i.e. an economy which revolves around creating, sharing and using knowledge and information to create wealth and improve the quality of life.
- (c) Knowledge Worker – a person who provides value by generating, sharing or applying ideas. It can equally apply to an eminent scientist, the skilled craftsman or to a receptionist or secretary with an expert knowledge of who’s who in the organization and where all the useful information can be found. (Umeh, 2015).

### **Developing a Knowledge Based Economy**

The term Knowledge Economy was coined to reflect the critical role played by knowledge and innovation in economic development. The four essential pillars for the development of a knowledge based economy include: Economic and Institutional regime operating in the country, Education and Skills, ICT Infrastructure and the system for promoting innovation. Countries pursuing a knowledge economy based development strategy must act simultaneously on these four fronts.

Table 1: The four pillars of knowledge economy

<b>Pillar 1</b>	<b>Pillar 2</b>	<b>Pillar 3</b>	<b>Pillar 4</b>
<b>Economic and Institutional Regime</b>	<b>Education and Skill</b>	<b>Innovation System</b>	<b>ICT Infrastructure</b>
The country's economic and institutional regime must provide incentives for the efficient use of knowledge and the application of both to economic development.	The country's people need education and skills that enable them to create and share knowledge and to use it well.	The country's innovation system firms, research centres, universities and other organizations must be capable of tapping the growing stock of global knowledge.	A dynamic information infrastructure is needed to facilitate the effective communication, dissemination and processing of information.

Source: World Bank, 2014

### **Pillar 1: Economic and Institutional Regime**

The first pillar of a country's knowledge economy framework is the economic and institutional regime of a country. The economic and institutional regime of a country needs to provide incentives for the efficient use and creation of knowledge and should therefore have sound macroeconomic competition and regulatory policies. Knowledge - conducive economic regime should be open to international trade and be free from various protectionist policies and price distortions in order to foster competition, which will in turn encourage entrepreneurship, efficiency and innovation.

### **Pillar 2: Education and Skill**

The second pillar of the knowledge economy is the education and skill that the workforce needs to create, adapt and utilize. Knowledge driven economics demand higher level skills in the workforce. The diffusion of ICT is further increasing the demand for skills, particularly those of the highest quality. Importantly, they demand a large number of scientists, engineers, financial analyst and numerous specialised professionals. This pillar of the knowledge economy is clearly not receiving sufficient attention in Africa, particularly in Nigeria. In the face of competition from South and East Asia, a more skill - intensive route to development could provide both resource rich and resource poor countries an avenue for economic growth. This will require dramatic increase in the quality of education at all levels and particularly in vocational skills training and in tertiary education. Nigeria for example will ensure that all her institutions of higher learning are world class. (World Bank, 2014).

### **Pillar 3: Innovation System**

The third pillar of the knowledge economy is the country's innovation system which embraces firms, research centres, universities, think tanks, consultants and other organizations. This system must be capable of tapping the growing stock of global knowledge, assimilating and adapting it to local needs, and creating new technology that underpins the development of new competitive products and processes.

Some of the key actions for the development of such a system are:

- Establishing an enabling policy environment that supports the creation of new knowledge, the diffusion and absorption of existing knowledge, and the commercialization of both competitions among enterprises is key to making innovation pervasive.
- Increase private and public research and development (R&D) and commercialization efforts.
- Increasing openness to trade and foreign direct investment (FDI) as well as leveraging the talent of the diaspora.
- Promoting 'inclusive' innovation - for the needs of the power segments of the population through more creative efforts at the grass root level and supporting the absorption of technology by the informal sector.
- Strengthening higher education and vocational skills training across sectors.
- Upgrading the ICT infrastructure to reach even the rural areas.
- Improving finance/funding for innovation and small and medium scale enterprises.(SMEs)

#### **Pillar 4: ICT Infrastructure**

The final pillar addressed in somewhat greater depth, is that of ICT infrastructure which is required for efficient dissemination and processing of knowledge and information. In the development context and in recognition of the importance of ICT, many countries view ICT as a production sector and include policies that focus on the development and/or strengthening of ICT related industries such as computer hardware, software, telecommunication equipment and ICT services. They also recognise ICT as an enabler of socio-economic development and growth.

#### **Concept and Nature of Vocational Technical Education**

Vocational technical education comprises more or less organised or structured activities that aim at providing people with the knowledge, skills and competencies necessary to perform a job or a set of jobs whether or not they lead to a formal qualification (Manfred and Jennifer, 2004). Also, Federal Republic of Nigeria (2004) opined that vocational technical education is an aspect of the educational process involving in addition to general education, the study of technologies and related sciences and the acquisition of practical skills, attitudes, understanding and knowledge relative to occupations in various sectors of economic and social life. Technically, vocational technical education refers to studies in areas of technology, applied sciences, agriculture, business studies, industrial studies and visual arts. Its major justification is to provide occupational skills for employment.

However, Pucel (1990) submits that this keeps changing and vocational technical education has been assuming different meanings and purposes due to global, demographic, social, technological, economic and political development. These developments put pressure on government and policy makers to keep expanding the purpose and expectations of vocational technical education. Emezue, Attah, Ogbonna, Iwuagwu and Oragwa (2015) reported that, there are now five justifications for governments worldwide to invest in vocational technical education. These are:

1. To increase relevance of schooling by imparting individuals with skills and knowledge necessary for making the individual a productive member of the society.
2. To reduce unemployment as a result of provision of employable skills especially to the youths and those who cannot succeed academically.
3. To increase economic development due to the fact that it improves the quality and skill level of the working population.
4. To reduce poverty by giving the individuals who participate access to higher income occupations.
5. To transform the attitude of people to favour occupations where there are occupational prospects or future.

### **Challenges to Vocational Technical Education (VTE) In Nigeria**

Although Vocational Technical Education has been seen as a key element in the changing world economic order, nevertheless, VTE in Nigeria like in many other countries still face a lot of challenges. (Manfred and Jennifer, 2004).

For VTE in Nigeria to compete with their world counterparts in the changing economic order, they must address the following key challenges:

1. Putting in place workable policies and strategies.
2. Advocating VTE as a key element in the education industry.
3. Learning in authentic and real world environments.
4. Encouraging continuity in vocational technical education and training.
5. Putting in place coherent guidance and counselling system which will help to put students in proper career path.
6. Encouraging the development and usage of qualified trainees.
7. Creating awareness through image building, vocational attractiveness and participation in VTE in Nigeria.
8. Setting up ambitions and realistic goals that will enable Nigeria to be the most competitive and knowledge based economy.
9. Creating and sensitising the Nigerian populace in the need and vision of VTE.
10. Maintaining approved school age and exit in order to pave way for physical and mental maturity required for the acquisition of vocational skills.
11. Tackling the issues of insufficient and lack of up to date data for assessment of progress in VTE.
12. Adopting stringent measures for proper and efficient execution of policies regarding VTE.
13. Adopting uniform standards and certification in VTE at all levels. (Emezue, Attah, Ogbonna, Iwuegwu and Oragwa, 2015),

### **Strategies for Developing Knowledge Driven Economy in Nigeria**

For knowledge based economy to be achieved, Oguntoye (2011) in Igboanugo, Aguezeoma, Eneze, Onoh and Chukwu (2015), submits that the following will be in place:

- a. Reforming of Curriculum: This reform will involve all the stakeholders (government, education ministers, commissioners, administrators, teachers,



- etc) should put heads together to change the curriculum to technical and vocational based so that human resources (knowledge) can be utilised, so that we live like the Americans, Asians and Europeans in this dynamic world of globalization.
- b. Project Implementation, Monitoring and Evaluation: Implementation is also bound to suffer when reform are based solely on technocratic assumption. So the National Board for Technical and Vocational Education should ensure that VTE should be implemented effectively, monitored and evaluated from time to time so that it will help to build up our nation to that ‘Knowledge Based Driven Economy’.
  - c. Ensuring high quality and appropriate skilled Vocational Profession: For VTE to meet the economic, social and political trend of the time, the nation must use qualified vocational training professionals/teachers in implementing vocational technical educational programmes. These professionals are pivotal in promoting VTE policies/reforms and strategies in Nigeria. The professionals have all necessary skills, abilities and capabilities for carrying out the programme since the quality of VTE depends mainly on the quality of its teachers.

### **Implications for Higher Education Institutions**

Higher education institutions have specific and vital roles across all the elements of knowledge based economy framework. Hence, Nwaogu (2016) submits as follows:

1. Higher education institutions can partner with governments in developing the required strategy for transformation towards a knowledge based economy and also in developing the policy and institutional framework.
2. There is the imperative of dramatically scaling up the quantity and quality of higher education across different disciplines and striving to become world class. Within that context, in addition to the disciplines of science, engineering, entrepreneurship should be promoted. There is very little consensus on the precise contours of entrepreneurial education. The many facets of entrepreneurial education include raising awareness of the central concepts about entrepreneurship by teaching students about entrepreneurs and their individual experiences. Higher education institutions have the potential not only to teach about entrepreneurship, but also to nurture the qualities of entrepreneurship.
3. A critical role that can be played by institutions of higher education is to promote innovation by supporting academic and research activities. The emphasis on a knowledge based economy has brought to fore the role of institutions of higher education with respect to economic development. The roles of Massachusetts Institute of Technology in the growth of industries in greater Boston area and Stanford University in the Silicon Valley area are frequently cited examples. The impact of institutions of higher education on development is often bigger than their immediate environments and has historical antecedents. Germany was the pioneer country where university industry relationship helped create the pharmaceutical industry in the early 19<sup>th</sup> century. A more Knowledge-Intensive approach to development is clearly a viable option for many developing countries and possibly the only route that permit sustained, outward oriented development. Even recently University of

Nigeria, Nsukka (UNN) developed a 100KVA Refuse Derived Fuel (RDF) gasification plant for the generation of electricity for the institution. It is a breakthrough which is yearning for commercialization which will spiral into economic development.

### **Conclusion**

The success of knowledge based driven economy will only come to reality when government and other stakeholders in education stand to reform our education curriculum with much emphasis on VTE, funding it appropriately and also through changing Nigerians' mindset on formal education certificate culture as against what you can do with your skills and abilities. Educational reform of VTE would also aid knowledge based driven economy as it will help reduce importation of foreign goods, encourage spirit of entrepreneurship, create platform for foreign investments and as well reduce migration and brain drain from our country to other countries.

### **Recommendations**

Based on the foregoing, the following recommendations are made:

1. Higher education institutions can partner with the governments in developing the required strategy for fostering knowledge based economy.
2. The government should offer incentives that foster knowledge economy. Numerous examples indicate that access to reliable and steady sources of funding is essential to ICT and technological growth and sustainability.
3. The government should create an enabling environment for technological innovation and entrepreneurship. The very nature of innovation means that entrepreneurs will either take advantage of existing gaps or forge into new territories. Either way, creating an enabling environment that lowers the barriers to market entry will certainly spur technological development.
4. The policy environment needs to be one that will foster the growth of information and Communication Technology (ICT) as it is the bedrock for technological development.
5. Technical and Vocational education should be introduced at all levels of educational program in Nigeria.
6. Technical and Vocational schools should be adequately equipped with modern tools and equipment for effective teaching and learning to take place.
7. There is need for complete review of the educational curriculum of all educational levels in Nigeria with a view of incorporating VTE in them.

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***The Role of Higher Education in Socio-Economic Development in Myanmar:  
External & Internal Perspectives***

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**Abstract**

Political metamorphosis in Myanmar with the mandate of National League for Democracy paved the way for major structural reforms in various sectors. Unsurprisingly, higher education sector is one of them to undergo drastic changes since it is regarded as one of the key sectors in Myanmar's socio-economic development. And, efforts are made to reengineer the sector with the involvement of intra and international organisations. In this paper, three aspects are discussed to understand the overview of recent reforms and changes of higher education system in Myanmar: the role of Public Higher Education in Myanmar's Development Policy, triangle relationship between ministries, external agencies and public higher education institutions, formal and living autonomy of public HEIs in relation to national development. The first two aspects focus on the "external" dimension of the relationship public higher education institutions in Myanmar have with national government and international agencies and the last point addresses the "internal" dimension of the universities and their adaptation on national development initiatives. The methodology included review and analysis of scientific papers, policy documents, reports and other relevant sources. In summary, the findings reveals that Myanmar is heading towards decentralisation and increasing autonomy for universities by allowing universities to directly interact with local, intraregional and international stakeholders. However, the implications of enhanced autonomy in university leadership remains as an empirical question. Future research is recommended in the area of university adaption towards organisational change in alignment with recent development.

Keywords: Myanmar, Higher Education, Universities, Reforms, Development, Policy, National Development Initiatives, Government, International agencies, Ministries, Autonomy

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## Introduction

Political metamorphosis in Myanmar with the mandate of National League for Democracy paved the way for major structural reforms in various sectors. Unsurprisingly, higher education sector is one of them to undergo drastic changes since it is regarded as one of the key sectors in Myanmar's socio-economic development. And, efforts are made to reengineer the sector with the involvement of intra and international organizations. Although there are several studies emphasizing recent development efforts in Myanmar, research studies focusing on the higher education sector are insufficient to see the whole picture from external (national and international) and internal (institutional) perspectives. Thus, in this paper, three main questions will be addressed to understand the overview of recent reforms and changes of higher education system in Myanmar.

- (1) What is the role of Public Higher Education in Myanmar's Development Policy?
- (2) What is the relationship between ministries, external agencies and public higher education institutions?
- (3) How much formal and living autonomy do public HEIs have in contributing to development?

The first two questions will be addressing the "external" dimension of the relationship public higher education institutions in Myanmar have with national government and international agencies. The last question will address the "internal" dimension of the universities and their adaptation on national development initiatives. For question 3, the University of Yangon will be the focus of analysis due to the fact that reform of University of Yangon (UY) will be used as the template for country wide university reforms. UY was designated as a 'Centre of Excellence', and given priority to upgrade its facilities to international standards as well (Esson & Wang, 2018).

## Literature Review and Analytical Framework

In the brief literature review that follows, concepts and an analytical framework in relation to the questions above will be discussed. In the Cloete et al article, HEIs formed the social contract (or "pact") with society by performing four contradictory functions; generating and transmission of ideologies, selection of elites, generation of new knowledge and training of labour force. The authors further emphasized that "The ability to manage such contradictions while emphasizing the universities' role in generating knowledge and training labour in the context of the new requirements of the development process will to a large extent determine the capacity of countries and regions to become part of the new world economy" (Cloete, Maassen, & Pillay, 2017, p. 1). Since Myanmar has been under military regimes for the past five decades fulfilling the first two functions of the social pact, the development framework that emphasized the last two functions is assumed to pose challenges for universities maintaining the contradictory functions.

In Shin's article, education development in East Asia is grounded on human capital theory whereby the political leaders regard education as the main driver to enlarge and enlighten the mind of society and to train human resource for economic development. It is also a belief that education decides the social hierarchy in the

region of study and that drives educational development. The article also stated that contemporary higher education systems are becoming similar due to global scripts and converging trends of HE across Europe, Asia and the rest of the world (Shin, 2015). Reform efforts in Myanmar reflected the underlying vision of human capital theory, and they also emphasized research capacity building in universities. “Knowledge economy” and “innovation” are the frequently used terms in reform policy documents. Thus, it is a question if such used of terms are due to international influence (both South and North). It is also important to analyze if “Internationalization” has taken place in HEIs to allow the mobility of students and staff across national boundaries to determine the international influences on development plans (Tijssen, 2015).

The point mentioned above in regards to capacity-building in Myanmar could be translated to HEIs being regarded as the “academic core” in broad policy perspective. Academic core is referred as knowledge being the key in the university contribution to development either by knowledge transmitting (teaching) or knowledge producing and disseminating (research, engagement). It is further stated that academic core should be strengthened if a university is to contribute to development (Bunting, Cloete, Wah, & Nakayawa-Mayega, 2015).

In order to understand the university’s contribution to development, the formal and living autonomy of university will be discussed. In Maassen et al, “living autonomy” is referred as the real autonomy universities have after analyzing the limits imposed on the actual use of formal institutional autonomy (Maassen, Gornitzka, & Fumasoli, 2017). The analytical framework consisted of five dimensions, centralization, formalization, standardization, legitimization and flexibility when analyzing living autonomy when organizational change occurred in universities.

Centralization refers to the way in which decision-making authority is dispersed within an organization. The questions in relation to where the decision-making takes place in the university’s governance structure, how the rules of decision-making are promoted, nature of control systems, who controls the resources and workflow etc. The interest lies in identifying formal and de facto decision-maker in the organization so that we may be able to address if there is any discrepancy.

Formalization refers to the degree in which communications and procedures are written and filed in the organization. It is important to distinguish the source of formalization if it’s stemmed from legal requirements or individual ideas. In Maassen, it is addressed that increased autonomy calls for formalization of internal communications that ensure accountability. From these requirements, professional administration is emerged (Fumasoli, Gornitzka, & Maassen, 2014)

Standardization refers to the degree in which decision-making, information provision, implementation processes are standardized by the organization. Standardization ensures that there are rules that cover those processes and the role to carried out such processes are defined according to the qualifications required, titles, symbols, status and rewards rather than on individual personal basis.

Legitimization comes from institutional perspective and refers that a normative match of between an institution and government initiatives can accelerate the change process to be accepted and institutionalized.

Flexibility refers to the feasibility of the organization and its governance structures and processes can shift according to the changing circumstances, expectations, requirements from external environment. Flexibility concerns with informal structure and processes within an organization and the amount, the speed and the acceleration of change and adaptability are three important aspects to measure flexibility. It is an important aspect in analyzing Myanmar HEIs because of their long history of being state's apparatuses that could have lead them being precarious to utilize the given autonomy.

## **Findings**

In the following sessions, the findings from scientific papers, policy documents, reports will be discussed. The table in Appendix 1 provides the brief overview of non-scientific documents for better understanding of the context of these documents.

### **1. The role of Public Higher Education in Myanmar's Development Policy**

From literature review, training human resource and generating knowledge are often regarded as the main functions for HEIs in development. In the case of Myanmar, the broad policies linking several sectors as well as the narrowed sectoral framework validated these functions are important.

In Myanmar Sustainable Development Plan's (MSDP) there are three main pillars, namely, peace & stability, prosperity & partnership and people & planet. They are introduced as the nation's macro-level priorities. From this plan, Pillar 2 and 3 specifically mentioned that HEIs are prioritized to develop academic core and strengthen the quality at all levels in all forms (Ministry of Planning and Finance, n.d.). In relation to this, National Education Strategic Plan (NESP) indicated the goal of developing world-class higher education system that provides equitable access, leading to better employment for graduates and significant contributions to a knowledge-based economy. It is also stated that HEIs in Myanmar are responsible for nurturing skilled human capital needed in government, business and industry. They also have a key role to play in undertaking research and incubating the innovative and creative thinking needed for a globally and economically competitive society.

The strategies mentioned above clearly indicated that HEIs in Myanmar are aimed to perform the functions of knowledge generation and training of labour in alignment with the development plan. This role is supported by the development strategy in NESP which emphasized on developing a world-class higher education system, where universities have autonomy over their own curriculum and the ability to conduct independent research. This notion indicates the aim to decentralize university governance which will eventually lead to universities directly interacting with market. However, it is important to underline that not all HEIs in the country will move in this direction, for example, educational colleges and institutions in remote areas and HEIs under Ministry of Defense will remain under the government's umbrella.



In the following sections, the nature of triangle relationship between the three bodies, ministries, external agencies and universities will be discussed to understand how the role is supported by different agencies to fulfill the development objectives.

## **2. Triangle relationship between ministries, external agencies and public higher education institutions**

The triangle relationship between ministries, external agencies and HEIs in Myanmar is heterogeneous in nature. Currently, the ministries are the decision-maker with the highest-level of formal authority. However, the development plans aimed to convert this relationship and strengthen the autonomy of the HEIs. It comes with future vision of HEIs as self-governing bodies which directly interact with local and international agencies.

Previously, there were 170 HEIs performing under 13 different ministries. However, this structure is currently reformed and currently 174 HEIs are reporting to 8 ministries. Nearly 80% of them (134 HEIs) are under Ministry of Education (MoE) and the rest are fragmented into 7 different ministries. The detailed list of HEIs under each ministry is stated in Appendix 2. This could be a move towards the direction of gathering all HEIs under a single ministry suggested by Comprehensive Education Sector Review in 2012 (“CESR,” n.d.).

Currently, MoE is the primary governmental body coordinating and administering most of the HEIs. Under MoE, Department of Higher Education (DHE) is governing HEIs’ organizational regulations (such as selecting and dismissal of Rectors, highest rank in a university), academic affairs (including decisions on introduction of new programs, validation of curricula and their content, setting student intakes), personnel policies such as allocation of teaching and administrative staff and distribution of financial resources to various institutions.

Currently, international relationships with regard to higher education development are handled by Office of Union Minister in MoE. Office of Union Minister reports to “Ministry of the Office of the Union Government” which is a ministry-level body that serves the Government of Myanmar. Office of Union Minister in MoE takes care of communication with external agencies (ASEAN, Supranational agencies, EU, International agencies, NGOs) in relation to educational development (“Ministry of Education |,” n.d.).

However, a project, called CHINLONE project co-funded by Erasmus+, is underway to implement/strengthen International Relations Offices (IROs) in universities. The project includes initial five Universities from Myanmar (University of Yangon, University of Mandalay, Dagon University, Yezin Agricultural University and Yangon University of Economics) and aims to contribute to the modernization and internationalization of Myanmar's Higher Education System (CHINLONE Project, n.d.-b). The description from individual university websites suggested that the majority of them are well in progress of establishing IROs. It could be one of the indicators that the government is withdrawing from centralized position in international relationships and communication with external agencies (including donors). Once the IROs are fully equipped, universities will be assigned to take initiatives in direct coordination with external agencies.

In both ministry and institutional level, coordination with North especially EU is more visible than coordination with South (especially ASEAN) in Higher Education sector. One of the reasons would be that ASEAN has more interest in integration of trade sector than education sector. One of the papers examining research/academic collaborations between ASEAN flagship universities shows that regional collaboration is at a very nascent stage for many public universities in the less developed HE system. Interestingly, intermediary agencies based in Japan, Korea, and EU are coming in to provide the platform for flagship universities and other universities in ASEAN together to collaborate in research and perform academic exchanges. Due to the current need of regional harmonization, these platforms have facilitated meaningful academic exchanges and student mobility between flagship universities and other universities in ASEAN region. This, in the longer term would bring the regions closer in terms of HE development and cooperation (Sirat, 2017). The paper on Higher Education and Myanmar's Economic and Democratic Development also advised that Myanmar should actively engage in ASEAN higher education initiatives for capacity building, quality enhancement, mutual recognition, and, in time, meeting ASEAN higher education standards (Kamibeppu & Chao, Jr., 2017).

Currently, there is not much information to explain the weak integration of ASEAN in Myanmar HE development, however, Myanmar's recent interest of participating in ASEAN student mobility programme could be an indicator that a change is expected ("2nd ASEAN Student Mobility Forum kicks off in Yangon," n.d.).

Ministry and institutional level relationship with EU and Australia is a lot stronger in comparison to intraregional integration judging from the number of activities and projects. For example, University of Yangon has four Erasmus+ projects with EU partners. However, projects aimed for integration with South Asia/East Asia partners were not found ("University of Yangon | Official Website," n.d.). The president scholarship that is arranged by MoE and universities showed that nearly half of the scholars are sent to Australia universities compared to Asia counterparts. It would be fair to state that unequal relationships still characterize the current development architecture due to North-South dichotomy that is still integrated in development discourse as well as development practices (Mueller, 2017).

### **3. Formal and living autonomy of public HEIs in relation to national development**

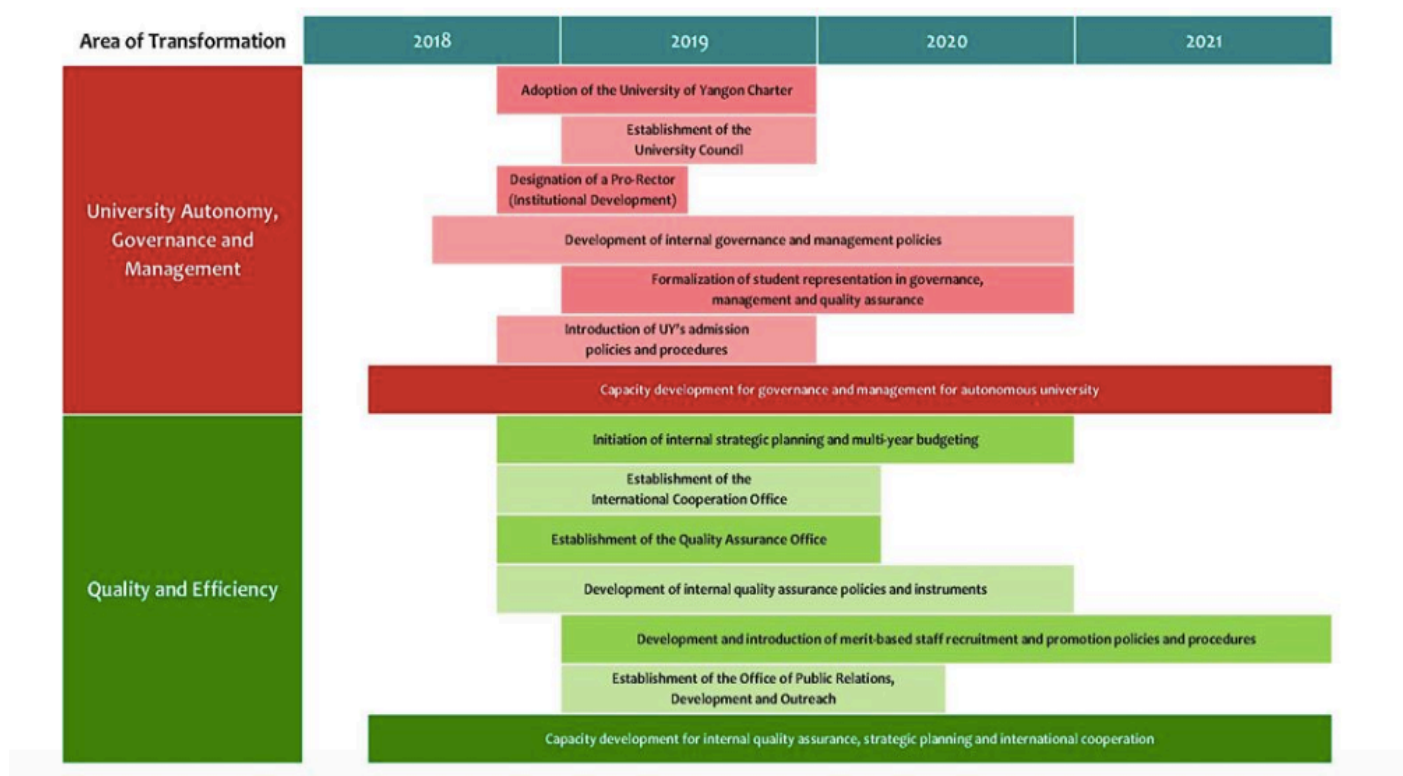
In retrospect, the Myanmar HE System has started formally when Rangoon University was founded in 1878 by the British Colonial Administration (Chongcharoen & Daungkaew, 2016). During that period, universities were run by a council of professors, scholars and government officials. Although the formal authority given to the university leadership was high, the real autonomy the university possessed was arguable due to the fact that the university was carrying the function of ideological transmission and elite recruitment (Castells, 2001) by British Colonial Administration (Khan Mon Krann & University of Singapore, 2000, p. 150).

The critical turning point for Myanmar HEIs was in the 1960s when the a military coup put the universities and colleges under the Directorate of Higher Education, a central government agency. During the five decades of military regime, Public HEIs

in Myanmar have suffered isolation, neglect, underinvestment and lack of academic freedom (Kamibeppu & Chao, Jr., 2017). Under the military regime, Public HEIs in Myanmar had little to no formal autonomy with high degree of governmental control and interventions in day-to-day management of HEIs by different ministries. Thus, it is important to understand that the legacies of such authoritarian leadership style remains strong and creates challenges for university leadership during reform.

One of the strategies in NESP focused on strengthening autonomy and accountability of HEIs. “In Myanmar’s context, the word “autonomy” is generally understood as the transition from a state-controlled system to a state-guided system allowing universities a degree of freedom to decide their own policies and activities”(CHINLONE Project, n.d.-a, p. 10). Although the nature of Myanmar’s “formal” and “living” autonomy might be different from Europe, the analytical framework of living autonomy would still provide a lens to analyse university adaption of organization change and the tensions that could come up from increased institutional autonomy. By using the analytical framework, five dimensions are discussed based on the analysis University of Yangon (UY). The discussion focused on university’s Master Plan for reform as follow (“Master Plan | University of Yangon,” n.d.).

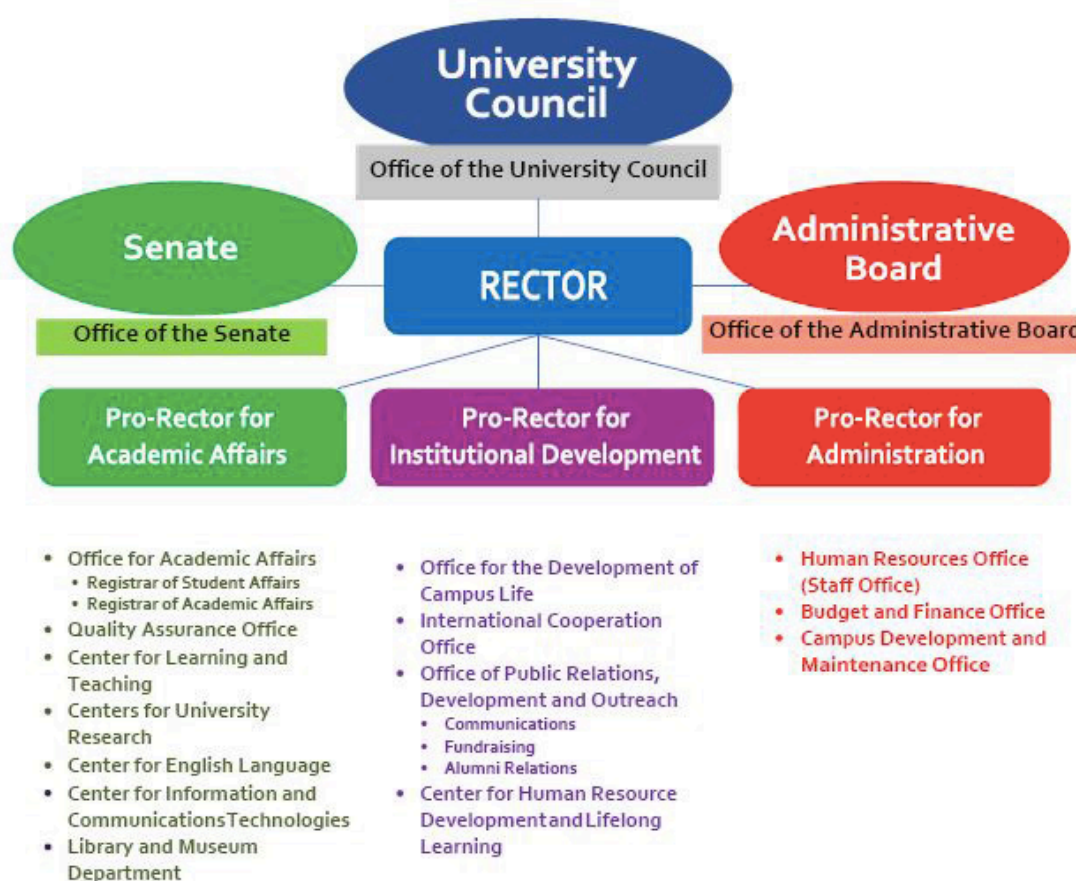
### High Level Implementation Timeline 2018-2021



### 3.1. Centralisation

In UY, the leader of the organization is currently the rector, however, the university council, functioning as governing body for individual HEIs, will be established by end of 2019. From the future organization structure as follow, the university council would be the key governing body. Although the stakeholders involved in university

council are not specified, it is predicted that professionals would be involved based on a clause in NESP highlighting the strengthening of management capacity in university structure. Due to the fact that current university leadership hasn't exercised institutional autonomy previously, tensions from parallel centralisation and decentralisation of autonomy are expected to be minimal. However, it runs the risk of "institutional autonomy" becoming symbolic due to the university leadership precariousness.



### 3.2. Formalisation

It is understood from the literature that "Increasing autonomy (and accountability) should augment formalisation, in the sense that strengthened managerialism resulting from increased autonomy calls for formalisation of internal communications and procedures, particularly when intervening in a professional organisation, such as the university" (Maassen et al., 2017, p. 245). Although there is not much helpful information on formalising of communication and procedures, the establishment of Quality Assurance Office displays the plan to formalise the procedures in UY. The lack of technology-enhanced support system calls for a delay and there is a risk that university leadership will struggle to implement the changes in a short span of time.

### **3.3. Standardization**

With increased formalisation, standardization is expected to increase as well (Maassen et al., 2017). It is found in the minutes of meetings in CHINLONE projects that management tools and curriculum templates are created for the participating universities, including UY and the standardization of procedures are introduced to university leadership and academics (“WP2—CHINLONE management platform,” n.d.). It is essential to find a fitting degree of standardization without creating tensions between management and academics and it is also important to understand the agentic factors displayed in collective body of academics.

### **3.4. Legitimisation**

Five universities involved in CHINLONE Project are interviewed in 2018 by the CHINLONE Staff to find out what kind of autonomy is feasible and how different layers of autonomy can be reached with regards to HEI reform. In this context, finding out “the feasible autonomy for universities” could be interpreted as individual HEI’s aim to find a normative match because “a higher level of normative match between a reform aimed at university change and the dominant collective academic regulatory rules, norms and beliefs, the likelier it is that the new practice will be accepted and institutionalized” (Maassen et al., 2017, p. 246). UY has been actively participating in the development and reform processes, thus it is easy to assume that current academic norms and values are in alignment with new directions. However, beyond what is visible through formal arrangements, it is questionable if the university’s active participation is actually derived from normative match or if it is just a passive approach to cope with current changes.

### **3.5. Flexibility**

Flexibility is a difficult dimension to analyse in Myanmar context due to the rigid hierarchy and unequal distribution of autonomy between rectors/pro-rectors and other administrative and academic staff in the universities. Although the speed and the acceleration of change and adaptability in UY is the most recognizable among HEIs in Myanmar, it is still early to confirm if the flexibility, if existing, is spread across all levels in the university.

From the findings, conflicts of norms and values from institutional level to ministry level is prominent. But the empirical questions lie on how the university adapts to institutional change and increased autonomy in the society it operates.

## **Conclusion**

The role of higher education in socio-economic development in Myanmar is discussed in this paper by addressing the role of HEIs in development stated in policies, triangle relationship of ministries, external agencies and universities and the living autonomy in universities compared to the formal autonomy.

In regards to the first question, it is clear that the role of Myanmar’s HEIs constituted in the policy is based on human capital theory with the heavy emphasis on developing academic core in existing universities.

The analysis of triangle relationship between ministries, external agencies and HEIs indicated the state aim to decentralize the external coordination to universities. Although it might be perceived as a more efficient approach, decentralization runs the risk of pulling the higher education system in several directions. In addition, with weak coordination. Thus, a clear framework in international relations with strong collaboration between universities is utmost important. Moreover, the development plan with strong intraregional integration is recommended based on the findings.

Analysis of formal and living autonomy in University of Yangon based on analytical framework by Maassen(2017) indicated that university adaption towards organizational change in alignment with recent development is understudied with many empirical questions emerged. Although it is apparent that increased institutional autonomy is expected to cause nuance in university's organizational structure, the implications of such reform efforts in the actual practices are left unanswered. Thus, the events following up to reform during the period of 2019 to 2020 in UY will be a critical case for future research in further understanding of formal and living autonomy in UY.

### **Acknowledgements**

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## Appendix 1

Background Information of the documents analyzed in this paper

Document	Period	Objective	Monitoring Methods	Author	Published Date
Myanmar Sustainable Development Plan (MSDP)	2018-2030	To provide whole-of-government development framework	Treated as “living document” and conduct progressive monitoring and revising	Ministry of Planning and Finance	2018
National Education Strategic Plan (NESP)	2016-2021	To provide the government, education stakeholders and citizens with a ‘roadmap’ for sector-wide education reforms over the next five years	Periodical Monitoring and additional Funding for NESP Program	Ministry of Education	2016
CHINLONE Project Report	2018-2021	To contribute to the modernization and internationalization of Myanmar's Higher Education System (HES), in order to facilitate the country's transition toward a knowledge economy	Periodical Meetings	CHINLONE Project (assisted by EU)	2018

## Appendix 2

The list of HEIs under each ministries

MINISTRY OF REFERENCE	SUB-CATEGORY	NUM.
Ministry of Education	Arts and Sciences Universities	42
	Universities of Economics	3
	Universities of Distance Education	2
	Universities of Foreign Languages	2
	Universities and Colleges for Teacher Education	25
	Technological Universities	33
	Universities of Computer Studies	27
<b>Total</b>		<b>134</b>
Ministry of Agriculture, Livestock and Irrigation		7
Ministry of Environmental Conservation and Forestry		1
Ministry of Defence		6
Ministry of Religious Affairs and Culture		5
Ministry of Border Affairs		3
Ministry of Transports		2
Ministry of Health and Sports		16
<b>Total</b>		<b>174</b>

Data provided by the Department of Higher Education, Ministry of Education, The Republic of Union of Myanmar, November 2018.

***Boarding College Strategy Management in Theology Sangkakala Kopeng,  
District Getasan***

Noveliza Tepy, Pelita Harapan University, Indonesia

The Asian Conference on Education 2019  
Official Conference Proceedings

**Abstract**

The purpose of this research was to: (1) Determine and analyze the boarding college management strategies that have been used by STT Sangkakala; (2) Analyze the root problems in the management of a boarding college in STT Sangkakala; (3) Design and produce strategies that can be implemented by STT Sangkakala in the management of a boarding college. Design of this research is the development, but in this research is limited to the fifth stage, namely the revision of product design, where the product that produced a strategic plan for the management of the boarding college at STT Sangkakala Kopeng. Data analysis technique used is the analysis of fishbone. Data collection techniques are observation, interviews, document study, and FGD. Meanwhile, data validation was done by using triangulation source. The results of this analysis are a strategy that is based on the analysis fishbone, includes four factors: (1) curriculum management strategies and guidance; (2) management strategies of learners; (3) management strategies of educators; and (4) strategies in the chairman policy. Furthermore, the foundations, the chairman (the Chancellor), lecturers and other staff are expected to optimize the implementation of the strategic plan that has been prepared.

Keywords: Strategic Plan, Boarding College Management

**iafor**

The International Academic Forum

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## Introduction

In the Act of the Republic of Indonesia number 20, year 2003 on National Education System, Article 1 stated that education is a conscious and planned effort to create a learning atmosphere and learning process so that learners will actively develop their potential. These potentials include spiritual religious force, self-control, personality, intelligence, noble character, and skills needed by them, society, nation and country. The conscious term in question is that the education process must always be in an atmosphere that supports the purpose of education.

One of the systems that can support the explanation before is through the implementation of education with dormitory system. Organizing education with dormitory system will be able to direct and control learners in their daily lives to be able to apply the things they learn. Learning in the dormitory system refers more to education in a holistic manner.

One of the educational institutions that has implemented a dormitory education system is the Sangkakala College of Theology (STT Sangkakala). STT Sangkakala has implemented the dormitory education system since 2002. The system is intended for all learners from Sabang to Merauke in Indonesia. STT Sangkakala is one of the colleges that implements a dormitory education system to form and produce quality servants of God in accordance with the study programs pursued by each student.

The dormitory education system that has been running so far, is only managed through the dormitory “rule book/guidelines” made by the Foundation. The guidebook contains various regulations and procedures that must be carried out by dormitory residents (hereafter boarders). However, due to the lack of a good dormitory management strategy (patent), the system of dormitory education in STT Sangkakala has not been able to achieve the vision, mission, and objectives owned effectively and efficiently.

The fact that this dormitory management strategy is lacking creates a number of phenomenon in the field where lecturers, dormitory staff, and boarders experience problems in various aspects related to dormitory school management. One problem that is obvious is that there are often misbehaving of learners in the field. Some examples of misbehavior are intended such as delays in submitting assignments, not respecting lecturers or dormitory staffs (there was a ‘rebellion’ against lecturers and dormitory staffs), and not following rules and procedures in the dormitory (*source: interview with the head of the dormitory and STT Sangkakala lecturer – September 21<sup>st</sup>, 2018*).

Misbehaving that occurs is influenced by several factors. One factors that greatly influences the existence of misbehavior is that the dormitory companions are led by a man (like a father figure) with quite heavy responsibilities which must guide 90 boarders who come from different ethnic groups and cultures. Moreover, the companions do not live in the dormitory environment. In other words, the boarders are required to be independent in carrying out their daily activities in the dormitory. Intensive supervision of the daily lives of learners in the dormitory is quite lacking.

The ineffectiveness of the mentoring system in the dormitory has an impact on learners' struggle related to work on assignments. STT Sangkakala dormitory has not been facilitated by internet service (wi-fi access) and the campus library is only opened until business hours are over (between 1pm or 3pm). There are internet facilities around the campus for 24 hours, yet the distance between the dormitory and the campus is quite far if they have to walk at night. Learners are really required to be independent if they have problems in carrying out tasks, namely learners must ask the lecturers directly the next day. Learners cannot enrich other sources of information besides from lecturers because of the obstacles described. (*source: interview with STT SANGKAKALA learners – October 29<sup>th</sup>, 2018*).

Furthermore, given that the boarders come from various tribes in Indonesia which automatically had different cultural background, became one of the causes of the poor dormitory management. The lack of a dormitory school management strategy in STT Sangkakala can hamper the achievement of the vision, mission, goals, and objectives owned which requires the birth of future leaders in this case high integrity and competent servants of God. Therefore, this research is expected to produce a strategy for managing dormitory schools for STT Sangkakala so that the existing vision, mission, goals and objectives can be achieved effectively and efficiently. The formulation of the problem in this study are:

- 1) What strategies have been used in managing STT Sangkakala dormitory school?
- 2) What is the root problem of managing STT Sangkakala dormitory school?
- 3) What strategies can STT Sangkakala use to manage dormitory school system based on fishbone analysis?

Based on the aforementioned problems, this research aims to:

- 1) Determine and analyze dormitory management strategies that have been used by STT Sangkakala.
- 2) Analyze the root problems of dormitory management system in STT Sangkakala.
- 3) Design and produce strategies regarding dormitory management that can be implemented in STT Sangkakala.

Furthermore, the theoretical benefit of this research is to provide academic contributions in the field of education management in the form of a study of strategies for managing dormitory schools. Meanwhile, the empirical benefits from the study are:

- 1) To provide information to the school regarding the root problems of the poor dormitory management system in STT Sangkakala.
- 2) To provide input to STT Sangkakala in the form of a strategy to overcome the problem of managing dormitory schools which are documented in the form of products (strategic plans).

## **Research Methods**

This research is a development research. Van Den Akker (1999) states that development research is a type of research that aims to produce certain products and

to test the effectiveness of these products. However, in this study it will be limited only to the income of a product that is designing a strategy for managing STT Sangkakala boarding college. This research will be conducted at STT Sangkakala located in Kenteng village, Raya Kopeng KM 7 street, Salatiga. The reason for choosing STT Sangkakala was because the college had implemented dormitory school system since 2002 but until now it still did not have a strategy for dormitory management. The research subject in this study are Vice Chancellor 3 (from student affairs department, who is directly responsible for managing the dormitory), lecturers, learners, dormitory companion (or parents in dormitory), and the campus committees (other parties outside the campus). Data collection will be carried out through observation, interviews, Focus Group Discussion (FGD), and documentation study.

#### **a. Observation**

Observation were carried out by researcher in two dormitories (female and male dormitory) in STT Sangkakala to identify the root problems. In addition, observations are carried out on campus (during the lecture) to identify interactions between lecturers and learners of STT Sangkakala.

#### **b. Interview**

Interviews were conducted to gather information regarding the root problems of dormitory management of STT Sangkakala. Interviews were conducted with Vice Chancellor 3 who was responsible for dormitory management, Vice Chancellor 2 who was directly responsible for curriculum management (learners' achievements), the head of the dormitory companion, treasurer, learners (boarders), lecturers, and the campus committee. In addition to extract information, interviews were conducted as a source of triangulation technique.

#### **c. Focus Group Discussion (FGD)**

The FGD will be conducted involving Vice Chancellor 3, Vice Chancellor 1 who is responsible for the curriculum (learners' achievement), the head of the dormitory companion, treasurer, learners (boarders), lecturers, and the campus committee. In the FGD, a brainstorming process will take place to determine the root problems of the dormitory management in STT Sangkakala.

#### **d. Documentation Study**

The documentation study was conducted aimed at finding written information relating to dormitory management problem factors in the form of school profiles, school strategy plans, dormitory guidelines, and students' academic and non-academic achievements.

The data analysis technique used is the fishbone analysis technique. The first step is the finding the potential problem as well as the second step, which is data collection to find out the problems of poor dormitory management system in STT Sangkakala. Furthermore, the causes of the problem are mapped in the fishbone diagram. The identified factors are limited to important factors based on Tan's (2014) theory review in the management of dormitory schools, namely curriculum management, learners,

educators, facilities and infrastructure, and financing. However, based on the results of the study, the data in the field shows that there are four factors that influence the dormitory management in STT Sangkakala, namely management of curriculum and guidance, management of learners, management of educators, and the policy of leaders (the Chancellor). These factors will be analyzed and displayed in figure 2.1

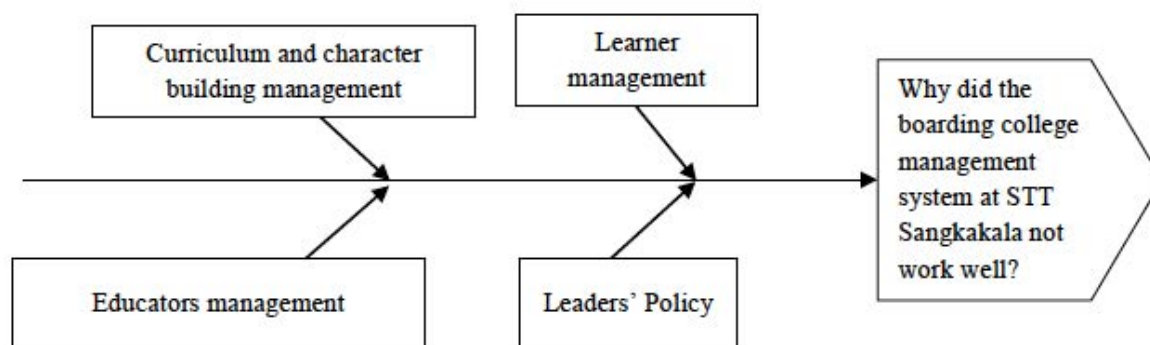


Figure 2.1 Identification of the Cause of Problems through *Fishbone* Analysis Diagram

## Findings

Based on research data in the field through observation, interviews and focus group discussions, the results of research related to the root problems of STT Sangkakala dormitory management were influenced by four factors: curriculum and guidance management, learners management, educators management, and chairman policy. The root problems in curriculum management were caused by the staffs not modifying the new curriculum (Vice Chancellor 1 with other administrator staff). The intended curriculum modification is a combination of the curriculum from the central government and the regulations of the National Accreditation Body (BAN).

Furthermore, the root problem in learners' management was due to the absence of dormitory companions who lived with the learners. Following was the root problems of educator management which was caused by the absence of a recruitment team and the leadership policy. The last factor that was the strong influence on the dormitory management in STT Sangkakala was the policy of the leaders of the institute which was caused by his experiences in the past (idealism of depending on life experience). The root of the identified problems can be seen in Figure 3.1 The Fishbone Diagram of Dormitory Management in STT Sangkakala.

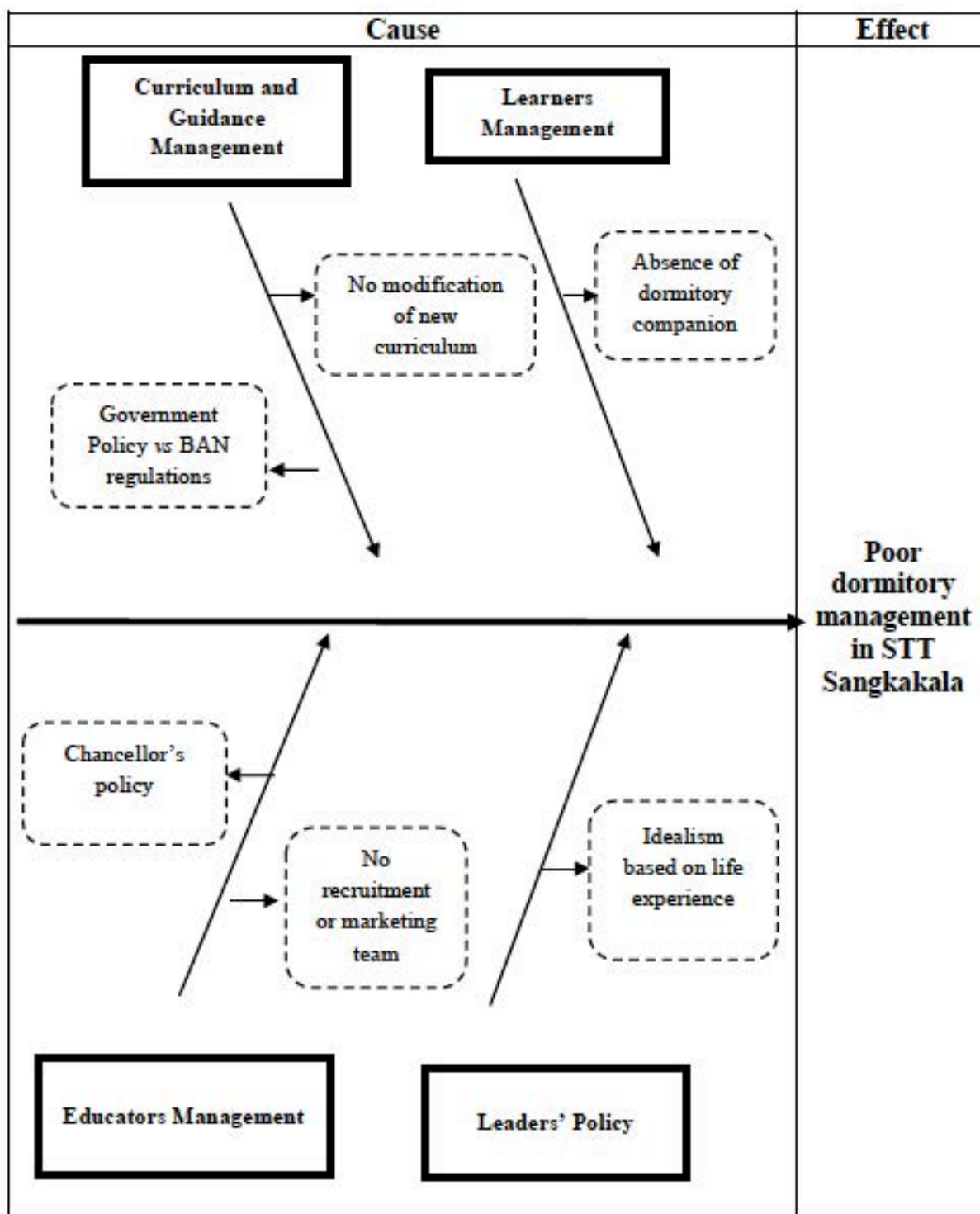


Figure 3.1  
Fishbone Diagram of  
Dormitory Management in STT Sangkakala

After identifying the root problems carried out through the fishbone analysis techniques, the follow up step is to develop a product design of dormitory management system strategy in STT Sangkakala. The strategy is based on fishbone analysis and needs analysis obtained through FGDs, interviews and observations. The strategy prepared can be seen in Table 3.1 Dormitory System Management Strategy in STT Sangkakala.



No	Factors	Strategy
1	Curriculum and Character Building Management	<ul style="list-style-type: none"> <li>• Establishing a quality curriculum drafting team</li> <li>• Developing an innovative curriculum based on outside world experience and learners' needs</li> <li>• Developing quality instructors/lecturers regularly and planned based on the needs of the learners</li> </ul>
2	Learners Management	<ul style="list-style-type: none"> <li>• Recruiting dormitory companion and other staffs needed in the dorm</li> <li>• Implementing the following parenting dormitory system: Dorm Parents, Residence Assistant, and Supervisor.</li> <li>• Arranging innovative and precise programs for learners to develop learners with quality CASH (Character, Skill, Attitude, and Habit) holistically</li> </ul>
3	Educators and Educations Management	<ul style="list-style-type: none"> <li>• Forming a recruitment/marketing team to promote STT Sangkakala regularly tailored to the needs of the university</li> <li>• Developing quality lecturers and instructors on regular basis accordingly to evaluations in the field and based on learners' needs (planned and precise)</li> <li>• Compiling the periodic evaluations of the results from each vice chairmen based on the reality in the field systematically and updated to the chairman.</li> </ul>
4	Chairman's Policy	<ul style="list-style-type: none"> <li>• Maximizing the role of each vice chairmen through active discussion for evaluate and monitor controlling from both parties</li> <li>• Increasing sensitivity and dexterity in responding to the matters of urgency in the field through analysis of the updated evaluation results related to the dormitory management in STT Sangkakala</li> <li>• Conducting comparative learners periodically with the heads of the institute to dormitory colleges or institutions that have proven its excellence in dormitory management</li> </ul>

Table 3.1 Boarding College Management System Strategy in STT Sangkakala

## Discussion

### a. Curriculum and guidance management

The root problems identified in curriculum and character building management factor is that there is no modification of the new curriculum by Vice Chairman 1 and other staff responsible for the curriculum management in STT Sangkakala. The absence of

new curriculum modification is caused by government curriculum policy that must be adjusted to BAN's regulations so that there will be no obstacles in the implementation of the curriculum.

Curriculum and character guidance management factor is one of the determining factors in managing dormitory schools. Tan (2014) states curriculum and guidance management is one of the determinant factors of the success in achieving the schools' vision and mission. Through the management of curriculum and proper guidance for the learners, the vision and mission of the school can be achieved effectively and efficiently.

In line with Tan, Papworth (2014) reveals that through the correct management of the curriculum, the objectives of the school towards learners who live in the dormitory can be achieved optimally. Therefore, the management of the correct and targeted curriculum and guidance is needed in the dormitory system management in STT Sangkakala.

#### **b. Learners management**

Management of learners is related to the process and success of character building holistically which should be achieved by each student who takes dormitory education. Schaverien (2004) reveals that through the dormitory school system it was believed that learners could have a much better life than in their home environment if they had good management. If the management of dormitory schools is not appropriate in its implementation, the achievement of learners to become successful learners holistically cannot be achieved. Poor trauma can occur when the management of dormitory schools is not well managed, such as: learners will grow and do bad things (rebellious against rules or the existing dormitory school system).

The root problems identified in management of learners, namely the absence of dormitory companion so that there is no role model for each dormitory. The fact that there is no adult supervisor as a role model for dormitory house learners has caused problems to arise. Learners who come from various regions with different cultural and family backgrounds, need a parent figure who is able to guide, protect and set a living example for them.

Based on the results of interviews and FGDs, the urgency of adult companion or supervisors for learners to get the parent figures (not only working as dorm staffs) is evident. This is considering that there are learners who do not have a picture of a complete family (parents who die or separate). Other problems related to learner management is the policy of the chancellor who wants each student to be able to live independently in the dormitory.

#### **c. Educators management**

The management of educators is a management factor related to the qualifications of teaching staff and dormitory staff (dormitory companions). The qualifications of teaching and dormitory staff are one of the important factors that play a role in carrying out dormitory education because these parties play a direct role in the field in forming learners' success holistically.

Curto & Fryer (2012) explain similar ideas as for numbers of things that were elaborated related to dormitory school management as well as the costs and human resources (principal and head of the dormitory). Dormitory schools with excellent human resource (HR) management can produce bright and successful learners both academically and non-academically. They also should be able to contribute better to character building and attitudes developing of dormitory learners than those who lives at regular house environment. However, when there is no good management of the dormitory system, the opposite can happen that cannot able to shape the character and attitudes of learners to be better.

In the management of educators, both teachers and staffs, the identified problem is the absence of recruitment or marketing team and the chairman policy. The intended management of educators is related to the extent of managing existing staff, including in terms of the sufficient staffs to meet learners' needs. Staff sufficiency is not only regarding the number or the quantity but also in quality. It means that there is a need of appropriate quality of staffs to meet learners' needs thus the vision, mission and the objective of STT Sangkakala can be achieved optimally.

According to the result of interviews and FGDs, the basic cause problem of educator management in STT Sangkakala is they did not yet have the strategy in recruiting dormitory companion who can handle dormitory system intensively. Another thing is that there is no recruitment team as well as the chairman's poor response in handling the problems in dormitory management as a matter of urgency that needs to be addressed immediately.

#### **d. Chairman's policy**

The identified problem regarding the chairman's policy is the idealism of depending on life experience. The policy of the chairman greatly influences the dormitory management of STT Sangkakala. Curto & Fryer (2012) also reveals that the management of HR, including the leader has an important role in managing dormitory schools. Decisions made by leaders should be able to provide good results for achieving the vision and mission of the dormitory school. When leaders do not create the right decisions (counter-productive), the achievement of the vision and mission involving various factors in dormitory management can be hampered.

The chairman of STT Sangkakala has the view that every student needs to be educated independently (not spoiled) in accordance with his experience in the past. According to the chairman, high independence will shape the personality of young generations who value and enjoy each process towards holistic maturity. Therefore, so far the problems in managing the dormitory are considered to have been handled to the maximum extent based on the idealism possessed by the chairman.

The policy of the chairman who will make decisions related to dormitory management greatly affects the management of the STT Sangkakala dormitory. Dormitory management issues that have actually become classic problems have not yet received a significant response from the chairman. Therefore, changes in paradigm and strategy of the leaders in managing the dormitory are very necessary so that the vision, missions, goals and objectives of the establishment of STT Sangkakala can be achieved optimally.

## Conclusion

The result of the root cause analysis regarding curriculum and coaching management factor is that there has been no modification of the new curriculum due to government curriculum policy that must be adjusted to the regulation of BAN. In the management factor of learners, the identified problem is the absence of adult companion in dormitory. Furthermore, no recruitment or marketing team as well as the lack of chairman policy are the factors influenced the educator management. On the chairman policy factor, the problem is the idealism of the leader depending on their life experience.

Based on the results of problem and needs analysis, the strategies formulated are arranged into four dormitory management factors which are curriculum and guidance management, student management, educator management, and the chairman policy. The strategies formulated for curriculum and guidance management factor include: 1) Establishing a quality curriculum drafting team, 2) Developing an innovative curriculum based on outside world experience and learners' needs, and 3) Developing quality instructors/lecturers regularly and planned based on the needs of the learners. The strategies suggested regarding student managements are: 1) Recruiting dormitory companion and other staffs needed in the dorm, 2) Implementing the following parenting dormitory system: Dorm Parents, Residence Assistant, and Supervisor, and 3) Arranging innovative and precise programs for learners to develop learners with quality CASH (Character, Skill, Attitude, and Habit) holistically.

Furthermore, the strategy for educator management are: 1) Forming a recruitment/marketing team to promote STT Sangkakala regularly tailored to the needs of the university, 2) Developing quality lecturers and instructors on regular basis accordingly to evaluations in the field and based on learners' needs (planned and precise), and 3) Compiling the periodic evaluations of the results from each vice chairmen based on the reality in the field systematically and updated to the chairman. The strategy on the chairman policy factor include: 1) Maximizing the role of each vice chairmen through active discussion for evaluate and monitor controlling from both parties, 2) Increasing sensitivity and dexterity in responding to the matters of urgency in the field through analysis of the updated evaluation results related to the dormitory management in STT Sangkakala, and 3) Conducting comparative learners periodically with the heads of the institute to dormitory colleges or institutions that have proven its excellence in dormitory management.

## Suggestion

Based on the result of the research, the suggestions generated are as followed:

1. The institute as the main party overseeing STT Sangkakala is expected to always play an active role in the implementation of the dormitory management strategic plan. Besides this, the foundation is expected to be able to quickly and courageously make decisions to overcome the problems faced by STT Sangkakala.
2. The leadership of the chairman (the head of the university) was very important in carrying out the strategic plan for managing the dormitory of STT Sangkakala Kopeng. The chairman, in this case is the head of the university may consider implementing a strategic plan and proposed programs in order to achieve the

vision, mission, goals and objectives of the STT Sangkakala. Besides this, active communication with other staff, especially Vice Chairman 3, and the head of the dormitory is very necessary to monitor and ensure the management of STT Sangkakala dormitory will run well.

3. Lecturers as the spearhead of the implementation of the teaching and learning process need to be committed and consistent in implementing strategic plans, especially in efforts to improve curriculum management and guidance and management of learners. Lecturers and staff are expected to always improve their professionalism, ability and expertise according to the development of technology and information.

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*Experiences of Outstanding Principals as Mentors:  
Policy Inputs to a Viable Mentoring Program in  
DepEd – Division of Pasig City*

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**Abstract**

This paper aims to understand the everyday experiences of outstanding principals as mentors cum school leaders, and propose policies for a viable mentoring program in DepEd – Division of Pasig City. In the context of this study, mentoring is a learning and development (L & D) program deliberately designed to prepare aspiring principals for the position to ensure that the next generation of school heads are well-prepared for the demands of the job. Utilizing a case study design, this paper purposively identified five (5) outstanding principals who answered the following questions through semi-structured interviews and focus group discussions: (1) How were the participants mentored prior to them becoming school administrators themselves? (2) What mentoring programs have the participants put in place prior to and after they became school administrators? (3) How did the participants deal with the challenges of sustaining the mentoring programs that they initiated? (4) What have been the products of the mentoring programs started and sustained by the participants? (5) What types of mentoring programs may be institutionalized in the Division of Pasig City?, and (6) What policies may be put in place to institutionalize mentoring programs in the Division of Pasig City? Findings from the study revealed that the principals mentored teachers with leadership and management potential through job rotation, job shadowing, immersion, and stretched assignments. The study concludes with policy-related suggestions and practical ways to strengthen and institutionalize a culture of mentoring and continuous improvement in the Division of Pasig City.

Keywords: mentoring program, policy, continuous improvement

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## Introduction

Mentoring is usually defined as a formal or informal relationship between a highly experienced mentor and a relatively inexperienced understudy (United States Office of Personnel Management, 2008; Jones, Woods and Guillame, 2015). According to Ilevbare (n.d.), it is

“a developmental relationship between a more experienced individual (the mentor) and a less experienced partner (the mentee) for purposes of sharing technical information, institutional knowledge and insight with respect to a particular occupation, profession, organization or endeavor (p. 197)”.

It is also thought of as “planned early intervention designed to provide timely instruction to mentees throughout their apprenticeship, to shorten the learning curve, reinforce positive work ethics and attitudes, and provide mentees with role models” (Hipes and Marioni, 2005, p.1).

The concept of mentoring is not something new (Educational Alliance at Brown University and National Association of Elementary School Principals, 2003). In fact, the words ‘mentor’ and ‘mentoring’ stem from the Greek classic “The Odyssey” by Homer (Hiwatig, Faustino, Sumida, Pawilen, Fujita and Kumagai, 2011). It was said that a wise man named Mentor cared for, protected and educated Telemachus, the son of Ulysses (Johnson, 2002; Hipes and Marioni, 2005; Abiddin, 2006). The word ‘mentor’ also signifies a “father figure” who backs up, counsels, trains, and develops a younger person (Erich, Hansford and Erich, 2011). Kram (1985) notes that a mentor “supports, guides, and counsels a young adult as he or she accomplishes mastery of the adult world or the world of work” (p. 2). A mentor also teaches the mentee the “values, customs, resources and personal dynamics found in the organization” (Levinson, 1978 in Al Jenaibi, 2013). He or she is also expected to offer advice, share information, sponsor, and develop his or her mentee (Hipes and Marioni, 2005; Holland, 2009; Ehrich, et al, 2011).

Mentoring also applies to a wide range of people, situations and purposes. It includes a wide-ranging scope of roles and responsibilities such as teaching, sponsoring, counseling, advising, and even challenging; however, the “whole is clearly more than the sum of these parts” (Johnson, 2002). Further, the relationship between a mentor and mentee is usually long-standing. For Ragis and Kram (2007), this bond usually goes through stages, such as initiation (up to 1 year), cultivation (years 2-5), separation (from 6 months to 2 years) and redefinition (where it becomes more peer-like). Under a mentoring relationship, the mentor is expected to be highly proficient and knowledgeable in the discipline or field in which the mentee is merely starting.

In the context of this study, mentoring is a learning and development (L & D) intervention deliberately implemented by principals to adequately groom aspiring and future leaders for the position to ensure that the next generation of school heads are well-prepared for the demands of the job. With the growing call for shared governance, shared leadership, accountability, and transparency, principals nowadays face greater challenges compared to their counterparts in previous years. The Southern Regional Education Board (n.d.) mentions that

“...too many new leaders are left to “learn on the job.” Their first opportunity to plan and implement school improvement actions will be as head of a school — typically without much guidance from successful peers. In an environment of increasing accountability from the statehouse to the schoolhouse, this “sink-or-swim, stumble through it” approach to principal leadership development not only is counterproductive but helps explain why school reform efforts so often sputter and die out (p. 9).”

Recognizing the importance of mentoring in supporting the professional growth and development of school leaders, this paper will show how selected outstanding school principals were themselves mentored, how they later on intentionally designed mentoring programs, what have been the outcomes of these programs, and how these successful stories can be used now as inputs to a viable mentoring program in DepEd Division of Pasig City.

### **Methodology**

This study is a qualitative research that utilized the case study design. It sought to answer the following questions:

- (1) How were the participants mentored prior to them becoming school administrators themselves;
- (2) What mentoring programs have the participants put in place prior to and after they became school administrators;
- (3) How did the participants deal with the challenges of sustaining the mentoring programs that they initiated;
- (4) What have been the products of the mentoring programs started and sustained by the participants;
- (5) What types of mentoring programs may be institutionalized in the Division of Pasig City?;
- (6) What policies may be put in place to institutionalize mentoring programs in the Division of Pasig City?

### **Data Gathering Procedure**

Focus group discussion (FGD) and one-on-one semi-structured interviews were the main data gathering methods used for this study. Participants were asked to sign prior consent forms that indicate the following:

- a. Participation in the study is voluntary. The school heads may opt not to join succeeding sessions as the data gathering procedure progresses.
- b. FGD and actual interviews will be tape-recorded to ensure fidelity of data capture.
- c. Participants’ privacy will be safeguarded. Names of the school heads involved in the study, as well as their personal circumstances and other information, will be omitted.

The researchers also utilized document analysis as a data gathering procedure. School performance indicators, school report cards, accomplishment reports, and other documents (ie, school learning action cells) and proofs of outstanding accomplishments were analyzed to examine the mentoring programs of the schools.

Findings from these reports were organized, categorized, and quoted to form a coherent narrative in answer to the research questions. Significant statements were quoted verbatim in appropriate sections of this paper.

### **Research Participants**

Purposive sampling was used to identify and choose the school heads who participated in the study. To obtain relevant and broadly-encompassing perspectives on mentoring programs, the following criteria were used in choosing the participating principals:

- a. The participant should have been a full-pledged principal for at least 5 years.
- b. He/she must have been in the public school system for an aggregate of at least 10 years.
- c. He/she must have been or must currently be principal of a performing school, and must be known to have initiated innovations and continuous improvements programs and projects that resulted to better performance indicators for the institution.
- d. He/she must be well-respected among his/her peers in his/her respective organization (ie, PACESPA for principals of elementary schools and ASSAP for principals of secondary schools).
- e. He/she must be known and acknowledged for mentoring at least one (1) highly successful teacher-leader, fellow principal or Division office employee.

Of the criteria listed above, six (6) principals were shortlisted for this study. They were chosen not only for meeting the abovementioned descriptions, but also for their willingness to be involved in the research. However, due to time constraints, only five (5) actually participated. Three (3) of the principals were secondary school heads, while two (2) were elementary school leaders. Two (2) were male and the three (3) were female. Only one (1) participant was in his mid-forties, one (1) was in her early fifties, while three (3) were already near the retirement age of sixty-five. All of them have been with DepEd for a minimum of twenty (20) years in service, three (3) of whom have served the Department beyond thirty-five (35) years.

### **Data Analysis Procedure**

The data from the focus group discussions and interviews were analyzed qualitatively. The interviews were transcribed and coded. Recurrent themes or patterns were identified. These include ideas, concepts, and terminologies or phrases that kept repeating or iterating. These were further organized into coherent categories.

### **Results and Discussion**

The findings of this study are reported qualitatively. The results are clustered and reported based on the research questions of this study.

#### **(1) How were the participants mentored prior to them becoming school administrators themselves?**

All five of the participants started out as classroom teachers in the public school system. Unanimously, they all shared that “their former school heads saw and

recognized their potential, and helped jumpstart their careers”. When their principals saw that they had leadership potential, they immediately provided or opened up opportunities for these administrators-in-training to learn firsthand, and to have actual field experience. Of this, they said:

**Principal (P) 1:** My former principal believed in my capabilities to become a school head; since then, she has assigned me to work in her office and I became her Assistant Principal. Everyday, we would talk about my work and how I handle daily issues and concerns. If there were problems, we would both sit down and discuss them but she lets me find the solutions to them. She really focused on me and made sure to mentor me. She made me feel how much she trusts my judgment, so I also did my best not to disappoint her. We were together for four years, and in all those years, she supported, guided, coached, mentored, and led me. When she finally felt that I was ready to take on greater responsibilities, she recommended me to become an Officer-in-Charge until I was eventually promoted as Principal I.

We may differ in the way we approach problems and issues, but what I really appreciate about her is that she never dictated to me what to do. She let me make an respected my own decisions. She let me learn from my experiences. She gave me opportunities to learn about this type of work by myself, with her, and with other fellow principals since according to her, one day I will just be left on my own and with them [fellow principals].

**P 2:** At first, she [the principal] would just ask me to help out in the office. However, later on it became an official arrangement. This time, I was no longer on an on-call or per project basis. I became a full-pledged Assistant Principal [with designation papers]. Ma’am taught me the work of a school head because she said, “One day, I will no longer be around and you’ll be left behind to do the work of a principal. You have to know everything, and I know you can do it”.

Little by little, Ma’am trained me systematically. At first, it seemed that she gave me only the so-called ‘easy cases’. But later on, she entrusted to me the more complex ones. She calibrated every single task she assigned to me. Ma’am also ensured I know every aspect of school operations by making me go through job rotation where I learned the ropes. Indeed, I went through everything by experience.

**P 3:** I was the right-hand man of Ma’am for a long time. She is really a very good teacher who patiently taught me everything I know about being a principal, from dealing with the parents, to making decisions, to handling responsibilities, to taking

good care of partners like the local government. Ma'am taught me all that I know about being a school head. She always brought me along to every major activity, introduced me to her networks, and made sure all people and all transactions passed through me first so that I know what is happening and I could help her make decisions. I was like her shadow, and I screened everything for her. She intentionally designed that kind of arrangement so that I would grow and learn through firsthand experience and exposure.

**P 4:** I'm very lucky that Ma'am became my principal because she never withheld any vital information from me. She taught and passed on all that I needed to know about how to become a school head. She patiently supported and guided me until I was able to predict how she herself would think and react on each problem or situation. But she also let me exercise my creativity. She did not stifle my own decision-making. She just made sure I had a good foundation and that I was really capacitated [to become a school head] so that I wouldn't be starting from scratch. Then she let me implement my own ideas. She always made her presence felt and made sure I had a wonderful training under her guidance.

**P 5:** Ma'am let me go through the toughest training because for her, I needed to experience the difficult times now so that when the real tests of school leadership come, I would know what to do. I think I went through everything a trainee needs to do through. She gave me a chance to lead, to solve problems major concerns, to make big decisions, all by myself but with her constant guidance. She never left me on my own nor allowed me to be in uncertain situations. At first, she was really very strict with me but later when I earned her trust and confidence, I also felt her "relax" towards me. She made sure she prepared me well before she let me go.

**P 6:** Before, every school head would look for an understudy. Every principal would try to look for a teacher who can potentially lead a school later on. So if one has the potential, the principal would really train and mentor that teacher. That is exactly what my principal did to me. I was almost like a shadow to her because I was with her wherever she went so that I would see what and how she was doing things as she ran the school. When there were decisions to make, she would patiently ask me what I thought was best for the situations even if I knew she already had an answer in mind. I knew she purposely exposed me to her line of work and gave me opportunities to learn firsthand from her so that I would learn what principals do and how they deal with the consequences of their decisions.

Mentoring, in the context of the respondents' answers, was to go through what Harvard Business Review (2017) calls as *job rotation*, or being introduced to different facets of operation in the organization; *job shadowing*, or being given guidance one needs to perform the role well; and *stretched assignment*, or exploring the untapped potentials of trainees through challenging tasks. This was very evident when the predecessors of the participants made them go through different roles in the organization, provided technical assistance to empower them in their tasks, and unleashed their otherwise unknown capabilities. The position of a school head requires many competencies that cannot just be learned by reading books; they have to be *lived experiences* of going through the actual job by being an understudy or mentee of a real principal, having the right exposure to circumstances that will bring out those competencies (Southern Regional Education Board, n.d.), and acquiring wisdom by "moving in the circles of the practitioners themselves" (Johnson, 2018). These are all consistent with the current array of learning and development programs of the Department (De Sagun, 2018).

**(2) What mentoring programs have the participants put in place prior to and after they became school administrators?**

Four out of the five principals were Master Teachers themselves before they became school heads; one was a Teacher but held the post of Assistant to the Principal; thus, they were familiar with what it meant to mentor people before they became school heads.

The principals understood the concept of passing on *what they know* and *what they have experienced* to their teachers who were also potential leaders; hence, their common answers were making them go through the same things as they experienced before. These include being given stretch assignments, doing one-on-one mentoring, leading learning action cells (LAC) and teachers' quality circles (TQC), and sharing what they know through demonstration teaching and echo training of seminars attended.

**P 4:** Every Friday, we would always meet and share what we know about our field of specialization so that these experiences would be useful to our colleagues. We also always had trainings, and whoever was sent to these events were required to do an echo training back in the school. I continued to do all of those things in my school when I became a principal. I experienced many things with my former principal which I now pass on to my teachers so that I can also prepare them. I also make sure to give them challenging tasks and make them do things they have never tried before to further develop their competences. I make it a conscious effort on my effort to always give them challenges that will provide them a different perspective...

**P 2:** ...I ask teachers to share what they know and use the opportunity to impart what they have learned to others. Whenever my teachers are sent to trainings, they have to

conduct the same in our school and district. When I became a school head, I intensified our LAC sessions, demonstration teaching and continuous improvement projects. I did my best to train my teachers even in areas that are not their strengths to spur their professional growth and development since one day they will become school heads themselves.

**P 5:** What I experienced from Ma'am, I also did to my own fellow teachers. I gave them a variety of assignments and responsibilities so that they would see the different facets of being a principal's work life. I sent them to trainings, made them share their own personal learnings and application from the trainings, supported their demonstration teaching and research, and gave the committee work so that they know how to mobilize people because they will be doing the same things I was doing someday.

**P 3:** I had LAC, continuous improvement, research work, committee assignment, and job rotation. I insisted that they do not remain in one position or assignment; they had to know all the aspects of a principal's work.

(Mentoring) before and now are the same. Only that, I give my Master Teachers more intense training and preparation compared to my Regular Teachers.

It is worth noting that all of the principals themselves shared that they had to be creative and insistent in mentoring their teachers, and in maintaining a culture of mentoring in their schools. As one school head shared, "Some teachers are resistant to change. But this [mentoring program] is important. They need to know that we are serious in implementing this program and that this needs to be done and sustained." (**P 4**). Consistently, they all said that though the mentoring strategies and techniques they used were the same ones that they went through, they had to "be creative on how we will implement them, when we will implement them, and with what combination of mentoring program will we implement them" (**P 3**). This array of strategies includes coaching and mentoring on a daily basis, structuring opportunities for mentees to solve problems, asking mentees to observe, then later on lead teams in solving problems and in implementing school-wide programs and projects. Also, they all said that this meant being participatory in their approach to school leadership and management, and asking the mentees to take part in planning and decision-making.

### **(3) How did the participants deal with the challenges of sustaining the mentoring programs that they initiated?**

Sometimes, the difficulty itself of the job of being a principal becomes the very factor why people do not want to be mentored and trained. Some teachers would rather remain as teachers, and not go up the hierarchical structure (Southern Regional Education Board, n.d.). This is what the principals intimated to the researcher during the interviews. On the other hand, when one has already trained and promoted people,



the challenge is to also look for new ones to recruit and train; that is, if they are also willing and have the capabilities necessary for the position. In the words of all the principals interviewed, sustaining the program also means finding “creative ways to push through with it even if the schedule is very tight, and even if we have so many priorities coming our way”. As one principal said, it also means “using our executive power as school heads to insist that this program be done because otherwise they will not do it if they see that we are not serious with it” **(P 3)**. For all of the respondents, this means embedding mentoring in the job, and requiring the mentees to be there for mentoring sessions either on lunch breaks, or after work. The principals also unanimously shared that they needed to be creative and have a strong will to implement a good program like this, or else they will not be able to positively impact the teachers and effectively run their schools.

In addition, data revealed that all of the principals regularly tapped mentees, and all of them also strengthened the LAC as a means to mentor teachers through their colleagues. All five of them also put in place various types of incentives and rewards system for mentees who have successfully completed their tasks, and four out of the five principals introduced succession planning so that the potential leaders in the organization have a clear career pathway. One is already on his way to crafting the succession plan, but also generally agrees that there has to be a “systematic way of developing people in the organization, and this plan should be known to all” **(P 4)**.

Interestingly, only two participants institutionalized LAC by earmarking a budget for these learning sessions by including them in the Annual and School Improvement Plans (AIP / SIP).

**P 2:** I included in our AIP/SIP the LAC sessions so that my teachers are assured that there is budget for snacks every time they conduct the LAC.

**P 5:** The LAC was made part of our school’s AIP/SIP so that teachers would be more encouraged to share what they know and what they learned to their fellow teachers.

#### **(4) What have been the products of the mentoring programs started and sustained by the participants?**

Five out of the five principals have produced Master Teachers, Head Teachers or Department Heads, while four out of five already produced principals. The one who has not yet produced a principal inspired his teachers to go through researches and continuous improvement projects; his school was recently awarded as the most productive in terms of number of researches produced. Three out of the five were able to produce Division Education Program Specialists and Supervisors. All five of the principals were the publicly acknowledged inspirations and driving forces by their teachers who received various recognitions given by DepEd.

It is worth noting that all of the respondents mentioned that from the time they mentored these teacher-leaders until now, they have not stopped communicating and meeting regularly. They continue to provide mentoring to these teacher-leaders, albeit on a per need basis, and not so frequent as before when they were being

immersed in their current work. Mentoring, according to all of the participants, is “a wonderful lifestyle that should be cultivated among teachers and leaders”.

### **(5) What types of mentoring programs may be institutionalized in the Division of Pasig City?**

The Department of Education has already introduced a Teacher Induction Program (TIP) for newly-hired teachers and teachers with 0-3 years of teaching experience. Hence, the school heads simply suggested that these be “further institutionalized by making TIP a Division-led activity before it becomes a school-based initiative”.

All of the participants also suggested that since there is an induction program for teachers, so should newly-promoted Master Teachers, Head Teachers, Assistant Principals, Principals, and even Supervisors. As two of the principals said,

**P 1:** To make the transition from being a teacher to being a leader in the school is difficult. There is a need to prepare people to do their job well *before* they get appointed to that (principal) position.

To this, another remarked:

**P 4:** It is extremely important to completely prepare a person for work --- mind, heart, and hands. This is why if we have an induction program for teachers, we should also have an induction program for Master Teachers, Head Teachers, Principals, and Supervisors, especially since they have greater responsibilities. Mentoring should be a must for everybody in the school.

All five of the participants were in agreement that there is a need to also intentionally teach people how to do mentoring and coaching. Since they all had a very positive experience being mentored and coached by their former principals, they also strongly push for the same type of experience to be a “permanent program for training future principals and leaders” (**P 4**).

Finally, the principals also mentioned that since teachers have been very active in LAC sessions, principals themselves can also adapt this learning modality. Hence, in the discussions and interviews, the participants suggested the idea of mentoring a fellow school head through “Division-wide learning action cell (LAC) sessions or Principals’ Quality Circle (PQC) sessions” (**P 1**).

It should be noted that at the time when data was being gathered for this study, unknown to the participants, the Division Office was already preparing for the very first PQC as well as the very first principals’ induction program specially designed for the newly-appointed Assistant Principals and Principals.

### **(6) What policies may be put in place to institutionalize mentoring programs in the Division of Pasig City?**

To institutionalize mentoring in the Division, the school heads unanimously suggested that the Division office should take the lead in organizing mentoring-related activities and in providing technical assistance to the field to make sure that the activities put in place are being implemented. The principals noted that:

It is so much different if it is the Division Office initiating mentoring and mentoring-related activities. The Division should lay down guidelines how to go about (mentoring) it so that it is clear. We have many newcomers for school heads. They need our technical assistance and guidance. **(P 3)**

The Division and the school heads can collaborate to set up a mentoring system in Pasig. We can start by mentoring fellow principals, especially those who are still newly appointed. **(P 1)**

I am excited about the ways we can think of on how to share and disseminate our best practices on mentoring. There is so much to learn from fellow school heads. **(P 5)**

### **Conclusion and Recommendations**

There were three recurrent themes that emerged from this study. They are: willpower and motivation of the principals to effect positive changes, creativity and innovativeness of the school heads in using tried and tested mentoring techniques and strategies, and collaboration and cooperation of the school heads and teachers to sustain the gains of their mentoring programs.

The success of the schools critically begins with the school heads who have been sufficiently prepared for the job through well-thought of mentoring programs that engage them in actual leadership and management experiences where they are challenged to thrive and perform (Southern Regional Education Board, n.d.). To this end, the Division Office of Pasig City must provide the technical assistance required to help set-up a formal mentoring program starting with the principals themselves, but also provide technical assistance to support newly-appointed principals as they also mentor their own teachers.

The Division office must revisit its strategic education plans to include mentoring as one of its strategic directions. It must also fine tune its L & D system by involving school heads in its continuous improvement to ensure that their inputs are considered when designing mentoring programs for the Division and for the schools. It must also take the lead in orienting and training new school heads on how to conduct mentoring and coaching to their own teachers.

To further strengthen a culture of sharing knowledge and best practices, the Division office may also opt to make L & D interventions as output / outcomes-based. This means requiring all employees sent to trainings and seminars to have conduct workplace application projects, or projects that directly apply what they have learned from the training they have been sent to.

The researcher recommends that further studies on the impact and outcome of mentoring programs for school heads be further explored. Also, another study on the specific competencies and skills of great principals who have mentored others should be further investigated. Not all great principals turn out to become great mentors. It is one thing to perform the job; it is another to teach and pass it on to someone.

No successful school leader made it on his own. Mentoring must be deliberately included as part of the duties of principals so that they can contribute to ensuring that the next wave of school leaders have been thoroughly prepared for the job.

### **Acknowledgements**

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## *Harnessing Learning Analytics to Improve Online Quiz Equity*

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Official Conference Proceedings

### **Abstract**

The use of online learning management systems (LMS) such as Blackboard, Canvas and Moodle is becoming a norm in higher education. These systems have been used widely for student assessments such as online quizzes. The Singapore University of Social Sciences (SUSS) established in April 2005 (then known as SIM University), also uses pre-class online quizzes to encourage students to self-study. The questions used for the quizzes are usually randomly drawn from a 50-question bank. The level of difficulty for the questions varies and this raises the question of quiz equity. This paper investigates how the current method of question allocation affected the equity of the quiz. It also proposes a solution to mitigate the issue of quiz inequity. With an integration of learning analytics and problem solving, we hope to provide a different approach to implementing online quizzes that will be more equitable.

Keywords: Online quizzes, random assignment, quiz equity, learning analytics.

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## 1. Introduction

The use of online learning management systems (LMS) such as Blackboard, Canvas and Moodle is becoming a norm in higher education. In general, these systems provide tools to facilitate active learning such as discussion forums and student assessments such as online quizzes. Studies (Johnson and Kiviniemi (2009), Narloch, Garbin, and Turnage (2006), Salas-Morera, Arauzo-Azofra and García-Hernández (2012)) have shown that students who do pre-class online quizzes that encourage preparatory reading perform better in examinations. Dobson (2008) explains that these quizzes motivate students to be better prepared for class through the reading of course materials such as textbooks, study guides and notes before class, which ultimately leads to more effective learning of the course materials.

The Singapore University of Social Sciences (SUSS), established in April 2005 (then known as SIM University), is a university that caters primarily to working adults. Its mission of lifelong education equips learners to serve society as well as contribute to the workforce. In line with self-directed lifelong learning, it uses pre-class online quizzes to encourage students to self-study. SUSS uses Canvas as the learning management system to house and implement these quizzes. The pre-class quizzes constitute a small percentage of the students' overall grade (less than or equal to 6%). In particular, the students need to obtain at least 12 out of 20 questions correct for the first pre-class quiz (also termed as pre-course quiz), which is available to them at least one week before class starts. Otherwise, they will not be allowed to attend classes. This further motivates students to engage the course materials before the classes start. The faculty will usually prepare a bank of questions from which the questions for the pre-class quizzes will be randomly drawn for each student. The level of difficulty for the questions varies. This raises the issue of quiz equity despite the random allocation of quiz questions.

In this context, this study investigates how the current method of question allocation has affected the equity of the quiz. It also proposes a solution to mitigate quiz inequity. With an integration of learning analytics and problem solving, we hope to provide a different approach to implementing online quizzes that will be more equitable.

## 2. Literature Review

While there does not seem to be any prior investigation of the control and effect of the selection of quiz questions, issues of learning analytics and pedagogy design have been well studied. This helps to provide the background for our study, for which the principal thrust concerns the application of learning analytics to improve the design and implementation of pedagogy and the related artefacts for online learning.

Learning analytics is an emerging discipline that lies in the crossroad of data analysis and pedagogy (Siemens (2013)). The discipline focuses on a better understanding of how data produced and collected from the learning process can be fruitfully analysed in educational settings. Siemens (2013) has traced the historical developments of the field



through the enumeration of conferences, journals, summer institutes and research labs to conclude that learning analytics has strongly emerged as an important research area. Thus, consistent with this development, the setting up of the Society for Learning Analytics Research (SoLAR) has connected international researchers on the impact of analytics on teaching, learning, training and development since 2011. SoLAR also has its own publication, the Journal of Learning Analytics. In a landmark study, Ferguson (2012) has charted the developing areas of learning analytics research and challenges.

Martin and Ndoeye (2016) apply learning analytics to assess student learning in online courses. Through a case study, they discover and affirm that learning analytics data on student activities in the learning management system helps guide the implementation of courses, design of assessments and the provision of support to weaker students.

Tempelaar, Heck, Cuypers, van der Kooij, and van de Vrie (2013) classify information sources for learning analytics into two main types – intentional and learner-activity metadata. Intentional data arises from formative assessments retrieved from learning management systems, while learner-activity metadata records facets of learner interaction on the systems. In an integrated infrastructure, Tempelaar, Heck, Cuypers, van der Kooij, and van de Vrie (2013) combine both types of data to provide feedback to students and teachers on personal learning dispositions, attitudes and values.

At Purdue University, Arnold and Pistilli (2012) rely on learning analytics in the form of grades, demographic characteristics, past academic history and students' effort to provide feedback to students. The goal is to help students improve their performance by keeping them informed about their academic position in a course in real time. The project, called Course Signals, is reported to have been deployed to over 23,000 students across 100 courses and 140 instructors.

It is evident from these studies that learning analytics hold promise for positive intervention in the teaching and learning process at a multitude of interfaces and in a variety of situations. Our present work involves the real-time collection of learning analytics data for improving the online quiz design through more equitable selection of question sets. With reference to the literature on online quizzes, this falls into a spectrum of concerns that can be classified into research on the pedagogical effects and effectiveness of online quizzes (Dobson (2008), Angus and Watson (2009)) and quiz design considerations (Gray and Jackson (2003), Kajitori, Aoki and Ito (2014)). The former delves into the existence of positive impacts on learning or examination performance through statistical tests performed on data sets obtained from online quizzes. On the other hand, the latter covers issues of operational effectiveness through the use of technology such as round-the-clock access (which promotes self-learning in a safe environment), automatic generation of hints and the inclusion of a retry functionality which improve the learning experience.

### 3. Method

In this study, we analysed the pre-course quiz of an introductory business analytics course delivered in a blended mode to 300 students in July 2018. Students are required to obtain at least 12 out of 20 questions correct for this quiz before they are allowed to attend classes. The 20 questions are randomly drawn from a 50-question bank. The pre-course quiz is available to the students at least one week prior to the first class and students are allowed to make unlimited attempts during the period that the quiz is made available to them. Only the best score will be recorded and form part of the students' overall grade ( $\approx 2\%$ ). The students' performance of the pre-course quiz is very important as it determines whether the students can proceed to attend classes. This also raises the question of quiz equity that might affect the students' performance of the pre-course quiz.

Canvas provides quiz statistics at the student- and question-level, with all attempts recorded. The difficulty index, tabulated as part of the quiz statistics, indicates how hard it is to answer a particular question correctly. The index is computed as the proportion of correct answers over total number of answers and hence is reverse-scored (i.e., the higher the index, the more the correct answers, which in turn means the easier the particular question). A scatterplot of the mean (x-axis) and standard deviation (y-axis) of the difficulty index of the set of questions taken by each student and the students' quiz performance for the first (and completed) attempt (of all 20 questions) is as shown in Fig. 1. The first and completed attempt was used in the analysis as a means to eliminate attempts that might constitute students trying to "game the system".

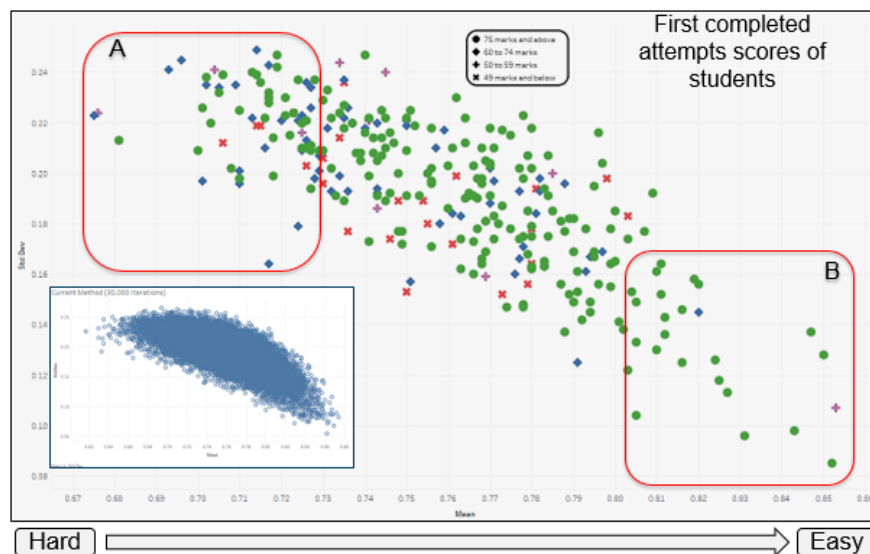


Figure 1. Random allocation of questions and quiz score.

It can be observed that the current allocation approach of 20 questions randomly drawn from a 50-question bank has resulted in some students getting proportionately more questions that are either easy or difficult. In particular, students in Box A have been allocated proportionately more of the harder questions and have performed relatively

poorer. The converse is true for students in Box B. The insert is a plot based on 30,000 Monte Carlo simulation iterations of quiz question allocation. It shows that this inequity is inherent in the current method of quiz question allocation. To mitigate this, a new quiz-question random-allocation method that considers the difficulty level of each question is proposed. Two methods are presented in Fig. 2A and 2B below.

The Optimal Method bins (i.e., groups) questions based on “clean breaks” in their difficulty index (e.g., Easy, Fairly Easy, Fairly Hard, and Hard) as shown in Fig. 2A.



Figure 2A. Binning of questions based on the optimal method.

On the other hand, the Feasible Method bins questions based on different quartile-ranges of their difficulty index (e.g., 0%-25%, 26%-50%, 51%-75%, and 76%-100%). This is shown in Fig. 2B.

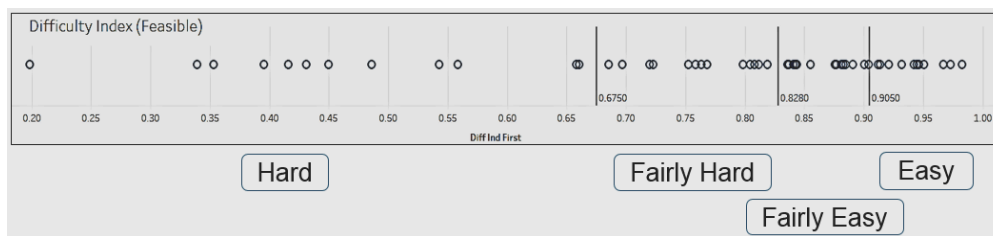


Figure 2B. Binning of questions based on the feasible method.

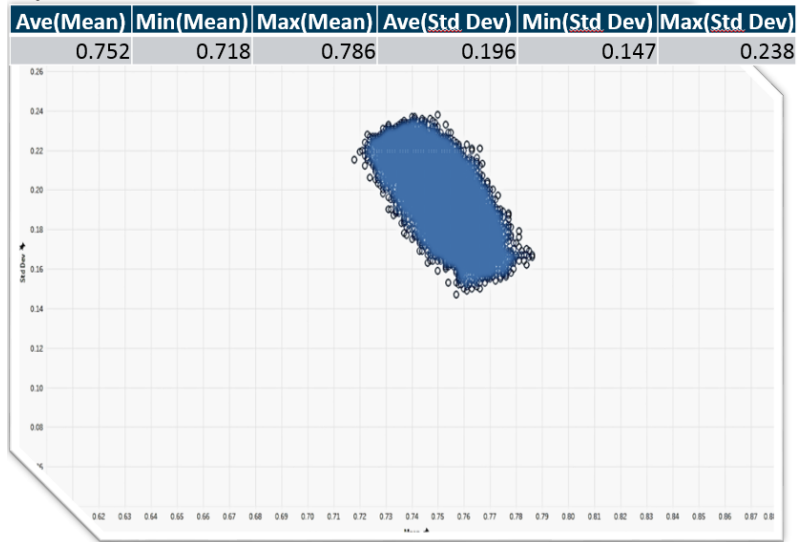
For each of the proposed methods:

- All the questions are first grouped into bins by difficulty index, and then questions are randomly selected from each bin in appropriate proportions to make up the required number of pre-course questions, which is 20 in this study.
- For validation, 30,000 Monte Carlo simulation iterations are generated and compared with the outcomes of the current method of allocation.

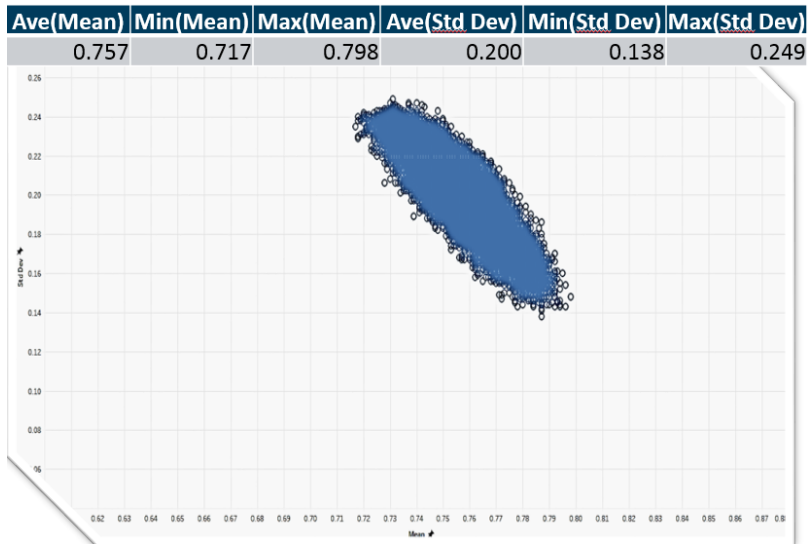
#### 4. Findings

Simulating 30,000 random draws of 20-questions sets using the optimal and feasible methods, while adhering to the stipulations as discussed, produce distributions in the question-set characteristics as illustrated in Fig. 3.

**Optimal Method:**



**Feasible Method:**



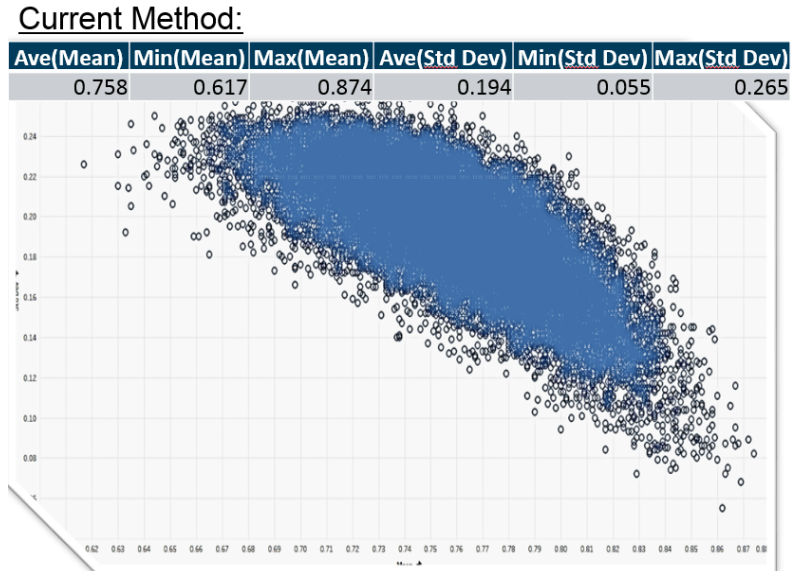


Figure 3. Distribution of questions for the optimal and feasible method (versus the current method (based on 30,000 iterations)).

Fig. 3. shows very clearly that the ranges for the mean and standard deviation of the difficulty index for both the optimal method and the feasible method, as compared to the current method, have reduced significantly. This implies that the question-set generated using either optimal/feasible method have smaller variations in difficulty across the quizzes vis-à-vis the current method.

The ranges (i.e. max – min) of the mean of the difficulty index in both the optimal method and the feasible method have reduced significantly to 0.068 (0.786-0.718) and 0.081 (0.798-0.717), respectively, while it has been 0.257 (0.874-0.617) under the current method. This signifies that the spread of average difficulty of a question-set has been reduced under either of the proposed methods thereby increasing quiz equity.

The standard deviation of a quiz indicates the variability of question difficulty within it. A high standard deviation (which is preferred) indicates that a quiz has a good variety of questions of differing difficulty (instead of consistently easy questions or consistently difficult questions). However, a large range of these standard deviations across the quizzes is not preferred as this implies the lack of consistency across quizzes in terms of the distribution of easy and difficult quiz questions within individual quizzes, which in turn, adversely affects quiz equity. Hence, within a quiz a high standard deviation is preferred, whereas across quizzes a small range of the standard deviations is preferred. The ranges of the standard deviation of the difficulty index for both the optimal method and the feasible method have also reduced significantly to 0.091 (0.238-0.147) and 0.111 (0.249-0.138) as compared to the current method of 0.210 (0.265-0.055). This indicates that there is greater consistency in the allocation of quiz questions of varying difficulty level across quizzes under either of the proposed methods vis-à-vis the current method. Quiz equity is consequently enhanced.

Finally, we conducted a Chi-Square Goodness-of-Fit test to establish that the distributions of quiz based on mean and standard deviation have significantly departed (i.e., improved) from the distribution obtained with the current method (Fig. 5). To do this, the observations of both optimal and feasible methods are partitioned into 4 buckets (known as the expected values) and compared with the observations of the current method (based on and known as the observed values). The partition of the 4 buckets is based on the mean and standard deviation of the quiz difficulty index. In particular, Bucket 1 represents question sets that comprise mainly difficult questions whereas Bucket 4 contains question sets that comprise mainly easy questions. Bucket 2 and 3 are more desirable in term of quiz equity as both buckets contain a good mix of difficult and easy questions. Collectively, the outcomes in the quizzes of both buckets are within an acceptable range of quiz difficulty.

The test shows that the null hypothesis can be rejected, i.e., there is a significant improvement in quiz equity (i.e., (concentration of question sets in bucket 2 and 3) using the optimal/feasible method vis-à-vis the current method. Collectively, this signifies that both the optimal and feasible method are able to significantly affect quiz attributes to enhance quiz equity.

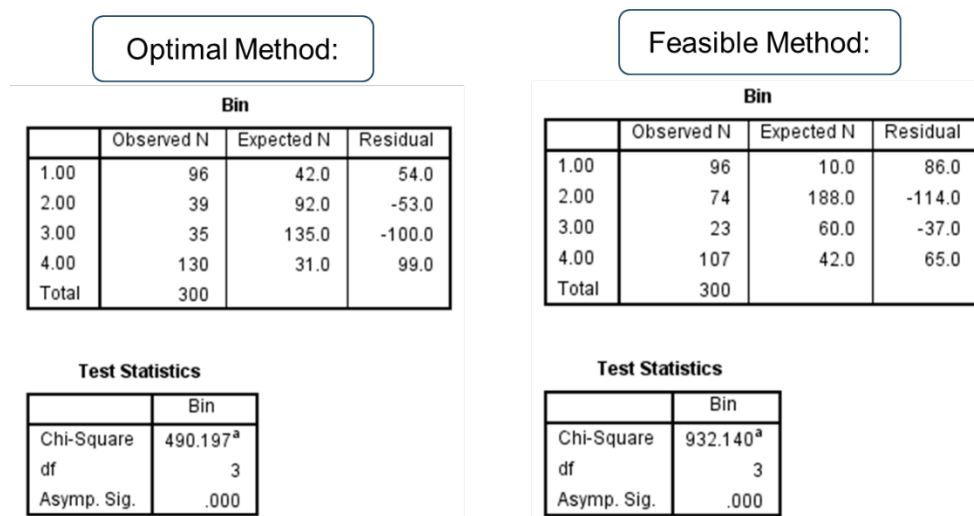


Figure 5. Chi-Square Goodness-of-Fit Test: Current method versus Optimal/Feasible method.

## 5. Conclusion

This study is an integration of learning analytics and problem solving that examines random allocation of questions for online quizzes. Based on the findings, it can be concluded that proportionate random assignment by difficulty bin can significantly enhance quiz equity. The optimal method is also deemed to be more favourable in terms of the findings; however, this binning of the questions requires human judgement. To ease deployment, it is recommended that the feasible method be used as it can be fully-automated (vis-à-vis the optimal method). The difficulty index for existing quiz questions can be extracted directly from the learning management system, while that

for new quiz questions can be decided by quiz writers.

This recommendation is generalisable to all courses, although this study is based only on an introductory business analytics course. This applies to the extent that there is a substantial range of question difficulty level and there is no consideration of this difficulty level in the random allocation of questions.

It is hoped that this study provides an efficient and effective approach to implementing online quizzes that will be more equitable.

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***Knowledge Management as a Catalyst to Building Resilient and Effective Human Capital in Manufacturing Companies***

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**Abstract**

The study argues that human capital development from a knowledge management perspective helps to shape attitudes and foster ethical values for higher productivity. Human capital is central to productivity in an economy and if well groomed, may result in sustainable development of a society. Human cultures vary, but application of knowledge management perspectives lead to cooperation, collaboration, team work and understanding that all people desire to live in a safe and secure world. Knowledge management is an idea-generating process that must be shared within the organization through tacit means or explicit knowledge which leads to the alignment and integration of human resources' skills, competences and abilities to the positions held by the various incumbents in the organization. Knowledge management also implies the product value and features should match the cultural and physical inclinations of that community for it to be of any use or market value. Thus, fusion of knowledge management into human capital development leads to development of employees who are able to make decisions in uncertain scenarios and make organizations successful and sustainable. This was a case study of twenty manufacturing companies and both qualitative and quantitative instrumentation were used. The study found out that use of knowledge management as a discipline to guide policy formulation and decisions in organizations was a farfetched idea. No organization used knowledge as one of the co-competences. The study recommends use of research to create knowledge so that decisions are made based on empirical evidence.

Keywords: Knowledge Management, Human Capital Development, Idea-Generating Process

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## 1.0 Introduction

The study had been prompted by difficulties faced by students to get attachment for On the Job Education and Training Program as part of their curricular requirements as companies shut down. The research then sought to establish the degree of company resilience in order for them to survive. Zimbabwe is a country that is struggling to make progress in its economic endeavors to attain the middle income status by 2030 as enshrined in the Zimbabwe Government Transitional Stabilization Program (TSP, 2018). This vision, notwithstanding the strides made in the economic arena, is still a closed system embroiled in mystery, secrecy and intellectual trials that are not supported by human capital skills, competencies and knowledge of what is to be done. There is much talk about the vision 2030 in public gatherings and in the public sector, without a strong *throng* of effort supporting and directing manufacturing companies to live to expectations.

Building resilient and human capital effectiveness in manufacturing companies is a pre-requisite for organizational survival in a business environment shaped by competition and other economic shocks and surprises. The definition adopted for this study for resilience is defined as a positive response to adversity that allows individuals or organizations to thrive cope with stressors and overcome disadvantage (Masten, 2007). The concept of resilience then is seen or understood as a process for having capacity to adopt and adapt to challenging or threatening situations as a result of the innate ability in human capital for the good of the organization. Human capital effectiveness is implied to mean the desired outcome from employee performance that reflect agility and flexibility in solving dynamic challenges facing an organization for sustainable competitiveness. Knowledge management becomes instrumental in shaping the desired habits, traits and personality to build the suitable and cultured human resources for the creation of economic value. Policy makers should realize the fact that human resources make use of all other resources in order to create the much needed economic value. Alawamleh, et al (2019) concede that there is a relationship between innovation and human capital investment and if these two aspects are in existence in the organization, they lead to economic development. Human capital is an indispensable organizational resource because that is the resource that can utilize other resources (tangible or intangible assets) in order to attain organizational competitiveness leading to achievement of organizational goals. Eigbiremolen and Anaduaka (2014) posit that of all factors of production, only human beings are capable of learning, adapting or changing, innovative and creative. Drucker (1985), cited in Stehr and Ruser (2017) points out that the knowledge society is one in which the quality of life is dependent upon the primary production of knowledge as a resource instead of capital and labour as was the case in the agrarian and industrial economies. This study argues that human capital development is more effective if it is done from a knowledge management perspective which helps to shape attitudes and foster ethical values for higher productivity. Human capital is central to productivity in an economy and if well groomed, result in innovation and sustainable development of a society. Human cultures vary, but application of knowledge management perspectives lead to cooperation, collaboration, team work and understanding that all people desire to live in a safe and secure world. This the reason why El-Farr and Hosseingholizadeh (2019,p. 5) argue that in the knowledge economy, “knowledge is recognized as the major source of wealth production, and managing knowledge effectively and efficiently is considered to be a key success factor to gain sustainable

competitive advantage for organizations”. This implies in Knowledge production and management to build the much needed capabilities of an organization.

### **1.1 Objectives of the study**

The main objective of the study is to explore how use of knowledge management paradigm in human capital development can enhance productivity in the manufacturing sector in Zimbabwe. The specific research questions of the study were:

- a) Is there any connection between knowledge management and building organizational resilience?
- b) How can knowledge management be used as a catalyst to building resilient and effective human capital for organizational competitiveness?

### **1.2 Theoretical Framework**

There are two theories underpinning this study, namely the Endogenous Growth Theory (EGT) (Grossman and Helpman, 1994) cited in Antonelli (2017) and the Human Capital Theory (HCT) (Becker, 1966). The EGT argues that that economic growth is driven by the improvement and enhancement of human capital (by means of innovation) to constantly create new, effective, and efficient processes and ideas from within the organization or system itself, without recourse to external factors of any sort. The HCT refers to the stock of habits, knowledge, social and personality attributes embodied in the ability to perform labour so as to produce economic value. Human capital is unique and differs from any other capital. It is needed for companies to achieve goals, develop and remain innovative. Even though fragmented and politically disorganized criticisms exist on the usefulness of the HCT, the theory provided a framework for training and development of human resources. From the two theories it can be argued that companies ought to place value on their human resources for they alone bring change to an organization and that building the sort of teams desired for specific tasks leads to competitive advantage. The two theories point to the fact that knowledge generation based on resilient cultures creates value in the employees which lead to constant improvement and high productivity resulting in significant economic growth (Pelinescu, 2015).

### **2.0 Literature Review**

The current global trends show a rapid emerging of markets that are fast growing, leaders in the business arena are now relying on data analytics for decision making, more discerning consumers with access to product information, rapid innovation and isolationist economic policies. In such a business environment there is need to embrace knowledge driven solutions coupled with business intelligence to confront business challenges. The World Development Report (2019) posit that the changing nature of work demands skill sets that improve the adaptability of workers, allowing them to transfer easily from one job to another. Across countries, both higher-order cognitive (technical) skills and socio-behavioral skills are consistently ranked among the skills most valued by employers. Employers in Benin, Liberia, Malawi, and Zambia rank teamwork, communication, and problem-solving skills as the most important set of skills after technical skills. Knowledge management is an idea-generating process that must be shared within the organization through tacit means or

explicit knowledge which leads to the alignment and integration of human resources' skills, competences and abilities to the positions held by the various incumbents in the organization. Knowledge management also implies the product value and features should match the cultural and physical inclinations of that community for it to be of any use or market value. Thus, fusion of knowledge management into human capital development leads to development of employees who are able to make decisions in uncertain scenarios and make organizations successful. The concept of human capital refers to the abilities and skills of human resources of a country, while human capital development refers to the process of acquiring and increasing the number of persons who have the skills, education and experience that are critical for economic growth and development of a country's economy (Okojie, 2005). Knowledge is a new form of labour. Building organizational resilience and effective human capital create a conduit for business success whose decisions are made from an informed point of view in the context of being innovative and robust in strategy formulation. According to Hitt, et al (2006) a company with skillful and knowledgeable human resources has higher human capital and is more likely to create knowledge, make appropriate decisions, innovate and properly utilize organizational resources for its benefit. Zimbabwean manufacturing companies face challenges of foreign currency, raw materials due to poor agricultural production affected by many variables, inflation rate, unstable exchange rate, unpredictable cost of goods and at times redundant human capital skills.

## **2.1 Building resilient and effective human capital**

In their study, Ho, et al (2014) concluded that development of capabilities and capacities of human resources is an essential piece of the "organizational toolbox" through which organizational resilience is built. Organizational resilience is thought to be important in how organizations respond to external events and highly dynamic environments. Vogus and Sutcliffe (2008) cited in Visser and Jacobs (2019, p.3) define resilience as "the maintenance of positive adjustment under challenging conditions such that the organization emerges from those conditions strengthened and more resourceful. By 'challenging conditions' they include discrete errors, scandals, crises, and shocks, and disruptions of routines as well as ongoing risks (e.g. competition), stresses and strain". For this to be realized, there is need for new knowledge generation, management and good governance such there is higher degree of sustainability and survival of the organization. Knowledge building and application make disruptions to organizational existence manageable and create knowledge-able employees who can study their environment and take necessary strategic decisions on behalf of their principals. The changing nature of work also implies upgrading the skills of employees so that they remain relevant and committed to their work. Suryaningtyas, et al (2019) argue that in the Fourth Industrial Revolution Era (4IR) is unavoidable in the face of the digital technology which has become the main driver of economies disruptions. In such a situation, organizations need to build resilience mechanisms that help them to respond and adapt within the shortest possible space of time to adversities in order to maintain the sustainability of their businesses. It is a fact that without proper knowledge management, capabilities to maintain positive changes are slim in the face of difficult situations which make organizations fail to attain their desired goals. Bell (2002) cited in Obioma, (2017, p.145) argues that organizations are living in times "of unprecedented change, wrenching economic instability and business discontinuities that demand

organizational agility and organizational resilience. In many respects, resilience represents the next phase in the evolution of traditional place-centric enterprise structures to highly virtualized, people-centric structures that enable people to work anytime, anywhere.” This implies that investing in human capital as a strategic resource in the organization, is important in building a culture of resilience as well as being able to survive external and internal business threats through adoption of new strategies, innovations and technologies. Knowledge sharing is one way of building organizational resilience and helps the organization to remain strong and endure any pressures until success is achieved as reflected in the Figure 2.1 below.

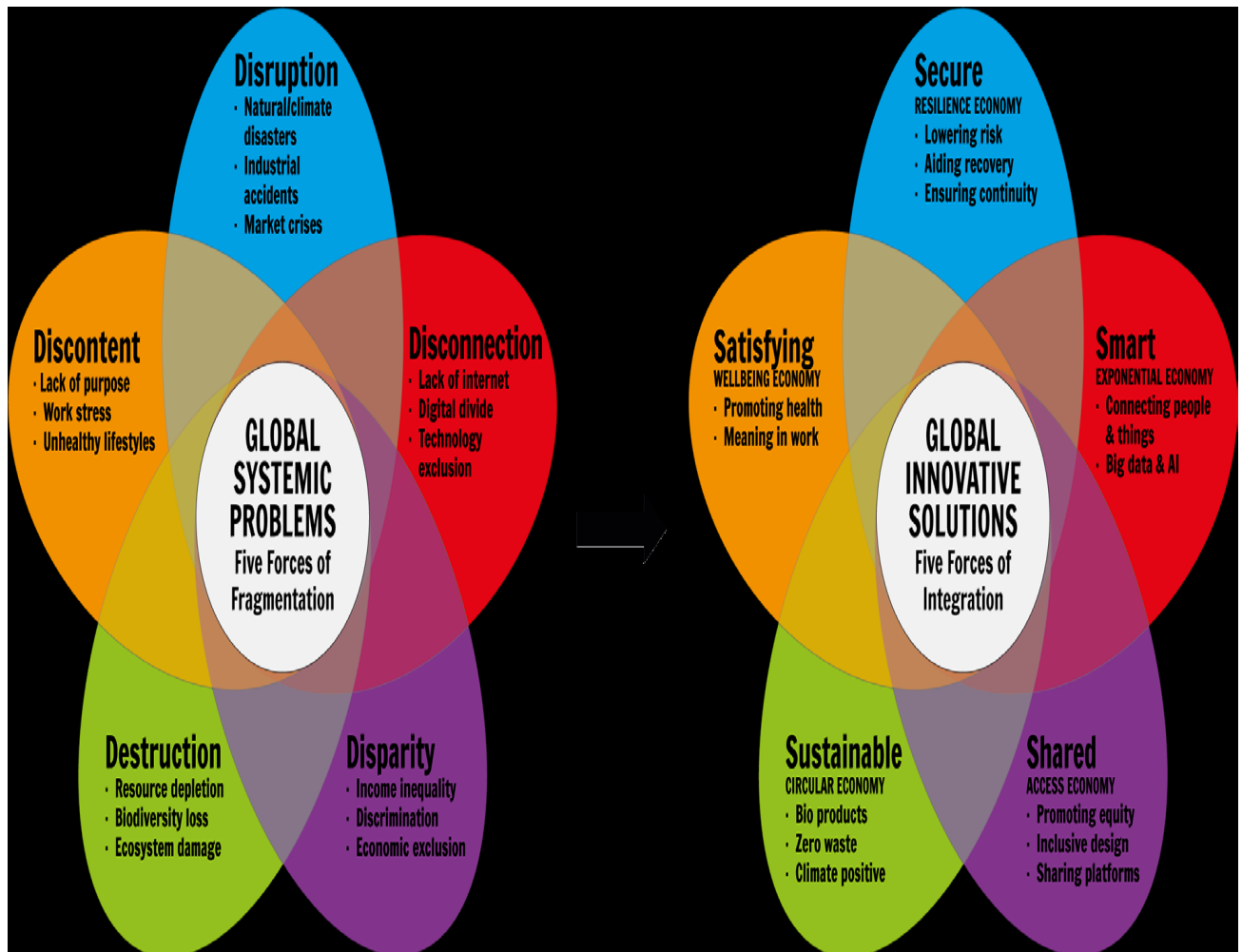


Figure 2. 1: Moving from systems breakdown to systems breakthrough

Knowledge management (KM) is a strategic asset or weapon that can be used in an organization to improve its performance and buttress its culture. Jennex and Olfman (2006) refer to KM as the practice of selectively applying knowledge from past experiences of decision making to current and future decision-making activities. According to Behringer and Sassenberg, (2015), KM is viewed as one of the critical elements of organizational success and an enabler of competitiveness in local and global contexts. It is one fundamental activity of the business to learn how to generate knowledge, build knowledge management systems in order to configure and reconfigure its business processes in the context of new strategies through effective

information management. Building the KM systems require an added dimension of human capital development in order to create an organization culture with the sort minds, fortitude and inclinations the business wants. Attia and Salama (2018) reinforce the role of KM as assisting organizations to remain competitive through sharing information with the external partners and knowing their competitors' products, services, strategies and best practices. Thus manufacturing companies need to embrace KM as a strategic tool to enhance their competitiveness on the market as well as developing the human skills that help employees to steer the organization in the right direction amidst economic difficulties. Beck, et al, (2011, p.1) allude to the fact that "in turbulent, surprising, continuously evolving marketplace environments only flexible, agile, and relentlessly dynamic organizations will thrive. In fact, firms often must be able to move beyond survival and actually prosper in complicated, uncertain, and threatening environments. Unstable environments create frequent challenges and even relatively stable marketplaces experience occasional jolts or undergo periodic revolutionary shifts". This with a much strong thrust in KM, chances are high that the organization becomes more proactive and highly risk calculating for the good of strategic decisions and as well as organizational prosperity.

The current economic shock waves that are affecting Zimbabwean manufacturing companies, strategists and shareholders need to view these challenges as windows of opportunities rather than stumbling blocks to economic success and competitive growth. Embracing the tenets of knowledge management can be used to overcome challenges threatening organizational survival. Resilient employees tend to be resourceful and are capable of interpreting their environment without panicking or emotional imbalance which is good for an objective assessment of both the internal or external factors that affect the organization. Knowledge management coupled with good motivation strategies and corporate governance help to develop a character within an employee that increases sturdiness and logical thinking. Employees tend not to withhold information that is useful to the next person in the in organization for improved decision making processes that lead to organizational success. Knowledge-intensive organizations need to develop a culture that promotes organizational learning; that encourages innovation and the development of novel systems and processes, products and services El-Farr and Hosseingholizadeh (2019).

## **Research Gap**

There are a few studies if any carried out on how knowledge management can be used as a vehicle to increased production within the manufacturing sector in Zimbabwe in particular. Furthermore there is a strong laxity from the manufacturing companies on training and development of their employees for enhanced performance. It is against this background that the authors decided to conduct a study on the essence of knowledge management perspective in human capital development as a conduit to shape attitudes and foster ethical values for higher productivity leading to the attainment of the middle income level by 2030 by the government.

## **2.4 Empirical Reviews**

There are numerous empirical reviews on human capital development and organizational purposes but the study has restricted itself to three seminal studies. Firstly, a study by Alawamleh, et al (2019) on the bilateral relationship between

human capital investment and innovation in Jordan identified four main pillars required to support economic development and achieve a competitive advantage using the country's human capital namely the "Habilitation, Opportunity, Power Distance, and Entrepreneurship (HOPE)". They further noted that culture is central to innovation and economic development. In their study culture is a product of knowledge generation. Their study led to an awakening understanding that Jordan culture and Arab world in general lacked some awareness of the importance of human capital. Secondly, Dawodu, et al (2018), in their study of human capital development and organizational performance in the Food, Beverage and Tobacco Industry in Lagos State, Nigeria, concluded that human capital development may improve the performance of the seven manufacturing companies investigated and should be accorded a premium place in the upgrading of people skills, knowledge and abilities particularly when it comes to preparing and grooming people for the present and future roles in an organization. From their study it can be noted that there is a strong assertion that developing human resources is critical for the survival of an organization. Thirdly, Azam, et al (2015) in their study stretching from 1981-2013 on foreign direct investment and human capital: evidence from 34 developing countries where the thrust was to evaluate the impact of foreign direct investment (FDI) using the Fixed-Effects Model found out that the inward FDI has statistically positive impact on human capital and recommended that policy makers need conducive and investment friendly approaches to enhance more FDI into the host counties and this evidently improve the social welfare of the people of developing countries. By implication human capital is central to competitiveness of an organization.

Thus from the three cited empirical reviews, the only missing link is the use of knowledge management and culture as conduits to building resilient and successful companies.

### **3.0 Methodology**

The study was guided by two main research questions:

- a) Is there any connection between knowledge management and building organizational resilience?
- b) How can knowledge management be used as a catalyst to building resilient and effective human capital for organizational competitiveness?

This was a case study of twenty manufacturing companies in Zimbabwe's Msasa Industrial Area randomly sampled out of a target population of eighty companies. Sample size was based on the Internet Based Sample Calculator with a confidence interval of 19.09 and confidence level of 95% for representativeness. A Case study research allows the exploration and understanding of complex issues and is considered a robust research method particularly when a holistic in-depth investigation is required (Zainal, 2007, Yin, 2013). Both quantitative and qualitative instrumentation were used. Four questionnaires were sent to middle and top management in each of the selected case study unit making it a total of eighty and out of these, seventy-three were retrieved. Five face-to-face scheduled interviews were conducted.

### 4.0 Discussions and Findings

The sample size N= 78 (73 questionnaire respondents and 5 Interviewees) was used. Before the analysis of the two research questions, two important aspects of the respondents are worth mentioning their statistical figures namely educational level and gender.

#### 4.1 Educational level

From the responses given, the following Table 2.1 shows the educational qualifications of the respondents:

Level	Number of Respondents	Percentage level %
O Level	6	7.69
National Certificate	7	8.97
Diploma	13	16.66
Degree	40	51.28
Postgraduate	12	15.39
<b>Total</b>	<b>78</b>	<b>100%</b>

Table 4.1 Educational Level

The above statistical data serves to demonstrate that the responses given were from credible sources and which can be relied upon. It is also important to establish why KM may not be or is in use in organizations staffed by highly qualified experts.

#### 4.2 Gender response rate

The following Figure 4.1 shows the gender response rate of the case study:

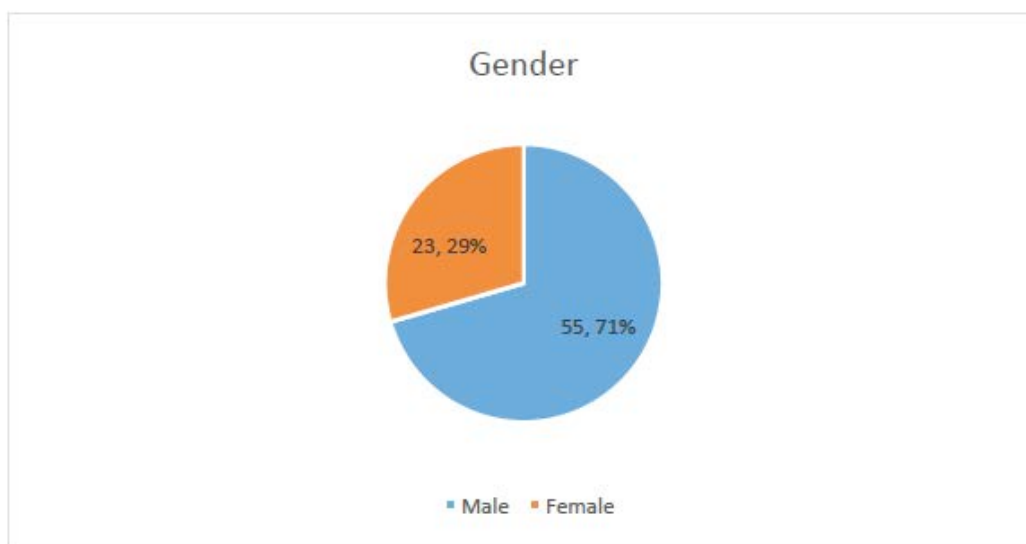


Figure 4.1 Gender

The Figure 4.1 shows 23 (29%) of respondents were female and 55 (71%) were male indicating that the study was gender sensitive and balanced and the recommendations from the study fit in all types of organizations where females and males are constituted for organizational success.



### **4.3 Connection between Knowledge Management and Organizational resilience**

From the responses noted, 37 (44.43%) felt that organizational resilience is built by having a strong culture that is based on organizational values reflected in their vision and mission and these are often displayed in an organization's reception area or in the various management offices. They believed that the personality of the leader is instrumental in shaping organizational resilience. Twenty-seven (34.6%) indicated that the statutory instruments already in place were the source of organizational resilience. They argued that once there is no risk management policy, for example, there was no budget for such an item and if any calamity befalls an organization, there is nothing to fall back on. This creates a challenge. From this observation it can be concluded that the scope of being proactive is there amongst the employees but how strategies are designed may be lacking. Fourteen (17.94%) were of the view that there is a strong link between KM and organizational resilience. The resilience stems from the employee's ability to see beyond the horizon or see things coming and plan ahead so as to future-proof their systems thereby being proactive. However, they believed this solely is the responsibility of top management to strategically position the organization to survive any attacks. This contradicts literature review which refers to information sharing and human capital development as important elements to create a firm foundation for organization resilience and improved performance.

### **4.4 Knowledge management, building resilient and effective human capital.**

This question received interesting attention from the respondents and it reflected much on whether KM tools were known and how they impact the human capital and the organizations at large. Seven (9%) respondents from the questionnaires underlined the word "How" on the questionnaire and went on to write small comments like: "application is difficult in life, do we have such a thing, I need to read about this," and this in a way points to some clear understanding that the concept is new or vague to some. The skill to closely scrutinize organizational challenges or opportunities depends on the ability to utilize fully the various KM tools at hand in the organization that help them to do knowledge production or generation, storage, dissemination and evaluation of progress. In this case, sixty-eight (87, 2%) respondents suggested that meetings were one of the most effective tool to gather information for strategy formulation in this ever changing business environment which requires organizations to be innovative and creative. However, the major derailment is a sad culture which leads organizations to be poor caused by lack of understanding on the implementation of meeting resolutions. Before the agreed resolutions are effected, another meeting is called with a different agenda totally divorced from the initial course of action earlier on agreed upon put to waste resources, time, efforts of employees who were tasked to perform certain duties. There is no consistency in sticking to one thing. It is always a butterfly strategy used every day to tackle challenges facing the organization without a solid foundation to base new ideas on. This agrees with Robinson, et al., (2006) and Nonaka, (2007) who argued that any changes in knowledge management are positively associated with changes in innovation. This entails a thorough analysis of the strategy to be followed whether the strategy content is in line with desired course of action. Minutes of meetings must be shared, and then evaluated if the resolutions agreed upon were effective or not without closing that strategy and evolve an emergent strategy that is not related to the initial thrust. Any drift from the initial vision or organizational philosophy without having taken into cognizance the building

of a strong thread to the new path or course of action is suicidal. Three (3.8%) respondents mentioned that at times organizations do not want to train and develop their employees for fear of losing them for greener pastures. Even if the training and development programs were to be conducted, usually companies outsource this function from consultant firms that have no much understanding of the organization. This training must be done by the founders of the company who exactly know their initial intention of establishing the business, have a grounded vision and as leaders, can as pointed out by Mullins (2013) start planning from the future, engage others and then deliver. This helps to keep organizational values intact and these shape the attitude of employees. From the overall perspectives, little of knowledge management is in use in manufacturing companies as indicated by the responses given and the idea seem foreign to policy and strategy formulation.

**5.0 Conclusions**

The study found out that Knowledge management is central to human capital building and organizational resilience. There is a relationship between investing in organizational resilience and organizational survival. Valuing human capital and building the necessary values, help them to be prepared for any change in the business environment without compromising the needs of customers. Manufacturing companies should budget for knowledge management systems as well as the development of human capital. The study recommends use of research to create knowledge so that decisions are made based on empirical evidence as the strategic route to building strong organizational resilience and competent human capital. The tool below developed by the researchers can be of hand in analyzing the level of resilience of the organization so as to be in a position to align strategic goals to the mission and vision.

**The Organization Resilience Tool**

Metric Quality	Score or rating:1 is the least score and 5 is the highest				
	1	2	3	4	5
Use of Knowledge Management tools	1				
Employee development			3		
Research, culture and information sharing		2			
Key performance indicators			3		
Use of Disruptive technologies to counter environmental complexities and changes	1				
<b>Total Score</b>	<b>10/25</b>				

Mazhazhate & Mudondo, 2019

**Key:**

Total Score is expressed as a simple fraction out of 25, the converted into a decimal fraction. Any figure less than 0.5 shows less organizational resilience and 0.5 shows better chances of survival. For example, as obtained in one organization:  $10/25 = 2/5 = 0.4$ .

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***Modified Lab Rotation Model: A Blended E- Learning Approach to Improve Student's Conceptual Understanding of English Verb Tense and Aspect***

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**Abstract**

In language Education, verb tense and aspect is one of the most difficult lesson in elementary grade. For the past three years, S.Y. 2015- 2016,2016-2017 and 2017-2018, English verb tense and aspect is consistently included in the least mastered skills topic in Grade Five English. This study aimed at investigating the use of Modified Lab Rotation Model in improving the conceptual understanding of English Verb tense and Aspect. This model is based on the concept of Blended E-Learning Approach, an integration of traditional “chalk-talk” and online learning in order to provide educational opportunities that maximize the benefits of each mode of delivery and thus effectively facilitate student learning. This paper offers a comparative analysis of students’ conceptual understanding and achievement in the Blended E-Learning Approach and traditional classrooms. A pre-test- post –test design was used, utilizing quantitative and qualitative methods of research. Data triangulation plan was used to further verify the results of the pre and posttest. The results revealed substantial improvements in the technical aspect of language and achievement of students from Group B. It also showed that students who used the Modified Lab Rotation Model were more likely to contribute higher perceptive ideas during class discussion. However, further analysis indicated that the Modified Lab Rotation Model is not certainly superior over the traditional “Chalk-talk” approach since we included chalk-talk in the MLRM processes, thus not all lesson can be blended.

Keywords: Blended E-Learning, chalk-talk method, Modified Lab Rotation Approach

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## Introduction

Learning English verb tense and aspect is one of the difficult lesson in the new K-12 English Curriculum. For the past three years, English verb tense and aspect is consistently included in the least mastered skills topic in Grade Five English.

Based on the comparative test results of the First Periodical Test, English verb tense and aspect got an average of 55% which is 15% lower than the Division standard of 75%.

According to some students, they find it hard to understand the concept because their teacher used “chalk and talk” method and they find it so dull and boring. For average students, “chalk and talk” method maybe effective. The teacher centers 'chalk and talk' approach with a focus on the average student in the class and this is the most common method of instruction. Among the various established method of instructions, the “chalk and talk” method is the easiest, the most accepted, the safest, the oldest and the most basic method. (Steel,2012)

Even though, the 'Chalk and Talk' method of Instruction remains the best according to some scholars, (Routledge,2010), it's still obvious that “chalk and talk” is not enough to engage learning especially to the elementary pupils.

Based on the feedback of students, teachers need to use more teaching aids that can inspire student's interests in learning and also assist students in concept formation.

The primary goal is to improve student's learning in order to increase the percentage of mastery of this certain topic. The objective is to use technology to enhance the traditional chalk and talk lecture, not to replace it. Specifically, the wish to improve the understanding about verb tense and aspect with the use of technology and the traditional “chalk and talk” approach.

Blended learning is an approach of teaching wherein they combine technology and traditional approach like “chalk and talk” method.

One way of teaching blended learning is by using a Lab Rotation Model. It allows students to rotate through stations on a fixed schedule. (Station1 – Chalk –talk with teacher, Station 2- learning through digital activities) However, in this case, online learning occurs in a dedicated computer lab. This model allows for flexible scheduling arrangements with teachers and pupils, and enables schools to make use of existing computer labs.

In this model, the teacher will provide and create activities about verb tense and aspect that may be used in the computer laboratory, provided that the first station is the “chalk and talk” station.

As students learn more during the lecture and take better quality notes in the chalk talk station, they will be more productive during their seatwork, homework and study time if it is improved with an appropriate technology.

As an English teacher for 5 years, I saw how pupils transformed, same with



technology. They changed their interest and without technology innovation, learning for them is boring and dull. I want to try this Modified-Lab Rotation Approach to improve the percentage of mastery of my pupils in understanding the concept of verb tense and aspect.

### Action Research Questions

1. How does the Modified Lab- Rotation Model improve the conceptual understanding of verb tense and aspect?
2. What are students' perceptions of the Modified Lab-Rotation model in an elementary classroom?

### Action Research Methods

The participants of the studies are 62 Grade 5 students. The researcher used the simple random sampling. To have a verifiable data, triangulation plan was made; student's perception questionnaires, pre-test and post-test, student's interviews.

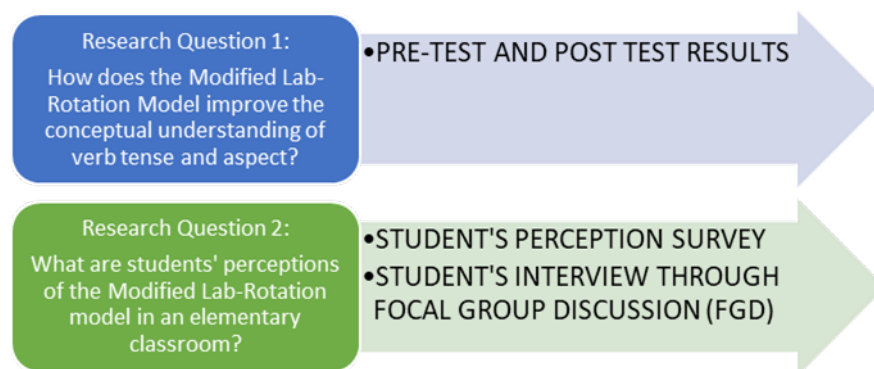


Figure 1  
Data Triangulation Plan

The pre-implementation phase of the study was the selection of 62 students. Parent's consent form where given to inform their parents of being part of the studies. The researcher used the true- experimental designs wherein the respondents were randomly assigned using the computer aided sampling. After assigning them into two group, Group A will not receive the treatment (control group) while Group B will receive the treatment (experimental group).

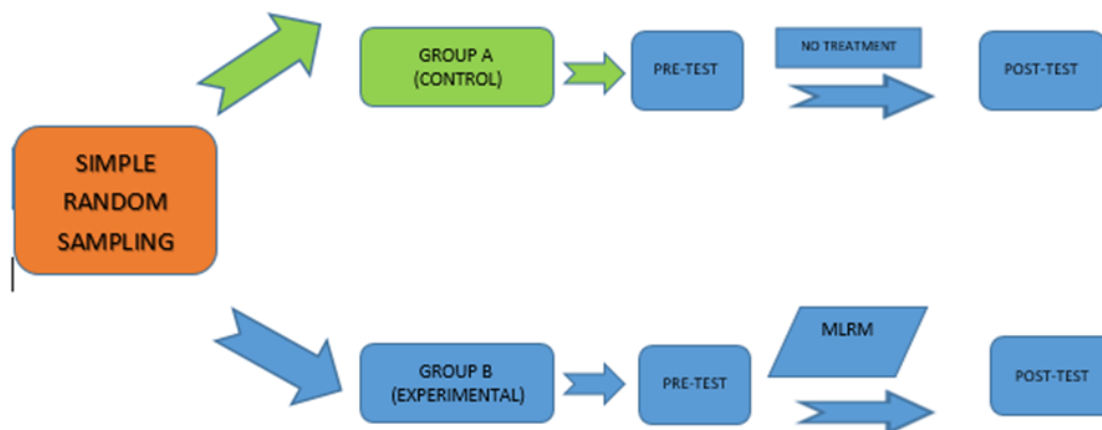


Figure 2  
Pre-test- Post –test Design

In the implementation phase, we conducted the studies for 2 weeks. First day will be the pre-test for both group. The pre-test/post-test where made and validated by the English Coordinator together with the six Master Teacher in our school.

For the next five days, the researcher, will teach the tenses and aspects of verb using the traditional “chalk-talk method” for 50 minutes. On day 7th day, they will have the post-test. Next in line is the Group B, for five days they will have the lesson of Aspects of verb using the Lab-Rotation Model for 50 minutes using a standard lesson plan, modified by the researcher. On their 7th day they will have the post-test.

The post-implementation phase, include the Focused Group Discussion, conducted in order to verify the Student’s Perception Survey.

All the collected data were charted, tallied, graphed and analyzed using the qualitative and quantitative statistics.

## Conclusion

All the collected data were charted, tallied, graphed, analyzed and treated statistically to find out how does Modified Lab-Rotation Model improve the conceptual understanding of students in the topic Aspects and Tenses of verb.

An English-based pre-test and post test was administered to the respondents to find out their baseline learning performance in the topic aspects and tenses of verb.

GROUP	PRE-TEST MEAN	PERCENTAGE OF MASTERY
A ( CONTROL )	10.78	35.94%
B ( EXPERIMENTAL )	10.44	34.79%

PRE-TEST mean and mastery level of both groups.  
Table 1

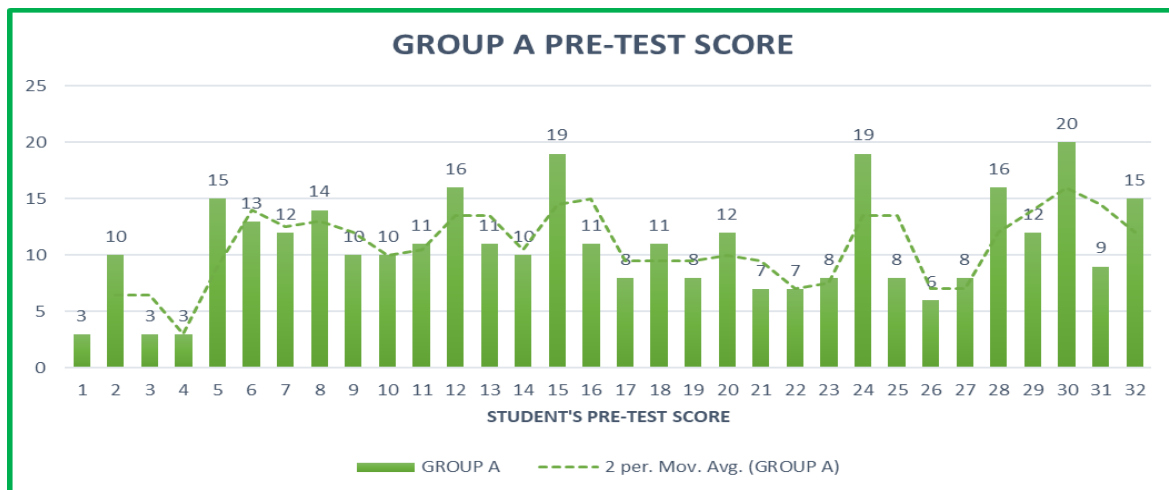


Figure 3

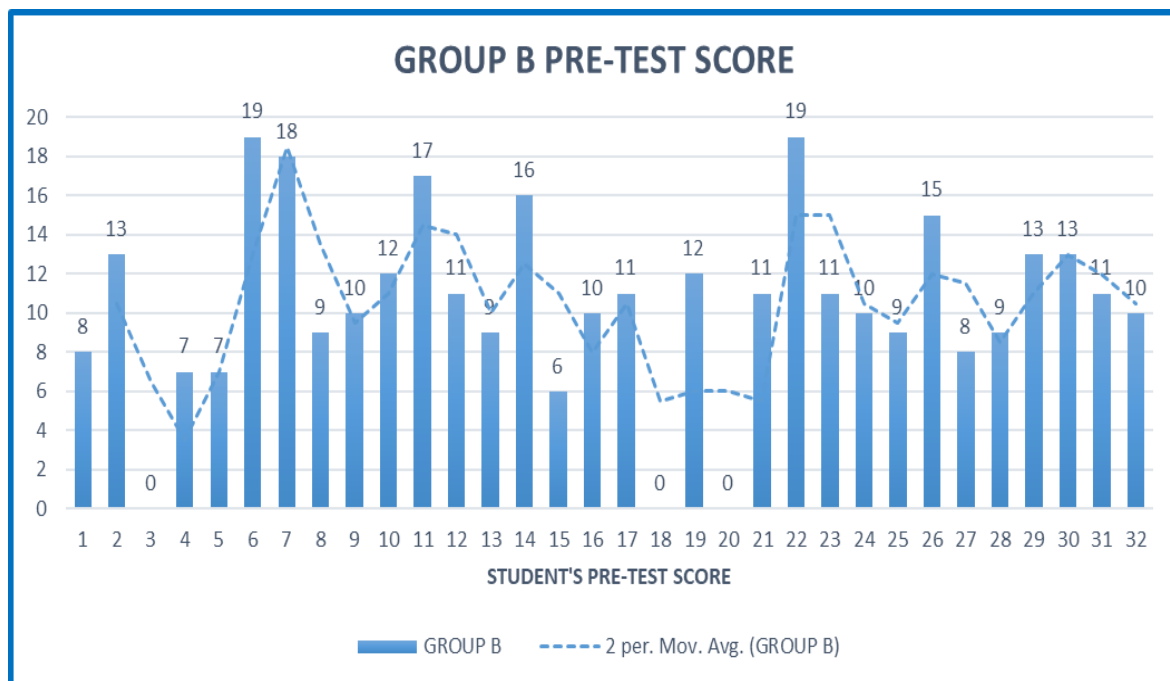


Figure 4

The above graph shows the individual score of the respondent from Group A and Group B. It reveals that only 1 student got 20 out of 25 items, and 3 of them got zero.

Mode reveals that most of the respondent got 10 ( n=10) out of 25 item pre-test. The results imply that at the beginning of the study the respondents (both groups) have a low conceptual understanding about the topic of Aspect and Tenses of verb.

**Post test**

After the implementation of the Modified Lab- Rotation Model ( MLRM ), the same English test was given as post-test to assess the improvement of their conceptual understanding about the topic. Table 2 and Figure 5 a and 5 b show the post-test results of Group A and B.

GROUP	POST-TEST MEAN	PERCENTAGE OF MASTERY
A ( CONTROL )	12.03	40.10 %
B ( EXPERIMENTAL )	21.31	71.04 %

Post test Result of the Two Groups  
Table 2

The results of improvement were evident after the implementation of the MLRM. The Group A has a mean of 12.03 with the PM of 40.10, while Group B has a mean of 21.31 and a percentage of mastery of 71.04 %, which is 36.25% higher than their pre-test.

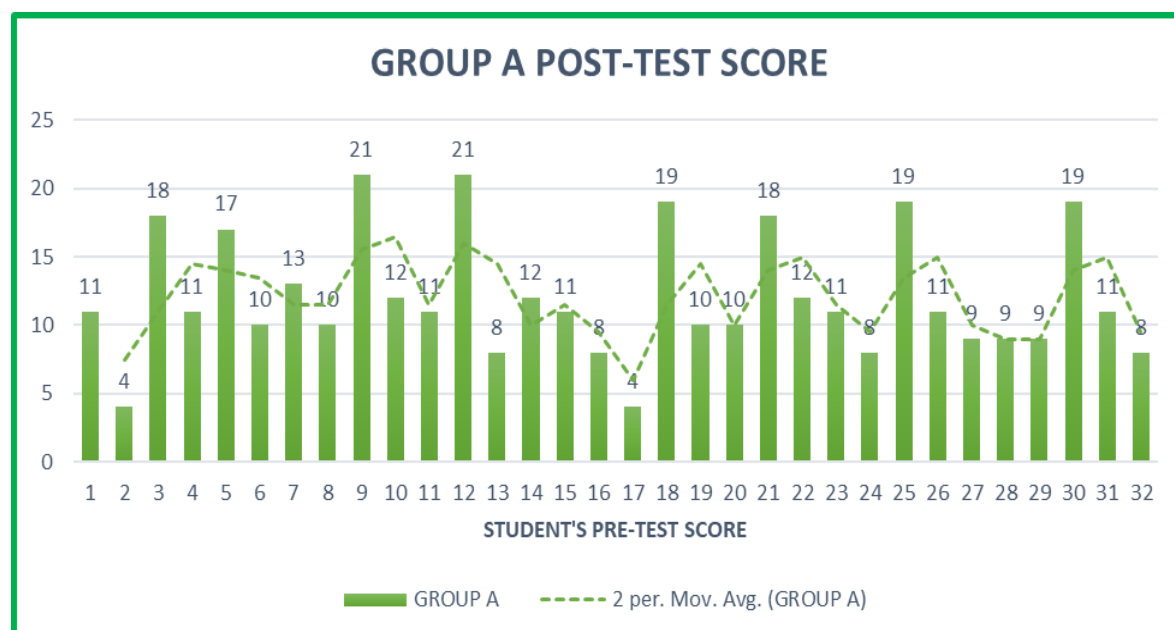


Figure 5 a

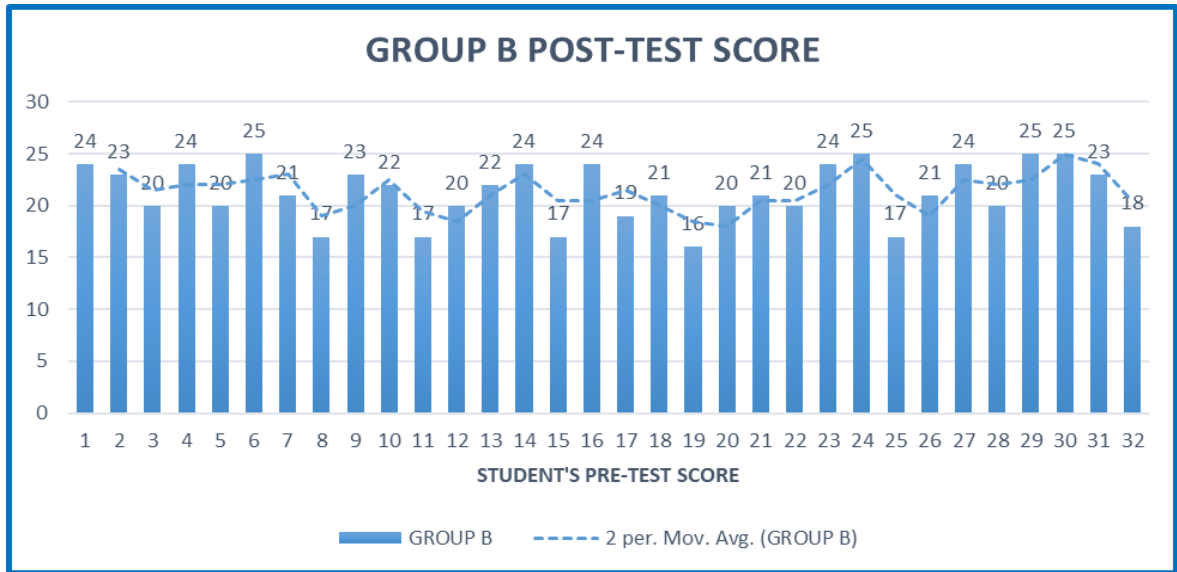


Figure 5 b

The figure above shows the individual score of the respondent, from the control and experimental group. Mode reveals that most of the respondent in the experimental group got 24 of 25 items. (n=24)

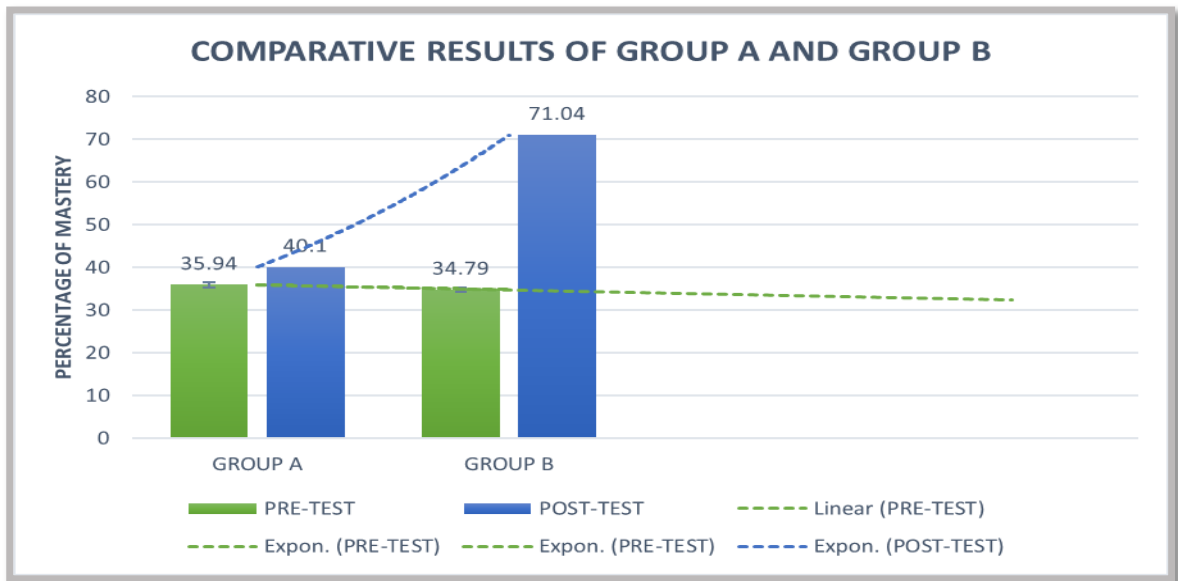


Figure 6  
Comparative Results of Group A and Group B Test

The figure 6 reveals the increase in the post- test of Group B. The used of Modified Lab-Rotation Model was able to improve the conceptual understanding of the Grade 5 students in the topic Aspects and Tenses of Verb. In order to validate the results of the post-test, the students, in particular gave their positive responses about their perception in MLRM through the reflective interview during the FGD or Focal Group Discussion, that the said approach improve their conceptual understanding about the topic.

In conclusion, the researcher found out that through the Modified Lab-Rotation Model: A Blended E-learning Approach, students registered a great improvement in

understanding one of the most difficult lesson in Grade Five English, which is the Aspects and Tenses of Verbs.

### **Reflection**

When beginning a blended learning model in any classroom, there are many things to consider and many things to learn. This was the case in this research as well. Looking back on the study, there were six lessons that I learned that are worthy of sharing with future blended educators.

First off, blended educators need to permit themselves to make mistakes and to learn with their students. Educators need to understand that they will not know how to do everything when they begin implementing a blended learning model.

Second, reflect on what they are doing, try something new, and understand that it will get easier as time goes on. It is difficult for a public school to do blended but since we are now in the 21st century we need to do some innovation using a low resource facility.

Third, it is important to make a lesson plan when using blended classrooms and teachers should be flexible and willing to accept change when it does not quite fit what their students need.

Fourth, the researcher has come to realize that blended-learning is happening in our classroom today. It just happened that we do not follow a certain procedure to achieve a better result. Blended learning is not laid-back. You need to check first if this kind of strategy will suit your learners. It not just merely using technology in teaching. It's the process and making the process standard. And how can you make the process standard? Making things standard we need to thoroughly review the needs, strengths, and weaknesses in a certain subject. After that make a concrete plan and follow the MLRM lesson plan that the researcher proposed.

Fifth, the researcher also realized that most of their students have difficulty in understanding the technical aspects of English lessons.

Lastly, not all subjects or topics can be blended.

### **Action Plan**

The researcher is planning to do the second phase of the action research, where in, we are going to encourage other teachers to do the blended learning in their respective subject area.

The researcher recommends the continuous implementation of this model in other learning areas.

Since, we used a modified lesson plan in this action research, we encourage our teachers to have a month long session in making a lesson plan for blended classroom. We encouraged other school to visit and observe the process of blended learning in our school.

The researcher, will incorporate other model that will suit the needs of the learner.

We encourage other schools to do the Modified Lab-Rotation Model in their school to assess the effectiveness of this model.

### **Acknowledgement**

Learning. In one word that is what research is all about. Last July 2018, I have been on a journey that has taught me a lot about Research and even more about perseverance. I did not make that learning experience alone, and for that I am thankful.

I am very thankful to work in an institution that has supported my research. Mark Ryan Romero and Ma'am Maricris Murillo, thank you so much for the happiness that we have share in Tokyo, Japan. It was indeed a moment to treasure. To Ma'am Isa Sibayan. Thank you.

To my family. Words cannot express how thankful I am for your support. Rodel, my husband, Amethyst Nichole and Summer Abbriana, my two precious daughters, all of your lives you have watched as I have pursued my research.

Above all, thank you to our Almighty God, this will not be possible without him.

**L.R.B.C**

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## Appendices

### STUDENT'S INTEVIEW QUESTIONS

You have been working on blended learning for a long time now. When you are in modified lab-station-rotations, you have learned all about your computers and how to move from the computer laboratory to the blended classroom. You have also learned how to use the computers to learn new things. We have invited you here today to share what you have learned. You are the experts at this, and we want to use what you know to help other teachers learn about blended learning.

Let me explain how this is going to work today. In front of you, there is a netbook. This netbook is going to record our conversation, so Mrs. Cruz can hear your great ideas later. When she listens to it, she will want to know who is speaking, so I am going to give you a number. Before you answer the question, just say that number, so Mrs. Cruz will be able to keep track of who is talking. She won't know your name, but she will know your number. Be sure to speak loudly and clearly and only one person at a time. Also, don't be afraid to say the good and the not so good things that you know about blended learning. We want to learn as much as we can about blended learning. While we are sharing what we know about blended learning, we will also be sharing our opinions, so there is no right or wrong answer. Everyone's opinion does not have to be the same. It is okay to politely disagree with someone else's ideas.

Do you have any questions? (Answer any questions the students have.) Let's get started.

1. What is the best part of blended learning using the modified lab-rotation model?
2. What is the worst part of blended learning using the modified lab-rotation model?
3. Have you had any problems during blended learning using the modified lab-rotation model? How did you fix them?
4. What advice would you give to students who have never done blended learning before?
5. Do you have anything else you would like to share about blended learning using the modified lab-rotation model (MLRM)?

**Thank you for sharing your thoughts with us today.**



***The Science of the Banana Cake; Development of Integrated Instruction on Science Knowledge and Skill by Using Hands-on Activities***

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**Abstract**

The baking activity is a science teaching enhancement course that is focused around using food to engage students in many topics in chemistry. The purposes of this study are to develop ways of integrating science knowledge and skills by using hands-on activities and to find out the effectiveness of a baking activity for teaching of concepts of the biomolecule and chemical reactions. The results showed that the scores for the posttests which are statistically significant difference of the control group (CG) (M=6.98, SD=0.84) and experiment group (EG) (M=8.67, SD=1.60). In pretest and posttest students were also asked to self-assess their knowledge by answering the following questions with "I am sure" and "I do not know". The number of students in the CG that assessed "I am sure" stayed about the same with a decrease in the answer "I do not know" at both answers "Right" from 41.46% on the pretest to 17.31% on the posttest and from 2.69 % on the pretest to 0.45% on the posttest, respectively. In contrast with the EG students, there was substantial improvement. Especially, "I am sure", encouraging is to increase in the number of right answers and decrease in the number of wrong answers. In the same way, "I do not know" results showed that the right answer increased after they learned with a baking activity. The results show that a baking activity can enhance students' understanding about conceptual knowledge and encourage students to realize the link between food and chemistry.

Keywords: Hands-on activity; baking activity; biomolecule

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## Introduction

Many schools have developed teaching and learning methods which are the embodiment of various knowledge and skills necessary for the 21<sup>st</sup> century. For teaching methods, instructors have an important role to engage students to discover, explore, design and solve real life problems. Instructors will also go from lecturers and become the facilitators of learning. Hands-on learning, an active learning method, is one of the teaching methods (Capraro R.M., et al., 2013). This concept aims to help students build their own knowledge and learning skills by doing the activities themselves (Ainsworth S., et. al., 2011).

Also, this concept provides learners with experience and continuing education. The literature on education has explored that hands-on learning is one of the skills to reinforce 21<sup>st</sup> century learning skills. Hands-on learning is a concept designed to support students' learning through self-dependence (Cheung, T., et. al., 2016). Students are engaged in learning through research, exploration and starting to do, which will become a skill vital for lifelong learning and professional sources.

The fundamentals of chemistry is a topic that has been a part of the scientific curriculum at both junior and senior school levels. Many concepts in chemistry seem complicated and difficult for the students to understand in terms of scientific knowledge. One reason for such difficulty is that some concepts deal with chemistry on a microscopic level and so this cannot always be understood by just looking at it (Kelly, R., et. al., 2005). Hence, instructors must transform and simplify non-visual concepts into chemical models or symbols to help students understand them clearly. Moreover, many instructors applied various activities in courses such as games (Seungkeun K., et. al., 2014), art (Eisenkraft A., et. al., 2006), cartoon (Özmen H, 2012), cooking (Brunosson A., et.al., 2013) and baking (Amy C. R., et. al., 2010) et cetera. that help students of all ages to enjoy science. Therefore, the selection itself of an activity is important, as a well-selected activity can have a positive impact on students and help them understand concepts (Schwartz K., 2015).

Food can be a useful teaching tool to develop understanding of science concepts and engage students in active learning (Brunosson A., et.al., 2013 and Amy C. R., et. al., 2010). Students can then link and apply chemistry to everyday life. Food science-based activity allows for an interdisciplinary approach to learning including chemistry, biomolecule, chemical reaction, microbiology, engineering and mathematics (Amy c., et. al., 2010; Harvard. J. A., 2015; Sharon K., et. al., 2004). For example, according to Brunosson A., et.al. (2013), cooking is a subject of increasing interest, within both society and science. The cooking statements from the food and meal science students and teachers show that there is a great interest in food, its ingredients and how to prepare a meal by using different types of cooking processes to create delicious food and meals. Amy C. R., et al. (2010), scientific concepts in the context of a familiar food, pizza, might be used interactively as a demonstration where children act out the role of the molecules. At the end of the lecture, a professional pizza maker twirls pizza dough, and we even serve pizza so that everyone can experience the food they just learned about. Based on audience feedback, the presentation generates excitement and curiosity to continue asking questions about science in everyday life. Moreover, the skills learned in the activities would also be instantly transferable to the students' own cooking opportunities.

From the specific research questions which were how science could be enjoyable, and so easier to make students understand the topic on the “biomolecule”. Therefore, the purposes of this study are to develop ways of integrating science knowledge and skills by using hands-on activities and to find out the effectiveness of a baking activity for teaching of concepts of the biomolecule and chemical reactions in secondary school.

### **Objective**

1. To determine and compare the effect of food science-based instruction in high school and how it can enhance students’ understanding of the biomolecule and chemical reaction concepts.
2. To investigate the effectiveness of teaching chemistry by integrating a baking activity into students’ scientific knowledge.
3. To encourage students to realize the link between food and chemistry.
4. To apply scientific knowledge in everyday life.

### **Methodology**

#### *Participant and assessment*

The research design included two groups which consisted of a control group (CG) and an experiment group (EG). The CG and EG were taught with lecture-based learning, hands-on based learning (food-science-based activity; baking activity) but with different to teaching approaches. Twenty-four students from the 12<sup>th</sup> grade of CG and EG were investigated. Students participated in a series of lessons, and activities over eight weeks. A pretest and posttest were also administered to measure student learning in this course.

#### *Course design*

We are developing and integrating several teaching methods in an effort to improve students’ attitudes toward understanding the biomolecule and chemical reaction concepts which involves a hands-on approach, including baking activities, question-based and lecture-based teaching. The course is designed based on 3 mainly expected outcomes which are 1. Understanding the biomolecule and chemical reaction concepts, 2. Understanding the meaning of food and chemistry and 3. Applying the scientific knowledge to everyday life. This course has also integrated 9 learning goals and soft skills. These are listed in below.

#### **Learning goals and soft skills related to biomolecule in the curriculum**

1. Learn the elements present in biomolecules and the difference between monomers and polymers.
2. List the four major complex biomolecules found in living cells, three of which are found on food labels and the basis for the grouping of biomolecules into those four groups.
3. For each group of biomolecules learn the name of its generic monomer (simple unit) and polymer (complex structure) and their function.
4. Carbohydrates:
  - 4.1 Identify their chemical elements and the difference between simple sugars and complex carbohydrates. On the food labels, what do sugar or sugar alcohol, and

fiber refer to?

4.2 Compare and contrast the structure and function of the following carbohydrates and where they are found: glucose, glycogen, starch, cellulose, chitin.

5. Proteins:

5.1 Identify their chemical elements and functional groups. Recognize the structure of an amino acid and the peptide bond that connects di-, tri, and polypeptides. Recognize the presence of 20 amino acids and that not all are essential amino acids.

5.2 Summarize the function of proteins and recognize the importance of the three dimensional shape of a protein on its function and the role of non-covalent bonds in maintaining the shape of a protein.

5.3 Explain protein denaturation and the effect of heat on protein structure and function.

6. Lipids:

6.1 Identify their chemical elements and learn their property of insolubility in water.

6.2 Identify the three groups of lipids.

6.3 Compare and contrast saturated and unsaturated fatty acids. Explain the importance of unsaturated fatty acids and why omega-3 and omega-6 fatty acids are considered essential. List sources of unsaturated fatty acids.

7. Develop a positive attitude and skill toward scientific experiments.

8. Understand and acknowledge links between science and food.

9. Develop capabilities in scientific thinking processes and practical skills.

Furthermore, the approach of the course design contains a variety of activities for the students to do. It is worthy to note that the instructor will attempt to integrate theory with practice during the teaching and learning process, and intends to keep some parts of the tasks as open-ended problems to challenge the students to study it themselves.

In the study, there were two groups of students: experimental group and control group. Both groups participated in the baking activity (seeing in figure 1.1 and 1.2). However, teaching approaches in each group were different. For the control group, the students were instructed with traditionally designed chemistry instruction. During the classroom instruction, the instructor used lecture and discussion methods and solved algorithmic problems to teach biomolecule concepts. For the experimental group, students participating in the baking activity were presented with lecture notes throughout this study. After that, the baking experience was used to strengthen the different chemistry concepts they were learning about. The posttest will be conducted immediately after they finish this final activity.

As seen from figures 1.1 and 1.2, the procedures of teaching consist of:

*Pretest and posttest;* Both the pretest and posttest were used before and after learning. The pretest was used to determine the students' background knowledge. It was very important to know students' background knowledge so it can then be used as a guideline to create suitable lessons. The posttest was also used to assess the students' gain in cognitive ability after learning through the new approach.

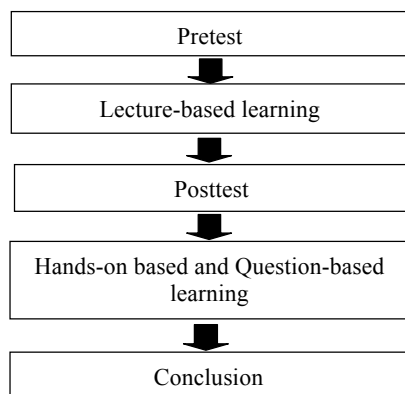


Figure 1.1 Course design of control group

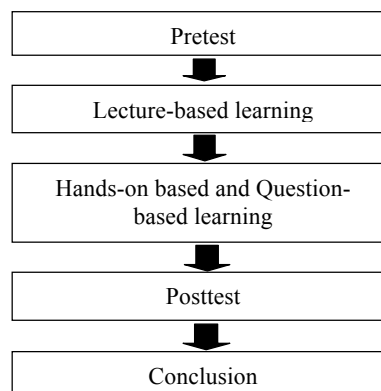


Figure 1.2 Course design of experiment group

*The chemistry lecture*; During the lessons, instructors tried to make a student-centered instruction based on discussions and oral explanations. The chemistry lecture process was used to explain the important concepts related to the biomolecule. The topics are listed below.

- 1) Carbohydrates
- 2) Proteins
- 3) Lipids

*The learning activity (baking activity)*; This activity covered 2 approaches of teaching and learning processes. These are hands-on-based and question-based learning. The hands-on-based learning was used to attract students' attention and encourage students to learn chemistry concepts by using baking as an activity. Instructors combined chemistry concepts, the cooking activity and laboratory activity to engage students and improve students' understanding of the biomolecule concept. The teaching and learning processes for the baking activity were divided into 3 steps as follows.

#### 1. Before the experiment.

All students were divided into 6 groups (6 experiments) which were;

- The baking temperature at 150 ° C (The large group A)

Group 1: took 10, 15, 20 minutes to bake, a regular recipe.

Group 2: took 10, 15, 20 minutes to bake, a regular recipe without lime.

Group 3: took 10, 15, 20 minutes to bake, a regular recipe without baking powder and baking soda.

- The baking temperature at 180 ° C (The large group B)

Group 4: took 10, 15, 20 minutes to bake, a regular recipe.

Group 5: took 10, 15, 20 minutes to bake, a regular recipe without lime.

Group 6 took 10, 15, 20 minutes to bake, a regular recipe without baking powder and baking soda.

The baking time and temperature have an impact on the morphology and the texture of cake and on its quality. This baking activity was to compare the influence of temperature with different functional ingredients (baking soda, lime and baking

powder) and on the physical characteristics of a banana cake (color, weight, height and diameter).

## 2. Experimental procedure

Each group of students was allowed to make the banana cake according to the ingredients and description as follows.

The dry ingredients		The wet ingredients	
1. All purposes flour	115 g	1. Milk	¼ cup
2. Cake flour	115 g	2. Lemon juice	1 teaspoon
3. Baking powder	2 teaspoons	3. Unsalted butter	150 g
4. Baking soda	1 teaspoon	4. Ripe banana	300 g
5. Sugar	160 g	5. Egg	3 eggs
6. Salt	¼ teaspoon	6. Vanilla extract	1 teaspoon
7. Cream of tartar	¼ teaspoon		

Description: Preheat the oven to 150 ° C (No.1) and 180 ° C (No.2)

- 1) Whisk flour, baking powder, and baking soda together 2 times, set aside.
- 2) Separate the egg yolk from the white, set aside.
- 3) Add lemon juice to milk, set aside.
- 4) Using a handheld mixer to beat the butter on high speed until smooth and creamy about 1-2 minute.
- 5) Add the eggs yolk and the vanilla extract in No.4. Beat by handheld mixer on medium-high speed until combined.
- 6) Add the banana in No.5.
- 7) Add No.1 and No.3 in No.6, stir until well mixed
- 8) Using a handheld mixer to beat the egg white with cream of tartar until smooth and creamy.
- 9) Add No.8 in No.7, stir until well mixed, set aside.
- 10) Scoop the No.9 into small cups, weight 30 g. Baked at the temperature and time specified in each group.

## 3. After the experiment

In question-based learning, the instructor tried to engage students with questions and class discussion. Instructors asked students to make observations about the physical characteristics of the banana cake (weight, height, diameter shape, color, texture, mechanism of forming, structure and properties of ingredients). Students brainstormed and took part in to asking the questions regarding the observation of the baking activity with recorded whole questions for discussion. Finally, they discussed and shared their previous and new knowledge together. They also helped each other respond to the questions. Moreover, the teacher emphasized important points of the biomolecule topics in order to help make students understand the topic more clearly.





Figure 2 Baking activity in Chemistry class

## Result and Discussion

The baking activity is a science teaching enhancement course that is focused around using food to engage students in many topics in chemistry. In this section the results are shown for our teaching and learning activity consisting of 2 sections which are pre-posttests and questionnaire results. In pretest and posttest students were asked to self-assess their knowledge by answering the following questions with “I am sure” and “I do not know” that were as follows;

Question Topic	Answer	Assessment	
		I am sure	I do not know
What kind of biomolecules of cake flour, egg, unsalted butter, sugar and milk? (Protein, Carbohydrate or Fat etc.)			
How does it work of sugar, salt, unsalted butter, milk, lemon juice and egg in bakery products?			
What is the emulsion?			
Why is the wheat flour in the bakery products?			
What is the process of baking, protein denature?			
What is the similar and difference between fat and oil?			

The descriptive measures of tests for the control group (CG) and the experiment group (EG) are given in Table 1. One way (factor) ANOVA revealed no statistically significant difference between students' mean scores of pretest for the CG ( $M=6.56$ ,  $SD=1.14$ ) and the EG ( $M=5.62$ ,  $SD=2.25$ ) at the p-value of 0.078 ( $> 0.05$ ). This reflects similar backgrounds of both groups' students in respect to biomolecule and chemical reactions knowledge before integrating the baking activity.

TABLE 1: Pretest and posttest score of on students' knowledge

Group	Test	Mean $\pm$ SD	N	p-value
Control	Pretest	6.56 $\pm$ 1.14 <sup>ab</sup>	24	0.157
	Posttest	6.98 $\pm$ 0.84 <sup>b</sup>	24	
Experiment	Pretest	5.62 $\pm$ 2.25 <sup>a</sup>	21	0.000*
	Posttest	8.67 $\pm$ 1.60 <sup>c</sup>	24	

\* Values followed by the same letter in the same column are not significantly different ( $P > 0.05$ )

The posttest score of students' knowledges also summarized in Table 1 were quite positive in each group. The mean score of posttests showed a statistically significant difference of the CG (M=6.98, SD=0.84) and EG (M=8.67, SD=1.60) with respect to the achieved chemistry knowledge ( $p < 0.05$ ). This means that there was a significant mean difference between the students' knowledge in the CG and EG with respect to understanding of biomolecule and chemical reactions.

Many previous literature reviews reported that students who learned using hands-on manipulative activities had higher science achievement and science attitude scores than students who learned through traditional lecture, reading and discussion activities (Özmen H., 2012 and Capraro R.M., et al., 2013). In the lecture section, students learned chemistry concepts such as protein, carbohydrate and lipid. It was more abstract. Students could not visualize or understand the chemistry concept or application of the biomolecule. After the students had finished the learning activities, the results from students' discussion and posttest were presented which showed students understood the chemistry concepts more clearly. For example, students had more to discuss in terms of the different physical properties, which can be considered as characterizing the banana cake, the porosity is important not only for the mechanical properties of the crumb but also for moisture transfer within the product. Other aspects may also be considering how the ingredients interact with each other such as starch characteristics in the flour sifting process, dripping lemon juice into milk, butter beating, adding the eggs into the butter and sugar and et cetera. The hands-on activity can create a new learning environment that can help students to construct their knowledge. Moreover, question-based and lecture-based learning can also develop logical and inquiry skills.

In pretest and posttest students were also asked to self-assess their knowledge by answering the following questions with "I am sure" and "I do not know" as shown in Table 2 we present the self-assessment results in each group.

Group	"I am sure"						"I do not know"					
	Right		Half-Right		Wrong		Right		Half-Right		Wrong	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Control	41.4	17.3	26.4	31.2	32.1	51.4	2.69	0.45	13.7	19.5	66.9	63.3
	6	1	3	7	1	2			1	4	4	4
Experiment	16.2	33.8	40.9	46.2	42.8	19.8	0.25	16.6	18.1	19.0	81.6	47.6
	9	6	0	5	1	9		7	4	5	2	2

TABLE 2: Percentages of pretest and posttest score on students' assessment

The number of students in the CG that assessed “I am sure” stayed about the same with a decrease in the answer “I do not know” at both answers “Right” from 41.46% on the pretest to 17.31% on the posttest and from 2.69 % on the pretest to 0.45% on the posttest, respectively. While, the answers “I am sure” and “Wrong” at 32.11% on the pretest to 51.42% on the posttest. One possible explanation could be that students were not interested in the subject and so it was difficult for them to visualize. Another may be that some students did not enjoy the methods in which the lessons were taught, that is having only a chemistry lecture or lecture-based learning which could have had an impact on their interest. In contrast with the EG students, there was substantial improvement. Especially, “I am sure”, encouraging is to increase in the number of right answers (Pretest = 16.29%, Posttest = 33.86%) and decrease in the number of wrong answers (Pretest = 42.81%, Posttest = 19.89%). In the same way, “I do not know” results showed that the right answer increased after they learned with a baking activity (Pretest = 0.25%, Posttest = 16.67%). From students’ interviews, their confidence increased compared with before doing the activity. However, they were still not sure how to assess the “I am sure” answer. Moreover, the number of “I do not know” of wrong answers decreased. This means more confidence in the student’s ability to try and answer the question even if the answers were wrong. At this percentage it is more important to increase student’s confidence and excitement concerning the baking activity rather than getting all the answer 100% right. The majority of students felt this baking activity allowed them to increase their confidence in respect to the chemistry achievement from pretest to posttest. Özmen H., et. al. (2012) report that hands-on nature of the practical works and concept cartoons were particularly helpful for the students’ understanding of the concept of acid-based in chemistry. Moreover, a literature review gives us some information about active learning sometimes called inquiry learning, which engages the students and requires them to take part in the learning process through activities and student-driven studies. Passive learning consists of traditional lecture-based teaching. This includes practice problems or book questions. Passive learning may suit some learners some of the time, but it is ineffective for many learners much of the time (Michel N., et. al., 2009).

## Conclusion

The results show that a baking activity can enhance students’ understanding about conceptual knowledge and encourage students to realize the link between food and chemistry. Students in EG performed better on the posttest compared to the students in CG. For example, students can conclude that the relation between the structure of the biomolecule and properties that a carbohydrate had more oxygen atom to improve solubility, whereas a lipid had less oxygen atoms. To mix them together, the phospholipid in egg yolk was used to emulsify them. Many recipes require fats and water-based liquids to come together in a solution, even though they repel each other. This kind of solution is called an emulsion.

The strength of this hands-on activity was that it allowed students to create something they could call their own. This in turn motivated the students to spend many hours outside of class baking banana cake which led them to ask higher level questions. The hands-on activity has a positive effect on students’ baseline knowledge. The use of hands-on activity in solving the real problems provided students with a great opportunity to use their chemistry curricula to illustrate concepts that were taught in the classroom and difficult for students to visualize. Therefore, this project sparked

creativity in the students and motivated them to understand the chemistry behind baking banana cake. Students significantly improved their knowledge and skills.

### **Recommendation**

Researchers may improve our approach to biomolecule concepts by integrating other food activities and new teaching methods. Moreover, researchers may also improve assessment methods by using pre and post-interviews to gather more information about students' views and conceptions related to biomolecule for improving their understanding about the actual concepts. This further step would be to both rework and refine the curriculum based on the posttest and interview results and then implement the curriculum into a larger setting in other schools.

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## *Gathering Tacit Knowledge through Oral History*

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The Asian Conference on Education 2019  
The Official Conference Proceedings

### **Abstract**

The University of Malaya is one of the earliest campus established in the country. Over the years, many of its scholars including professors and staff have retired; many who are distinguished and reputable experts in their fields. Hence, there is a need to gather tacit knowledge from these individuals rapidly before the information are gone forever, particularly non-quantifiable knowledge about social interactions that explained how decisions were made, how groups worked together and how communications flowed so that this crucial information can be passed on to future generations for reference and guidance. Such knowledge while unpublished, are commonly conveyed by narrative, although it is impossible to represent the total knowledge explicitly. This paper provides an insight on the oral history project conducted by the University of Malaya Library and how the 'tacit knowledge' was gathered. It examines the challenges in developing such spectrum of knowledge and discusses how the issues can be overcome. It is also hoped that through oral history, the depth of understanding from various perspectives and different situations could be further heightened. Furthermore, individuals are able to share their stories in their own words based on their own interpretations which are then recorded and preserved.

Keywords: oral history, tacit knowledge, interviews

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## Introduction

This paper examines the oral history project undertaken by the librarians of the University of Malaya to gather and document tacit knowledge among retired Professors and other experts according to their subject expertise. Oral history here refers to a collaborative process of recorded interviews (audio and/or video) between a narrator with personal experience of significant events and an interviewer (librarians). Some organizations have an official process for recording *lessons learned* so that others can benefit from experiences in which they did not participate. These are real and relevant case studies which are conversational in nature in order to capture and transmit tacit knowledge. It is considered as an effective way to spread knowledge gained from experience (Malamed, 2017).

Tacit knowledge is rarely embedded in an organization's processes and procedures for continuous improvements. Without an awareness of it, tacit knowledge can be inconsequential, neglected and vanished. To avoid this, it is important to raise awareness of the organization's tacit knowledge store and make part of it if not all, explicit through knowledge management strategies.

Furthermore, when people with expertise leave a job, the organization often loses critical tacit knowledge because it was not passed on to others. This knowledge gap can be costly and time-consuming or impossible to replace (Leonard, 2014). Organizations need ways to glean and disseminate the tacit knowledge of experts for their own preservation. Tacit knowledge transmission is essential to an organization's future success.

Narration via the interview technique has been used for thousands of years but its fusion with technology, the tape-recorder, brought about oral history as it is known today. The origins of the modern oral history can be traced to a programme initiated by a North American journalist and oral historian Allen Nevins at Columbia University in 1948. His project, the tape recording of spoken memories of white male elites, became the first organized oral history project. Ever since, the movement has mushroomed, with hundreds of oral history programs underway around the world (Davis, 1977).

The oral history project in South East Asian began in the 1960s with each country individually initiating its own oral history programme. In Malaysia, a number of higher learning institutions had begun to introduce oral history in their respective course offerings. Among them are Universiti Teknologi MARA (UiTM) and Universiti Kebangsaan Malaysia (UKM). The outcome of the project is the recording and transcription of interviews which are kept at relevant departments. Its objective is to increase students' theoretical and practical knowledge of oral history and to enable them to be involved in projects that document historical event. The oral history methodology was also introduced at USM through courses like The Socioeconomic History of Malaysia and the Japanese Occupation in Southeast Asia. In 2015, the Malaysian Oral History Association was set up in Shah Alam with the objective of collaborating with other agencies to carry out oral history studies in Malaysia. Mahani (2018) however commented that oral history projects merely exist within the confines of a particular institution and remain inaccessible to other researchers or the interested public.



In highly developed countries, oral history is highly applauded because of its ability to bring out and preserve the silences of traditional history. Singapore, for example, had executed its oral history program in a systematic manner with a comprehensive interview framework, selection of interviewees and respondents who are appropriate to the topic, high quality audio equipment and suitable place to store audio and visual testimonies. Since 2018, it has undertaken more than 4,000 interviews ranging from politicians to hawkers, medical personnel, war prisoners, artists and entrepreneurs.

Mahani (2018) also suggested that much of the problems faced by oral history in Malaysia are due to lack of manpower, leadership, finance and lack of strong interest from the top, be it the government, department, unit etc.

Oral history constitutes history that revolves around society itself. It provides an opportunity not only to leaders, but also to the public who are themselves part of a particular historical episode. This methodology does not only fill the void in official records but also challenges conclusions that are based on these documents. More importantly, it provides a “sense of belonging to a place or in time” to the entire community; not only for the experts but also for the students or the community. As intimated by Thompson (1978), they will not only learn about their history but in fact, they can write their own history. Oral history returns this history back to society using their own words. In retelling the past, this methodology indirectly helps society and the new generation to shape their future.

## **Background**

Founded on 28 September 1905 in Singapore as the King Edward VII College of Medicine and on 8th October 1949, it became the University of Malaya with the merger of the King Edward VII College of Medicine and Raffles College in 1928.

The University of Malaya derives its name from the term 'Malaya' as the country was then known. The Carr-Saunders Commission on University Education in Malaya, which recommended the setting up of the university, noted in its Report in 1948: *"The University of Malaya would provide for the first time a common centre where varieties of race, religion and economic interest could mingle in joint endeavour ... For a University of Malaya must inevitably realise that it is a university for Malaya."*

The growth of the University was very rapid during the first decade of its establishment and this resulted in the setting up of two autonomous divisions on 15 January 1959, one located in Singapore and the other in Kuala Lumpur. In 1960, the government of the two territories indicated their desire to change the status of the Divisions into that of a national university. Legislation was passed in 1961 and the University of Malaya was established on 1st January 1962.

On June 16th 1962, University of Malaya celebrated the installation of its first Chancellor, Tunku Abdul Rahman Putra Al-Haj, who was also the country's first prime minister.

Since it is the earliest university in the nation, it has over a century of journeys with stories to be told. The Library's oral history initiative seeks to safeguard these voices and ensure that these narratives are not lost. In the University Management Committee Meeting on 5th March 2019, the Library was asked to initiate this project

and document *tacit knowledge* among retired Professor and other experts according to their subject expertise.

### Statement of the problem

The higher learning institutions are changing rapidly. Strategic visions and goals have to be revisited and reevaluated so that these are aligned with the institutions' priorities. A generational shift can also be seen as the Baby Boomers move toward retirement, while a new group of academic and non-academics enter positions of leadership in the institution.

As the new generation creates the future, it is useful to remember that progress is rarely a smooth progression of guaranteed success, but rather a series of trials and errors, wrong turns, frustrations, insights, major hiccups and setbacks. Much can be learned from previous mistakes. The young generations particularly the Millennials can learn and value the sacrifices from the previous generations particularly the Baby Boomers and Gen-X.

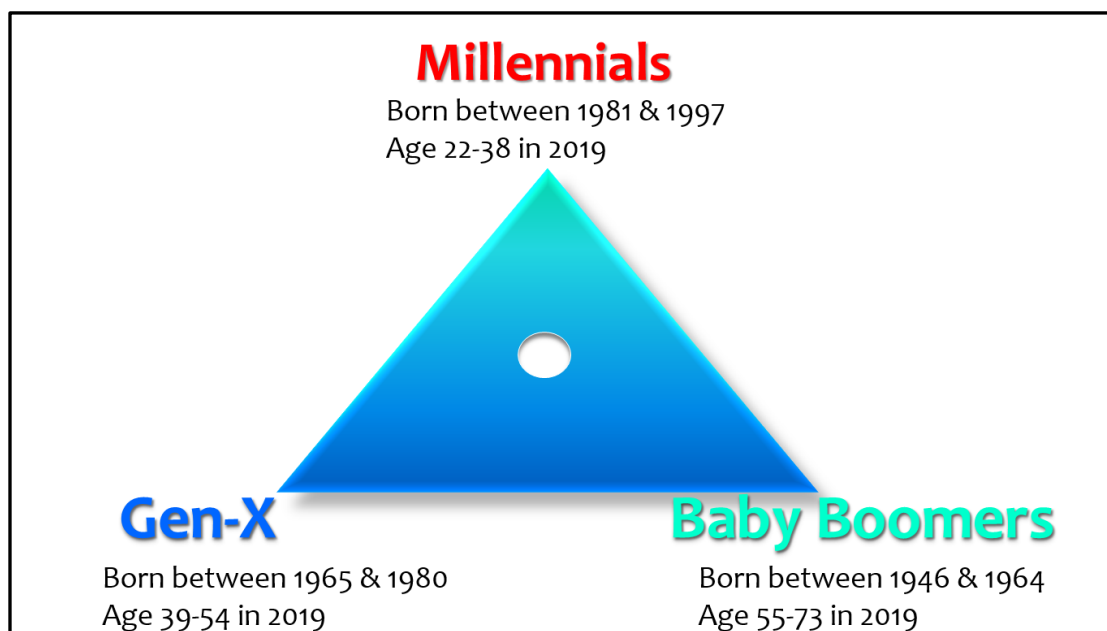


Figure 1 : The higher learning workforce

The higher learning industry is starting to experience a gap in knowledge and collective memory as those retiring are leaving the field with years of experience. There is a need to document the lives and experience of these groups in order to help prepare the next generation of leaders.

One approach to documenting this knowledge is through gathering life histories. Life history is an aspect of oral history, “that area where memory, myth, ideology, language, and historical cognition all interact in a dialectical transformation of the word into an historical artifact” (Harris and Grele, 1985). Through life history, informants relate not only their life experiences but also their reflections on what they have learned and how their actions and presence may have influenced the others. By gathering more than one life history, “the wider meaning of the life story, however, is conveyed not by the individual anecdotes, but by their weaving together” (Ashplant,

1998). Oral history has the potential to break down barriers between generations, between educators and students, between educational institutions and the world outside.

This paper will share the challenges and experiences of establishing an oral history project specifically in an academic library setting.

### The approach

Upon request from the University Management Committee in March 2019 to gather tacit knowledge among the retired professors and other prominent non academicians, the library then held a two-day workshop to train a team of librarians and technicians. The workshop illustrates ways to conduct oral history according to the standards by skilled and qualified trainers from the Malaysian Oral History Associations. The training consisted a series of theories and practical sessions where participants had a chance to act as narrators and interviewers and the roles were then commented upon by the facilitators for improvements.



Figure 2 : Training session

Once the team are back in the office, preparations and planning for the first interview session began which was with the Protom Chairman (Retired Professors Committee), Prof Emeritus Dato Dr Isahak Haron. Dato Isahak, aged 79, is a renowned academician in the education field in the country. This interview is currently available for viewing on the web site ([https://youtu.be/\\_iL7ykO5agI](https://youtu.be/_iL7ykO5agI)).

Before the interview session, the team had meticulously did background researches, prepared the questions, set the date and ensured all the equipments are in working order. The interview was held in a private room with minimum noise and interference. Few members of the team came to support the session and also to make the narrator felt comfortable and welcome. Some of the subsequents sessions were held at the narrators' home to make them feel at ease in their own surroundings.



Figure 3 : Oral History equipments

The taped interviews are then edited, processed and archived to become aural record for future generation.

The most tedious and difficult part of the oral history project is editing and transcribing. Editing the taped interviews require special skills in software manipulation such as Adobe Premiere while the transcription is painstakingly done by listening and writing the conversation verbatim.

Some of the interview sessions lasted more than sixty minutes so the team had to look for suitable storage to keep them as well as provide backups.

Once everything is up and ready, the team then explored ways to promote the project. Snippets of the recordings were uploaded into Youtube while the audio recordings were blasted using a Podcast platform as shown below.

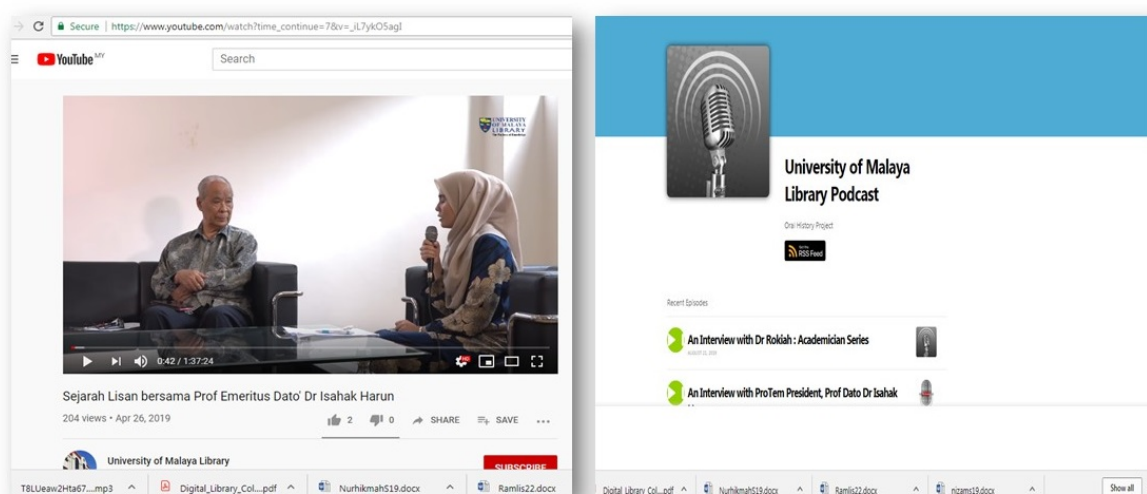


Figure 4 : Promotion

## Findings and Discussion

The Oral History project revealed the following :

- Majority of the team members who conducted the interviews enjoyed the experience and learned the significance of many events and were able to relate with them. The sessions were engaging and they gained profound insights out of it.
- Some of the early ideas conceived by the retired Professors have become part of the nation's policy
- How the setting up of the country's first STD & HIV Centre came about amidst the taboo back then
- How policies on education system were formulated
- Figure 5 below summarised the entire process. The interviewers constantly reflected lessons learned during the sessions by deciding and evaluating the conversations which happened both ways. Basically, to a certain extent it has an impact on decision making process, judgement and evaluation.

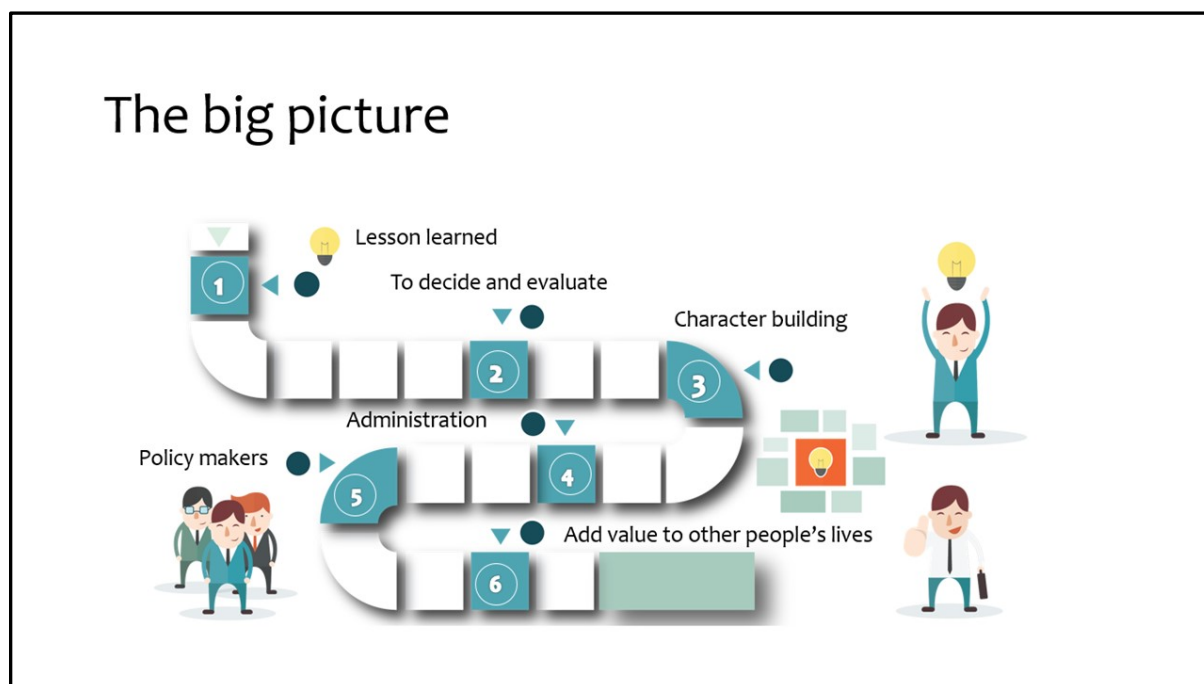


Figure 5 : The big picture

## Challenges and Opportunities

Several institutions conducting oral history are facing similar challenges. Generally, the following factors pose challenges to the oral history initiative :

- a. Lack of technical skills  
Not many librarians possess video editing skills and have to rely on existing technical staff. This tend to delay the project because the same staff have to set

precedence according to a task's urgency. Since no deadline is set for the accomplishment of the project, it tends to be on the last in the list of priorities.

It is suggested that all team members be trained with basic video editing skills so that the oral history project of an individual can be concluded faster instead of depending on the technical staff indefinitely and causing much delay.

b. Lack of manpower

Again, limited number of manpower in the team which is conducted on a project basis rather than a set of annual key performance indicators (KPIs). With staff multitasking, the project is not given priorities that it should. Without adequate manpower, it is difficult for the project to be implemented in a systematic manner because those involved are burdened with other responsibilities.

Conducting oral history will indirectly improve research skills. If team members can be made to understand that it builds capabilities of recording oral history (asking questions, listening, empathising and otherwise responding appropriately, applying historical knowledge, awareness of self and others, including showing an ability to acknowledge difference, and producing a high quality recording). Another suggestion would be to collaborate with institutions that teach oral history as part of its academic programme. The end result can be archived in the library for collection development which could be used by the public for research purposes.

c. Difficulty in transcribing

Creating transcripts are extremely time consuming and tedious. It may require anywhere up to eight hours or more to transcribe a single hour of recording (roughly 10 to 15 minutes of transcription for each minute of audio). This has appeared to be a considerable time investment especially when there are a number of interviews held in the project.

Various literatures have shown that since the 1980s there has been a heavy emphasis on the *oral* nature of oral history. The recorded interview has therefore become the primary document of the discipline. Reasons for this centre on the difficulty of capturing the essence of spoken communication in a written format. It is difficult to accurately recreate all the nuances of a spoken conversation in writing; conversation and text are fundamentally different forms of communication. These difficulties have been the focus of much oral historical methodological consideration and there is a rich and varied literature on transcription.

As such, perhaps the initial emphasis would be to focus on the audio and video recording rather than to transcribe the interviews so as not to delve too much time into it that it renders the project stagnant.

d. Lack of awareness

The return on investment (ROI) of oral history is not immediate. An interview may only become worthy and invaluable after the narrator is no longer alive. Or, it could be useful and searched for by many, 5 or ten years down the line. In the

meantime, fighting for the meagre budget and team members who are committed can be a struggle if its value is not highlighted.

Promotion, intrinsically, plays a vital key. It is indeed worthwhile to publicize and market its significance at every possible opportunity there is. One recommended avenue would be to organize conferences or workshops which serve as venues for oral historians to narrate their experiences, share lessons they have learned and exchange ideas about the method. Through these forums, scholars may also analyze their activities to recognize basic principles that would “provide a broader conceptual framework with which to understand goal oriented, socially and culturally influenced” practices (Santiago, F, 2017).

e. Narratives on crippling setbacks

Since majority of the team members have just started conducting the interviews, most of the questions are considered ‘safe’, over the surface and did not dig deeper. Questions on crippling setbacks if any should also be asked and how they overcame the situations especially among the retired top managements so that it can be valuable “lessons learned” for future generation so as not to make the same mistake that could tarnish the institution’s name and image.

## **Conclusion**

This paper has discussed the oral history project conducted by the library and hoped that it contributes to the body of knowledge since very few has been written on the topic locally.

In conclusion, collaborative research through oral history has brought the academicians and librarians into a much closer, less hierarchical relationship and the dependence have become mutual in the process. The narrators brought with them special experience of the organisation culture at a particular time in its history and provided insight into significant events but relied on the support of librarians as organizers and field workers in the spirit of intellectual co-operation.

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***Information and Communications Technology Competencies and Integration  
Practices of Public Secondary School Teachers in the Philippines***

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**Abstract**

This study investigated the ICT competencies and integration practices of 573 public secondary school teachers in the Philippines, particularly their level of ICT competencies, extent of ICT integration, challenges encountered, and their perceptions on ICT integration. The study employed a descriptive-correlational research design which explored the significant relationship between teachers' level of ICT competencies and their perceptions on ICT integration, and the teachers' extent of ICT integration and their perceptions on ICT integration. Pearson Product Moment Coefficient Correlation was used to analyze the foregoing relationships. The findings revealed that: (1) there is a significant relationship between the level of ICT competencies and the perceptions on ICT integration, and (2) there is no significant relationship between the extent of ICT integration and the perceptions on ICT integration. With the foregoing findings, the researcher proposed recommendations that are relevant to the public secondary school teachers' implementation on ICT integration.

**Keywords:** ICT Competency, ICT Integration, Public Secondary School Teachers

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## Introduction

The end of the 20th and the beginning of the 21st century saw a transition from industrial to an innovative type of economy based on the priority of new knowledge, production of the new type of information. It has caused the necessity of modernization in the education sphere (Karpovaa, et al., 2016, p. 11228). One of this modernization in education is the proliferation of Information and Communications Technology (ICT) in the teaching and learning process. ICT in education plays an important role in today's new learning landscape. Advances in ICT and its accessibility, provide opportunities for its use in education.

The Department of Education (DepEd) in the Philippines has made initiatives and plans to attain the goal of improving the quality of education through enriching the teaching and learning process by coming up with the ICT4E Vision: "21st Century Education for All Filipinos, Anytime, Anywhere." In which an ICT-enabled education system that transforms students into dynamic lifelong learners and values-centered, productive and responsible citizens (DepEd, 2008, p. 1). It was in the same plan where DepEd states that in order to achieve the abovementioned vision in the next five years, DepEd aims to: (1) completely integrate ICT into the curriculum; (2) intensify competency-based professional development programs; (3) establish necessary ICT infrastructure and applications; and (4) develop processes and systems that ensure efficient, transparent and effective governance.

With the aforementioned aims, it is important to note that DepEd is really trying their best to integrate ICT in education because this will be an important component as they formulate and implement an effective and enhanced K to 12 Basic Education Curriculum (BEC), particularly in the teaching and learning process. In order to effectively implement the enhanced K to 12 BEC, students, school heads and most especially teachers, who are the facilitators of learning, should attain a certain level of competence in the use of ICT.

The integration of ICT in education is a procedure in which instructional technologies such as computers and software are applied regularly to support both teaching and learning across levels and subject matter (cited in Eib and Mehlinger (1998) by Leng, 2008, p. 2). It is important to assure that ICT integration should be utilized effectively and efficiently by the teachers to cater to the needs of 21st-century learners and be able to acquire 21st-century skills. Having that in mind, teachers should also be given the utmost importance since they will be playing an important role in today's learning environment. According to Bonifacio (2013), "Integrating ICT into teaching and learning has become a great concern for many educators in developing countries like the Philippines. ICT must be used and taught in powerful and meaningful ways. With its rapid development, educators should find ways to integrate technology in the learning process" (p. 1). In this way, teachers' role is crucial in the sense that teachers should find ways and means to integrate ICT meaningfully in the teaching and learning process. Also, teachers need to have the ICT competencies to integrate ICT efficiently in the teaching and learning process.

This study is concerned with the ICT integration among public secondary school teachers in a particular province in Mindanao, specifically their level of ICT competencies, the extent of ICT integration, challenges encountered, and their

perceptions of ICT integration. The meager budget for ICT in some areas, coupled with lesser number of teachers professionally developed towards ICT, there is indeed a need to study on the integration of ICT in the public secondary schools, and explore some issues and practices relative to the ICT integration program implementation with the K to 12 Basic Education program. The aforementioned statements also supported by the study of Espinosa and Caro (2011) which states that “schools in the provinces in Mindanao have the lowest incidence of computers specifically the regions IX, X, XI, XII, CARAGA, and ARMM... In public secondary schools, computer training is introduced only as an area of study in Technology and Home Economics (THE)” (p. 342). Further, since ICTs are now common fixtures in communities, workplaces, and schools all over the world (cited in Coiro, et al. (2008) by Hutchison, 2009, p. 17) and even in the Philippines’ Department of Education, it is important to determine how teachers are extensively integrating ICT into their classrooms across disciplines and what are the challenges they face when attempting to integrate ICT into the teaching and learning process.

The researcher believes that knowing more about the status of public secondary school teachers’ ICT integration will strengthen and improve the teachers’ level of ICT competencies and that the delivery of instruction will be more meaningful in response to the needs of 21st-century learners who will then acquire 21st-century skills. Further, this will give the DepEd an idea on how to improve and update ICT integration in public secondary schools most especially in the context of Mindanao through relevant and meaningful professional development and training programs. Essentially, it may suggest reasons that ICT has not been fully integrated into the delivery of instruction and how they might be more fully integrated particularly in the areas of Mindanao.

This study sought to examine ICT competencies and ICT integration practices of public secondary school teachers in a particular province in the Philippines. Specifically, this study focused on the following questions:

1. What is the extent of ICT integration of the public secondary school teachers?
2. What is the level of ICT competencies of the public secondary school teachers?
3. What are the perceptions of the public secondary school teachers on ICT integration?
4. What are the challenges encountered by the public secondary school teachers in the ICT integration?
5. Is there a significant relationship between the teachers’ level of ICT competencies and the teachers’ perceptions on ICT integration?
6. Is there a significant relationship between the teachers’ extent of ICT integration and the teachers’ perceptions on ICT integration?

## **Methodology**

This study employed a descriptive-correlational research design. In gathering the data, an adapted survey questionnaire (from the research conducted by Mr. Jayson Bingcang of Philippine Science High School, Quezon City, with permission) and follow-up interviews were used. The following statistical tools were employed in the computation and analysis of the gathered data: Frequency, Percentage Distribution,

Mean, Standard Deviation, Pearson Product Moment Coefficient of Correlation (PPMCC), and Likert Scale.

The study was conducted in 36 public secondary schools in a particular DepEd Division in Mindanao, Philippines. Only one school did not participate in the conduct of the study. A total of 573 public secondary school teachers participated.

## Results and Discussion

### Teachers' Extent of ICT Competencies

Table 1 presents the extent of ICT integration among the 573 respondents.

Activities	Mean	Remarks
1. Using the Internet for research (web-based information retrieval)	4.15	Often
2. Using computers for information management (databases)	3.91	Often
3. Using computers to enhance my teaching and learning	4.12	Often
4. Using computers for planning and organizing activities	3.94	Often
5. Using computers for online communication (e.g. email)	3.85	Often
6. Using distance learning hardware and software	3.02	Sometimes
7. Using computers to assess student learning	3.76	Often
Overall:	3.8212	Often

Table 1: Teachers' Extent of ICT Integration (N=573)

Table 1 shows that "Using the Internet for research" is "Often" being practiced with a mean of 4.15 and followed by "Using computers to enhance my teaching and learning" (4.12), "Using computers for planning and organizing activities" (3.94), "Using computers for information management (databases)" (3.91), "Using computers for online communication (e.g. email)" (3.85), and "Using computers to assess student learning" (3.76). While "Using distance learning hardware and software" is found to be practiced "Sometimes". These activities help teachers in making their instructional-related tasks easier and fruitful.

Based on the grand mean or overall mean of 3.8212, the extent of ICT integration generally is practiced "Often" by the 573 teacher respondents from the rural and urban teacher respondents across disciplines in the activities enumerated.

The result implies that ICT integration activities are "Often" being practiced by the respondents. This contributed to the fact that most of the schools lack resources (inadequacy of computers). It can also be noted that of all the activities mentioned, "Using the Internet for research" got the highest mean of 4.15 which only shows that teachers of Lanao del Norte are using the advantage of ICT for educational and instructional purposes. This result strengthens the study of Bingcang (2013) who found that the majority of teachers use the internet to find information resources in their lessons which got the highest mean score of 4.33 among the listed activities (p. 47). Likewise, "Using computers to enhance teaching and learning" ranked second which is also similar to Bingcang's study report. Teachers need to keep abreast of the current trends in the teaching and learning process for them to be able to function well in the knowledge economy.

Further, the result shows that “Using distance learning hardware and software” got the lowest mean and labeled as “Sometimes” practiced which is again contributed to the fact the schools don’t have strong Internet access. In addition, according to Bingcang (2013), this shows that teachers do not make use of ICT for distance learning in education. Some issues regarding the non-use of distance learning hardware and software are lack of training for teachers and the availability of hardware and software (p. 49).

### Teachers’ Level of ICT Competencies

Presented hereunder are the teachers’ level of ICT competencies based on the National ICT Standards for Teachers (NICT-T) of the Philippines.

Generally, the level of ICT competencies among 573 teacher respondents is “Average” as presented in the table below. The computed grand mean is equal to 3.3031 having a standard deviation statistic of .76769.

	<u>Mean</u>	<u>Std. Deviation</u>
Competency Total	3.3031	.76769
Grand mean: 3.3031		
Remarks: Average		

Table 2: Teachers’ Overall ICT Competencies (N=573)

This result is quite alarming because according to UNESCO (2011), the successful ICT integration into the classroom will depend on the ability of teachers to structure the learning environment in new ways, to merge new technology with a new pedagogy, to develop socially active classrooms, encouraging co-operative interaction, collaborative learning and group work which requires a different set of classroom management skills. Having this statement, it only shows that it is not enough for a teacher to have an “Average” level of ICT competencies, teachers should have above average level of ICT competencies in order to have a successful ICT integration given the fact that teachers of today’s Enhanced K to 12 Basic Education Curriculum have complex roles to play. The Senior High School Program started in School Year 2016-2017 and that the Senior High School curriculum has 17 Core Subjects (one of which is the Media and Information Literacy) and four (4) Tracks (Academic, Tech-Voc, Sports, and Arts & Design Tracks) with specialized subjects and applied subjects (i.e. Empowerment Technologies for the strand) (DepEd website). With this, students from Junior High Schools (Public Secondary Schools) or at least Grade 9 and 10 students should already be equipped with necessary ICT skills before entering Senior High School. In the same way, teachers in Junior High School should also have the necessary ICT competencies for them to be able to use it in the teaching and learning process. Thus, teachers should have above average level of ICT competencies if not high-level ICT competencies to develop innovative ways of integrating ICT in the teaching and learning process. Concepcion (2003) further reiterates in his study that knowledge and skills in the use of computers are essential in the application of computers in instruction. This implies that the professional development program is

necessary for the enhancement of the level of ICT competencies that the teachers have. Meaningful and relevant programs for teacher respondents such as ICT skills training and workshops is a must. According to Concepcion (2003), a one-shot training does not make a difference in computer self-efficacy. Thus, longer training and workshop must be encouraged.

### Teachers' Perceptions on ICT Integration

The perceptions of the 573 teacher respondents on ICT integration are presented hereunder. The first ten perceptions among the perceptions were laid.

	<u>Mean</u>	<u>Rank</u>
1. I enjoy using ICT for creative purposes; like videos, photo stories, etc.	4.50	5
2. I prefer using ICT in doing research.	4.53	2
3. I am aware of the opportunities that ICT offers like online collaboration, information management, etc.	4.43	11
4. I want to integrate ICT in all of my classes.	4.44	10
5. I think that I can use ICT in class activities more effectively day by day.	4.31	13
6. I like using e-mail, forum, and chat to make communications with my co-teachers and students easier.	4.10	14
7. I think that technology-supported teaching makes learning more effective.	4.49	6
8. I think using ICT in instruction increases the interest of students toward their lessons.	4.52	3
9. I think using ICT in instruction increases the quality of teaching.	4.54	1
10. I think using ICT makes it easier to prepare course materials like assignments, handouts, etc.	4.49	6
11. I think integrating ICT will enable me to handle different learning preferences of my students who have different learning styles.	4.43	11
12. I think integrating ICT makes effective use of class time.	4.46	9
13. I think integrating ICT makes me more productive as a teacher.	4.47	8
14. I think that using technology makes it easier to reach instructional resources.	4.51	4
Overall:	4.4433	Strongly Agree

Rating scale: 1:00 – 1.79 – Strongly disagree

1.80 – 2.59 – Disagree

2.60 – 3.39 – Undecided

3.40 – 4.19 – Agree

4.20 – 5.00 – Strongly agree

Table 3: Teachers' Perceptions on ICT Integration (N=573)

“Using ICT in instruction increases the quality of teaching” revealed to be the number one perception with a mean of 4.54. Ranked second is that “Respondents prefer using ICT in doing research” (4.53). Third among the perceptions is “Respondents think using ICT in instruction increases the interest of students toward their lessons” (4.52). Ranked fourth among the perceptions is “Respondents think that using technology makes it easier to reach instructional resources” (4.51) and followed by the following perceptions: “Respondents enjoy using ICT for creative purposes like videos, photo

stories, etc.” (4.50), “Respondents think that technology-supported teaching makes learning more effective” (4.49), “Respondents think that using ICT makes it easier to prepare course materials like assignments, handouts, etc.” (4.49), “Respondents think that integrating ICT makes them more productive as a teacher” (4.47), “I think integrating ICT makes effective use of class time” (4.46), “I want to integrate ICT in all of my classes” (4.44), and “I am aware of the opportunities that ICT offers like online collaboration, information management, etc.” (4.43).

These findings clearly imply that the 573 teacher respondents have positive perceptions of ICT integration. They believe that ICT integration increases the quality of teaching, ICT integration increases students’ interest in the subject matter, and ICT is an important tool in doing research. This only shows that teachers in Lanao del Norte see the importance of ICT integration to both teachers and students, who are important drivers in the teaching and learning process.

Having a grand mean of 4.4433 indicates that the 573 teacher respondents “Strongly agree” that ICT integration in their school activities is important.

### Teachers’ Challenges on ICT Integration

Table 4 presents the perceived challenges among the 573 teacher respondents on ICT integration.

	<u>Mean</u>	<u>Rank</u>
1. Lack of time to prepare materials based on ICT	3.81	11
2. Lack of teachers’ technical knowledge to prepare materials based on ICT	3.64	15
3. Issues about accessibility to existing hardware like computer, LCD projector, etc.	4.02	3
4. Lack of school’s computer laboratory	3.91	5
5. Lack of school’s technical infrastructure about instructional technology	4.02	3
6. Shortage of computers for use of teachers	4.07	2
7. Absence of reward systems for encouraging ICT use	3.90	6
8. Poor technical and physical infrastructures of learning environments	3.88	7
9. Inadequacy of computers used by learners	4.18	1
10. Inefficiency of guidance and support by administration i.e. School Principal	3.39	17
11. Insufficiency of financial resources for technology integration	3.88	7
12. Inefficiency of instructional software/electronic resources	3.88	7
13. Scarcity in ICT resources for getting information	3.75	13
14. Lack of professional development opportunities for gaining knowledge and skill like ICT trainings, seminars, and workshops	3.73	14
15. Lack of support services in material development/technology usage	3.82	10
16. Lack of interest of teachers in ICT use	3.07	19
17. Lack of teaching methods/strategies for ICT use	3.45	16
18. Inadequacy of the technology courses offered to students	3.76	12
19. Difficult to explain computer applications to students	3.26	18

Table 4: Teachers’ Perceived Challenges on ICT Integration (N=573)

The first eight ranking challenges of teacher respondents are enumerated. Based on the table, it can be seen that “Inadequacy of computers used by learners” (4.18) ranks

first. Second identified is the “Shortage of computers for use of teachers” (4.07). “Lack of school’s technical infrastructure about instructional technology” (4.02) and “Issues about accessibility to existing hardware like the computer, LCD projector, etc.” (4.02) ranked third. The fourth among the identified challenges is “Lack of school’s computer laboratory” (3.91). Ranked fifth is the “Absence of reward systems for encouraging ICT use” (3.90) and followed by “Poor technical and physical infrastructures of learning environments” (3.88), “Insufficiency of financial resources for technology integration” (3.88), and “Inefficiency of instructional software/electronic resources” (3.88) which are both in the sixth place. The seventh among the challenges is the “Lack of support services in material development/technology usage” (3.82)” and finally the eight ranks of the challenges is the “Lack of time to prepare materials based on ICT (3.81).

It can be gleaned from the table that the first eight rankings are about the lack of facilities and infrastructure particularly the inadequacy of hardware (e.g. computers) and software to both students and teachers. This attributed to the fact that many schools don’t have a computer laboratory and or if there’s one, they cannot afford to connect this to the Internet. Likewise, most of the students of these schools are from far-flung areas who cannot afford to have their own computers. According to Anderson & Plomp (2008), in Thailand, a developing country like the Philippines, limited ICT-infrastructure prohibits the development of many ICT-skills. Having mentioned that, school leaders and service providers should find ways and means on how these ICT-infrastructures will be available to the teachers and students in order to implement ICT integration across disciplines meaningfully and soundly. Furthermore, teachers cannot realize certain pedagogical goals unless information technology equipment and tools are available to them. They need not only sufficient equipment (PCs, printers, Internet connections), but also ready access to software tools (for word-processing, communication, information retrieval) and communication facilities (e.g. email addresses for teachers and students). In addition, the location of equipment, ease of access, and maintenance of equipment are potentially important conditions facilitating the use of ICT for teaching and learning (Pelgrum, 2008, p.74).

Also, the “Absence of reward systems for encouraging ICT use” is another perceived challenge by the teacher respondents. This supports the study of Gulbahar & Guven (2008) who found that the inadequacy of the technology courses offered to teachers and the lack of incentives for encouraging technology are further challenges to ICT usage. This implies that there’s really a need to promote ICT integration from school leaders i.e. School Heads and ICT Coordinators for an ICT integration to be fully realized by encouraging teachers thru relevant programs and projects. According to Goh (2015), to attract, develop and retain such knowledge workers, education systems need to reconfigure the leadership and organization of their schools, with a key objective of enabling and empowering teachers and school leaders to develop different leadership practices that can drive school improvements (p. 23). With this, there’s really a need for school leaders to get involved in the process and in the implementation.



### Relationship between the Teachers' Level of ICT Competencies and the Teachers' Perceptions on ICT Integration

To test the significant relationship between the teachers' level of ICT competencies and the teachers' perceptions of ICT integration, the "Pearson correlation" was the statistical tool used. Table 5 shows the relationship at 0.05 level of significance.

		Perception	Competency
Perception	Pearson Correlation	1	.102*
	Sig. (2-tailed)		.015
	N	573	573
Competency	Pearson Correlation	.102*	1
	Sig. (2-tailed)	.015	
	N	573	573

\*. Correlation is significant at the 0.05 level (2-tailed).

Table 5: Relationship between teachers' level of ICT competencies and teachers' perceptions on ICT integration

As shown in Table 5, there is a significant relationship between the level of ICT competencies and the perceptions of ICT integration. As shown, the computed p value (.015) is lesser than the level of significance (0.05). Even if the relationship is weak as indicated by the computed r (.102), still the relationship is significant. Moreover, the relationship is positive which means that perception of ICT integration is associated with the level of ICT competencies, vice versa.

This implies that there is a weak relationship between perceptions of ICT integration and level of ICT competencies. The perceptions of ICT integration is influenced by the level of ICT competencies. As the level of ICT competencies is high, the perceptions of ICT integration is also high. Perceptions of ICT integration, therefore, is a factor relative to the level of ICT integration. However, it can be gleaned from the table above that the relationship is weak, this is because of the teachers' learning environments as evidenced by the revealed challenges that they faced. Challenges such as inadequacy of computers used by learners, issues about accessibility to hardware like computer and LCD projector, access to the Internet and lack of school's infrastructure such as computer laboratory. This only implies that for a positive perception to be fully influenced by the level of ICT competencies, there must be sound and meaningful learning environments in order to maximize its full potential.

The result is in agreement with previous studies which found that pre-service teachers' attitudes toward technology are significantly correlated with technology competencies (Java, 2004). In addition, Lau & Sim (2009) concluded that a positive perception of computer in education was positively related to the ability to apply ICTs [in instruction]. The results suggest that a higher ability to use ICT means there will be a more positive perception of computer use in education [vice-versa] (p. 30). The result is consistent with the findings of the previous study which concluded that teachers who are more competent in using computers have also more favorable attitudes towards computers (cited in Sa'are, et al., 2005 and Jegede et al., 2007 by Lau & Sim, 2009). The aforementioned statement supports the study of Bazer, et al. (2012) which

states that there is a significant positive relationship between students' perception towards ICT and their self-efficacy on the use of ICT.

### **Relationship between the Teachers' Extent of ICT Integration and the Teachers' Perceptions on ICT Integration**

Table 6 presents the correlation of the extent of ICT integration and perceptions on ICT integration. As shown, there is no significant relationship since the computed p-value which is .311 is greater than the level of significance (0.05).

		<u>Extent</u>	<u>Perception</u>
Extent	Pearson Correlation	1	.042
	Sig. (2-tailed)		.311
	N	573	573
Perception	Pearson Correlation	.042	1
	Sig. (2-tailed)	.311	
	N	573	573

Table 6: Relationship between the Teachers' Extent of ICT Integration and the Teachers' Perceptions on ICT Integration

The result is attributed to the fact that though the teacher respondents have high positive perceptions on ICT integration, these perceptions may not be put into action and or realization because of the challenges and limitations that they are facing such as lack of ICT-infrastructure. The result is consistent with the findings of Peralta (2007) and Bandalaria (1995) who found that positive perception towards ICT integration does not assure the integration of ICTs to instruction. This further supports the claim of Chow & Law (2008) on the teachers' perceived impact of ICT-use on self that the levels of perceive positive impact did not bear clear relationships with the levels of reported ICT-use. The aforementioned claim is also consistent with the findings from Law (2008) which show that the higher levels of reported ICT-use did not necessarily equate with higher levels of perceived learning gains from ICT use (p. 270). Indeed, the relationship between the extent of ICT integration and perceptions on ICT integration, as supported by the studies above, is not significant.

### **Conclusions**

The following conclusions were made based on the results of the study: 1) Public Secondary School Teachers' extent of ICT integration is "often" practiced particularly in using the Internet for research and using computers to enhance teaching and learning; 2) Public Secondary School Teachers' level of ICT competency is "average"; 3) Public Secondary School Teachers have positive perceptions towards ICT integration; 4) Public Secondary School Teachers' top perceived challenges to ICT integration are the following: Inadequacy of computers used by learners; Shortage of computers for use of teachers; and the Lack of school's technical infrastructure about instructional technology; 5) There is a significant relationship between the level of ICT competencies and the perceptions on ICT integration; and 6) There is no significant relationship between the extent of ICT integration and the perceptions on ICT integration.

## Recommendations

In view of the findings of the study, the researcher recommends the following: 1) Teachers should be given priority because teachers' levels of ICT competencies are only on the "Average" level. Professional development program is necessary for the enhancement of the level of ICT competencies that the teachers have. Meaningful and relevant programs for teacher respondents such as ICT skills trainings and workshops is a must; 2) It is no doubt that teachers of today perceived ICT integration positively, use this as an important avenue for meaningful and longer trainings in order for them to become more equipped and skilled drivers of the teaching and learning process particularly about the *National ICT Competency Standards for Teachers* so that they would know the importance of equipping themselves with these necessary ICT skills and competencies; 3) Sound ICT-infrastructure shall be provided in all of the public secondary schools particularly in the DepEd Division of Lanao del Norte i.e. adequate and sufficient computer laboratories for students and teachers with strong Internet access. The inadequacy of computers in the secondary public schools must be given priority consideration in the acquisition program and budget allocation for the betterment of ICT integration in the fulfillment of school activities deemed necessary, consequently improve the educational system, especially in the rural areas; 4) The need to promote ICT integration among school leaders i.e. Schools Division Superintendent, ICT Coordinators, and School Head for an ICT integration to be fully realized by encouraging teachers thru relevant programs and projects. The need for school leaders to get involve in the process and in the implementation of ICT; 5) There is a need to conduct a *Phase II* of this research where an in-depth study will be conducted employing the use of interviews and actual observations. The respondents will include the Schools Heads and some Teacher respondents to explore some factors relative to the implementation of ICT integration; 6) The present study may be replicated with more participants to increase the generalizability of the result in other areas in Mindanao. Further, this study may also be conducted in Visayas areas to compare the result of this study with other learning contexts and environments; and 7) Conduct another study that may show if geographical condition and culture could affect ICT-pedagogy integration practices of teachers.

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***From Teaching to Leading:  
A Phenomenological Inquiry on Overcoming Challenges from the  
Lens of Novice Principals***

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**Abstract**

Literature suggests that the high school principal position is one of the most essential, complex, and challenging assignments in the public education system. While efforts to understand the nature and dynamics of the transition from being a teacher to a principal have been undertaken in different studies worldwide, a gap in literature exists in the context of Philippine education. It is relevant to explore and subject to inquiry the experiences of Filipino novice principals on overcoming challenges along their transition from teaching to leading thus, this study was conducted with five novice principals (n=5) as participants. From the thickness and richness of the descriptions of the field text gathered in this research, an interesting conceptualization labeled as the Leader Continuum Movement emerged. The novice principal milieu circumscribes facets associated with preparations and influences (motivation to move), transition challenges (the big move) and meeting halfway (steadfast). Identifying the ways on how to cope up with the challenges of being a teacher to a school head from this study underscore a continuum movement for school leaders. Through the experiences, they exemplified sophisticated interpretations and reflections on their practices, which is unique for novice principals at their stage of learning and development. The findings of this research will be valuable to current principals, teachers transitioning to a leadership role, and those aspiring for a leadership position.

Keywords: novice principal, overcoming challenges, Philippines

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## Introduction

For an accomplished teacher, advancing into an administrative position is a significant avenue for professional growth and important career achievement as well. It is undeniable that the best candidates for school administrators have previously held positions as successful teachers. Nevertheless, novice administrators are also shocked to discover the number and variety of responsibilities and demands embedded in their new frontline position and the dramatic psychological effects that it has on their personal lives (Armstrong, 2012, 2014; Marshall & Hooley, 2006). Even those administrators who feel prepared to perform administrative tasks often find themselves unprepared for the social and emotional changes that accompany both their exit from teaching and entry into administration (Armstrong, 2012). Many variables influence administrators' transitional trajectories, among which are individual personalities (Hohner, 2016), the nature and location of their role, (Manard, 2017) and the social, political, and cultural contexts and climates (Morillo, 2017) within which their transitions occur (Armstrong, 2009; 2012). When administrative trajectories take place in environments of deep structural change, they create additional layers of challenge and uncertainty. (Armstrong, 2012).

It is a known fact that most if not all school administrators were teachers at some point in their career, and the experiences as a teacher help many school heads to better understand their responsibilities and thereby guide them in performing their duties more effectively and efficiently. The decision making of the school head and the strategies employed in problem-solving are critically important in the attainment of the goals of the school. School principals face many challenges, especially in their first year at a school, when they must function effectively in a new environment and assimilate quickly to a new culture. (Burkhauser, Gates, Hamilton, & Ikemoto, 2012). These challenges also include; differentiation of instruction, classroom management, and the unexpected expectations required of the teaching profession (Brubaker, 2016). In the study of Bayar in 2016, several types of challenges were experienced by novice principals which include: violence families' negative attitudes towards school, immigrant students/families, teacher unions (syndicalism), teachers' attitudes and behaviors to principals, and the increasing undesired behaviors inside the school/classroom.

The principal's major role as manager of teachers and students is a significant contributor to the success of a school. The efforts exerted by the principal to staff cohesion are a primary determinant in improving the school's achievement. (Burkhauser et.al.,2016) The principal's effort in building culture and relationships within the school community, forming leadership teams, and promoting teacher professional development are a few of the strategies on which novice principals focused their time. The most effective principals develop these networks both within the school system (teachers, district administrators, division administrators) and in their local communities. It seems particularly important for school principals to have the support of their Barangay Captain, the neighborhood official with the most authority in a community. (Brooks & Sutherlands, 2014) The principal is not working in isolation apart from others, one way of finding meaning to the role of the school head is recognizing the value of working and collaboration with parents, and students. Through the principal's interaction and involvement, a sense of awareness of what is going on in the school's internal and external environments is being developed. This



awareness enables the principal to possess a high degree of sensitivity to and sensibility of the needs, problems and concerns of both students and parents (De Guzman & Guillermo, 2007).

In the Philippine educational system, school heads shall have authority, accountability, and responsibility in managing all affairs of the school following national educational policies, plans and standards (RA 9155, 2001). Thus, the success and failure of the school are greatly influenced by the kind of school head it has. Understanding the principal's most difficult leadership experiences is relevant in revealing the key aspects of how teachers cope up with the challenges they face as a new school administrator. The support from the Philippine government to the educational system and on how K to 12 classrooms are managed to meet the challenges of the 21<sup>st</sup> century is substantial in ensuring that every school is effectively led by dynamic school heads. The National Educators Academy of the Philippines (NEAP) has been mandated to continuously develop school personnel including school managers for professional competence as well as management and leadership excellence in the educational community. NEAP was created through the Department of Education (DepEd) order number 111 series of 2001. This undertaking is one of the key reform initiatives of the department under Republic Act No. 9155 on the Governance of Basic Education Act of 2001). Principals in the Philippines work in a unique political and social context. They have many challenges but also work hard to educate students and to serve their community (Brooks & Sutherlands, 2014).

In preparation for the K to 12 curricula, the Department of Education through the National Educators Academy of the Philippines (NEAP) conducted the pilot run of the School Heads' Development Program (SHDP) for Senior High School (SHS) School Heads in 2015. NEAP responds to the demand for professional competence as well as management and leadership excellence in the Philippine educational community. To fulfill this mandate one of the components of NEAP is the training and development component. The NEAP School Heads Development Program (SHDP) Foundation Course is a competency-based educational leadership and management development program that aims to enable school heads to lead and manage K to 12 schools in the 21<sup>st</sup> century. It is a three-module course that covers the principal's role in delivering the curriculum and core programs, managing school processes, strategic human resource management and development, fiscal management, partnership, and leadership. The regional Human Resource Development Department (HRDD)- NEAP started this course in 2016. The curriculum development and training of facilitators of SHDP are supported by the Basic Education Sector Transformation Program (BEST) through the Development Academy of the Philippines. These efforts were made consequently to provide quality assurance in delivering educational services among Filipinos.

According to Bridges, (2013), there is a difference between change and transition; change happens quickly while transitions occur slowly over time. He suggests that change is situational and happens without people transitioning, whereas a transition is psychological and is a process where people gradually accept the details of the new situation and the changes that come with it. However, although recent literature provides a rich understanding of the different variables influencing the transition from a teacher to a school administrator there is a need to have a focus on the motivations for making the move, uncovering why they made the transition from teacher to an

administrator as well as their perceptions of the role versus their current realities in the principal position (Carey, 2017).

Hence, the major intent of this qualitative investigation is to describe the transition from teaching to leading as viewed by a select group of novice principals from public secondary schools in the Philippines. Specifically, the present study sought to answer the following questions; 1. What are the motivations of teachers as they ascend to administrative positions; 2. What are the challenges and coping up mechanisms of novice principals as they take on their new positions as school head. The collective descriptions generated by this phenomenological inquiry will help the Department of Education to understand the task faced by school heads, particularly the newly appointed principals to guide them in their recruitment and support initiatives for aspiring principals. The challenges faced by the teachers and how they were able to overcome these challenges and managed to move up to an administrative position, is an inspiring experience that will provide learning for aspiring principals, teachers who are transitioning to a leadership role and veteran school heads to emerge as stronger leaders.

## Findings

From the individual and collective articulations shared by select Filipino novice principals, a continuing movement of concerns emanating from their experiences as a teacher, as an aspiring principal and a newly designated school head was observed. Labelled as the **Leader Continuum Movement** (see Fig.1), the model provides a clear nature and dynamics of the movement creating gradual steps in overcoming challenges along the transition of the novice principals' spectrum that encompass aspects that are related to preparation and influences (motivation for the move), transition challenges (the big move), and meeting halfway (steadfast).



Figure 1: Leader Continuum Movement

In this study, the experiences of the novice principals' way back when they are new into the teaching profession were taken into account, as a new teacher in a secondary school is the most challenging experience for the participants. This occurs when the demands of the new teaching profession start to unfold such as dealing with students, piles of papers to grade, lessons to plan and increasing amount of paper works. As one principal recalled, *"At the start of my teaching profession, nothing is easy, everything is challenging. I have to handle subjects that are not my area of specialization. I have to teach 5 to 6 sections in a day, each having 70-90 students. Checking outputs, recording their grades, checking assessments is a tough job"* (P1)

*"I experienced handling pilot section, middle section and the last section students that are usually composed of misbehaving students. There was also difficulty in dealing with the parents of these students who are usually frequent visitors to the Guidance Office in the school. Aside from the usual class records that I need to be prompt of preparing, I need to have a guidance notebook that keeps track of the cases. There was also a time that I handled two advisory class at the same time."* (P2)

Aside from dealing with various types of students and the tedious clerical works bothering the teachers who were new on the profession they also experienced pressures from colleagues, as shared by another participant,

*"During my first year of teaching, I experienced negative feedback from other teachers regarding the way I teach and how I deal with my students. You really cannot please everybody. Since I am a new teacher, I was also asked to do the task of other teachers"* (P1)

Remarkably, the entry into the teaching profession was never easy as transpired on the experiences shared by the participants. The pressure was from different sources such as students, parents, paper works and relationships with colleagues. The pressure brought about by the profession leads them into different realizations; as another participant declared,

*"On my first month, my voice was gone and I have to use lapel, I have to utilize strategies like hand signals and sign language which is a sort of understanding between me and the students. Nevertheless, I happen to develop a deeper concern with the students. Most of the students in public school came from poor families and if the teacher will not give concern to them, who else will?"* (P3)

*"I became more sensitive to the needs of the students and that of colleagues. I realized that I should not stop learning and improving myself."* (P4)

Notably, the challenges faced by the new teachers in the profession has its impact on the personal outlook of the teacher, as stated by another participant, *"my experiences when I was a teacher provided me opportunities for learning, as a leader of a school you have to know what is happening inside the classroom, you cannot be an effective principal if you do not have a technical know-how of being an effective teacher"* (P5)

Another participant sharing the same insights, *"All the experiences I have as a teacher helped me to pass the qualifying examination for school heads, everything is in there."* (P1) Moreover, in their role as a teacher they develop a deeper sense of responsibility as another participant added, *"In the examination for principals, I know that if my answers were really to point out what's for the best for the students, I know I'm on the right track."* (P2)

*“The road of becoming a school head is very steep, you need to equip yourself to fit in the position. There is a tough competition among others who are also aspiring for the position”*,

as stated by another participant. Moreover, to qualify for a school head position entails professional growth and qualification standards. The participant added that *“since it’s difficult to earn points for the qualification standards, it is important to attend to trainings and seminars.” (P4)*

*“I joined international conferences and presented my research, I published my research works and strengthen my connections. I have trainings, national competency certificates, I have also several trainers’ methodology certificates.” (P5)* According to the respondents, attending graduate studies and earning certificates from trainings and seminars are all relevant preparations for aspiring school head. Another participant declared, *“I’m ambitious and I have plans to finish my graduate studies and I know I have to work hard for it” (P3)*

Leadership opportunities are the stepping stone of teachers aspiring for a principal position. Seemingly, the participants shared how their immediate superior entrusted them for administrative functions along with their teacher tasks. As the participants articulated, *“Leadership skills is already embedded in me, I was motivated by my former school head, who trusted me as her Officer-In-Charge” (P3)* *“I was a subject chairman, I already planned to be a school head because I’m always with the principals since I’m into sports and at the same time a coach and most of the time the principals are present during sports meet.” (P4)*

The participation in administrative responsibilities helps shape the outlook during the transformation because these new responsibilities are different from those of a classroom teacher. The novice principals also shared instances wherein they have to accept every task given to them without complaining, as verbalized;

*“You have to do the work assigned by the principal to do, do not take it negatively, because at the end of the day you will benefit from it. Accept those as chances for learning.” (P1)*

*“I’ve been designated as an academic coordinator, department chairman, year level coordinator and subject group head. The experiences I had are my best teacher, it gives me a sense of confidence that I already been there and I already know what to do”. (P2)*

During the transition phase, the most challenging part is in dealing with teachers, (subordinates) this is even supported by the following comments;

*“It’s very difficult to adjust to the different cultures of teachers, specifically those negative teachers who have a lot of side comments on programs, projects and activities of the school to the point that these programs will not be done because of their negativities.” (P3)*

*“The most challenging part is in handling varied types of teachers, with a lot of master teachers, dealing with their diversities, indifferences and unpredictability” (P2)*

Moreover, aside from the challenges mentioned by the participants with regards to transition, they also shared that managing fiscal resources is demanding, as verbalized;

*“The most challenging is on how to run the school, considering finances, all these are in my mind, how can I send teachers to trainings, seminars or even meetings if we do not have the budget or resources.” (P1)*

*“The SBM or School Based Management has a very large scope, wherein early morning, my thoughts are already pondering on what to do in school.” (P5)*

*“It’s really hard to operate a school without money, and if you have the budget it is still harder to liquidate” (P4)*

The challenges arising on the transition period from being a teacher to a school head gives way to coping up strategies as mentioned by the participants;

*“You should have the heart and the firmness or objectivity. No room for extremes, it should be in between.” (P2)*

*“I run a survey regarding the effectiveness of my management strategies, it takes a lot of courage to welcome that what you see, what you perceived about yourself is different from how others see you. Nevertheless, through the survey, it will reflect the voice of the customer”. (P3)*

Notably, the participants were able to reflect and developed a sense of transformation just to cope up with the demands of the transition, in addition to these participants claimed that;

*“I have my support group; these are the group of friends I have which are also in the same endeavor. It’s a good feeling that you have someone who will understand your agony and will listen to your predicaments especially when things get rough.” (P2)*

*“I always consult my mentors which are all veteran school heads of other schools. Seeking their expertise during situations that I need to make decisions on some critical cases”. (P1)*

Based on the accounts given by the participants, it is evident that in adversities they turn on to their family and friends who will listen and support them. Moreover, the participants also seek advice coming from their mentors concerning leadership technicalities.

This phenomenological inquiry emerged a model labeled as the **Leader Continuum Movement**, the model provides a clear nature and dynamics of the movement creating gradual steps in overcoming challenges along with the transition from teaching to leading of the select group of Filipino novice principals. High school principal position is one of the most essential, complex, and challenging assignments in the public education system (Pounder and Merrill, 2001). In this study, **the motivation for the move** described as the experiences of the novice principals’ way back when they were new to the teaching profession are also the same experiences

that influenced the participants' outlook as a teacher. Many teachers were school leaders before moving into an administrative role; however, Newton, Riveros, and da Costa (2013) argue that many classroom teachers are hesitant to move into a leadership role, as they fear to lose their connection to the classroom and teaching and learning. Their research study found that a lot of the teachers who eventually take on leadership roles do not start with a desire to move into formal leadership or administrative positions.

The teachers gain experience in leadership positions within the school which builds their capacity and promotes their leadership capabilities (Newtown, Riveros, & da Costa, 2013). The challenges they have experienced during their entry into the service as professional teachers were accounted which includes dealing with students, piles of papers to grade, lessons to plan, increasing amount of paper works and pressure from colleagues. As reported by Headden (2014), teachers are consumed with tasks other than instructional obligations including accelerated accountability, making their jobs increasingly "much harder" than a decade ago. As verbalized by the participants these experiences that they had been a former classroom teacher made them realize and develop a deeper sense of responsibility for the welfare of the students. Armstrong (2010) suggests that teachers may be ready to seek a new challenge beyond the classroom and that they would like to learn more about education and be involved in school policy. Many aspiring leaders also want to make a difference for students' in a school as a principal rather than as a classroom teacher (Armstrong, 2010). Principal leadership is about inspiring others to rally behind a common vision or reach an ultimate goal and the ability to see the big picture while not losing sight of the process along the way (Williams & Lindsey, 2011).

Another issue observed by the novice principal participants is the difficulty in qualifying for a principal position, this is due to the tough competition among other aspiring teachers who also want to be in the administrative position. The struggle to qualify for the position entails the participants to earn post-graduate degrees, attend to trainings and seminars and do research work not only for presentation but for publication as well. Aspiring principals and administrators consider a Master's degree in educational leadership or educational administration to start their transition. This degree prepares them to move from the classroom into administration with practical training in establishing a successful culture and climate of continuous improvement by managing teachers and staff, setting goals, preparing and managing budgets, and working with parents and the community. It also helps the aspiring principal in understanding the social, economic and political landscape that they will be facing.

Along with the motivation to move, novice principals in this study also experienced the **big move** which encompasses their transition challenges from being a teacher to a school head. From this point, the participants shared that their immediate superior has a great impact on their transition period. According to the participants, the leadership opportunities entrusted to them by their immediate superiors helped shaped their outlook during the transformation. In her research, Armstrong's (2015) participants identified the support of their principal and mentoring as a significant factor in their growth and development as new administrators. The development of leadership involves internal motivation, access to leadership opportunities, and mentoring (Morillo, 2017). Another concern pointed out by the participant during this process is their difficulty in dealing with teacher subordinates. They pointed out that leading a

diverse group of teachers is their most challenging experience in the transition. (Armstrong, 2012) found a similar situation experienced by the participants in her study, she stated that, while technical skills were easier to acquire, developing personal and people management skills were more difficult because of the unpredictability of their role and the different people and constituency groups to whom they were accountable.

In this study novice principals also shared, how the challenges made them reflect and develop a sense of transformation in coping up with the transition. Novice principal leadership experiences are often described as overwhelming, pressure-filled “reality shocks” (Spillane & Lee, 2014). This is outlined as the **steadfast or meeting halfway**, through the challenges faced by the participants in this study, they were able to develop coping up strategies in dealing with the struggles. Crossing over to the principal role represents a sizeable shift for most newcomers, and often abrupt change in perspective, expectations, and work tasks for novices (Spillane & Lee, 2014). Principal leadership is about growth, personal responsibility, and accountability (Williams & Lindsey, 2011). In another study, effective leadership is intensely interpersonal as a leadership challenge, elevating the important role principals hold in establishing relationships built on collaboration, commitment, and trust (Thessin & Clayton, 2012). Moreover, the participants also verbalized that in moments of adversities they turn into their support group which includes their family and friends. The participants claimed that they always consult their mentors which are veteran school heads specifically in decision making on some critical cases. (Manard, 2017) reported that, novice principals receive support from other principals, they valued opportunities to discuss their experiences and challenges with more experienced colleagues, and they appreciated their guidance. They also connected having someone to “vent to” and “knowing that they were not alone” to their ability to grow as administrators and put things into perspective.

It is important that principals put student needs above all others and approach student support from a holistic perspective, looking first to meet their basic needs such as nutrition, and then building on that by developing capacity for excellent instruction (Kouzes & Posner, 2003). Moreover, communication and building a strong support network is a key in effective school management, this can be done internally between teachers and students; and or externally from stakeholders and the community which includes parents. Sharing of ideas and best practices from other school heads within the District and Division levels ensures a greater chance of coping up with struggles faced by the novice principal in the first year as a school head. Constant meetings and dialogue with the constituents of the school enhance the ability of the Principal to get to recognize their job well. In so doing, the reflective space in the life of the principal starts to develop and expand. As the principal dwells and communes with this reflective space, a certain kind of serendipity takes place where she begins to witness the language of her tasks as a school leader. (De Guzman & Guillermo, 2007)

Novice principals face varied conditions in the plight as school head, this could be school conditions which includes the degree of decision-making autonomy, parent support, teacher capacity, the degree of staff cohesiveness, and the level of pressure to raise test scores. District conditions include resources, consistency of district priorities, and quality of district-provided professional development. Among these factors, the teaching capacity and cohesiveness are closely related to student outcomes. Principals

reporting higher teacher capacity with regards to skills to help other teachers improve and the ability to promote learning among all students were more likely to see achievement gains. (Burkhauser et.al.,2016)

Capitalizing on the unique power of naturalistic inquiry to research, this phenomenological paper purported to capture and describe how the experiences of educators who transitioned as novice principals in public secondary schools in the Philippines. Impliedly, the emerged model Leader Continuum Movement afforded an eidetic description of the dynamics of the prevailing transition from classroom teaching to leading a school. The novice principal milieu circumscribes facets associated with preparations and influences (motivation to move), transition challenges (the big move) and meeting halfway (steadfast). Identifying the ways on how to cope up with the challenges of being a teacher to a school head from this study underscore a continuum movement for school leaders. Through the experiences, they exemplified sophisticated interpretations and reflections on their practices, which is unique for novice principals at their stage of learning and development. Hence, educators, aspiring principals, and veteran school heads are challenged for the need to widen their perspectives to contribute to a better school system.

While the findings of this study cannot make generalizable statements that can reflect local and international principals' transition milieu, this paper progresses the current literature by shedding light on the experiences of Filipino novice principals which is not previously cited although concurring with previous international investigations. It is suggested that the emerged Leader Continuum Movement model served as a fecund foreground that is noteworthy to spearhead future research initiatives such as scale development and modeling. This study concludes to increase scholars' cognizance to problems related to the transition of teachers to being school heads and the best possible ways to support them on their plight and address their needs.

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*A One Semester Research Study on the Effects of Extensive Reading on Students' Receptive Vocabulary Size*

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**Abstract**

Extensive Reading has been touted as beneficial for improving students' reading fluency, speed, confidence, and vocabulary. This paper examines whether some of these claims are true for a group of students over a 14-week semester. Administering vocabulary level tests at the start and end of the semester does not indicate that there is a greater positive correlation between Extensive Reading and an increase in receptive vocabulary size compared to a control group. However, student surveys suggest that using the website [mreader.org](http://mreader.org) to keep track of Extensive Reading may be responsible for boosting students' confidence in their vocabulary growth, which feeds into a self-propelling virtuous loop: reading leads to improved confidence, which leads to more reading. These findings should reaffirm the virtues of using Mreader with Extensive Reading, and convince teachers who are not yet familiar with the website about its virtues.

Keywords: Vocabulary, extensive reading, confidence

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## Introduction

The conventional wisdom is that one benefit of Extensive Reading (ER) is the improvement of students' vocabulary. The Extensive Reading Foundation's website lists the benefits gained from ER, and "builds vocabulary" is listed second ([http://erfoundation.org/ERF\\_Guide.pdf](http://erfoundation.org/ERF_Guide.pdf)). This claim, however, needs qualifying. If, for example, students follow the ER guidelines and read books that are well below their ability, students should not be encountering many unknown words. The ER Foundation's website says that books can appropriately be categorized as "Extensive Reading" if 98% of the words on each page are known ([http://erfoundation.org/ERF\\_Guide.pdf](http://erfoundation.org/ERF_Guide.pdf)). By this standard, only 2 out of every 100 words should be unknown to the reader, which is not a significantly large amount of new vocabulary. Furthermore, the claim that ER "builds vocabulary" is ambiguous, difficult to quantify, and leads to more questions. For example, does "builds vocabulary" mean that completely new vocabulary will be learned, or that already familiar words will be strengthened? There is a big distinction between these questions and teachers and students should be clear on what to expect when participating in ER. Another consideration is the problem of measuring the vocabulary-building benefits of ER. It is difficult to isolate the vocabulary that is learned as a result of ER, and not conflate it with the vocabulary learned in some other class, or as the result of a combination of factors. With all of these ambiguities in mind, the goal of this research was to determine whether participating in ER for one 14-week semester positively affects students' receptive vocabulary awareness. This paper first explains what is meant by "Extensive Reading," then examines the claim that ER improves vocabulary; next, the ER method used in my classes is described, followed by the origin of my interest in the relationship between ER and vocabulary building; then the methods of my vocabulary testing are outlined, and my results are discussed; finally, the positive effects of ER on students' confidence in their English vocabulary are proposed and further areas of research are considered.

## What is Extensive Reading?

Before exploring the issue of whether ER "builds" vocabulary or not, a short explanation of what is meant by ER is appropriate. Waring (2011) provides a simple summary of ER, describing it as "the practice time where learners read a lot of easy-to-read texts" (p3). In other words, ER means reading many books that are already within a student's lexical comprehension. Day and Bamford (1998), Day (2002), Prowse (2002), and Maley (2008 and 2009) describe many other factors that can be included in a definition of ER. These writers quantify how much of the vocabulary on each page should be understood, give ideas on whether students should be quizzed on the books or not, and estimate how fast a student should read per minute. These strict parameters do not need to be followed strictly; as long as the ER program is stimulating students' desire to read, and that desire leads to more reading, the ER program will have a positive impact on students' reading ability. Research by Richard Day (2002) and many others shows that students learn to read by reading, and that the more they read the better readers they become.

## **Does ER Actually Improve Vocabulary?**

Vocabulary learning is a gradual process and requires many encounters in different contexts before words are completely comprehended. Notably, there is a difference between native English-speaking students' vocabulary acquisition rates, and EFL students' rates of acquisition. Native English speakers in an English-speaking society encounter new vocabulary in many more contexts (in conversations, on television, in classrooms, etc.) than their EFL counterparts who encounter the vocabulary in limited and structured contexts, mostly in language lessons. Nagy & Herman (1987), find that native English-speaking children between third and twelfth grade (U.S. grade levels) learn up to 3000 words a year. It is thought that only a small percentage of this is due to direct vocabulary instruction, and the remainder is due to acquisition of words from reading, and from incidental encounters with the words through the normal course of living in an English-speaking environment. Snow (2010), concludes that EFL students are highly unlikely to encounter enough new vocabulary, even in a 4-skills class, to learn new words and phrases as quickly as native English speakers living in an English-speaking society. She argues that instead of the traditional method of studying vocabulary from word lists — such as making sentences, taking quizzes, then moving on to the next set of words — students need between 15 and 20 repeated exposures to vocabulary in many different contexts to maximize their success rates of learning new words and phrases. This repeated meeting of new vocabulary words simulates (though does not replicate) the type of exposure that students are exposed to in a native English-speaking society. Waring and Takaki (2003), write that an average word should be met more than 25 times for it to be known well enough to be understood and not slow down comprehension when reading. Even seeing a word 25 times does not guarantee that it will be learned, as other research has shown that some words met over a hundred times are still not known (Waring, p4, 2011). In summary, it is clear that for new vocabulary to be learned, whether in a native English environment or in an EFL situation, words must be seen and heard many times in many different ways. It is reasonable to assume that ER provides EFL students with some of these necessary repeated encounters to reinforce vocabulary that is known in some contexts but unknown in others. Therefore, it would not be unexpected to find that students who engage in a significant amount ER will improve their receptive vocabulary awareness of words that are already partially familiar. In terms of learning completely new words, the proposition is more dubious. Returning to the ER guidelines, remember that 98% of a text's words should be known to the reader. If a book is 5,000 words long, no more than 100 words (which is 2% of 5,000) will be unfamiliar. Does ER, by itself, provide enough exposure to those unknown words to justify the claim that ER “builds vocabulary”? While it is an interesting research question, this paper does not investigate that claim. Instead, it attempts to understand whether ER is responsible for improving receptive vocabulary over 14 weeks compared to a control group that does not participate in ER but is actively engaged in English learning.

## **Extensive Reading in my Classes**

With the goals of improving students' vocabulary, reading fluency, and reading confidence, ER has been an important part of my classes for years. The website [mreader.org](http://mreader.org) has been an indispensable resource in helping my students achieve impressive results, and in helping me motivate and monitor students' progress. The

website keeps track of how much reading (and understanding) the students are doing by giving students a reading comprehension quiz after each book they finish. If the students pass the quiz, they are credited with the number of words in the book. If the students do not pass the quiz, they do not receive any credit for that book. Instead, they must choose a different (and probably easier) book and start again.

Skeptics may argue that quizzing students demotivates weak readers and that when students fail quizzes they are discouraged from reading, rather than inspired to read more. Additionally, there are surely teachers who adhere to the strict definition of ER which holds that students should not be quizzed on the information in the books. These teachers probably believe that by trying to remember a book's details, the students are not reading for pleasure and not reading as quickly as they otherwise would if they were just enjoying the book.

While all of these objections have some merit, I have discovered that if students are not responsible for understanding a book's content, they tend to glide over unfamiliar words without truly realizing their meaning. After skim reading a book, it is unlikely that a student will be able to accurately recall the events, characters, or plot twists to any significant degree. If a student is unable to recall the events or the characters of a book immediately after "reading" it, is that truly reading, and should a teacher give that student credit for reading the book?

This is the rationale for using the quizzes on the extensive reading website [mreader.org](http://mreader.org). By using this website, students are encouraged not just to read, but to follow the developments in the story, and what each character is contributing. Students are much less likely to hurry through a book when using [mreader.org](http://mreader.org). Instead they will read it with a more critical eye and pay attention to vocabulary and characters' dialog. The website is simple for students to use, which is important for maintaining their motivation. Furthermore, it is easy for teachers to use as well, making the task of monitoring hundreds of students' reading significantly easier than it would be without the website. "How to Implement a Graded Reading Program" (Weinberg, 2016) further explains why [mreader.org](http://mreader.org) is a useful ER tool for teachers, and how to use the website to implement an ER program to take advantage of all the benefits ER has to offer.

## **The Survey**

Although experts in the field of reading and language acquisition are quite sure that ER is a useful tool, I surveyed my students on their opinions of ER and the [mreader.org](http://mreader.org) website to discover how students felt about the reading program in my class. I began by asking my students to assess their experience with ER and the effects they thought it had on their language development. I asked them to complete an anonymous survey (Appendix C) indicating their level of agreement with statements like "I enjoyed using Mreader," and "I think my reading speed has increased since I started using Mreader." In response to the statement "I think my vocabulary has increased since I started using Mreader," 60% of the students agreed (8% of the students strongly agreed, and 52% slightly agreed). The large amount of agreement to this claim immediately generated my curiosity. Did the students truly improve their vocabulary? If so, by how much and was the improvement solely the result of ER? Waring and Takaki (2003) are dubious that ER helps students learn a significant



amount of new vocabulary that can be retained for longer than a few months. Yet many other researchers (Day, Omura and Hiramatsu (1991); Dupuy and Krashen (1993); Grabe and Stoller (1997); Hayashi (1999); Horst, Cobb and Meara (1998); Mason and Krashen (1997) and Pitts, White and Krashen (1989), have concluded that ER does in fact benefit vocabulary acquisition. Considering how much positive effect ER is purported to have on vocabulary development, it is not surprising to see that 60% of my students self-reported that their vocabulary improved in just one semester after completing ER. The next step was to test whether this was actually true.

### **The Vocabulary Tests**

While it is plausible to believe that ER improves students' reading skills, it is worth considering if ER truly benefits students as much as is proclaimed by the Extensive Reading Foundation among others. First, does ER actually improve students' vocabulary? If so, how much improvement is due to ER, and how much is due to the other courses that students are studying? It is very difficult to measure students' vocabulary levels to account for the vocabulary that is learned as a direct result of ER if students are enrolled in other English classes while they are simultaneously reading for ER. To conduct that research, a group of students would need to be engaged in ER exclusively, and their vocabulary acquisition at the end of the semester could then be compared to two different groups of students: one group that studied in English classes but did not do ER, and the second group that studied in English classes and did participate in ER. At the beginning and end of the semester all three groups would take vocabulary level quizzes and the results could be compared to determine which group benefited the most from which approach. It would be necessary to isolate the students who only did ER from all other forms of English content. The list of restrictions on these students would be long: no interaction with English speaking friends, no English songs, no English movies or YouTube videos, no English in music, and on and on. These prohibitions would be impractical and difficult to regulate. It would additionally be contrary to the ethos of ER and English teaching in general, which is to promote an interest in English so that students seek out other means of English input to enhance what they are already learning and reading about. As a result of the difficulty of conducting a scientifically sound research experiment, the research I undertook involved just two groups of students, both of which studied a normal load of English classes, but only one class also engaged in ER. The purpose was to learn if including ER, in addition to their standard coursework, improved the students' receptive vocabulary awareness.

I began by giving all my students Paul Nation's (Nation, I.S.P. & Beglar, D. 2007) vocabulary level test on the first day of the semester. According to Nation, "The Vocabulary Size Test is designed to measure both first language and second language learners' written receptive vocabulary size in English. The test measures knowledge of written word form, the form-meaning connection, and to a smaller degree concept knowledge. The test measures largely decontextualised knowledge of the word although the tested word appears in a single non-defining context in the test."

After measuring the students' initial vocabulary size, the students in the research group then participated in ER for a 14-week semester, while the students in the control group did not do any ER. Some students in the research group far surpassed the reading targets that were set for them, while one student failed to read any books

during the semester. Regardless of the amount of ER completed, I tested all the students' vocabulary level again at the end of the semester. There are two versions of Nation's vocabulary test so the students did not take the same test their second attempt. As Nation explains on his website, "Versions A and B of Vocabulary Size Test are parallel forms. This means that versions A and B can be used as if they were the same test." If ER truly improves vocabulary awareness, it is reasonable to expect that the students who did a lot of ER would see their scores on Nation's vocabulary level test improve, while students who did not participate in ER should have seen comparatively less vocabulary improvement.

## **The Results**

The results of my research indicate that there is not a statistically significant difference in vocabulary improvement between the ER group and the control group. While students in the ER group did in fact improve their receptive vocabulary size, the control group also improved, and therefore there was not a statistically significant correlation that can be ascribed to ER. Although the gains are moderate, the data indicate there was a gradual increasing trend in vocabulary awareness in both groups.

Among the research group, the average increase in vocabulary size was 2,425 words for students who read at least 166,926 words. The top reader (576,691 words) saw an increase in vocabulary of 2,200 words. The student whose vocabulary score improved the most (4,400 words) read 200,647 words. The weakest reader (166,926 words) managed to improve on the vocabulary quiz by 1,600 words. The student with the smallest gain in vocabulary size (0 words), completed 197,715 words in ER. In general, among the research group of students who actively participated in the ER, there was an improvement in their score on the vocabulary level test, while students in the research group who did not significantly engage in ER did not see substantial improvements in the vocabulary awareness.

It is important to note that there was not a direct correlation found between the amount of words read in ER and the amount of vocabulary improvement. Furthermore, the control group of students who did not participate in an ER program, also improved their vocabulary over the course of the semester. There was a statistically significant difference ( $P < 0.01$ ) between the initial average score of the control group and the research group on the first vocabulary level test. Interestingly, at the end of the semester the average increase in score on the vocabulary level test was greater among the control group. The control group improved on average 2625 words, compared to 2529 words for the research group. However, with a P value of 0.65, this increase was not statistically significant. A number of reasons could account for these research results. First, the students in the research group self-selected which books to read, and were encouraged to choose books that they could easily and quickly complete. This means that it is possible to have read tens of thousands of words and not encountered any new vocabulary. If this was the case, the students likely still could have benefited from the ER through the improvement their reading speed, fluency, confidence, and enjoyment of the experience, which would then feed back into their attitude towards learning English in general. There were also students who reached or exceeded the reading goals for the class, yet their vocabulary size either stayed the same or—in a few cases—decreased. Reasons for this are not clear, but some possibilities include

test anxiety, fatigue, distraction, or less than ideal effort and enthusiasm with the vocabulary quizzes.

Another finding from the second vocabulary quiz results was that students in the control group, who did not participate in ER, still managed to improve their vocabulary size over one semester. This is not entirely unexpected because there are many ways for students to learn vocabulary besides ER, such as through their other English classes. The control group was not prohibited from looking at, studying, or using English in between their vocabulary level quizzes. On the contrary, the control group of students (as well as the research group of students) were all studying for the TOEFL exam and as such, were certainly deliberately learning vocabulary related to that test. Prohibiting the studying of vocabulary among the control group would have more accurately highlighted the binary distinction between the benefits of ER versus the consequences of not doing ER, but that was not the objective of this research. Also, simply because students in the control group improved their vocabulary without doing ER does not negate the claim that ER does help many students to improve their vocabulary. Taken as a whole, the data support the proposition that most students who do ER will improve their vocabulary, but ER is not the only way to improve vocabulary.

### **Questionnaire Bias**

After conducting the research and comparing the results of vocabulary quizzes, it is clear that students did improve their vocabulary after completing a semester of ER. It is not clear, however, how the students knew that their vocabulary improved. The students did not have any objective data to verify the claim or indicate improvement. Although the students in the research group were able to see their vocabulary test scores increase after one semester, students who completed the initial survey about ER and mreader.org did not take any vocabulary quizzes related to their vocabulary size. This raises the question: why did students believe their vocabulary improved? Were they simply answering how they thought they should? There are potentially many factors that affected those students' answers including Acquiescence Bias (respondents agree to every question on a survey), Demand Characteristics (altering responses because they are participating in a study), Extreme Responding (only selecting the most extreme choices), Question Order Bias (answering questions differently depending on where the questions appear on a survey), and Social Desirability Bias (answering in ways that make respondents look better in the eyes of the questioner), (Wikipedia, Response Bias, accessed 12/27/17). Acquiescence Bias, Demand Characteristics, Extreme Responding, Question Order Bias, and Social Desirability Bias are all known phenomena that skew answers on self-reporting surveys and help explain why so many of my students said they believed that their vocabulary level improved after ER, even though there was no data to support that answer. Also, when introducing ER to my students at the beginning of the year, I told them that many linguists claimed that ER would improve their vocabulary. It is likely that they accepted this statement because it was delivered from their teacher. Therefore, when they were asked at the end of the year whether they thought their vocabulary improved, they remembered my earlier promotion of ER and answered affirmatively.

It can also be said that the statement on my survey regarding vocabulary improvement was too vague and therefore open to a variety of interpretations. Some students may have interpreted the statement “*My vocabulary has improved using Mreader*” to mean that they learned more new words. Other students may have thought that if the words they already knew became more understood than before, then they could also answer positively. Still other students may have understood the words “improved vocabulary” with their ability to achieve automaticity with vocabulary. Yet other students could have read the question and responded “Yes” if they simply felt more comfortable with their recognition of words, because Grabe (1991) explained that ER helps to improve word recognition and the ability to decode symbols on the page. Given that there are so many ways to interpret the idea of “improved vocabulary,” the initial question that began my interest in this study was overly broad and ill defined.

### **Improved Confidence**

The most positive conclusion I can draw from the students’ responses about their vocabulary improvement relates to their improved confidence. When asked if they thought their vocabulary improved, a majority of the students responded that it had. The fact that they believed that their vocabulary improved, even when it may not have, suggests that students’ *confidence* in their vocabulary improved. This optimistic interpretation of the students’ answer is supported by research around the power of positive thinking. The concept is that believing in your ability to do something actually enhances your ability to do it (Briggs, 2014). Additionally, boosted confidence is consistent with what the Extensive Reading Foundation includes as a reason for ER (erfoundation.org). Confidence, a “feeling of self-assurance arising from an appreciation of one's own abilities or qualities” (Merriam-Webster), is a difficult feeling to quantify. Although it is an imprecise means of measurement, asking students about their confidence level is one way to gauge it. Although the phrasing was different, my survey question about students’ vocabulary improvement was in fact asking whether they have developed confidence in their vocabulary. By responding that they thought their vocabulary improved, they were indicating that their confidence in their vocabulary increased.

If the students’ confidence in their vocabulary improved, and if vocabulary awareness is integral to being a confident reader, it is fair to suggest that the students’ confidence in their reading ability improved as a result of ER. This is an important and necessary development if students are going to be successful in school. Reading is a large part of most academic programs and if students are poor readers, or if they are intimidated by reading academic texts, they are likely to struggle in their classes. Kembo (1993) points to the value of ER in developing students’ confidence and ability in reading longer academic texts. This is important because it will help students learn how to decipher longer texts when they encounter them in their classes.

It is helpful to consider why the students’ felt their vocabulary improved (even when it didn’t). One of the expected results of ER is better reading fluency and a quicker reading speed. As the students become better readers through ER, their reading speed gradually improves, and their comfort and confidence level increases. If the students were then asked to identify what has changed in their English ability as a result of ER, it is natural to ascribe their new-found fluency on an improved level of vocabulary understanding. This logical conclusion indicates how ER can begin a virtuous circle:

the more one reads—>better understanding—>reads faster—>more enjoyment—>repeat (erfoundation.org). If the students are able to read more smoothly at the end of the semester, it is reasonable for them to assume that one reason is because they have improved their vocabulary. In this sense, whether or not the students' quiz scores on their vocabulary awareness actually improved, they believed that their vocabulary improved because they felt more comfortable reading in English. This indicates a positive correlation between reading, vocabulary awareness, and overall confidence in English ability, and points to the undeniable benefits of Extensive Reading.

Another explanation for the students' improved confidence in their vocabulary could be related to the use of the website mreader.org in combination with ER. After passing a quiz on the website, the students are "rewarded" with the cover of the book attached to their mreader page. This serves multiple functions: first, it reminds the students which books they have already read so that they don't attempt to read the same book twice; but beyond that, an even more helpful outcome of this feature is that the book cover serves as a kind of trophy or milestone. The more book quizzes the students pass, the more book covers they collect on their webpage. In addition to their word count increasing, the book covers begin to occupy more space reminding the students every time they access their page of what they have accomplished. I have heard students say that they appreciated this feature and enjoyed watching the book covers accrue on their page because they felt a sense of pride and achievement. This could be the reason why the students who used mreader.org said they believed ER (and mreader) helped grow their vocabulary. The idea that using mreader.org boosts confidence in vocabulary was not an intentional component of this research and there are still unanswered questions about this supposition. For example, it is as yet unknown if students who are not participating in ER, or participating in ER but not using mreader.org, would feel as strongly optimistic about their vocabulary growth after 14 weeks of studying as the students in my research group. It is true, however, that students who are participating in ER but not using mreader.org do not have this subtle yet continuous reminder of their successes. This is an area that needs more research.

## **Conclusion**

As expected, most students who read for ER for 14 weeks made significant improvements in their vocabulary. However, the students who did not participate in ER also improved their vocabulary. This was an interesting and unexpected discovery, but not unexplainable. The control group of students were actively involved in deliberate vocabulary study for the TOEFL exam, so the improvement on their vocabulary recognition can be ascribed to this effort. It is important to point out that no specific prescription can be made about how many words of ER will equate to what degree of increase in vocabulary awareness. There are too many variables to account and control for to make such a claim. However, the data add validity and justification for using ER and mreader.org in classes. The overarching takeaway from this research is that when students actively participate in ER and use mreader.org, they will almost certainly improve their vocabulary awareness. Additionally, the students' belief that ER (and mreader.org) improves their vocabulary is an indication of their improved confidence in their English vocabulary competency. Regardless of the actual degree to which students' vocabulary awareness improves, if the students

gain confidence in their English vocabulary ability vis-a-vis ER and mreader, this will feed into a virtuous circle: reading makes them more confident, which inspires them to read more, which boosts their vocabulary, which improves their confidence again. Students should be made aware of the benefits that will result when they participate in ER and use mreader.org. Showing students what is achievable if they devote the time and effort to improving their ability is motivational, self-sustaining, and rewarding.

### **Further Research**

Several further areas of research became clear over the course of this study. First, although there was no statistically significant difference in vocabulary growth after 14 weeks, would a longer research period show a greater difference between the research and control groups? Second, would a research group of hundreds (or thousands) of students show a larger increase in vocabulary after 14 weeks? Third, would students who do ER but do not use mreader.org also feel that their vocabulary increased? Fourth, do TOEFL students also realize that their vocabulary increased after 14 weeks? Fifth, how long does the improvement in vocabulary last after students stop reading?

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## Appendix A

Chart of Students' Vocabulary Scores Together with Number of Words Read

Student	First Test 04/19	Number of words known after first test	Second test 07/19	Number of words known after second test	Increase	Mreader words at time of second test 07/19
A	72	7200	37	7400	200	85728
B	78	7800	46	9200	1400	287160
C	83	8300	48	9600	1300	77521
D	74	7400	40	8000	600	94511
E	84	8400	70	14000	5600	80871
F	75	7500	79	15800	8300	450768
G	67	6700	45	9000	2300	82900
H	74	7400	43	8600	1200	80994
I	84	8400	52	10400	2000	124445
J	86	8600	44	8800	200	115682
K	73	7300	42	8400	1100	100403
L	75	7500	47	9400	1900	109611
M	87	8700	48	9600	900	76913
N	84	8400	62	12400	4000	144459
O	76	7600	54	10800	3200	135988
P	86	8600	49	9800	1200	83521

## Appendix B

### Extensive Reading Survey

1. On a scale of 1-5 (5 is the highest) how much do you like English?
2. Did M-reader help you improve your attitude towards English?
3. Do you like reading in your native language?
4. How many books on average do you typically read per year for fun?
5. How many books/words did you read for M-reader in 15 weeks?
6. Have you taken a TOEIC score since the M-reader program and have you seen you score improve?
7. Do you feel your reading ability has improved because of M-reader?
8. How much time did you read per day or week?
9. Do you feel you know more vocabulary because of M-reader?
10. Do you have more confidence reading English now?

## Appendix C

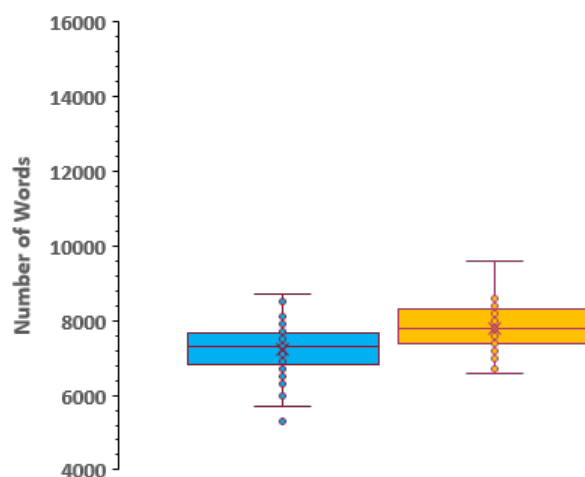
	Control	Meiji	<i>P</i> value
Average Beginning Vocab	7243	7806	<.01
Average End Vocab	9868	10269	0.25
Average Increase in Vocabulary Size	2625	2463	0.65

## Appendix D

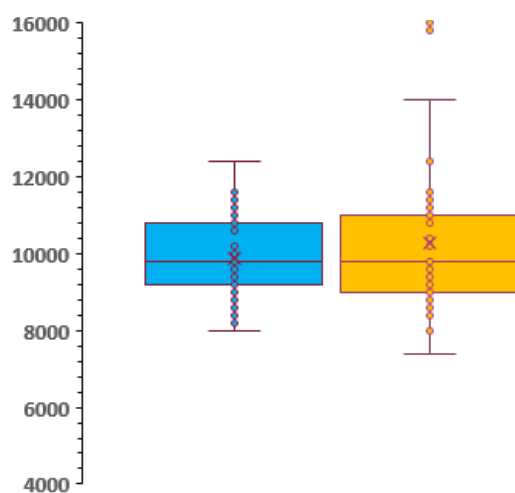
Control=blue

Extensive readers=orange

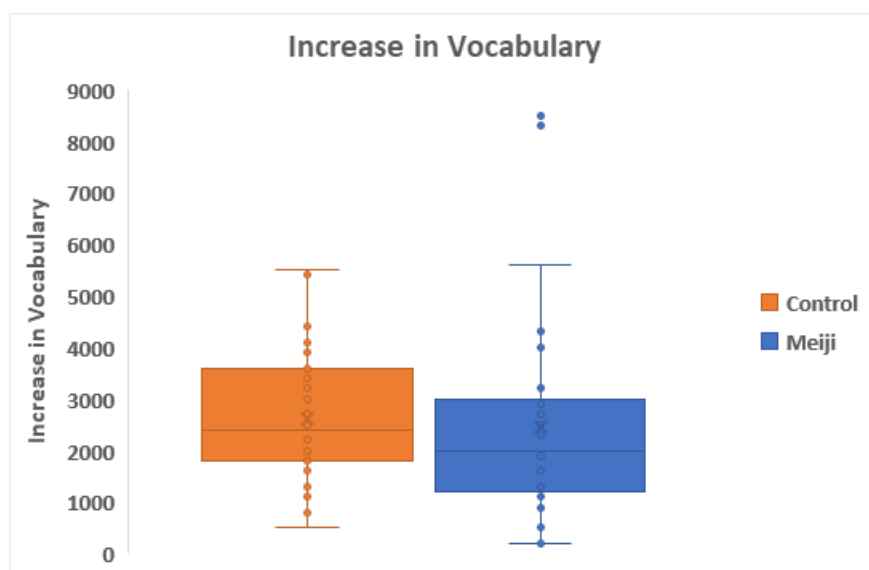
### Beginning Vocabulary



### End Vocabulary



### Increase in Vocabulary



### Appendix E



## *Process-Oriented Guided Inquiry Lessons in Grade 10 Biology*

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### **Abstract**

This descriptive developmental study determined the effect of Process-Oriented Guided Inquiry Lessons in Biology to the Grade 10 students' performance. It focused on the developed Process-Oriented Guided Inquiry Lessons, jurors' evaluation of the Process-Oriented Guided Inquiry Lessons in terms of competency-based, process skills involved, inquiry-based and cooperative learning strategy, and its effect on students' conceptual understanding, process skills and metacognitive awareness. The respondents were Grade 10 students of Taysan Resettlement Integrated School, Legazpi City, SY 2018-2019. The researcher employed a pre-experimental research design particularly a pretest-posttest design. Both qualitative and quantitative methods were utilized in analyzing the results in the lesson implementation. The qualitative data were obtained from the students' journals and remarks of the teacher-observers in the affective process skills observation sheets. In the quantitative method, data were obtained from the jurors' evaluation on the developed Process-Oriented Guided Inquiry Lessons for Grade 10 Biology, pretest and posttest scores and the students' response in the metacognitive awareness inventory. Mean gain and t-test were used for statistical rigors. Results show that the six Process-Oriented Guided Inquiry Lessons were deemed excellent by the jurors. This means that the jurors were convinced that developed Process-Oriented Guided Inquiry Lessons were of high quality and the four features were evident and commendable in the developed lessons. There were improvements in the conceptual understanding, process skills and metacognitive awareness of students supported by positive mean gain scores and the positive remarks given by the teacher-observers on student's affective process skills during the conduct of the study.

Keywords: Competency-based, inquiry-based, cooperative learning strategy, conceptual understanding, process skills and metacognitive awareness.

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## Introduction

Nowadays, educators have developed a wide variety of approaches to promote student engagement, enhance learning, and emphasize scientific attitudes and process skills. These approaches can be referred to as active learning. Teaching approaches where students are given opportunities to work as groups are also referred to as cooperative learning. Process-oriented guided inquiry learning (POGIL) is an approach to cooperative learning which combines a set of effective practices such as integrating guided-inquiry activities in teaching. Process-oriented guided inquiry learning is a learner-centered instructional strategy that aims to actively engage students in developing process skills during the learning process. It was developed based on the positive effects that constructivism, cooperative learning, and inquiry learning have in enhancing student's performance (Simonson, 2013). In a classroom where process-oriented guided inquiry learning is integrated, students are given the chance to work in learning groups on specially designed guided-inquiry activities that promote mastery of discipline content and the development of skills in the processes of critical thinking, information processing, problem-solving, communication and teamwork (Hanson, 2006). A lot of research conducted have proven the effectiveness of process-oriented guided inquiry learning in improving students' academic performance. Since then this student-centered teaching philosophy that was first developed in chemistry education was later adapted in a wider range of subjects.

In process-oriented guided inquiry learning, teachers only act as the facilitator of learning. The learning process will focus more on student's activities rather than the teacher's discussion. Process-oriented guided inquiry learning allows students to work on a small group consisting of 4 to 5 members where each member is assigned specific roles. Process-oriented guided inquiry learning employs learning groups as it provides a positive impact on students learning. Research has documented that learners working in teams feel better about themselves and their classmates. They also have more positive attitudes regarding the subject area, course, and instructors. Aside from that they also acquire better understanding and retention (Hanson, 2006).

The guided-inquiry activities utilized in process-oriented guided inquiry learning are designed based on the learning cycle approach. The learning cycle has different versions, but they all have similar features. According to Lawson (2002), the cycle is comprised of three steps: exploration, term introduction, and concept application. During the exploration phase, students are asked to explore or collect data from the model provided. Guide questions that promote information processing, problem-solving and critical thinking help students investigate the model given to them. After the students have figured out the pattern, they will proceed to the second phase called the term introduction where the instructor introduces the concept. Both the exploration phase and the term introduction phase guide the students to develop an understanding of the concept. The final phase called application, students will apply the concept to other situations or contexts to help generalize its meaning and applicability. The guided-inquiry activity provides information and asks questions to guide students through the learning cycle and help them develop process and learning skills (Abraham & Renner, 1896).

One principle that characterizes process-oriented guided inquiry learning as a teaching strategy is an explicit emphasis on the development of process skills as a component

of the student learning process. The “process-oriented” part of Process-oriented guided inquiry learning refers to the five key process skills that would be the focus of development. These are Information Processing, Problem-solving, Critical thinking, Oral and Written Communication and Teamwork.

Aside from process skills, the student's metacognitive awareness can also be enhanced in process-oriented guided inquiry learning approach. Metacognition is utilized in this approach to help students realize that they are the one responsible for monitoring their own learning. It allows students to reflect or to assess their own learning and the strategies they need to improve their learning. During activities students can be asked to assess their own work and that of each other; instructors also monitor the groups and provide feedback to individuals, groups, and to the whole class in order to improve skills and help students identify the things that still need improvement. At the end of guided-inquiry activities, the product that each group developed gives them the opportunity to reflect on what they have learned, the strategies they have employed and the improvement they have gained from the activity (Hanson, 2006). Considering that process-oriented guided inquiry learning approach utilizes metacognition, this feature can be an instrument to help students achieve better performance in class.

This study was conducted in a barangay high school which had performed poorly in the National Achievement Test over the past years. This barangay high school has a population of more than 596 students in the school year 2017-2018. The results of the School's Science National Achievement Test in the school year 2013-2015 had a 49.33% overall mean percentage score and this poor performance has not improved in the succeeding years. The school's mean percentage scores were considered below the accepted standard of the Department of Education which is an MPS of 75%. This alarming poor performance of the students provided a very good reason using the process-oriented guided inquiry learning approach may be implemented as an intervention in order to give the students the chance to become active participants in the learning process by providing them with the avenues to become responsible learners. The process-oriented guided inquiry lessons will give the students more opportunities to enhance their conceptual understanding, process skills, and metacognitive awareness. Adopting the process-oriented guided inquiry learning approach to develop lessons in Grade 10 Biology it can create a positive effect on a student's conceptual understanding, metacognitive awareness, and process skills.

## **Research Methods**

This study employed a descriptive developmental research method to describe the development of process-oriented guided inquiry lessons and determine its effect on students' learning. The study utilized a pre-experimental research design particularly the single group pretest-posttest design. The design was used in order to evaluate the effect of process-oriented guided inquiry lessons on students' conceptual understanding, process skills and metacognitive awareness in biology. The respondents in this study were given a test prior to the process-oriented guided inquiry lesson intervention and a test after the implementation of process-oriented guided inquiry lessons. The change between the scores of the students in the two tests was attributed to the effect of the developed process-oriented guided inquiry lessons in Grade 10 Biology.

The study combined both quantitative and qualitative techniques in the analysis of data. The researcher gathered the quantitative data using results on the Pretest-Posttest, Cognitive Process Skills test, and Metacognitive Awareness Inventory. The qualitative data were gathered from the jurors' evaluation of the process-oriented guided inquiry lessons in Grade 10 Biology, teacher-observer's evaluation on students' affective process skills and the insights in their journal.

### **Results and Discussions**

Six (6) lesson plans were sifted from the learning competencies stipulated in the K to 12 Curriculum Guide. The topics in the book were considered in the construction of the lessons. The lesson plans have five (5) parts: the learning objectives, subject matter, teaching procedure, lesson proper, and assignment. The researcher followed the 5E Instructional Model in the lesson proper which consists of Engagement, Exploration, Explanation, Elaboration and, Evaluation.

The six (6) process-oriented guided inquiry lessons focused on how the students would learn the content and at the same time develop process skills by working as a group on guided-inquiry activities. Each lesson developed was incorporated with a cooperative learning strategy and guided-inquiry to give the students the opportunity to work effectively as part of a cooperative group and share each other's idea. All the lessons were developed to give the students the chance to conduct small group discussions and brainstorming as the students accomplished the guided-inquiry activities.

Table 1 presents the topics of the developed lessons. The learning competencies are also given together with what guided-inquiry activities will be done and the process of how the students will learn the content.



Table 1. Process-Oriented Guided Inquiry Lessons

Lesson Plan	Learning Competency	Guided Inquiry Activity	Process-Oriented
Lesson 1: DNA and RNA Structure and DNA Replication	Explain how protein is made using information from DNA. Code: S10LT-IIIc-37	-Interpreting DNA and RNA model.  -Evaluating and interpreting the table using Chargaff's rule.  -Interpreting the DNA replication video.	Students were expected to work cooperatively, generally in groups of 4 to 5. Each group interpreted the DNA and RNA Structure to answer the guide questions. They also evaluated and interpreted a table that showed Percentages of Bases in Four Groups in order to identify which sample supports the Chargaff's rule of base-pairing. Lastly, the students also watched and interpreted a video to identify the correct sequence of DNA replication.
Lesson 2: Protein Synthesis		-Solving a protein synthesis problem by determining the correct mRNA, tRNA and Amino acid sequence.  -Calculating the total value of the amino acid sequences.	The students worked together in small groups to understand the concept and to solve the protein synthesis problem. Each group identified a specific strategy that would help them determine the correct mRNA, tRNA and amino acid sequence using the information from the DNA. Lastly, the students calculated the mystery gene expression equation using the corresponding values of the amino acid sequence.
Lesson 3: Mutations	Explain how mutations may cause changes in the structure and function of a protein. Code: S10LT-IIIe-38	-Analyzing the mutation that occurred in each sample.  -Drawing conclusion based on the findings.	Each group analyzed the different samples and determined the mutation that occurred. The students also determined the major causes of each mutation. At the end of the activity, each group drew a conclusion based on the answers they formulated in the guided-inquiry activity.
Lesson 4: Fossils and Geologic Time Scale	Explain how fossil records, comparative anatomy, and genetic information provide evidence for evolution. Code: S10LT-IIIc-39	-Interpreting the fossil and sedimentary rock layer. -Creating a pie chart that shows the range of time of each era based on the data provided. -Interpreting the geologic time scale.	In the first part of the activity, each group is expected to interpret the fossil model and sedimentary rock layer diagram to answer the guide questions. To understand the length of time of each era in the geologic time scale, the students created a pie chart that correctly shows the range of time of each era. The students also interpreted the geologic time scale to complete the guide questions in the activity.
Lesson 5: Evidences of Evolution		-Interpreting the models whether homologous or analogous structures.  -Interpreting the embryological development model.  -Interpreting and evaluating the amino acid sequence to determine which organism is closely related to humans.	The students participated in small group work. In the first part of the activity, the students interpreted two models and determined whether these are homologous or analogous structure. The students justified their answer afterward. The second part of the activity gave the students an opportunity to interpret the embryonic development model and explain how this evidence supports evolution. The last part of the activity allowed the students to interpret the amino acid sequences of different organisms and use these amino acid sequences to determine which organism is closely related to humans.
Lesson 6: Theories of Evolution	Explain the occurrence of evolution. Code: S10LT-IIIg-40	-Comparing Darwin and Lamarck's ideas about evolution.  -Analyzing and arranging the cards using Lamarck's theory of evolution and Darwin's theory of evolution.  -Drawing conclusion based on their findings.	In a small group, the students read an article about the two theories of evolution. They used their understanding in completing the first part of the activity. The students determined whether each statement was from Darwin or Lamarck. In the last part of the activity, the students also applied the information they have gathered in the reading material in analyzing the cards and arranging them in the correct order based on Darwin's theory and Lamarck's theory. Each group was given enough time to discuss their ideas with the whole group before arranging the cards. After arranging the cards, the students drew a conclusion based on how they arranged the cards and how they understood the theories of evolution.

These lessons were evaluated by jurors from the Division of Albay. The jurors evaluated and gave their numerical and adjectival ratings based on the given content criteria. Each lesson was evaluated in terms of the following criteria: competency-based, process skills involved, inquiry-based and cooperative learning strategy.

Table 2 summarizes the evaluation of the jurors by generalizing the criteria. The overall mean under each criterion (i.e., competency-based, process-skills involved, inquiry-based and cooperative learning strategy) for a lesson was multiplied then added to those of the other lessons. The total was then divided into the total number in the evaluation tool for the process-oriented guided inquiry lessons.

Table 2. Summary of the Jurors' Evaluation of the Developed Lessons

Lessons	Competency-Based		Process Skill Involved		Inquiry-Based		Cooperative Learning Strategy		Overall Mean	Adj. Rating
	W.M	Adj. Rating	W.M	Adj. Rating	W.M	Adj. Rating	W.M	Adj. Rating	W.M	Adj. Rating
1	4.94	E	4.74	E	5.00	E	4.63	E	4.83	E
2	4.97	E	4.74	E	4.42	VS	4.58	E	4.68	E
3	4.94	E	4.67	E	4.58	E	4.71	E	4.73	E
4	5.00	E	4.48	VS	4.58	E	4.50	E	4.64	E
5	4.91	E	4.41	VS	4.79	E	4.54	E	4.66	E
6	4.85	E	4.70	E	4.67	VS	4.58	E	4.70	E
<b>Mean</b>	<b>4.94</b>	<b>E</b>	<b>4.62</b>	<b>E</b>	<b>4.67</b>	<b>E</b>	<b>4.59</b>	<b>E</b>	<b>4.71</b>	<b>E</b>

Legend: 5 (4.50-5.00) means Excellent; 4 (3.50-4.49) means Very Satisfactory; 3 (2.50-3.49) means Satisfactory; 2 (1.50-2.49) means Moderately Satisfactory; and 1 (1.00-1.49) means Poor.

The overall ratings of the jurors in the different criteria revealed an overall mean of 4.71 which is interpreted as "Excellent." This means that the process-oriented guided inquiry lessons were of high quality and that the different criteria for the lessons are evident.

Although the lessons were generally rated "Excellent", it is noted that the jurors rated Lesson 5 with the lowest score of 4.41 for the process skills involved because the guided inquiry activity in Lesson 5 needed to have more models and data that would help the students practice their information processing skills. The jurors recommended adding more models and information suited to the level of understanding of the students that would help enhance student's information processing skills. One of the ideas that they recommended is adding a model that shows the amino acid sequences of organisms. According to one juror, the model that should be included in that guided-inquiry activity must challenge students to use their information processing skills in interpreting which of the following organisms are closely related.

The result is consistent with the comments and suggestions of the jurors. One juror stated that "*The activities are organized and have included guide questions that promote a deeper understanding of the concepts in biology. The provided models and information will challenge the students to have critical analysis and interpretation as they accomplish the given tasks.*" One juror more said, "*Allowing the students to work together in doing the activity motivates the students, encourages active learning, and develops key critical-thinking and communication.*"

Whenever there is an instructional intervention done in a learning setting, it hopes to generate a positive outcome in improving the quality of education. The present study aimed to do the same by enhancing the students' conceptual understanding, process skills and metacognitive awareness in studying heredity and biodiversity and evolution.

Table 3 presents the statistical data gathered from the pretest and posttest results of the group. The individual learning competency was also presented to show the areas in which the conceptual understanding of the students was advanced or diminished. The performance level was also given for comparison purposes.

Table 3. Conceptual Understanding Results Summary Statistics

Learning Competencies	Pretest Mean Scores	Performance Level		Posttest Mean Scores	Performance level	
		%	Descriptive Equivalent		%	Descriptive Equivalent
LC 1	7.35	38.68	LM	9.93	52.24	NM
LC 2	4.95	45.00	LM	6.08	55.23	NM
LC 3	7.43	39.08	LM	9.90	52.11	NM
LC 4	4.90	44.55	LM	6.28	57.05	NM
Mean	24.63	41.83	LM	32.18	54.15	NM
Standard Deviation	5.65			6.18		
Mean Gain	+7.55					
<i>p</i> -value	0.00					
Significance	Significant ( $\alpha=0.05$ )					

*Legend: 92% and above means Full Mastery (FM); 83% to 91% means Near Full Mastery (NFM); 75% to 82% means Mastery (M); 51% to 74% means Near Mastery (NM); 25% to 50% means Low Mastery (LM); 24% and below means No mastery (NoM).*

The table shows that there was a significant improvement in the scores of the group ( $p < 0.05$ ). This means that the students' performance in the posttest was better than the performance in the pretest. In addition, the scores of the group became more varied after the implementation period. Similarly, this means that some students in this group made significant progress while others did not; thus, extending the range of the test scores. The mean scores of the group have increased from 24.63 to 32.18 (+7.55). It was evident that the mean scores of the students in the posttest were higher than the mean scores in the pretest. The result implies that the students' conceptual understanding in biology has improved after the implementation of the process-oriented guided inquiry lessons.

The performance level of the group has also increased from 41.83% (low mastery) to 54.15% (near mastery). The students gained the highest performance level in Learning competency 4. The pretest is only 44.55% which was interpreted as "Low Mastery" and the posttest is 57.05% which was interpreted as "Near Mastery". This only shows that during the implementation of the process-oriented guided inquiry lessons the students developed a greater understanding of the theories of evolution and the process of how evolution takes place within species.

Overall, the results suggest that the students' conceptual understanding was enhanced. The students could grasp the different concepts in Heredity, Biodiversity and Evolution in the process-oriented guided inquiry lessons. The result implies that the developed process-oriented guided inquiry lessons helped the students gain knowledge in the six lessons. It can be drawn in the discussions above from the students' journal entries and the supporting previous researches that it helped the students improve their understanding of the topics.

The process-oriented guided inquiry learning project identified five process skills as those that would be the focus of development in a process-oriented guided inquiry classroom. The process skills are identified as cognitive process skills and affective process skills. The cognitive process skills are information processing, problem-solving and critical thinking skills. The students use these cognitive process skills when learning new concepts and procedures, practicing skills and solving problems. The affective process skills are also developed in process-oriented guided inquiry learning. These are teamwork and oral and written communication which can be developed when students work together as a group on guided-inquiry activities. The process skills of the students play a crucial role in their success in the subject.

Table 4 presents the statistical data gathered from the tests results of the group. The mean scores under the different processes emphasized in this study were also shown for tracking the areas which may have improved or diminished after the implementation of the Process-Oriented Guided Inquiry lessons for the group.

Table 4. Cognitive Process Skills Results in Summary Statistics

Parameters	Pretest Mean Scores	Performance Level		Posttest Mean Scores	Performance level	
		%	Descriptive Equivalent		%	Descriptive Equivalent
Information Processing	17.50	43.75	LM	22.16	55.39	NM
Problem Solving	8.66	43.29	LM	11.79	58.95	NM
Critical Thinking	15.61	39.01	LM	20.74	51.84	NM
Mean	41.76	42.02	LM	54.68	55.39	NM
Standard Deviation	7.47			8.43		
Mean Gain	+12.92					
<i>p</i> -value	0.00					
Significance	Significant ( $\alpha=0.05$ )					

*Legend: 92% and above means Full Mastery (FM); 83% to 91% means Near Full Mastery (NFM); 75% to 82% means Mastery (M); 51% to 74% means Near Mastery (NM); 25% to 50% means Low Mastery (LM); 24% and below means No mastery (NoM).*

The data table shows that there was a significant improvement on the pretest and posttest scores of the group ( $p < 0.05$ ). This means that the students' performance in the cognitive process skills posttest was better than the performance in the cognitive process skills pretest. Talking about the dispersion of the test scores, the posttest scores became more varied after the implementation period. This connotes that some students in this group made significant progress while the others did not; thus, extending the range of the test scores. The mean scores of the group have been increased from 41.76 to 54.68 (+12.92). It is evident that there was an increase in the

mean scores of the students in the posttest. This is supported by the higher increment on the test scores of the students under the different cognitive processes. The result implies that the students' cognitive process skills were enhanced after the implementation of the process-oriented guided inquiry lessons.

In this study, the affective process skills developed by the students were observed during the process-oriented guided inquiry lessons. There were three teacher-observers invited to observe the students as they worked on the guided-inquiry activities as a group. In each lesson, the teacher-observers gave remarks on how the groups worked together and how they effectively presented their output.

Overall, the remarks given by the teacher-observers were positive. This highly suggests that the process-oriented guided inquiry lessons had successfully developed the students' affective process skills. The students were able to show effective teamwork and oral and written communication as they accomplished the guided inquiry activities.

Metacognition is considered a critical component of successful learning. It involves self-regulation and self-reflection of strengths, weaknesses, and the types of strategies you create. This is used in process-oriented guided inquiry learning by creating an environment where continuous improvement is encouraged, and students realize that they are in charge of their own thinking.

Table 5 presents the comparison between mean scores and the corresponding level of metacognitive awareness of Grade 10 students before and after the process-oriented guided inquiry lessons intervention. The weighted mean in each indicator was computed then interpreted according to its corresponding qualitative remarks. The average weighted mean was computed using the means of the indicators.

Table 5. Metacognitive Awareness Results Summary Statistics

Metacognitive Awareness Indicators	Mean Score and Level of Awareness				Mean Gain
	Pretest Weighted Mean	Interpretation	Posttest Weighted Mean	Interpretation	
1. I understand my intellectual strengths and weaknesses in biology.	3.79	Mostly aware	3.97	Mostly aware	0.18
2. I know what kind of information is most important to learn in biology.	3.39	Aware	3.66	Mostly Aware	0.27
3. I am good at organizing biology information/concepts.	3.63	Mostly aware	3.95	Mostly aware	0.32
4. I know what my Biology teacher expects me to learn.	3.63	Mostly aware	4.13	Mostly aware	0.50
5. I am good at remembering information related to biology.	3.74	Mostly aware	3.87	Mostly aware	0.13
6. I have control over how well I learn biology concepts.	3.87	Mostly aware	3.97	Mostly aware	0.10
7. I am a good judge of how well I understand concepts in biology.	3.37	Aware	3.42	Aware	0.05
8. I learn more when I am interested in the topic in biology.	2.79	Aware	3.74	Mostly aware	0.95
9. I try to use strategies that have worked in the past.	3.39	Aware	3.87	Mostly aware	0.48
10. I have a specific purpose for each strategy I use.	3.82	Mostly Aware	3.84	Mostly Aware	0.02
11. I am aware of what strategies I use when I study.	2.84	Aware	3.05	Aware	0.21
12. I find myself using helpful learning strategies automatically.	3.95	Mostly aware	3.97	Mostly aware	0.02
13. I know how to use a specific strategy when studying biology concepts.	3.63	Mostly aware	3.71	Mostly aware	0.08
14. I know several strategies to use when studying biology.	3.08	Aware	3.13	Aware	0.05
15. I learn best when I know something about the topics in biology.	3.32	Aware	3.89	Mostly aware	0.57
16. I use different learning strategies depending on the topics in biology.	3.84	Mostly Aware	4.18	Mostly aware	0.34
17. I can motivate myself to learn biology when I need to.	3.66	Mostly aware	3.92	Mostly aware	0.26
18. I use my intellectual strengths to compensate for my weaknesses in biology.	3.34	Aware	4.00	Mostly Aware	0.66
19. I know what strategy will be most effective in learning biology.	3.63	Mostly aware	3.76	Mostly aware	0.13
20. I know why a specific strategy works better than the other when studying topics in biology.	3.95	Mostly Aware	3.97	Mostly Aware	0.02
<b>Average Weighted Mean</b>	<b>3.51</b>	<b>Aware</b>	<b>3.79</b>	<b>Mostly Aware</b>	
<b>Mean Difference</b>	0.28				
<b>Standard deviation</b>	0.32		0.29		
<b>p value</b>	0.00				
<b>Significance</b>	Significant ( $\alpha=0.05$ )				

Legend: 1.0-1.5 (never aware); 1.6-2.5 (sometimes aware); 2.6-3.5 (aware); 3.6-4.5 (mostly aware); and 4.6-5.0 (always aware).

Results show that there is a significant increase in the students' overall metacognitive awareness in biology. At the end of the implementation, the students had increased response in mostly aware. The pretest for Metacognitive awareness had an overall mean of 3.51 which was interpreted as "aware". The pretest overall mean denotes that the students were already aware of their own learning but not most of the time. The posttest for metacognitive awareness had an overall mean of 3.79 which was interpreted as "mostly aware". This means that the developed process-oriented guided inquiry lessons in Grade 10 Biology had a positive effect on enhancing students' metacognitive awareness. The mean difference of the pretest overall mean and the posttest overall mean is 0.28.

The overall evaluation suggests that the posttest result is statistically significant but with a minimal mean difference since the lesson implementation only happened for a short period of time. As with any skill, enhancing metacognitive abilities requires time, patience and practice, but helping students to develop metacognitive skills at each stage of a task will help. Prior to the task, this involved setting goals, preparing thoroughly and thinking about similar previous situations. During the task, this included monitoring their performance and after the task seeking feedback, taking action on it and keeping a diary.

The overall findings of this study on the effects of the developed process-oriented guided inquiry lessons in the students' conceptual understanding, process skills, and metacognitive awareness suggest that the intervention enhanced their academic performance under each criterion. The impact of the process-oriented guided inquiry lessons has been proven as a force to reckon with in the context of teaching biology.

## **Conclusion**

Six (6) Lessons under Module 2 (Heredity: Inheritance and Variation) and Module 3 (Biodiversity and Evolution) of the K to 12 Curriculum Guide for Grade 10 biology were developed. The jurors' overall evaluation of the process-oriented guided inquiry lessons for Grade 10 Biology was excellent. This implies that the jurors were convinced that developed process-oriented guided inquiry lessons were of high quality and the four features namely: competency-based, process skills involved, inquiry-based and cooperative learning strategy were evident and commendable in the developed lessons. The integration of the process-oriented guided inquiry lessons in Grade 10 Biology was effective in enhancing the students' conceptual understanding, process skills, and metacognitive awareness.

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***Does Blended Learning System Boost Student's Knowledge Sharing in General Education Course? The Indonesian Higher Education Challenge***

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**Abstract**

The role of General Education is to equip students with basic knowledge, to understand the relationship between one science and another, to teach how to apply human knowledge and experience universally, so that it will enhance mutual understanding and respect for human beings. One of the challenges in General Education learning in higher education is to improve students' ability of knowledge sharing. Knowledge sharing is usually not something normal, where people tend to hoard knowledge and suspiciously perceive knowledge from others. In this context, General Education course should strive to foster the habit of sharing knowledge in order to become the character of students as young intellectuals. The use of Blended Learning in General Education course will provide opportunities for students to share knowledge online. However, according to the experience of using Blended Learning at Universitas Pendidikan Indonesia, online forums are nothing more than an empty framework because they are deemed to have insufficient knowledge that the students need. This study seeks to find ways to improve the Online Knowledge Sharing Behaviour (OKSB). In this paper, we view that OKSB is influenced by intention factors, self-efficacy and technological capability factors.

Keywords: blended learning, general education, knowledge sharing, knowledge sharing intention, online knowledge sharing behaviour

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## Introduction

General Courses (henceforth GC) refer to a group of courses that carries a national mission of educating the life of the nation through "value-based education" to transform citizens that embrace religious, Pancasila (the Five Principles), and nationalism values (Winataputra & Budimansyah, 2014). In light of this, GC is a highly relevant subject for prospective teacher students so that they will later become teachers who can organize a learning process based on the Pancasila moral values whatever they teach (Tjalla, 2019).

However, since implemented at the tertiary level, GC has faced the constraints of a shortage of lecturers, the quality of which was not evenly distributed and lectures were still dominated by lecturer-centered approaches, rendering students passive. Thus, the implementation of GC has yet to attain the goal as it should (Budimansyah, 2017; Nurdin, 2017). This is a strategic issue in the implementation of GC in Indonesian tertiary institutions (henceforth ITI), including in Institutes of Teachers' Education (henceforth ITE) namely the lack of lecturers, the quality is not evenly distributed, and lectures have not been successful in fostering students to improve their information and knowledge literacy (Scott, 2015).

Addressing these problems, this research developed a blended learning (BL) system. Being an international trend at the higher education level (Pima et al., 2018), BL is a learning system that is in high demand and effective for integrating face-to-face lectures with e-learning systems (Bujdoso, Novac & Szimkovics, 2017; Mayer, 2010; Watson, 2008). This system will continue to utilize the advantages of face-to-face lectures to develop human communication between students, lecturers, and other social environments (Boelens, De Wever & Voet, 2017). At the same time, we can also take advantage of e-learning systems (Henrie et al., 2015) to provide a very broad learning access so as to get around the limited number of lecturers in multi-campus universities with many classes (Clement, Vandeput & Osaera, 2016). BL becomes a beneficial approach because of the variety of learning opportunities it offers (Diep et al., 2019). Therefore, through BL, GC will be empowered to be more meaningful, integrated, values-based, challenging, and activating (Han & Ellis, 2019; Law, Geng, & Li, 2019)

The use of the BL system is thus a middle way to overcome the shortcomings of the "face-to-face" learning system that does not allow for student independence (López-Pérez, Pérez-López & Rodríguez-Ariza, 2011), while covering the weaknesses of the "full online" learning system that does not really foster social interaction (Boelens, De Wever & Voet, 2017). This is the advantage of the BL system for GC learning in ITE. Through a learning experience that combines a system of "face-to-face" and "online" in a balanced way student teacher candidates are encouraged to be able to build broad knowledge, develop attitudes, and hone skills that are meaningful to their future profession (Hilliard, 2015).

One of the challenges in GC is how to improve students' knowledge sharing ability, which is closely related to long-term performance and competitiveness. Knowledge sharing is a process that involves the exchange of knowledge between individuals or groups (Wang & Noe, 2010). Higher education will get added value through the development of knowledge sharing initiatives to achieve their goals. At present,

knowledge sharing can be done not only face to face, but also through the intranet, extranet, or internet. In Indonesia, knowledge sharing can be most possibly done via the internet. Based on Internet World Stats, Indonesia is the country with the third largest population of internet users in Asia, reaching one hundred seventy-one million two hundred and sixty thousand (<http://www.internetworldstats.com>, data: 30 June 2019). This potential may improve the quality of Indonesian higher education.

However, in actuality, knowledge sharing is not something normal; we tend to hoard knowledge and feel suspicious of knowledge that comes from other people. This study aims to examine what factors influence UPI students' knowledge sharing activities in GC lectures using the BL system.

## Conclusion

To account for how a person can increase participation in online learning, Chen, Chen & Kinshuk (2009) produced an online model of knowledge sharing behavior. In so doing, Chen integrated the Theory of Planner Behavior (TPB), Social Capital Theory, and Social Cognitive Theory. Adapting the views of Chen, Chen & Kinshuk (2009), the model invoked in this research can be seen in Figure 1.

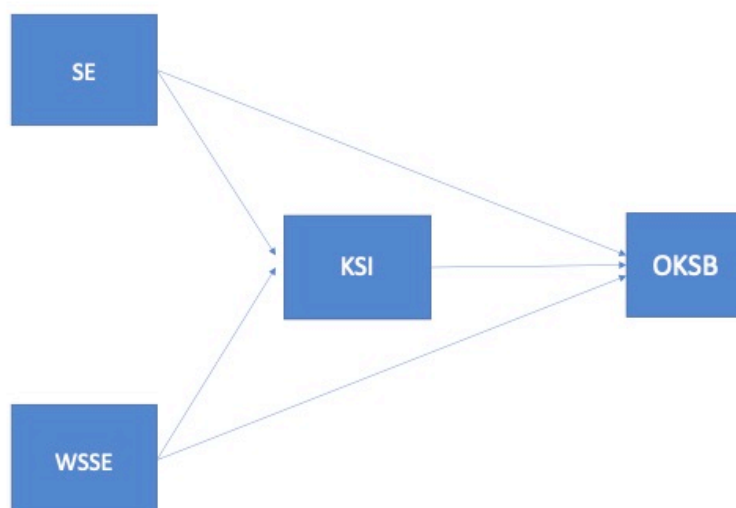


Figure 1. Research model

Based on Figure 1 above, the research model can be explained as follows. Online knowledge Sharing Behavior (OKSB) shows the process of delivering and receiving knowledge online whose success is measured by the amount of knowledge sharing and the quality of learning outcomes achieved. Knowledge Sharing Intention (KSI) is a motivational factor that shows how much a person wants to do knowledge sharing. Based on the Theory of Planned Behavior, intention is influenced by attitude, subjective norm, and perceived behavior control (Chen, Chen & Kinshuk, 2009). Self-efficacy (SE) is defined as a form of self-evaluation that influences decisions of action, amount of effort, and perseverance needed to face obstacles, ending up in mastery of behavior. Web-specific Self-efficacy (WSSE) indicates the ability to use

the function of a virtual learning community website (VLC) in the learning process (Hsu et al., 2007; Lin, Hung & Chen, 2009).

The empirical test on this research model was undertaken by using a questionnaire survey to obtain data on the perceptions of the students who were learning participants with a blended learning system at Universitas Pendidikan Indonesia in three lectures on the general course of Pancasila Education and Civics Education as many as 146 people. Blended learning was utilized to support lectures in class via such features as uploading Semester Learning Plans, online lecture materials, learning videos, discussion materials, assignments, as well as discussion forums and webinars.

### Main findings

The first step performed towards the data was to analyze the conditions of the four research variables. The four research variables are as follows:

- (1) Online Knowledge Sharing Behavior (OKSB) shows the behavior of delivering and receiving knowledge online whose success is measured by the amount of knowledge sharing implementation and the quality of learning outcomes achieved;
- (2) Knowledge Sharing Intention (KSI) is a motivational factor that shows how much a person's desire to do knowledge sharing;
- (3) Self-efficacy (SE) is defined as a form of self-evaluation that influences decisions of action, amount of effort, and perseverance to face obstacles, and ends up in mastery of behavior; and
- (4) Web-Specific Self-Efficacy (WSSE) shows the ability to use the functions of online learning websites in the learning process.

From the data gathered, the statistical results of the research variables under examination can be seen in Table 1.

	N	Minimum	Maximum	Mean	Std. Deviation
Online Knowledge Sharing Behaviour	146	112	251	212.23	25.721
Knowledge Sharing Intention	146	28	50	43.15	5.828
Web-Specific Self-Efficacy	146	27	50	41.28	5.840
Self-Efficacy	146	20	50	40.08	5.877
Valid N (listwise)	146				

Table 1  
Statistical Descriptions of the Research Variables

Based on the data in Table 1, of 146 students who were the respondents, the mean of their OKSB is 212.23. This means, on the basis of the categories: 1) 0.00 - 60.00: poor; 2) 60.01 - 120.00: less than satisfactory; 3) 120.01 - 180.00: satisfactory; 4) 180.01 - 240.00: good; and 5) 240.01 - 300.00: very good, the average Online Knowledge Sharing Behavior (OKSB), sits in the "good" category.

The Knowledge Sharing Intention (KSI) variable obtained a mean value of 43.15. That is, based on the categories: 1) 0.00 - 10.00: poor; 2) 10.01 - 20.00: less than satisfactory; 3) 20.01 - 30.00: satisfactory; 4) 30.01 - 40.00: good; and 5) 40.01 - 50.00: very good, the average Knowledge Sharing Intention (KSI) resides in the "very good" category.

The Web-Specific Self-Efficacy (WSSE) obtained a mean value of 41.28. That is, using the categories: 1) 0.00 - 10.00: poor; 2) 10.01 - 20.00: less than satisfactory; 3) 20.01 - 30.00: satisfactory; 4) 30.01 - 40.00: good; and 5) 40.01 - 50.00: very good, the average Web-Specific Self-Efficacy (WSSE) is included in the "very good" category.

The Self-Efficacy (SE) variable obtained a mean value of 40.08. That is, referring to the categories: 1) 0.00 - 10.00: poor; 2) 10.01 - 20.00: less than satisfactory; 3) 20.01 - 30.00: satisfactory; 4) 30.01 - 40.00: good; and 5) 40.01 - 50.00: very good, the average Self-Efficacy (SE) is in the "very good" category.

Based on the research data above, it was found that the use of blended learning in the Pancasila Education and Citizenship Education courses in UPI (Indonesia University of Education) generated excellent SE and MSEE, but OKSB was only in good category. This condition somewhat aligns with the findings of Chen, Chen & Kinshuk (2009) that the use of blended learning in lectures at a tertiary institution produced very good SE, WSSE and OKSB and differed from the findings of Amila & Suryadi (2014) that the use of blended learning at ITB produced excellent SE and WSSE, but not so with OKSB.

After obtaining a picture of the condition of each variable, the testing of the research hypotheses was carried out. This testing was divided into 3 sub-structures, namely:

1. The influence of *Self-Efficacy* and *Web-Specific Self-Efficacy* on *Knowledge Sharing Intention*. The proposed hypothesis was:
  - Hypothesis 1:
    - H<sub>0</sub>: There is no significantly direct influence of *Self-Efficacy* on *Knowledge Sharing Intention*. If Sig. value > 0.05
    - H<sub>1</sub>: There is a significantly direct influence of *Self-Efficacy* on *Knowledge Sharing Intention*. If Sig. value < 0.05
  - Hypothesis 2:
    - H<sub>0</sub>: There is no significantly direct influence of *Web-Specific Self-Efficacy* on *Knowledge Sharing Intention*. If Sig. value > 0.05
    - H<sub>1</sub>: There is a significantly direct influence of *Web-Specific Self-Efficacy* on *Knowledge Sharing Intention*. If Sig. value < 0.05
2. The influence of *Self-Efficacy* and *Web-Specific Self-Efficacy* on *Online Knowledge Sharing Behaviour*. The proposed hypothesis was:
  - Hypothesis 3:
    - H<sub>0</sub>: There is no significantly direct influence of *Self-Efficacy* on *Online Knowledge Sharing Behaviour*. If Sig. value > 0.05
    - H<sub>1</sub>: There is a significantly direct influence of *Web Self-Efficacy* on *Online Knowledge Sharing Behaviour*. If Sig. value < 0.05
  - Hypothesis 4:
    - H<sub>0</sub>: There is no significantly direct influence of *Web-Specific Self-Efficacy* on *Online Knowledge Sharing Behaviour*. If Sig. value > 0.05
    - H<sub>1</sub>: There is a significantly direct influence of *Web-Specific Self-Efficacy* on *Online Knowledge Sharing Behaviour*. If Sig. value < 0.05
3. The influence of *Knowledge Sharing Intention* on *Online Knowledge Sharing Behaviour*. The proposed hypothesis was:
  - Hypothesis 5:

H<sub>0</sub>: There is a significantly direct influence of *Knowledge Sharing Intention* on *Online Knowledge Sharing Behaviour*. If Sig. value > 0.05

H<sub>1</sub>: There is a significantly direct influence of *Knowledge Sharing Intention* on *Online Knowledge Sharing Behaviour*. If Sig. value < 0.05

Based on the research hypothesis and after fulfilling the analysis prerequisites, further testing was done using SPSS software version 21. The results can be seen below.

The results of hypothesis testing in sub-structure 1 reveals that, R square = 0.675 so that the coefficient of determination is 67.5%. That is, the rise and fall of the variable Knowledge Sharing Intention, 67.5% is determined by Self-Efficacy and Web-Specific Self-Efficacy (see Table 2)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.822 <sup>a</sup>	.675	.670	3.7948	.675	148.500	2	143	.000

a. Predictors: (Constant), Self-Efficacy, *Web-Specific Self-Efficacy*

b. Dependent Variable: Knowledge Sharing Intention

Table 2  
Results of Simultaneous Variable Testing<sup>b</sup>

The model testing was done by way of analysis of variance (ANOVA) aimed at investigating whether testing this model can be done or not. The results can be seen in Table 3.

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	4276.955	2	2138.478	148.500	.000 <sup>b</sup>
	Residual	2059.272	143	14.401		
	Total	6336.227	145			

a. Dependent Variable: Knowledge Sharing Intention

b. Predictors: (Constant), Self-Efficacy, Web Use Satisfaction

Table 3  
ANOVA<sup>a</sup>

Table 3 shows that Sig. = 0,000. That is, analysis of sub-structure 1 model can be done and the results can be seen in Table 4.

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.728	1.840		2.026	.045
	Web-Specific Self-Efficacy	.373	.062	.404	6.016	.000
	Self-Efficacy	.517	.072	.485	7.217	.000

a. Dependent Variable: Knowledge Sharing Intention

Table 4  
Coefficeint of Sub-Structure 1<sup>a</sup>

Table 4 shows that, the Self-Efficacy and Web-Specific Self-Efficacy variables obtained a Sig.value of 0.000. That is, Self-Efficacy with a coefficient of 0.404 and Web-Specific Self-Efficacy with a coefficient of 0.485 directly affect Knowledge Sharing Intention.



The results of sub-structure 2 testing can be explained as follows. The results indicate that R square value is 0.098 and the coefficient of determination is 9.8%. That is, of the rise and fall of Knowledge Sharing, 9.8% is determined by Self-Efficacy, Web-Specific Self-Efficacy and Knowledge Sharing Intention (see Table 5).

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.313 <sup>a</sup>	.098	.079	24.689	.098	5.124	3	142	.002
2	.307 <sup>b</sup>	.094	.082	24.649	-.003	.533	1	142	.467
3	.304 <sup>c</sup>	.092	.086	24.593	-.002	.342	1	143	.560

a. Predictors: (Constant), Self-Efficacy, Web-Specific Self-Efficacy, Knowledge Sharing Intention

b. Predictors: (Constant), Web Use Satisfaction, Knowledge Sharing Intention

c. Predictors: (Constant), Web-Specific Self-Efficacy

d. Dependent Variable: Online Knowledge Sharing Behaviour

Table 5  
Model Summary<sup>d</sup>

The model testing was done by analysis of variance (ANOVA) to see whether or not the testing of sub-structure model 2 can be done. The results can be seen in Table 6.

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9369.484	3	3123.161	5.124	.002 <sup>b</sup>
	Residual	86558.057	142	609.564		
	Total	95927.541	145			
2	Regression	9044.690	2	4522.345	7.443	.001 <sup>c</sup>
	Residual	86882.851	143	607.572		
	Total	95927.541	145			
3	Regression	8837.028	1	8837.028	14.612	.000 <sup>d</sup>
	Residual	87090.513	144	604.795		
	Total	95927.541	145			

a. Dependent Variable: Online Knowledge Sharing Behaviour

b. Predictors: (Constant), Self-Efficacy, Web-Specific Self-Efficacy, Knowledge Sharing Intention

c. Predictors: (Constant), Web-Specific Self-Efficacy, Knowledge Sharing Intention

d. Predictors: (Constant), Web-Specific Self-Efficacy

Table 6  
ANOVA<sup>a</sup>

Table 6 exhibits that Sig. < 0,05. This means that sub-structure 2 model can be done. The results can be observed in Table 7.

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	179.112	12.144		14.749	.000
	Knowledge Sharing Intention	.477	.544	.123	.877	.382
	Web-Specific Self-Efficacy	1.005	.452	.280	2.223	.028
2	(Constant)	175.028	10.762		16.264	.000
	Knowledge Sharing Intention	.272	.465	.070	.585	.560
	Web-Specific Self-Efficacy	.904	.430	.251	2.103	.037
3	(Constant)	178.382	9.085		19.635	.000
	Web-Specific Self-Efficacy	1.091	.285	.304	3.823	.000

a. Dependent Variable: Online Knowledge Sharing Behaviour

Table 7  
Coefficients of Sub-Structure 2<sup>a</sup>

Table 7 uncovers that Web-Specific Self-Efficacy variable obtained a Sig. = 0,000. That is, Web-Specific Self-Efficacy with a coefficient = 0.304 directly affects Online Knowledge Sharing Behavior.

To test sub-structure 3, the results can be explained as follows: Hypothesis testing results in sub-structure 2 show that R square = 0.066 so that the coefficient of determination is 6.6%. That is, amidst the rise and fall of Online Knowledge Sharing Behavior variable, 6.6% is determined by Knowledge Sharing Intention variable (see Table 8).

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.257 <sup>a</sup>	.066	.060	24.940

a. Predictors: (Constant), Knowledge Sharing Intention

Table 8  
Model Summary

The model testing was performed by way of ANOVA analysis to probe whether or not substructure model 3 can be done. The results are presented in Table 9.

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6356.892	1	6356.892	10.220	.002 <sup>b</sup>
	Residual	89570.649	144	622.018		
	Total	95927.541	145			

a. Dependent Variable: Online Knowledge Sharing Behaviour

b. Predictors: (Constant), Knowledge Sharing Intention

Table 9  
ANOVA<sup>a</sup>

Table 9 demonstrates that Sig. = <0.05, meaning that the sub-structure model 3 can be carried out and the results can be seen in Table 10.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	178.456	10.763		16.580	.000
	Knowledge Sharing Intention	1.002	.313	.257	3.197	.002

a. Dependent Variable: Knowledge Sharing

Table 10  
Coefficients of sub-structure 3<sup>a</sup>

In Table 9, it is apparent that Knowledge Sharing Intention variable gets a Sig. Of 0.002, which suggests that Knowledge Sharing Intention with a coefficient of 0.257 directly affects Online Knowledge Sharing Behavior.

Based on the results of the tests, the overall effect of Self-Efficacy and Web-Specific Self-Efficacy through Knowledge Sharing Intention on Online Knowledge Sharing Behavior can be described as follows:

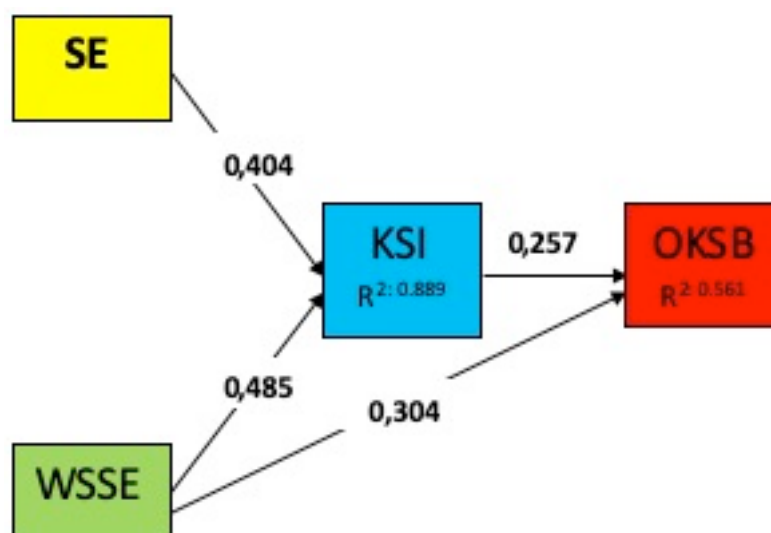


Figure 2

The testing results of the influence of *Self-Efficacy* and *Web-Specific Self-Efficacy* through *Knowledge Sharing Intention* on *Online Knowledge Sharing Behaviour*

Based on the test results, it can be concluded that the R-square value shows that Online Knowledge Sharing Behavior (OKSB) can be explained by 56.1% by the Knowledge Sharing Intention (KSI) construct and Web-Specific Self-Efficacy (WSSE) with the factors that have the greatest influence is WSSE. Self-Efficacy (SE) indirectly, through KSI, affects OKSB. KSI itself can be explained by 88.9% by the SE and WSSE constructs. The construct that has the most influence is WSSE. This empirical data is slightly different from the Theory of Planned Behavior that a person's behavior is determined by intention and perceived ability to control behavior (perceived behavioral control) (Ajzen, Brown & Carvajal, 2004). This study found that the effect of knowledge sharing intention was not very strong for online knowledge sharing. This was because the students who took the UPI BL class came from the same lecture class and from the same study program. Chen, Chen & Kinshuk (2009) conducted research on lectures attended by students from different majors. This makes it difficult for participants to meet directly with their online classmates and also with their lecturers. This difficulty raises the urge to do knowledge sharing online. In the BL case at UPI, the students had a great opportunity to meet directly with their classmates and also with their lecturers. Thus, knowledge sharing needed in the learning process was mostly done directly (offline) both in the classroom and campus environment.

This study found that the stronger influence on KSI and OKSB was the ability to use moodle-based spada.upi.edu learning applications or in other words information and communication technology literacy (ICT Literacy). WSSE significantly influences KSI and OKSB according to Liaw's research (2008) which proves that e-learning usage behavior intention is influenced by the skills and satisfaction of using e-learning programs, including website quality.

The conclusion of this research is that the main factor influencing online knowledge sharing behavior in BL of UPI is ICT literacy. The American Association of School Librarians & Association for Educational Communications and Technology (1998) reports that ICT literate students master content faster, are better at solving problems, become more independent, and take greater control of learning. ICT literacy is

essential to being productive citizens in a knowledge-driven society (Zurkowski, 1974), and employers want employees to have these skills (Herman, 2000). Many university leaders have added ICT literacy to be among the graduate and final competencies and it has recently become the focus of attention throughout the campus (Candy, Crebert & O'Leary, 2019) to improve ICT literacy for students.

### **The Impication**

Implicationally, to buttress BL at UPI, all students must be prepared to utilize ICT to facilitate the learning process. Spada.upi.edu needs to be designed as simple and interesting as possible so that it can attract students' interest in sharing knowledge online. Social interaction also needs to be supported by lecturers by fostering an interactive learning atmosphere so that the process of sharing knowledge is more productive and substantial.

### **Limitation of the study**

This research is cross-sectional in nature, with the evaluation undertaken only on the use of BL of UPI in the first semester of the 2019-2020 school year at the Pancasila Education course and the Citizenship Education course. Different conditions can occur in the use of BL of UPI in subsequent periods. In addition, conditions at other tertiary institutions may differ either due to differences in student characteristics or differences in scientific characteristics that affect learning styles. Further research is thus necessitated on BL of UPI in subsequent periods and also on other tertiary institutions that apply blended learning to ensure the validity of the external model.

This research is confirmatory in nature, merely using factors based on the theory to be proven. In reality, there is high possibility that other factors may influence online knowledge sharing behavior especially at BL of UPI. To this end, exploratory research is called for. A further study is required to ascertain what policies can be applied so that online knowledge sharing behavior can run effectively. Policies may start from the smallest scope, namely in class in which a lecturer has full control. Therefore, further research may gauge the effect of lecturer authority on the patterns of OKSB formation.

Finally, this research is not fully able to explain online knowledge sharing behavior through the basic concept of Theory of Planned Behavior. A further testing is needed to discover whether this discrepancy only applies at BL of UPI or applies to the application of a blended learning system in general.

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**Footnotes**

General Education in Indonesia is known as General Course. Under the Law of the Republic of Indonesia Number 12 of 2012 concerning Higher Education, there are four general courses in tertiary institutions: (1) Religious Education, (2) Pancasila Education, (3) Citizenship Education, and (4) Indonesian Language.

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***Reflexive Practices: Making Business Schools More ‘Critical’ by Teaching Modern Slavery. Practical Workshop***

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**Abstract**

This article invites breaking the traditional pattern in business schools and encourages management educators to engage critically with their subjects. Conventional methods give a trusting standard of learning; but, they are significantly better at producing followers than leaders or that they do not cultivate leaders at all. Limiting the purpose of the university mainly in economic terms bounds its social contribution to framing and forming futures. This article proposes taking a step further, by making modern slavery the focus of students’ reflection. Globalization led to the free movement of people. Through their economic migration or economic transformation, people travelled from developing countries and work when prospects for earning decent wages were limited. However, worldwide, circa 40 million people are now victims of modern slavery, mostly trafficked while searching for better jobs, detained in debt bondage, and confined by poverty and discrimination. While presenting concepts from educational philosophies applied to modern slavery, this article creates an affirmative connection between practice and critical thinking. Critical pedagogy translates in opening the learning space, which links a critical outlook to content and to critical methodology. It contains awareness of self and of the world on top of the conventional classrooms knowledge. It equips students with greater sensitivity to the emancipatory and transformational future perspectives. Teaching reflexivity involves awareness on how reflexive practice happens while assisting and being open to the process. Its proposed activities where students are required to write reflective notes stimulate reflection and encourage them to create their own meanings.

Keywords: reflexivity, modern slavery, critical pedagogy

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## Introduction

Teaching reflexivity implies no formula; it only involves awareness on how reflexive practice happens while assisting and being open to the process (Hibbert & Cunliffe, 2015). However, one must not anticipate that only one course can miraculously make students ‘critical beings’: “Prior institutional learning experiences significantly impact students’ uncritical socialization toward conformity and their expectations” (Dehler, 2009, p. 41). Similarly, no reflective activities guarantee learning, and no learning activities guarantee reflection. Students should be assisted in their learning by suitable reflective activities and skilled educators while. The activity where students are required to write reflective notes stimulates reflection only if students are encouraged creating their own meanings. But, poorly employed reflective activities may lead to ‘reflection without learning’: “Without a focus on conceptual frameworks, learning outcomes and implications, reflection for learners can become self-referential, inward looking and uncritical” (Boud & Walker, 1998, pp. 193-4).

The reasons behind choosing modern slavery as a focus of the teaching and reflection are numerous. Firstly, governments and whole societies are affected because the profits created by forced labour evade national tax collection systems, and the costs allocated in dealing with forced labour are substantial. Forced labour can ruin the reputation of entire industries and it creates an unfair competition for lawful, ethical businesses and employers. Secondly, for businesses to create a valuable statement they should have a good grasp of their own supply chains to explain the restrictions of the report and to hold the recognition of risk. In fact, the whole society must be aware: “consumers, investors, campaigners and the public also need information about the business” (Guidance Home Office, 2015, p. 27). Thirdly, our students will be part of global organizations. Therefore, they must ensure that slavery practices are not present in their supply chains, and even more, what is the content of the annual modern slavery statement needing to be published.

The problems that students will reflect upon are current issues, i.e. modern slavery. Today, there are more victims of modern slavery than in the entire history of the slave trade to the New World: ‘slavery never really disappeared but remained as a potentially significant policy and political issue’ (Craig, 2017, p. 16). In the United Kingdom (UK), Section 54 of the Modern Slavery Act 2015 targets transparency in businesses. Commercial organizations (See Appendix 1) ought to prepare a slavery and human trafficking statement for each financial year of their organization (Modern Slavery Act, 2015). Therefore, by teaching modern slavery business schools take a step forward in combatting this phenomenon.

Universities in the UK already comply with the Act. While posting online their statement, they present all the steps taken to be modern slavery free. Unexpectedly, this solid connection between modern slavery and management education is not also found in many universities’ curricula. Only few UK Universities (see Hull, Nottingham, Manchester, and Bedfordshire) accommodated modules in which students are taught or they conduct research on modern slavery.

Certainly, slavery never really disappeared, but it continued as a substantial political concern equally ‘outside the UK and its links to goods and services consumed within the UK, and, more latterly, within the UK itself’ (Craig, 2017, p. 16). Globalization

and the global population explosion lead to the free movement of people. Through their economic migration or economic transformation, they travelled from developing countries and work when prospects for earning decent wages were limited (Bales et al., 2009). However, they also brought about severe challenges. For example, worldwide, circa 40 million people are now victims of modern slavery, mostly trafficked while searching for better jobs. They are detained in debt bondage, confined by poverty and discrimination, producing profits ‘from the use of forced labour in the private economy worldwide amount to US\$150 billion per year’ (ILO, 2018b, p. 4). Moreover, specifically in the UK, they engaged changes in the rivalry between the UK and non UK workers, in terms of changes in vacancies, hazardous labour conditions and by new patterns of migration into the UK since EU expansion in 2004 (McDowell et al., 2009).

To get a brief but comprehensive understanding of modern slavery, Table 1 summarises some key concepts, such as Globalization, Slavery, Modern Slavery, Forced or Compulsory Labour, Child Labour, and The Worst Forms of Child Labour.

[Table 1 near here]

Although some teachers include critical-thinking courses in their curricula, Business students do not have textbooks of critical thinking written specifically for them: ‘critical thinking content is rarely taught explicitly in the dedicated instructional modules or lessons. Instead, business school faculty integrate critical-thinking material into content-area courses, developing students thinking skills through assignments and classroom activities’ (Smith, 2003, p. 28). Criticised for not being critical enough, several management educators are engaging in critique by teaching students reflexivity (Sinclair, 2007; Vince, 2010; Antonacopoulou, 2010; Hibbert & Cunliffe, 2015) and by explaining what being critical means in practice (Mingers 2000; Dehler, 2009; Boud & Walker, 1998; Gosling & Mintzberg, 2006; Pfeffer & Fong, 2002).

Usually, lecturers have one hour to talk and engage in some questions. Therefore, it comes down to the students/managers to collect this knowledge during lectures and apply it. Nevertheless, this is both a poor method and epistemology: ‘Abstract models and concepts are just that—abstractions from real-life complexity. They are generally developed, tested and fine-tuned in debate within the academic community. Practitioners—those who live the issues in question—are left out, at least until they are fed the results’ (Gosling & Mintzberg, 2006, p. 421). But, Dall’Alba (2012) highlights ‘a need to re-consider not only what students and staff in universities know or can do, but also how we are learning to be’. Education, research, and teaching involve change for all time: ‘transforming individuals as they learn, transforming the world as our inquiries alter our understanding of it, transforming societies as we see our knowledge translated into policies’ (Dall’Alba, 2012, p. 3).

### **Critical Management Education (CMS)**

Critical management education is the educational practice evolving from the more traditional critical management studies (CMS) (Grey, 2004, p. 178). The focus of CMS is the awareness that managers hold critical part in the society, but the task of merely refining solutions to practical issues is not enough for management educators: ‘Their role should also be to raise questions about purpose and intent and about the

assumptions which underpin organizational structures and practices. Consequently, the practice of reflection is involved with examining organizational aims and processes through ideas and analytical perspectives which are capable of such inquiry' (Vince and Reynolds, 2009, p. 92).

Management education presents means in which ideologies of critical management theory could be engaged as paths to reinvent business schools and their pedagogical practices (Dehler et al., 2001; Grey, 2004; Antonacopoulou, 2010). Some authors support 'a deconstructive practice' (Dey and Steyaert, 2007, p. 451) which allows developing critical pedagogy. Critical pedagogy questions the traditional business academic community emphasising selling education and producing managers who are authority compliant and consenting hierarchies (Hooks, 2003; Dehler, 2009). Vince (2010) agrees that conventional methods give a trusting standard of learning, but then, the risk for managers is reproducing, facilitating, and reinforcing this trusting method to leading, of managing and being managed. Conventional teaching methods have a simplistic division of power, where teachers have both knowledge and power. They speak, deliver information and decide on assignments, grades, while the students listen and conform (Freire, 1972; Vince, 2010). This reliance made some authors conclude that particularly MBA programmes are significantly better at producing followers than leaders (Gabriel, 2005) or that they do not cultivate leaders at all (Mintzberg, 2004).

In management education, critical pedagogy translates in opening the learning space, which links a critical outlook to content and to critical methodology. It contains awareness of self and of the world on top of the conventional classrooms knowledge. It equips students with greater sensitivity to the emancipatory and transformational future perspectives: 'The challenge management educators face is to prepare future managers for complexity, uncertainty, equivocality, and value conflicts, i.e. raise the level of students' complicated understanding' (Dehler et al., 2001, p. 507).

A deliberate change of conventional methods and rulebooks in management education facilitates changes in managers' understanding of power and command. Avoiding them eliminates the chance to reflect on what happens in the classroom, while discovering means to appreciate how they link to managers' daily experiences within organizations (Vince, 2010). The usual MBA/business or management curriculum comprises a set of courses: Accounting, Finance, Marketing, and Human Resource Management and it employ an economic logic promoting profitability as central in successful management. However, this is uncritical teaching and learning about management, which does not allow experimentation, reflection and questioning of the practice of managing. More importantly, it leaves out social and political aspects within management (Antonacopoulou, 2010). Instead, it needs changes in its curriculum, didactic roles, and practices to generate an environment inviting students to critical debates (Dehler et al., 2001).

Critical methods to management advance the probability of destabilization the traditional understanding of organizations as rational, correctly organized, conventional, and lacking emotions, where correct decisions are taken by the right people (Kersten, 2001; Vince, 2010). They decrease the risk of intellectualising reflection: as emotions and feelings are mostly ignored in educational surroundings, often reflection is considered as an intellectual exercise of thorough thinking.

Therefore, it is ignored that reflection represents both, a cognitive process and emotions, which are essential to all learning (Boud & Walker, 1998).

### **Challenges: Abstract or out of context practices**

A significant challenge in changing MBA programmes is the lack of staff which can successfully connect education to practice: ‘many full-time faculty have not practiced the profession or craft of management...more business schools are hiring from social science departments such as economics, psychology, or sociology’ (Pfeffer and Fong, 2002, p. 91). Hence, they fail to tackle managerial issues. Therefore, they cannot apply the knowledge that they teach.

In MBA programmes, there is a decoupling between knowledge and skills. The immaterial nature of taught management, ‘a set of abstract formulae, case histories and flow diagrams’ (Gosling & Mintzberg, 2006, p. 419) are valuable, however only when assessed and tested while practicing managing. They do not encapsulate the consistency, interdisciplinary, and the complexity of managerial practices, or the social and political features. Therefore, incorporating reflexive critique in the business curriculum could comprise more of students’ experiences and issues: ‘A more rigorous analysis of theoretical propositions and established wisdom would also be called for, such that social and political dynamics can be revealed in the tensions that are exposed’ (Antonacopoulou, 2010, p. S8).

Gosling & Mintzberg (2006) highlight the irony of management education which equally 1. Encourages managers to get a broad perspective on issues and to step back from work stress and 2. Persuades managers into the same stressful routine: very compelled timetables and massive materials to learn. Instead, these practical issues should be considered in their own context before concluding the relevance of employing these principles. Implementing these principles could have a negative effect on students’ feedback on these classes, risking the potential for tenure and promotion. Therefore, we must evaluate these complications emerging from students, administrators, and colleagues. Thus, it is fully understandable why most teachers would prefer to be on the safe side (Hibbert, 2013).

### **Challenges: lack of self-awareness**

Gosling & Mintzberg (2006) highlight the lack of self-awareness and of practical application of the new knowledge in MBA programmes, a detrimental ‘guiding ethos of most people who study’ (p. 420), spending extensive time and money to transform themselves and their prospects. They class the design of majority of MBAs programmes and their marketing as ‘wishful thinking’, because it equips students with novel skills to invest students to understand and operate the world using innovative approaches; it facilitates the build-up of out of context abstractions and generalizations (Gosling & Mintzberg, 2006).

Teaching reflexivity using critical reflection is challenging because the average undergraduate student will generally lack the required life experience (Hibbert, 2013). Rubens et al. (2018) focus on ‘Life Mission’- students’ purpose and reason for existence. They encourage students to think more broadly and deeply than their professional lives, and to clarify and prioritize their own personal core values. Eriksen

(2009) also emphasise students' need to develop their self-awareness to become effective leaders. Particularly, he suggests students to identify their values and beliefs, to facilitate their learning, self-understanding, and empathy. But, we must not anticipate that only one course can miraculously make students 'critical beings': 'Prior institutional learning experiences significantly impact students' uncritical socialization toward conformity and their expectations' (Dehler, 2009, p. 41). As management is a practice, not a profession, confirmed performance at work offers the suitable foundation for choosing applicants (Gosling & Mintzberg, 2006).

Finally, Gosling & Mintzberg (2006) advocate for Management education being limited to practising managers, based on their proven performance. Management education should not be seen as training for managing, but an addition to it. Besides, teaching management should not be separated from context and experience: 'If class time is about abstract and impersonal knowledge it robs the learning community of the opportunities for conversations that are most important—those that explore and evaluate the personal dilemmas faced by managers as they make choices, and encourage the choices of others, based on imperfect information and uncertain motives; not least concerning the social benefits (and damage) based on their actions' (Gosling & Mintzberg, 2006, p. 420).

### **The role of universities**

Universities help new societal development through knowledge creation and exchange (By et al., 2008). Universities assimilated also an entrepreneurial role or a 'third mission' (Hagen, 2008), by 'imbuing students with more entrepreneurial skills' (Hagen, 2008, p. 103) while lecturers are 'entrepreneurial scientists' (Etzkowitz, 1998, p. 823). But, 'philosophically, from a critical perspective, education itself is considered political and therefore critical pedagogy begins with the premise that 'there is no such thing as apolitical education' (Hinchey, 2004, p. xix) 'and thus schools are never neutral institutions (because) schools either function to maintain and reproduce the existing social order or empower people to transform themselves and/or society' (Solorzano, 2000, pp. 15–16).

Education, then, is a political project with consequences for the classroom context as well as the values that play out in critical classrooms; and CMS likewise is a political project that 'aims to unmask the power relations' of organizational life (Fournier & Grey, 2000, p. 19)' (Dehler, 2009, p. 35). Moreover, limiting 'the purpose of the university primarily in economic terms limits a wider contribution it can make as a social institution to framing and forming futures' (Dall'Alba, 2012, p. 2). Limiting the purpose of the university mainly on education for economic reasons excessively restrains our purpose as educators. In 'Re-imagining the university: Developing a capacity to care', Gloria Dall'Alba looks at the university as a social institution, stating that 'contributions of the university through education, research and engagement with the broader society are increasingly presented in terms of knowledge and skills enhancement for economic prosperity' (p. 1).

'The problem in today's management education is not a deficiency, but a surfeit of teaching' (Gosling & Mintzberg, 2006, p. 421). But, contrary to the expectations, values of liable management had little impact on practice due to a disconnection between knowledge and practice: demanding an awareness of ethical issues, does not

facilitate students taking individual responsibility for their behaviour (Hibbert & Cunliffe, 2015).

To face the challenges in Higher Education, many European institutions have embraced managerialism, applying 'private sector principles and practices to public service organizations' (By et al, 2008, p. 21). To access funding, universities accept governmental requirements, which emphasise measurable outcomes in relation to teaching students, doing research or interactions with society. Not conforming to these practices implies audacity and leadership; it requires becoming responsible in educating governments and policymakers on the wider inputs universities have in society (Dall'Alba, 2012). Pfeffer and Fong (2002) also highlight the issue of high cost and competition: those schools, which fought hard to improve their ranks, are not willing to risk allowing too much innovation, or at least not in best sold programmes.

Management does not contain neutral techniques but values that we must consider. Managers' role creating "good societies" and the fundamental philosophical principles held by managers which 'go beyond ethics to encompass the ontological and epistemological assumptions associated with, for example, the manageability of human relations and, indeed, the very notion of what it is to be human' (Grey, 2004, p. 180).

Chia & Morgan (1996) also propose a change of focus from prevailing signifying systems portraying existing approaches to management education centred on nurturing a 'negative capability': 'Educating the philosopher-manager entails systematically deconstructing the ossified layers of sign-systems which help make our understanding of the contemporary managerial world appear so immediately familiar and necessary' (Chia & Morgan, 1996, p. 37). Aiding students employ moral reflexive practices facilitates them to grow into responsible managers and leaders. These practices involve assisting learning from what can be difficult conditions and experiences: 'threshold concepts provide a way of framing and understanding the required learning process' (Hibbert & Cunliffe, 2015, p. 2).

Despite severe critiques, management education has moved forward from much more severe criticism such as Leavitt's (1989) remark that 'we have built a weird, almost unimaginable design for MBA-level education' that transforms students into 'critters with lopsided brains, icy hearts, and shrunken souls' (p. 39). Instances of educators emphasising 'practical' reflexivity are growing in management education. For example, in 'Teaching leadership critically to MBAs: Experiences from heaven and hell', Sinclair (2007) presents her experiences while teaching a new MBA subject called 'Leadership and Change' in a more critical way: 'By working experientially as well as critically, I aimed to create a space in which students could challenge their ways of thinking about leadership and all of us could experiment with different ways of 'doing' leadership in the group' (Sinclair, 2007, p. 461).

Engaging in management represents a commitment to political and moral values, equally comprising efficiency and employees' welfare. Additionally, management education has been normally, informed by the corporations' and managers' benefits and not by whole society (Grey, 2004). Values are rooted in all pedagogical choices and curriculum, but, critical pedagogues make them clearer in classrooms. Critical pedagogues constantly investigate and challenge all values, as well as accepted

notions of capitalism, globalization and democracy itself. This crucial approach to critical pedagogy helps students understand that values are the basis of an informed citizen, which once taken for granted stays, unrecognised (Dehler, 2009).

### **Reflexive practices**

Reflexive practice emerges using guided experiential learning, dialogue and discussion, not teaching. Although this method of learning can be therapeutic, it is achieved by releasing upsetting emotions and leave students feeling vulnerable. Such emotions can be difficult to deal with. Managing emotions is challenging and risky; some emotions can be controlled, but numerous surface from innate unconscious sources and deter learning (Gabriel & Griffiths, 2002). Reflexive educators acknowledge that learning experiences are affecting students' lives and activities, while taking attentive accountability for this. Educators are aware of the expected bounds of their own understanding, and being prepared to fully respect students' experiences and abilities. The purpose is transforming classrooms from 'the place where learning is completed, to the place where learning occurs through dialogue, and where reflexive practice begins' (Hibbert & Cunliffe, 2015, p. 26).

The presentation of the material perceived as unfamiliar, distressing, or challenging can cause particular concerns for both, students and educators. Including critical concepts that disconcert prior stable standpoints includes material that students may struggle. Students might reject concepts centred on unused principles. Moreover, a critical standpoint on typical material might make students believe that previous learning is devaluated or introduce scepticism on whether this discrediting is beneficial and acceptable. For these reasons, educators must create a 'learning contract': an environment of reciprocal accountability and suitable expectations (Hibbert, 2013). Educators must then return to what students signed for in terms of what and how to learn (Sinclair, 2007; Vince, 2010). Hence, the application of reflective strategies should be done in ways, which have sought inappropriate levels of disclosure or involved unethical practices (Boud & Walker, 1998).

Moreover, a critical standpoint on typical material might make students believe that previous learning is devaluated or introduce scepticism on whether this discrediting is beneficial and acceptable (Hibbert, 2013). Boud & Walker (1998) also highlight the risks of the acceptance that reflection could be simply controlled: 'the very nature of reflective activities is such that they may lead to serious questioning and critical thinking, involving the learners in challenging the assumptions of teachers or the learning context in which they are operating' (p. 194). Tackling sensitive issues, such as modern slavery, are highly likely to cause substantial distress, incite students to question their profession and raise ethical dilemmas regarding practices and chronic issues, which seem to have no solution. Hence, students might not accept these reflective practices (Boud & Walker, 1998).

Moreover, guilt and regret could happen when experiences are revisited and actions are re-evaluated as questionable (Hibbert & Cunliffe, 2015). Besides, anger may emerge as different, upsetting views are presented. Additionally, insecurity can occur when students become aware that previous safe methods of thought and behaviour are now disputed and 'even though students may abandon their formerly unchallenged, perhaps morally suspect organization-centered world view, they may still struggle to



translate their new perspective into something that is enactable' (Hibbert & Cunliffe, 2015, p. 22).

### **Supportive learning**

Educators should know that failing to create a supportive learning context could lead to 'intolerable tensions between staff and students can result, and some students may be left in situations detrimental to them' (Boud & Walker, 1998, p. 194). Vince (2010) believes that students' reluctance can emerge from the concern over quarrels that could emerge. Nevertheless, their feedback from students cause anxiety by voicing their opinion on tutor's capabilities as: 'unprofessional', 'incompetent', 'a disappointment', and 'unsupportive': 'the group task session raised the stress level of some students to the point where they were not thinking clearly and were unable to reflect on their experience - it was too intense an emotional experience. ... an uncomfortable experience and that they should reflect on this while devising and carrying out the task. Our group appears to have a preferred learning style of being taught in a conventional lecture style and then discussing it in small groups, which has worked very successfully in other modules' (Vince, 2010, p. S40).

Consequently, to deal with negative feelings, we cultivate learning defence systems which are relatively unconscious and involuntary: 'A very strong part of this defensive system is the identity defence, which actually protects us against too much transformational learning that could result in some kind of instability' (Illeris, 2014, p. 584). These reactions must be acknowledged, comprehended and respected. Dealing with them does not imply imaginative approaches, instead spotting if the learners really want to engage themselves in transformations (Illeris, 2014).

Hibbert & Cunliffe (2015) encourage educators to resist the temptation of just getting the job done in classrooms. Instead, they invite them to allow themselves being more 'unsettled'. Reflexive practice – for educators and students – means 'breaking frames and accepting new and contingent directions, rather than inchwise progress in familiar terrain. But for many, the notion of inchwise progress somehow feels less disturbing and more scientific' (p. 225). 'Reflexive practice is crucial to public administration because it can lead to more critical, responsible, and ethical actions' (Cunliffe & Jun, 2005, p. 225). Teaching students to care for others can offer 'a positive alternative to an instrumental approach that readily leads to exploitation in our world, with its high cost of war between peoples, financial collapse and damage to the environment' (Dall'Alba, 2012, p. 7).

### **Collective reflection**

Critically reflexive practices mean comprehending reality subjectively, as the foundation of further critical thinking on the influence of our expectations, principles, and behaviours on others. This translates in exploring critically the suppositions motivating our acts, their effects, and broadly, what means 'good management practice' (Cunliffe, 2016, p. 748). Universities can facilitate and question opportunities for being, at individual and collective levels, while promoting agreed awareness to our contemporary problems (Dall'Alba, 2012). Being critical involves distrusting current debates, traditions, norms, identifying the influence of social and

political dynamics and the effects of the differences of power and control (Antonacopoulou, 2010).

In management education critical reflexivity is essential because by analysing critically our own expectations and actions, we could cultivate more collective, receptive, and ethical means of managing organizations: 'If we accept that management education is not just about helping managers become more effective organizational citizens but also about helping them become critical thinkers and moral practitioners, then critical reflexivity is of particular relevance' (Cunliffe, 2016, p. 748).

Gosling & Mintzberg (2006) propose 'a collective reflection'. To force action, they relocate classroom reflection into the organization. Students/managers are sent by their firms with specific work problems and they examine these matters with their colleagues from the other companies, to expand awareness into their own suppositions and so to refine and reframe their concerns. They define this intense process tracking problems in forceful methods as 'a kind of mega-reflection of a collective nature': 'This robustness stems from the fact that they have surpassed their own perspectives by benefiting from the scrutiny, questioning and suggestions of their colleagues (Gosling & Mintzberg, 2006, p. 424).

Walsh (2009) also emphasise the use of both, individual and collective reflection to reconcile the 'three-party knowledge interests' in workplace learning: 'the collective activity of productive reflection could reconcile potentially conflicting demands from the employer, the learner and the university. In order to decide whether this in fact the case, it is helpful to briefly consider how those requirements may differ' (p. 3). But, a critical aspect of this process is that 'the collective reflection is not provided by the faculty at school or by external consultants at work: it comes from the managers of other companies who share similar experiences of managing. We call them 'friendly consultants', because they are there not to get 'repeat business', but to learn in a symbiotic, empathetic relationship' (Gosling & Mintzberg, 2006, p. 424).

### **Proposed reflective workshop**

When drawing up a modern slavery statement, organizations (or students in their lectures) should consider some of the questions suggested in the Modern Slavery Act 2015: Section 54-Transparency in supply chains (Appendix 1), Requirements of the Modern Slavery Statement for organizations (Appendix 2), and questions to ask to probe a modern slavery free organization (Appendix 3).

Using Smith's (2011) Reflection Framework, the workshop is asking students to reflect on four domains: Self-critical (reflecting on personal thoughts and actions), Interpersonal (reflecting on interactions with others), Contextual (reflecting on concepts, theories or methods used), and Critical (reflecting on political, ethical and social context). It suggests key questions for students' reflection:

[Table 2 near here]

## **Conclusion**

Limiting the role of universities mainly to economic purposes bounds its extensive impact that can have on framing and forming future ethical leaders. It also limits our purpose as educators. Moreover, considering the university as ‘a social institution’, with considerable influences in education, research and interaction with the wider society are progressively presented in terms of knowledge and skills enhancement for economic wealth (Dall’Alba, 2012). However, the perception that learning encompasses equally the instruments to learn and its dynamics is usually avoided or limited. But, a different approach would be beneficial managers by encouraging them to challenge the link between learning, managing and organizing. More importantly, making Business Schools more critical contains enhancing the political link between management and learning (Vince, 2010).

Generally, the argument on reflexivity emphasises philosophical matters around the nature of reality and knowledge. Nevertheless, reflexivity, as well, advances essential inquiries about our capability as academics to recognise the multifaceted, interactional and emergent nature of our social experiences (Cunliffe, 2003). A curricula which teaches students to help the society after graduation, but which ignores their capacity to care for others and things in our world cannot be classed as educative. By presenting concepts from educational philosophies applied to modern slavery, a better connection between practice and critical thinking can be created.

Though, the presentation of the material perceived as distressing or challenging can cause particular concerns for students and educators. Including critical concepts that disconcert prior stable standpoints includes material that students may struggle with. Students might reject concepts centred on unused principles. But, these practices are vital to management education; as they support our understanding of how we create our realities and identities in collective ways and how we can develop more collective and receptive ways of organizational management (Cunliffe, 2016).

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## Resources

**Table 1**

Terms	Definitions
Globalization	‘The phenomenon of globalization means that the goods we buy are increasingly assembled in different parts of the world, using components from all over the world. There are numerous steps and parts that go into making a product and slavery can creep into any one of them. [...] The problem is even more complex because only a small and hidden proportion of any particular commodity actually has slave input’ (Bales et al., 2009, p. 49).
Slavery	‘Slavery, in accordance with the 1926 Slavery Convention, is the status or condition of a person over whom all or any of the powers attaching to the right of ownership are exercised. Since legal ‘ownership’ of a person is not possible, the key element of slavery is the behaviour on the part of the offender as if he/ she did own the person, which deprives the victim of their freedom’ (Guidance Home Office, 2015, p. 21).
Modern Slavery	‘Modern slavery refers to situations where one person has taken away another person’s freedom – their freedom to control their body, their freedom to choose to refuse certain work or to stop working – so that they can be exploited. Freedom is taken away by threats, violence, coercion, abuse of power and deception. Modern slavery is a plain English term. It is not a legal definition. Different countries use different legal terminologies, but “modern slavery” includes the crimes of human trafficking, slavery and slavery like practices such as servitude, forced labour, forced or servile marriage, the sale and exploitation of children, and debt bondage’ (Walk Free Foundation, 2018).
Forced or Compulsory Labour	‘Forced or compulsory labour is defined in international law by the ILO’s Forced Labour Convention 29 and Protocol. It involves coercion, either direct threats of violence or subtler forms of compulsion. The key elements are that work or service is exacted from any person under the menace of any penalty and for which the person has not offered him/herself voluntarily’ (Guidance Home Office, 2015, p. 21). "all work or service which is exacted from any person under the threat of a penalty and for which the person has not offered himself or herself voluntarily." (ILO, 2018a)
Child Labour	‘Child labour is defined by international standards as children below 12 years working in any economic activities, those aged 12 - 14 engaged in more than light work, and all children engaged in the worst forms of child labour (ILO). The term “child labour” is often defined as work that deprives children of their childhood, their potential and their dignity, and that is harmful to physical and mental development. Whether or not particular forms of “work” can be called “child labour” depends on the child’s age, the type and hours of work performed, the conditions under which it is performed and the objectives pursued by individual countries.

Children can be particularly vulnerable to exploitation, but child labour will not always constitute modern slavery. It will still be necessary to determine whether, based on the facts of the case, the children in question are being exploited in such a way as to constitute slavery, servitude and forced or compulsory labour or human trafficking. For example, it is possible for children to undertake some 'light work' which would not necessarily constitute modern slavery. 'Light work' is defined by article 7 of ILO Convention No. 138. Children do have particular vulnerabilities which should be considered when determining whether modern slavery is taking place. The Modern Slavery Act 2015 specifically recognises that it is not necessary for a child to have been forced, threatened or deceived into their situation for it to be defined as exploitation' (Guidance Home Office, 2015).

The Worst Forms of Child Labour	<p>'The worst forms of child labour are very likely to constitute modern slavery. The worst forms of child labour are defined by article 3 of ILO Convention No. 182 as: a) all forms of slavery or practices similar to slavery, such as the sale and trafficking of children, debt bondage and serfdom and forced or compulsory labour, including forced or compulsory recruitment of children for use in armed conflict; b) the use, procuring or offering of a child for prostitution, for the production of pornography or for pornographic performances; c) the use, procuring or offering of a child for illicit activities, in particular for the production and trafficking of drugs as defined in the relevant international treaties; d) work which, by its nature or the circumstances in which it is carried out, is likely to harm the health, safety or morals of children' (Guidance Home Office, 2015, p. 22).</p>
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Table 1: Terms and definitions



**Table 2**

Domain	Suggested Questions for Reflection
Domain 1: Self-critical (reflecting on personal thoughts and actions)	<ul style="list-style-type: none"> <li>• Why are you interested in a particular issue or topic (i.e. modern slavery)?</li> <li>• What questions seem important to you?</li> <li>• What informs your views?</li> <li>• What aspects of your background are you drawing on?</li> <li>• What personal experience do you have?</li> </ul>
Domain 2: Interpersonal (reflecting on interactions with others)	<ul style="list-style-type: none"> <li>• What disciplinary-based ideas and frameworks inform your interpretations?</li> <li>• What aspects of your disciplinary background lead you to dwell on certain aspects of an issue or problem and not others (i.e. modern slavery)?</li> <li>• Whose perspectives might be missing or overlooked? Why are these perspectives excluded?</li> </ul>
Domain 3: Contextual (reflecting on concepts, theories or methods used)	<ul style="list-style-type: none"> <li>• What insights were generated, or do you hope to generate?</li> <li>• What concepts or theories are you drawing upon?</li> <li>• How will these insights contribute to existing knowledge or practice?</li> <li>• What different insights may be/have been made if a different approach or perspective had been taken?</li> </ul>
Domain 4: Critical (reflecting on political, ethical and social context)	<ul style="list-style-type: none"> <li>• What is the political context in this situation, who has most authority and why?</li> <li>• What are the tensions and contentious issues?</li> <li>• Is there a political agenda at stake: what might the outcomes be?</li> <li>• Who might gain because of what has been done, or not done, who might lose out?</li> </ul>

Table 2: Smith's domains and suggested questions

*Note.* Adapted from Smith, 2011, p. 13

## Appendices

### Appendix 1

#### Section 54 - Transparency in supply chains

- (1) A commercial organization within subsection (2) must prepare a slavery and human trafficking statement for each financial year of the organization.
- (2) A commercial organization is within this subsection if it
  - (a) supplies goods or services, and
  - (b) has a total turnover of not less than an amount prescribed by regulations made by the Secretary of State.
- (3) For the purposes of subsection (2) (b), an organization's total turnover is to be determined in accordance with regulations made by the Secretary of State.
- (4) A slavery and human trafficking statement for a financial year is
  - (a) a statement of the steps the organization has taken during the financial year to ensure that slavery and human trafficking is not taking place
    - (i) in any of its supply chains, and (ii) in any part of its own business, or
    - (b) a statement that the organization has taken no such steps.
- (5) An organization's slavery and human trafficking statement may include information about
  - (a) the organization's structure, its business and its supply chains;
  - (b) its policies in relation to slavery and human trafficking;
  - (c) its due diligence processes in relation to slavery and human trafficking in its business and supply chains;
  - (d) the parts of its business and supply chains where there is a risk of slavery and human trafficking taking place, and the steps it has taken to assess and manage that risk;
  - (e) its effectiveness in ensuring that slavery and human trafficking is not taking place in its business or supply chains, measured against such performance indicators as it considers appropriate;
  - (f) the training about slavery and human trafficking available to its staff.
- (6) A slavery and human trafficking statement
  - (a) if the organization is a body corporate other than a limited liability partnership, must be approved by the board of directors (or equivalent management body) and signed by a director (or equivalent);
  - (b) if the organization is a limited liability partnership, must be approved by the members and signed by a designated member;
  - (c) if the organization is a limited partnership registered under the Limited Partnerships Act 1907, must be signed by a general partner; (d) if the organization is any other kind of partnership, must be signed by a partner.
- (7) If the organization has a website, it must
  - (a) publish the slavery and human trafficking statement on that website, and
  - (b) include a link to the slavery and human trafficking statement in a prominent place on that website's homepage.
- (8) If the organization does not have a website, it must provide a copy of the slavery and human trafficking statement to anyone who makes a written request for one, and must do so before the end of the period of 30 days beginning with the day on which the request is received.

(9) The Secretary of State

(a) may issue guidance about the duties imposed on commercial organizations by this section;

(b) must publish any such guidance in a way the Secretary of State considers appropriate.

(10) The guidance may in particular include further provision about the kind of information which may be included in a slavery and human trafficking statement.

(11) The duties imposed on commercial organizations by this section are enforceable by the Secretary of State bringing civil proceedings in the High Court for an injunction or, in Scotland, for specific performance of a statutory duty under section 45 of the Court of Session Act 1988.

(12) For the purposes of this section— “commercial organization” means

(a) a body corporate (wherever incorporated) which carries on a business, or part of a business, in any part of the United Kingdom, or

(b) a partnership (wherever formed) which carries on a business, or part of a business, in any part of the United Kingdom, and for this purpose “business” includes a trade or profession; “partnership” means— (a) a partnership within the Partnership Act 1890,

(b) a limited partnership registered under the Limited Partnerships Act 1907, or (c) a firm, or an entity of a similar character, formed under the law of a country outside the United Kingdom; “slavery and human trafficking” means— (a) conduct which constitutes an offence under any of the following— (i) section 1, 2 or 4 of this Act, (ii) section 1, 2 or 4 of the Human Trafficking and Exploitation (Criminal Justice and Support for Victims) Act

(Northern Ireland) 2015 (c. 2 (N.I.)) (equivalent offences in Northern Ireland), (iii) section 22 of the Criminal Justice (Scotland) Act 2003 (asp 7) (traffic in prostitution etc), (iv) section 4 of the Asylum and Immigration (Treatment of Claimants, etc.) Act 2004 (trafficking for exploitation), (v) section 47 of the Criminal Justice and Licensing (Scotland) Act 2010 (asp 13) (slavery, servitude and forced or compulsory labour), or (b) conduct which would constitute an offence in a part of the United Kingdom under any of those provisions if the conduct took place in that part of the United Kingdom.

## Appendix 2

Specific field	Information required
Organizational structure	<ul style="list-style-type: none"> <li>• the sector(s) the business operates in and whether any of its work is seasonal</li> <li>• the organizational structure and group relationships</li> <li>• the countries it sources its goods or services from including high risk countries where modern forms of slavery are prevalent.</li> <li>• the make-up and complexity of the supply chains</li> <li>• the businesses operating model</li> <li>• relationships with suppliers and others, including trade unions and other bodies representing workers (Guidance Home Office, 2015, p. 27).</li> </ul>
Organizational policies	<ul style="list-style-type: none"> <li>• The process for policy development</li> <li>• Policies that concern business relationships , for example, a Supplier Code of Conduct</li> <li>• Recruitment policy</li> <li>• Procurement policy and incentives to combat modern slavery</li> <li>• Employee code of conduct</li> <li>• Policies concerning access to remedy, compensation and justice for victims of modern slavery</li> <li>• Policies that relate to staff training and increasing awareness of modern slavery</li> </ul>
Due Diligence	<ul style="list-style-type: none"> <li>• Actions taken to understand the businesses operating context</li> <li>• Details of risk management processes, including monitoring and evaluation measures</li> <li>• Impact assessments undertaken</li> <li>• Action plans to address and risk/actual instances of modern slavery and how actions have been prioritised</li> <li>• Evidence of stakeholder engagement</li> <li>• Business-level grievance mechanisms in place to address modern slavery</li> <li>• Actions taken to embed respect for human rights and zero tolerance of modern slavery throughout the organization</li> </ul>

Requirements of the Modern Slavery Statement for organizations

### Appendix 3

- What minimum labour standards are expected of the business, its subsidiaries and suppliers, and how do these align to industry standards?
- Who in the business is responsible for a) ensuring efforts are made to investigate and remediate the risk of modern slavery in the business and/or supply chains, and b) ensuring that basic labour standards are met, and how are such leaders financially incentivised and resourced to do so?
- How does the business factor legal and fair full labour costs into production and sourcing costs to avoid the need for seemingly cheaper slave or bonded labour in operations or the supply chain?
- What is the company's policy where a supplier is found to have been involved in modern slavery?
- When entering into a contract with a new supplier or renewing contracts with existing suppliers what checks, assurances, investigations will the company conduct or accept?
- What support or guidance is available to business operations or suppliers willing to remediate situations of slavery or forced labour found?
- What due diligence will the company commit to conducting regarding its supply chains?
- What is the company policy to support whistle blowing? What procedures are in place to facilitate reporting, including reporting by workers through helplines?
- What is the company's policy and approach to remediation for workers if and where cases of modern slavery and forced labour are found; and what measures are taken to protect them from further victimisation or vulnerability?



*Investigation of Process Oriented Guided Inquiry Learning as a Framework for Teaching Science-focused English Courses at a Japanese University*

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**Abstract**

Previous research indicates that inquiry-based learning is beneficial for English-language learners in content courses. Process Oriented Guided Inquiry Learning (POGIL) is a student-centered, team-focused framework widely used in the United States at the high school and university levels for teaching science. All POGIL activities follow a 3-phase learning cycle and are often organized such that students are treated as learners of the language of science. Published research investigating the effectiveness of POGIL has been conducted primarily at the undergraduate level using material written in English with no distinction regarding the English level of the students. However, anecdotal evidence indicates that POGIL benefits English-language learners in content courses, even when they are mixed with native speakers. The goal of this study was to investigate student assessment of their learning gains when POGIL was used to teach a molecular biology-focused English course at a Japanese university. All students in the course were English-language learners. Students were either first- or second-year enrollees and approximately 66% were science-track students and 33% were humanities-track students. Results from this study show that students had a positive attitude toward the POGIL method and felt that the activity structure furthered their content knowledge as well as improved their English language skills.

Keywords: POGIL, content-based language learning, student-centered science instruction

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## Introduction

Previous research indicates that inquiry-based learning is beneficial for English-language learners in content courses (Adams, Jessup, Criswell, Weaver-High, & Rushton, 2015). Process Oriented Guided Inquiry Learning is a student-centered, team focused framework widely used in U.S. science curricula at the secondary and tertiary level. For a general overview of POGIL, readers are encouraged to visit the POGIL Project's website (<https://pogil.org/>). For science teachers who wish to switch to student-centered teaching but lack experience and time to create material, POGIL is an attractive option backed by a supportive community and abundant peer-reviewed teaching material.

A recent review of the literature supporting the effectiveness of POGIL can be found in Chapter 5 of *POGIL: An Introduction to Process Oriented Guided Inquiry Learning for Those Who Wish to Empower Learners* (Simonson, 2019). Science courses taught using the POGIL framework showed improved student outcomes such as increased exam scores and decreased withdrawal rates. In the reviewed literature, the POGIL material used was provided in English. While the investigations were conducted with no distinction regarding the English level of the students, anecdotal evidence indicates that POGIL benefits English-language learners (ELLs) in content courses, even when mixed with native speakers.

Guillaud and Ruppel (Simonson, 2019, chapter 12, table 12.1) have demonstrated that principles of the POGIL framework can be applied to the five standards designated by the American Council on Teaching Foreign Languages. Moreover, POGIL has been implemented in second language learning, for example German (Johnson, 2011) and French (Simonson, 2019, chapter 12). However, POGIL has not been investigated as a method of teaching in science content-based English courses for ELLs in Japan.

Learning science, as with any academic field, requires acquisition of new vocabulary and phrases. Previous research indicates that the amount of new vocabulary encountered in a science textbook can exceed the recommendation for middle school and high school foreign language courses (Groves, 1995; Yager, 1983). The POGIL approach, which is primarily implemented for novice learners, does not assume the learner has acquired all the content-obligatory vocabulary. On the contrary, well-designed POGIL activities provide learners with vocabulary and phrases in a context richer manner, thereby treating the science student as a language learner (Ellinger, 2019)

The aim of the project described in this paper was to investigate student attitude toward and self-assessment of learning gains when published learning materials built around the POGIL framework were used in a science content-based English course for ELLs at a university in Japan.

### ***Classroom Context and Participants***

Participants were first- and second-year students at a Japanese university. The course was a 13-week thematic course in the university's intermediate English series. Students meet once per week for 105 minutes. Courses in this series are compulsory, content-based, and the theme is chosen by the instructor. Although students may



indicate a preference for certain topics, they are not guaranteed their first choice (this fact was not known by the instructor prior to design of the course).

A total of 33 students were officially enrolled in and finished the course. The study was approved by the university's Committee on Ethics of Experimental Research on Human Subjects. Participation in the study was voluntary and consent was received from 32 students.

Students demonstrated a wide range of spoken English fluency as determined by an in-house system of evaluation. Japanese was the native language for 30 of the participants, and for the remaining two Chinese was the native language. Of the surveyed students, 23 were science-track and 9 were humanities-track; 24 were male and 8 were female.

The instructor of the course holds a Bachelor's in biochemistry and molecular biology and a Ph.D. in biochemistry. He has considerable experience teaching and mentoring students in these fields. At the time of teaching the course, the instructor had 3 years of experience teaching scientific writing and academic presentation for ELLs but holds no formal training in language teaching. Although, he has extensive experience as a language learner having studied French for more than 10 years and Japanese for more than 5 years.

### ***Course Structure and Learning Materials***

The theme of molecular biology was chosen based on interest as expressed by students in the instructor's other courses. However, as mentioned above, during course design the instructor was unaware that actual enrollment in the course was dependent on a pseudo-lottery-based system. Therefore, course design did not anticipate the various demographics of the eventual course enrollees.

A survey of the enrolled students indicated that most had not completed much coursework in biology, regardless of whether they were science- or humanities-track. For example, multiple students indicated that they had not enrolled in a biology course since middle school. Therefore, the theme was deemed reasonable because many issues that appear in daily life, such as genetic diseases or genetically modified organisms, are rooted in molecular biology. A basic understanding of the topic is useful for all students.

The course was divided into multiple units by topic, and in general each unit lasted two weeks. During the first week, a POGIL activity was used to introduce students to the unit's topic. The POGIL activity served as an entry point for both the content and vocabulary. During the second week, students engaged in discussions using previously published material such as case studies from HHMI BioInteractive ([www.biointeractive.org](http://www.biointeractive.org))<sup>1</sup>.

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<sup>1</sup> The non-POGIL activities will not be discussed further, but as an example, readers are encouraged to check activities associated with the short film *Got Lactase? The Co-evolution of Genes and Culture*.

The POGIL materials used were taken from *POGIL Activities for High School Biology* (Trout, 2012b) and *POGIL Activities for AP Biology* (Trout, 2012a). The topics covered in the class are listed in Table 1. These texts were chosen because they have passed through rigorous testing and revision before publication. The materials were used in their original form and not modified for an ELL context.

Table 1. List of topics covered in the course.  
The topics were presented in the order shown.

Topic	Source of activity
Biological Molecules	<i>POGIL Activities for High School Biology</i>
Protein Structure	<i>POGIL Activities for AP Biology</i>
Prokaryotic and Eukaryotic Cells	<i>POGIL Activities for High School Biology</i>
DNA Structure and Replication	<i>POGIL Activities for High School Biology</i>
Transcription	<i>POGIL Activities for AP Biology</i>
Translation	<i>POGIL Activities for AP Biology</i>
Genetic Mutations	<i>POGIL Activities for AP Biology</i>

### ***Assessment of Student Attitude and Learning***

At the end of the semester, students were asked to assess their learning gains. The survey administered was designed following the guidelines of the Student Assessment of their Learning Gains (SALG) framework (Seymour, Wiese, Hunter, & Daffinrud, 2000). Student answers were based on a 5-point Likert scale.

After each POGIL lesson, students were surveyed about their perception of the difficulty of English used in the activity. Student answers were based on a 5-point Likert scale.

### **Results and Discussion**

The aim of this investigation was to gauge student attitude and self-assessed learning gains when published POGIL materials were used as teaching material in a science-based content-driven English course for ELLs.

Students felt that the structure of POGIL activities was helpful for both learning English and gaining scientific knowledge (Figure 1). Activities built around the POGIL framework are carefully structured to follow a 3-phase learning cycle: Exploration -> Concept or Term Invention -> Application. A notable point is that questions generally become more complex as students advance through each phase. As content knowledge and vocabulary are built during the first two phases, questions in the Application phase can be answered by drawing on the information that was previously encountered.

Teamwork is an important component of POGIL activities, and students felt that working in a team was helpful for both learning English and gaining scientific knowledge (Figure 1). In the context of ELLs, teamwork is important because it

provides a setting to improve oral communication skills, which is one of the process skills that POGIL is intended to help develop.

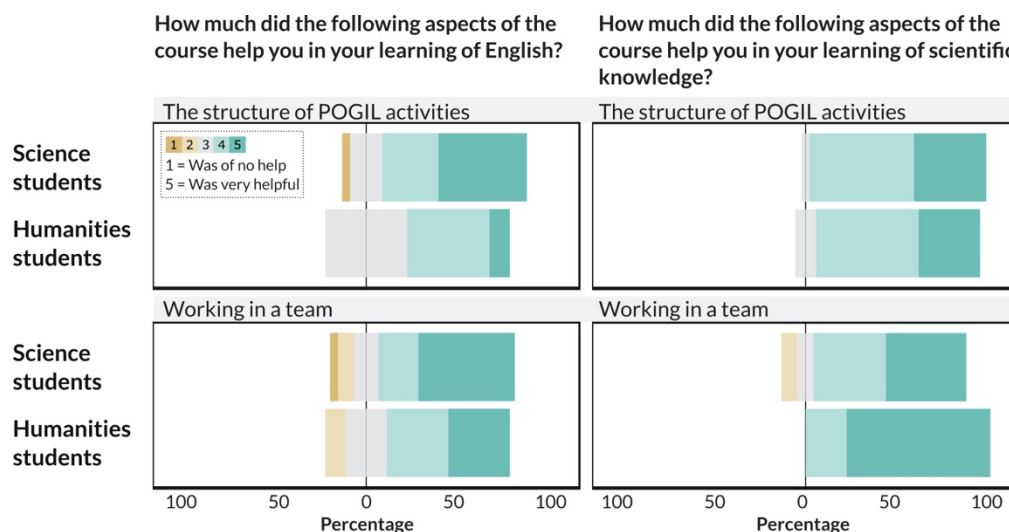


Figure 1. Students’ assessment of the structure of POGIL activities and teamwork with regards to gains in English and scientific knowledge.

Students felt that they gained an understanding of various subtopics within molecular biology (Figure 2). Quiz scores (data not presented) indicated that students understood the content and could describe some details in English. However, the quizzes were short, mostly multiple-choice, and when writing was required the output was usually one or two sentences. Therefore, a more thorough investigation including longer writing assignments or short oral reports might help elucidate student gains, especially with regards to English.

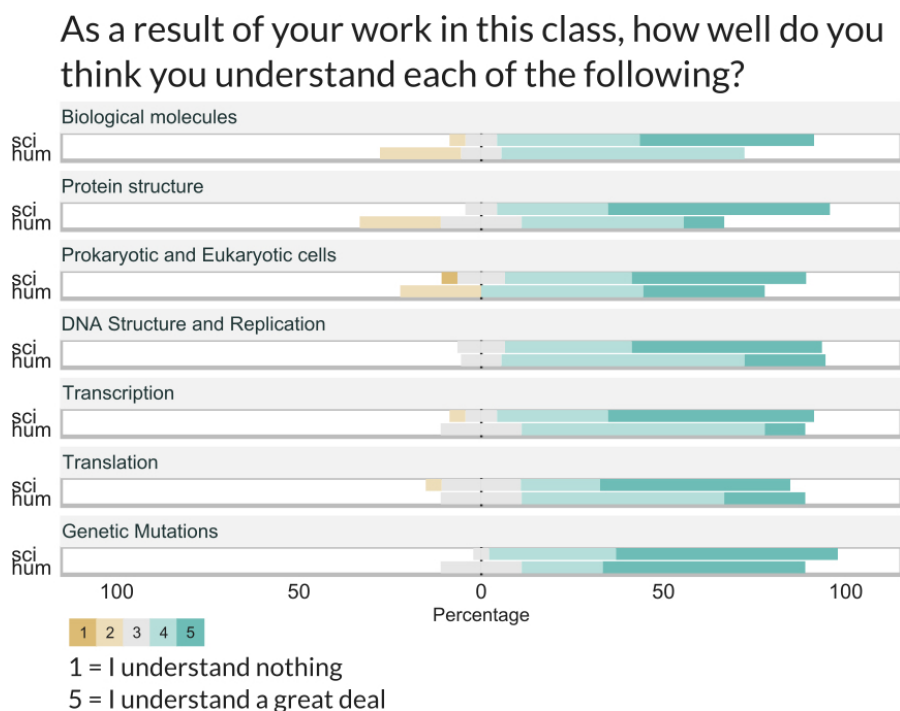


Figure 2. Students’ assessment of their learning gains in unit of the course (sci = science students, hum = humanities students).

Students feeling about the difficulty of English varied by topic and humanities students generally found the English to be more difficult (Figure 3). This study was conducted using previously published POGIL materials and applied to an ELL context. The material was used in its original form but may need adjustment for an ELL context to improve its effectiveness. Furthermore, as mentioned above, a more detailed method to evaluate acquisition of English is required, such as writing assignments or oral reports. Additionally, audio or video recording of students' interactions during class could help identify other English production hurdles.

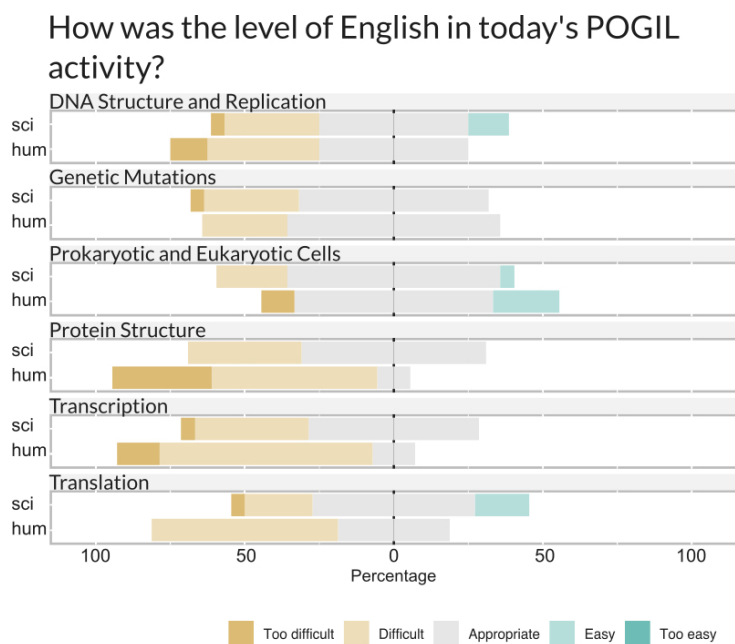


Figure 3. Students' assessment of English difficulty for each POGIL lesson (sci = science students, hum = humanities students).

As mentioned above, enrollment in the course is determined by a pseudo-lottery system. While enrollment of humanities-track students in the course was unexpected, the overall positive response is encouraging. In considering a future investigation, the humanities-track students could provide a good control against enrolled science-track students. Another point to consider is that second year science-track students enrolled in the course had more prior exposure to the scientific content of the course through lectures conducted in Japanese during their first year, which could lead to lower cognitive load consequently affecting English acquisition.

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***The Impact of Landmark Court Cases on Funding in American Public Education Systems: The Legal System and the Financial Structure of Educational Institutions***

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**Abstract**

Court rulings and legal precedents can significantly influence educational policy, the fundamental financial structure of schools, and the educational funding process at the local, regional, and national levels of education systems. Landmark court cases involving different stakeholders, employing various administrative concepts and a wide range of legal strategies, have had a significant impact on contemporary educational funding methods and on the creation of educational programs and new types of schools (Odden & Picus, 2004). This presentation examines the close interdependence of the legal and education systems and the outcomes of five landmark court cases which continue to influence current legislation at the local, state, and national levels of education. Student performance and learning outcomes related to funding, the trend towards privatization in education, and the planning of financial models which are appropriate to the contemporary needs and requirements of diverse student populations and American schools are also addressed. Despite increases in the total amount of funding for education in the United States and new legislation designed to address and correct educational funding imbalances, some differences continue to exist in local and state funding for education (Essex, 2005). Differences in funding between some school districts and systems persist despite decades of discussion, research, and various legal strategies and challenges in the legal system.

Keywords: public education, financial structure, funding, landmark court cases

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## Introduction

Court rulings and legal precedents can significantly influence educational policy, the fundamental financial structure of schools, and the educational funding process at the local, regional, and national levels of education systems. Landmark court cases involving different stakeholders, employing various administrative concepts and a wide range of legal strategies, have had a significant impact on contemporary educational funding methods and on the creation of educational programs and new types of schools (Odden & Picus, 2004). The outcomes of some landmark cases have influenced current legislation, student performance, the move toward privatization, and the building of financial models appropriate to the contemporary needs and requirements of schools. The total amount of funding for education in the United States increases each year, but some differences continue to exist in state funding for education (Essex, 2005). Differences in funding between some school districts and systems persist despite decades of discussion, research, and various legal strategies and challenges in the legal system.

### **Serrano v. Priest (1971)**

John Serrano was a parent of a public school student in Los Angeles, and Ivy Baker Priest was the California State Treasurer. As a result of the state's education funding policy, people in poor districts in California had to pay a higher rate of property tax to get the same level of school funding as wealthy districts (Coons, Clune, & Sugarman, 1970). The state of California provided some financial aid for districts with low tax bases but this was not enough to compensate for the significant differences between the rich and poor districts (Groen, 2006). In a class action lawsuit representing public school students in underfunded school districts, Mr. Serrano and his attorneys argued that this unequal funding situation was a violation of the Equal Protection Clause of the Constitution of California and of the Fourteenth Amendment of the Constitution of the United States which stipulated in 1868 that all U.S. citizens must have completely equal legal protection (Essex, 2005). Justice Raymond L. Sullivan ruled in favor of the plaintiffs in the Superior Court of Los Angeles County. The Supreme Court of California later ruled that the system of school finance in California was not constitutional (Odden & Picus, 2004). The legal strategy based on the state constitution was successful.

The plaintiffs in some similar court cases in the 1960s had also challenged the constitutionality of major differences in school funding methods based mainly on local tax bases, but the cases before *Serrano v. Priest* (1971) failed in part because a clear legal definition did not exist for the key concept of educational need (Essex, 2005). In *Serrano v. Priest* (1971), the wealth of each pupil in relation to the district property tax base was legally defined as a suspect class, and the funding of education was based on the entire wealth of the state (Coons, Clune, & Sugarman, 1970). The new legal strategies employed in *Serrano v. Priest* (1971) were successful in the California Supreme Court, but the same legal strategies failed in *Rodriguez v. San Antonio* (1973) which was judged in the U.S. Supreme Court, while in another similar case, the *Robinson v. Cahill* (1973) case, the same legal strategies were successful in the New Jersey Supreme Court (Odden & Picus, 2004). The same legal strategies in similar cases related to school funding are not always successful in all states or at all levels of the legal system.



The California Supreme Court ruled that the education funding system in California was unconstitutional since the differences in property wealth between school districts caused significant differences in spending per pupil in different school districts (Groen, 2006). The success of the legal strategies used in *Serrano v. Priest* (1971) resulted in many similar cases in other states across the United States of America and served as an important legal precedent in the promotion of increased equality in educational funding.

### **Rodriguez v. San Antonio (1973)**

Mr. Rodriguez was the parent of a pupil who filed his case against San Antonio, Texas. The Texas San Antonio Independent School District system was accused by a group of Mexican-American parents of acting in violation of the Equal Protection Clause of the United States Constitution by maintaining a system of school finance that caused major inequalities in funding between school districts (Essex, 2005). The law suit was filed on behalf of families residing in low property tax school districts in the state of Texas. The parents asserted that their Mexican-American children were subject to discrimination as a result of widely different per pupil expenditures between districts in Texas (Green, 1999). The amount of school spending per pupil may affect learning outcomes.

The trial court in Texas determined that education was a fundamental right and that property wealth per pupil in school districts could be used to legally define a suspect class, a clearly identifiable group of individuals with unique characteristics (Green, 1999). However, the United States Supreme Court determined that education was not a fundamental right under the U.S. Constitution because education was not clearly defined as such in the text of the U.S. Constitution (Odden & Picus, 2004). The U.S. Supreme Court also ruled that property wealth could not be used to legally define a suspect class (Essex, 2005). However, the U.S. Supreme Court did allow states to interpret the Equal Protection Clause in their own state constitutions in a manner that permitted them to provide more state funding to school districts with low tax bases (Odden & Picus, 2004). Texas increased state funding of education in districts with low tax bases after this case. The decisions of the U.S. Supreme Court in *Rodriguez v. San Antonio* (1973) were not unanimous and were decided by one swing vote (Essex, 2005). Court rulings involving more than one judge in educational funding cases are seldom unanimous.

### **Robinson v. Cahill (1973)**

Mr. Robinson was a parent and Governor Cahill was the Republican governor of the state of New Jersey. The public school systems in New Jersey used taxes collected from local property as the main method of school district funding (Emel, 2002). Poor urban areas had a low property tax base, while higher property value suburban areas and single family homes had a relatively high property tax base. As a result, educational spending per pupil based on the property tax base was lowest in urban areas (Odden & Picus, 2004). The plaintiffs in *Robinson v. Cahill* (1973) used the Equal Protection Clause of the New Jersey state constitution and the education clause of the state which guaranteed an equal level of education for all children in New Jersey (Emel, 2002). As in previous landmark court cases related to school funding in other states, clauses in the state constitution provided support for legal arguments.

The New Jersey Supreme Court ruled that the inequalities in school funding between some districts as a result of different property tax bases was a violation of the state constitution and that, as a result, some New Jersey pupils were not receiving a sufficient level of education (Essex, 2005). Educational funding was low in many poor districts despite high property taxes. As a result of the court ruling in favor of the plaintiffs in *Robinson v. Cahill* (1973), the state of New Jersey significantly increased educational funding in districts with low tax bases. Increased educational spending by New Jersey corresponded with an improvement in measurable learning outcomes in low tax base urban school districts, although the learning outcomes were still lower than the outcomes in wealthier districts (Odden & Picus, 2004). Increased educational funding alone may not be enough to raise learning outcomes in poor urban areas to the same high levels as wealthy suburban areas.

### **Abbott v. Burke (1985)**

Raymond Abbott was a pupil from an underprivileged family in New Jersey and Fred G. Burke was the education commissioner of New Jersey. *Abbott v. Burke* (1985) was influenced by *Robinson v. Cahill* (1973), a landmark court case which established that unequal funding in school districts in the state was unconstitutional under the New Jersey state constitution (Bari, 2005). Although educational funding from the state to districts with low tax bases had increased after the ruling in *Robinson v. Cahill* (1973), significant differences remained between poor urban districts and wealthy suburban districts (Crampton, Thompson, & Vesely, 2004). The plaintiffs, including Raymond Abbott and other pupils and their guardians, successfully argued that the comparatively low level of educational funding in their urban district resulted in a lower quality of education which was a violation of the Equal Protection Clause and of the Education Clause of the New Jersey state constitution (Gewertz, 2008). The link between school funding and learning outcomes was successfully established, setting a valuable precedent.

As a result of the case, the New Jersey state funding formula for public schools was significantly changed so that all public schools in New Jersey received an equal amount of tax money (Bari, 2005). In addition to securing equal levels of funding for all state public schools, *Abbott v. Burke* (1985) also inspired a wide range of special programs and measures to improve the quality of education and learning outcomes in poor urban areas, including smaller class sizes, new pre-school programs, more vocational training in high schools, more tutoring, and new apprenticeship programs (Odden & Picus, 2004). The urban public schools which participated in the successful lawsuit were classified as Abbott districts and received higher levels of state educational funding than some wealthy school districts and some rural districts (Crampton, Thompson, & Vesely, 2004). The higher levels of educational spending by New Jersey in poor urban school districts resulted in complaints from some wealthy districts and poor rural districts that too much of the state's budget was being spent on education in poor urban districts (Bari, 2005). The higher levels of state education spending in Abbott districts led to an improvement in learning outcomes in the lower grades but had a smaller impact on learning outcomes in the higher grades (Essex, 2005). Differences in learning outcomes remained between poor and wealthy school districts.

### **The Burlington School Committee v. Massachusetts Board of Education (1985)**

The Burlington School Committee v. Massachusetts Board of Education (1985) case involved a first grade pupil named Michael Panico who had a reading learning disability and was given special reading tutoring and general counseling in a public school (Essex, 2005). Despite the additional tutoring provided by the public school and placement in a small class of pupils with special needs, Michael's reading ability failed to improve, and his parents decided to send Michael to a private school for pupils with various learning problems (Odden & Picus, 2004). Michael's parents believed that the public school was not capable of providing adequate services to meet Michael's special educational needs. The Individuals with Disabilities Education Act (IDEA), passed in 1975 by the United States Congress, gave all public schools the obligation to provide free, special education to meet the specific learning needs of students with mental, emotional or physical disabilities (Essex, 2005). The overall goal of IDEA was to create an educational environment in which all students, regardless of any disability, could learn effectively. The parents of Michael Panico and their attorneys argued that, under IDEA, the public school had a duty to pay for the transportation and tuition costs of a disabled student at a private school if the public school was unable to provide adequate services to meet the special needs of a disabled student (Odden & Picus, 2004). The financial burden of sending Michael to a private school was significant for his parents.

The district court ruled in favor of the Panicos and the public school was ordered to pay the transportation costs and education expenses of Michael Panico at the private school, although the case lasted for eight years (Essex, 2005). Burlington School Committee v. Massachusetts Board of Education (1985) was a landmark case for the rights of disabled students and was followed by several similar cases which led increasingly to the transfer of funds from public schools to private schools to meet the special educational needs of pupils and students with disabilities (Odden & Picus, 2004). After the ruling in Burlington School Committee v. Massachusetts Board of Education (1985), special education services for disabled students became increasingly privatized in many states.

### **Conclusion**

Landmark court cases have had a significant impact on changes in the structure of school funding in many states in the United States of America. Increased school funding in poor districts in California, New Jersey, Texas and other states has led to measurable improvements in learning outcomes, especially in the lower grades. The rulings in court cases have also resulted in an increase in the privatization of special education for pupils and students with mental, emotional, or physical disabilities and in a wide range of new programs to support disadvantaged pupils and students in many states (Essex, 2005). In the United States, in theory and in practice, individual pupils, students, and parents have the power to change school funding structures at the district, state, and national levels by asserting their rights under state constitutions and the United States Constitution. Successful cases in one state often lead to many similar cases and outcomes in other states, profoundly affecting school funding structures and funding methods and reducing school funding inequalities across the United States of America.

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***Video Self-Modeling Intervention on the Social Skills of Children with Autism Spectrum Disorder***

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**Abstract**

Autism is a worldwide health dilemma that knows no boundaries—it does not categorize based on people, culture or societal status. Children with autism spectrum disorder (CWA) have social skill impairments that are predominantly challenging for them. The alarming impact of social skill impairments of CWA creates a need for an effective, evidence-based, best pedagogy and intervention that should be implemented early in a child's development to diminish barriers in acquiring important social engagements. This research aims to evaluate the use of Video Self-Modeling (VSM) as an intervention for social skills impairments of the CWA. The goal of the VSM is to transform a supported skill to an independent skill. It allows the child to see himself through videos performing targeted behaviors. The researcher used a purposive sampling of 10 children diagnosed with autism spectrum disorder. The research is a non-experimental, descriptive, case-study and utilized survey instruments, documentary analysis, interviews, and observations. The study revealed the common social skill impairments of the CWA negatively affecting their relationship with the others. After the use of the VSM intervention, most of the clients demonstrated substantial progress and development on their target social skill impairments. This result suggests that the use of VSM is an effective intervention for social skill impairments of the CWA. In addition, only a small number of clients showed no positive changes in their target behaviors. The research also revealed the difficulties experienced by the teachers and the students on the implementation of VSM.

Keywords: autism, social skills, and video self-modeling

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## Introduction

There are approximately 67 million people who are affected by autism spectrum disorder (ASD) around the world (Autism Speaks, 2008). Based on the current estimate of the United Nations, 1% of the global population are on the autism spectrum. In the Philippines, an estimated close to a million families deal with autism daily (Autism Society Philippines, 2012). The number of people with ASD in our country and other countries worldwide has almost doubled in the past six years and the number is still rising (Jaymalin, 2014). To recover the lives of the rising number of individuals and families shaken by this disturbing disorder, it is high time that the world begins to identify the magnitude of this problem and act not simply locally, but instead globally (Kopetz & Lee, 2012).

Autism is a complex neurological disorder diagnosed when an individual displays deficit in social-emotional mutuality ranging from abnormal social approach and failure of mutual conversation. Children with autism spectrum disorder (CWA) also manifest deficiencies in developing, maintaining, and understanding relationships. They also experience difficulties adjusting behavior to suit various social contexts; difficulties in sharing imaginative play or making friends; and absence of interest in peers (American Psychiatric Association, 2013). Apart from these challenges, most CWA still struggle to confidently stride over different life difficulties aside from their condition. Participation and engagement are such social skills that are being very difficult for the CWA. CWA who have failed to manifest these social skills behaviors are likely to be rejected by their peers. However, CWA who have acquired the appropriate social skills made it possible to initiate and develop positive social relationships with others and provide them communication strategies to highlight their needs, desires, and preferences.

Unfortunately, the education and psychology sectors have historical records that they have neglected these individuals (Boudreau & Harvey, 2013). They have engrossed their researches on disabilities and the deficiencies of CWA and unheeded the positive qualities such as relative strengths, positive emotions, fulfilment, life satisfaction, self-determination, and joy- qualities that make life worth living (Bellini & McConell, 2010). Most schools focused on academics and this ensues little time to engage CWA to acquire different social skills (Vining, 2010). The purpose of this paper is to assess the effectiveness of the video self-modeling intervention technique in modifying the social skill impairments of CWA.

This research utilized case study with combine data collection. The research is a qualitative type of study that used observation and formal interviews with parents and teachers in gathering data to address the main research questions and used the purposive sampling. 10 children with autism spectrum disorder are the clients of this research. The criteria used in the selection of the samples are (1) the client has an official diagnosis of having an autism spectrum disorder; (2) the client is currently enrolled in a segregated or mainstreamed class; (3) the client is under the age range of 6-15 years old. Questionnaire-survey/checklists were the primary tools used in gathering the data to achieve the goals of this study. The instruments were content validated and checked by the experts in Research and Special Education fields. The pilot test was conducted with participants that have similar profiles as those that will

participate in the implemented study. The pilot test assisted the researchers with the refinement of research questions.

The direct interview of the researcher with the teachers and the parents of the CWA about the clients significantly helped the researcher in the examination of data and contributed weight to the reliability of the answers and how the respondents delivered evidences on their responses. Interviews provide in-depth information pertaining to participants' experiences and viewpoints on a specific topic. The interview schedule was validated by the Research and Special Education experts. After the validation stage, the pilot testing was also conducted to two teachers and two parents. Triangulation was also done by comparing the responses of the group of participants. To gather data and information from the participants of this research, which deepened the study about the social skill impairments of the CWA, the researcher conducted orientation for the parents and the teachers. In addition, survey-questionnaires were answered by 10 parents and eight teachers. Interviews were also employed to the parents and the teachers to expand the scope of this research. Lastly, a series of observations by the researcher were conducted to validate and confirm the answers from the respondents.

### **Review of Literature**

Social skills are the ability to communicate, persuade, and interact with other members of the society without undue conflict or disharmony (American Psychiatric Association, 2013). Some examples of social skills include smiling and making eye contact, asking and responding to questions, greeting and starting conversation with others, and giving and acknowledging compliments during a social exchange (Rao, Beidel, & Murray, 2008). Developing good social skills include the development of the child's play skills embracing the skills in taking turns in a game, sharing a toy or material, joining a group of children who are already playing, and playing cooperatively with others. Better social skills also mean good communication skills manifested in choosing what to talk about or what body languages to use, introducing self to others, using appropriate tone and volume of voice, and taking turns in speaking. Suitable social skills also involve emotional skills which hold the ability to manage emotions and to understand how others feel (Raising Children Network, 2017). Good social skills lessen the chance for negative connections. Being the building blocks for friendship, social skills give children the chance to learn how to be considerate, confident, and caring of others.

Cullata, Tompkin, and Werts (2003) defined impairment as the lack of expertise or abilities to perform a task in the same manner as most persons. Children who have social skill impairments lack the behavioral collection necessary to interact with others, a deficit that affects both academic and social development. CWA experience impairments in social interaction and communication skills, with these impairments being identified as the most conspicuous feature of CWA. They demonstrate fewer social initiations and reactions. The social deficits exhibited by them disturb their ability to successfully interact with friends and adults, which results in decline opportunities to establish friendship and ensuing seclusion from peers (Radley et al., 2017). In addition, limited social skills can affect the child's ability to attain normal developmental milestones and establish sustaining peer and household relationships (Rao et al., 2008). It is also essential for children of all ages to gain proper social

skills, because social skills are the best portal in creating and maintaining relationships with others.

The DSM 5 (2013) as mentioned in American Psychiatric Association (2013) expounds that CWA prefer to play or spend time alone; they show little interest in making and keeping friends. They do not respond when their names are called or make facial expressions or gestures as signs of reciprocity. They do not like being touched and they resist cuddling. Furthermore, they do not seek or accept comfort when they are hurt, and they do not initiate social initiative play. It has been suggested that the impairments in social skill falls along a wide-ranging spectrum. Children who are under the spectrum opted to evade other people, do not know how to initiate and sustain communication, and therefore, their communication is usually unfitting. In addition, studies have reported that CWA cannot interpret the feelings and moods of others or foresee social events; they show impairments in listening and responding to others' demands, and in cooperating games and other activities. Furthermore, play skill impairment is also a common and critical component for children with autism, constrained play skills eradicate mutual tools needed to build independent performance and relationships (Morrison, Sainato, Benchaaban, & Endo, 2002). Moreover, some social signs, such as smiles and eye contact may be irrational to them (Golzari, Alamdarloo, & Moradi, 2015).

It is enormously imperative for educators to find significant and effective ways of supporting students with special needs to guarantee that they are confident and well-prepared to steer the social discernments and behavioral expectations of their school experiences. Equally within and outside of the school setting, Video Self-Modelling (VSM) has established to be both strong and efficient in addressing a variety of student problem behaviors. (Schaeffer, Hamilton & Johnson, 2016). The use of VSM, watching and learning from one's own positive behavior, is relatively a new modeling that first appeared in the literature in the early 1970's (Buggey & Ogle, 2012). Primarily, the goal of the VSM is to transform a supported skill to an independent skill. It allows the child to see himself through videos performing targeted behaviors (Bellini & McConnell, 2010). When the video is viewed in the VSM, the child only sees himself performing the specified target behavior at the mastery level, without errors, prompts, or off-task behaviors. Taking videos of individuals and watching themselves as the models is an intervention that maximizes characteristics and behaviors to promote modification to the model. Results from video modeling interventions have been promising in the acquirement, transmission, and preservation of target behaviors (Boudreau & Harvey, 2013).

VSM has been used across multiple disciplines including children with attention deficit hyperactivity disorder (ADHD), learning and cognitive disabilities, autism spectrum disorders, and various physical disabilities (Bellini & McConnell, 2010; Buggey & Ogle, 2012). VSM has also been used across a wide range of school ages, including preschool, elementary school, middle school, and high school (Prater, Carter, Hitchcock, & Dowrick, 2012). It is a strength-based intervention that focuses on the strengths of a child rather than on his weaknesses (Bellini & McConnell, 2010). Currently, VSM can be considered as an effective intervention for CWA across the four categories of language and communication, social skills, behavior and task instruction (Gelbar, McCarthy, & Buggey., 2012). In a classroom setting, the use of VSM has been effective and has shown ability in modifying the behavior of



individuals with ASD in both teaching skills and remediation problem behaviors (Gelbar et al., 2012). VSM has a precise, strong research base when implemented for CWA. Because of the proliferation of educational technology tools in the classroom, VSM has gained distinction as a means of improving behavior skills of those children with disabilities. The impact of the VSM as an intervention in the classroom has been the talk of the people searching for a dynamic intrusion for different skills.

Merrill and Risch (2014) presented a complete guide on the use of VSM. Ten steps are outlined which described how VSM is implemented with the CWA. The preliminary and most important step in implementing VSM is targeting a behavior for the intervention. The target behavior must be specific, attainable, and measurable. After successfully identifying the target behavior, having the correct equipment to be used must be the next priority. Facilitators should choose the fitting equipment based on the resources that are available in schools and in the locality and the budget limits. The third step is the planning stage. A task analysis is helpful for breaking down a difficult skill into an order of several behaviors. The plan should also contain a list of all the steps required to complete attaining the target behavior. Making the video is the heart of implementing the VSM. In creating the video, the facilitators must ensure that the videos made are acceptable in feature and accurately replicates the steps of the task analysis. After the video is recorded, it may need to be edited to eradicate any errors, and to take out prompts or added cues. Arranging the environment for watching the video is the subsequent procedure after the recording and editing process. The facilitators of the VSM should identify the environment where and when the video will be shown. Showing the video is the seventh step in implementing VSM. The facilitators of the VSM allow the CWA to watch the video and provide prompts needed to gain and/or keep attention. It is important to let the learner watch the video number of times before expecting the learner to demonstrate the target skill.

### **Research Questions**

This research specifically answered the following questions:

1. What are the social skill impairments of children with autism spectrum disorder before the use of video self-modeling?
2. How is video self-modeling used in teaching social skills to children with autism spectrum disorder?
3. What changes were identified after the use of video self-modeling on the social skills of children with autism spectrum disorder?
4. What are the challenges experienced by the teachers and students on the use of video self-modeling?

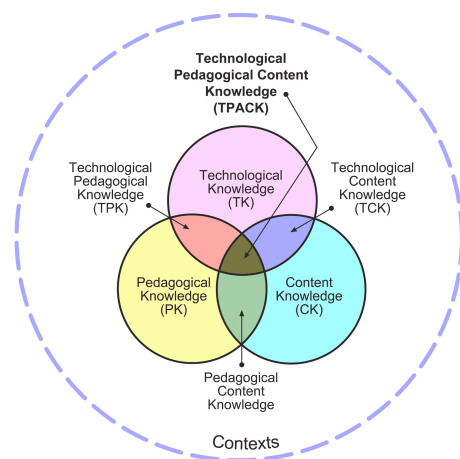


Figure 1: The Technology, Pedagogy, and Content Knowledge (TPACK) framework

Figure 1 shows the Technology, Pedagogy, and Content Knowledge (TPACK) theory by Punya Mishra and Matthew J. Koehler form the core framework of this research. At the core of effective teaching with technology are three fundamental components: content, pedagogy, and technology, plus the connections amongst and between them. These three knowledge bases form the fundamentals of TPACK framework. On an academic level, newer digital technologies such as computers, handheld devices and software applications bring about new challenges to teachers who are struggling to utilize more technology in their teachings. Teaching with technology is a complex process. Teachers often have insufficient trainings by using digital technologies for teaching and learning. Many educators earned degrees at a time when educational technology was in a very different phase of advancement than it is presently. Consequently, it is not surprising that they do not consider themselves sufficiently prepared to use technology in the classroom and often do not have appreciate its value or relevance to teaching and learning (Mishra & Koehler, 2007).

## Conclusions

Client	Target behavior	Description
#1	Join a group of children who are already playing	sometimes observed
	Say "NO" to indicate disagreement	sometimes observed
#2	Greet the teachers at the corridor	never observed
	Say "EXCUSE ME" in appropriate situation	never observed
#3	Invite others to play	never observed
	Join a group of children who are already playing	sometimes observed
#4	Invite others to play	never observed
	Assist others in need of help	sometimes observed
#5	Start a conversation with others	never observed
	Establish eye contact with others during interaction	never observed
#6	Ask others for help	sometimes observed
	Give compliments to others	never observed
#7	Asking permission when borrowing	never observed
	Comfort others when they are upset or hurt	never observed
#8	Start a conversation with others	never observed
	Introduce self to others	never observed
#9	Greet the teachers at the corridor	never observed
	Join a group of children who are already playing	never observed
#10	Greet the teachers at the corridor	never observed
	Join a group of children who are already playing	never observed

Table 1: The target behavior of the CWA before the VSM intervention.

In table 1 it shows that most clients manifested impairments in greeting the teachers and their classmates. The researcher had observed that clients rarely give compliments to others. Most of the CWA acted indifferently in situations where giving compliments are expected to be demonstrated by them.

Table 2 presents a sample pre-intervention social skill impairment of a client.

Social skill impairments of the child with autism spectrum disorder inside the classroom	Codes
<p>Client #3 is 7-year old girl diagnosed with autism spectrum disorder when she was four years old. She uttered her first word when she was two years old but seems to have regressed and that she could now only say the words “<i>baho</i>”, “<i>ice cream</i>”, and “<i>birthday</i>” occasionally. Her developmental report tells that her behaviors during the evaluation were significant for impaired social exchange including her play skills. Her social and play responsiveness and the ability to interact with other children is on 3.0-3.3 age equivalent.</p> <p>Inside the classroom, she does not bid for attention or help but rather does things on her own. She is unable to establish and maintain eye contact with his classmates. She shows repetitive and restrictive behavior- lining up the toys according to color or size and gets upset when these were disturbed or disarranged. She prefers to play alone with her favorite toys and materials. She always plays with her clay. She rarely invites others to either join her in playing or join other children who are already playing.</p> <p>Her developmental pediatrician recommended to have a one-on-one session with an occupational therapy-three times a week. She also needs to be exposed to other children for enhancement of her social and communication skills including her play skills.</p>	<ul style="list-style-type: none"> <li>• prefers to play alone</li> <li>• does not know how to invite others to play with her</li> <li>• does not ask others to let her play with them</li> </ul>

Table 2: Pre-intervention Social Skill Impairments of Client #3

Once the goal has been determined and the equipment to be used has been completed, the researcher thoroughly designed the recording stage. The researcher prepared script using the task analysis of the behavior which will undertake intervention. The scripts presented were not less than four steps, but not more than six steps. The researcher determined the location with restricted distractions for the video recording activity and additional supports were also included such as the parents, teachers, and classmates of the clients were involved to capitalize the natural setting of the recorded video.

To minimize distractions and interferences, most of the recording activities were done after the class. Blocking, lighting, and the set design were given attention to produce a seamless video clip. The researcher recorded the target behavior for at least four to six to display the expected skills as early as possible. For non-verbal clients, gestures, signs and body language were very important part of the recording process. The researcher used video editing applications downloaded in an android tablet for editing

the raw videos. The videos were edited to remove the teacher’s prompting and other visual supports that were employed in the recording process. Additional positive reinforcers, such as music or the sound of clapping, were also added to supplement the affirmation component. But the researcher noted that if too many special effects such as music background noises or fancy transitions were added, these potentially take the child’s attention away from the target behavior. The whole implementing process lasted for 10 days. On the first day up to fourth day of the implementation, the clients watched the video with a close monitoring and guidance of the teacher. On the fifth up to the seventh day of the implementation, the teacher provided the subject with the questions and asked the subject to imitate or demonstrate the actions shown in the video for each step. On the eight to the 10<sup>th</sup> day of the intervention, the videos will no longer be shown, but drills and practices were done demonstrating the target behavior.

Table 3 shows a sample post-intervention social skill impairment of a client.

Changes observed to the client with social skill impairments after the use of Video Self-Modeling inside the classroom	Codes
<p>On the first two days of the intervention, the researcher had difficulty motivating the client to watch the videos. The client wanted to do her daily routine inside the classroom. On the succeeding days, she viewed the videos with limited verbal responses but showed positive facial expressions and gestures. Her strong attachment to her favorite materials had manifested during the viewing stage, but showed significant interest responding on the questions of the researcher. Her VSM video teaches her to initiate play with her classmates by tapping the shoulder of her classmates or by sharing toys with them. Generally, she enjoyed watching her own videos.</p>	<ul style="list-style-type: none"> <li>• She starts to mingle with the group of children who are playing.</li> <li>• She initiates play with her classmates</li> </ul>
<p>During the demonstration stage of the target behaviors, the client tried her best to invite her classmates to play with her. She tapped the shoulder of her classmates and offered her toys as shown in the VSM videos- indicators that she wanted to play with them. The researcher noted the shifting of the client from being passive to an active player after the implementation of the VSM intervention. She now expresses her desire to play with her classmates and now enjoys sharing the classroom materials with her classmates. She started to open herself to play with her peers- substantial change that VSM brought to the client.</p>	

Table 3: Post-intervention Social Skill Impairments of Client #3

Table 3 shows the post-intervention social skill impairments of client #3. In general, after the intervention, the data gathered from the 10 clients revealed that VSM really helped improve most of the social skill impairments of the CWA such as asking others for help, introducing self to others, greeting the teachers and peers, and inviting and joining others to play with. Prater et al. (2012) said that the use of VSM served as a strong motivator for social skills improvement; and some students can be trained

also to support with the recording and editing, freeing the teachers to continue with their typical duties. Furthermore, Schaeffer et al. (2016) concluded that the VSM videos are easily created and implemented into the genuine school setting and can focus on social skills needed for social success. They have also underscored that VSM is a significant and effective intervention of supporting CWA to guarantee that they are assertive and equipped to steer the social discernments and social expectations of their school experiences. The positive testimonies gathered by the researcher from the teachers who facilitated the VSM as well as the interviews with the parents supported the claims of Schaeffer et al. (2016) who posited that VSM has established to be both strong and efficient in addressing a variety of student problem behaviors. In addition, their testimonies also intensified his proposition that the use of VSM is effective because people learn best from the models that most resembles them and having oneself as the model improves this element.

The different challenges experienced by the teachers, the recorder and the editor of the videos, and the students revealed that the implementation of VSM intervention required extra time and effort. It can also be inferred that having advanced technological skills in creating, and editing videos are essentials for a teacher to implement the intervention. This supported the idea posited by Mishra & Koehler (2006) that using technology in education required a deeper, more vital understanding and fluency of the technology for information processing, communication, and problem solving. The different challenges mentioned supported the claims of Buggey and Ogley (2012) that despite of the overwhelming empirical support for the efficacy of VSM, there are only minute numbers of schools implementing VSM in their classrooms. This lack of implementation can be attributed in large part to the apparent trouble involved in editing and producing videos, ability to purchase equipment, and the amount of time required for implementation. Bellini and McConell (2010) also supported the findings that the impermeable impediment that educators and parents report is the time constrictions.

Based on the data obtained from the survey by the teacher and parents of the CWA and the researcher, the most prominent social skill impairments of the CWA were the following: impairments in greeting others, initiating conversation, using fitting tone and volume of voice, taking turns in speaking, establishing eye contact and body languages including total lack of facial expressions, developing, maintaining, and understanding relationships, and impairment in sharing imaginative play or making friends including absence of interest in peers. The VSM has been used in teaching social skills to CWA. This research implemented VSM in teaching the social skills with the following steps: choosing the target behavior, gathering the correct equipment, planning the recording activity, recording the videos, editing the videos, and implementing the VSM to the clients. After the implementation of the VSM with clients, series of observations were conducted to assess the effects of the VSM on the social skills of the CWA. The VSM intervention lasted for 10 days, which includes the viewing stage for four days, the practice stage for three days and the post intervention stage for two days. The result of the VSM intervention for each client ranges from no positive result at all to substantial progress demonstrated for each skill. Some clients also showed slight progress on their impairments. It was also found out that the use of VSM as an intervention on the social skills of CWA is effective in a broad age range of children and can be implemented in a variety of settings. Most teachers and parents expressed their gratefulness in the positive impact of using VSM

on the social skill impairments of the CWA. The 10-day implementation of the VSM consumed much time on the part of the teacher since they were the facilitators of the intervention. The challenges encountered by the teachers and the researcher also included the extensive effort utilized in creating seamless videos. Viewing and practicing sessions of the VSM for each client resulted also in class disruption. And lastly, all teachers agreed that VSM intervention is a costly mediation activity since there were equipment utilized during the implementation.

The challenges encountered by the students include their inability to act out in front of the camera demonstrating desirable behavior, their readiness in attending or watching the videos daily, their atypical behavior in demonstrating or practicing the target behavior, and the extension of the VSM intervention due to their frequent absences in the class. The data gathered from the social skills survey were utilized by the researcher in delimiting the use of VSM in the social skill impairments of the CWA that can only be recorded using VSM. The reorganization of the steps on the use of VSM was transformed into a more fitting intervention based from the principles of VSM. Thus, the number of days for video viewing was lengthened. Since the use of VSM at home setting yielded positive results on the social skill impairments of the CWA, instructions were also provided for the use of VSM at home setting. The challenges experienced by the teachers like the expenditure of having a costly video recorder was addressed by providing ideas in utilizing cheaper but practical equipment.

Based from the findings of the study, the following conclusions were drawn: (1) children with autism spectrum disorder (CWA) experience a wide-ranging area of social skill impairments, including impairments in social-emotional exchange, impairment in nonverbal communicative behaviors, impairment in establishing and maintaining relationships, and impairment in play skills; (2) implementing VSM in teaching social skills to CWA were methodical, easy-to-implement and result-oriented; the use of the VSM as an intervention for the social skills of CWA has proven to be effective, (3) and produced substantial changes and progress, as well as minor or insignificant advancement in broad age range. The change was not limited only to new and improved skills demonstrated by the client at school, but also to skills demonstrated at home; (4) the implementer of the VSM intervention experienced concerns involved in the time-consuming recording and editing stages of the videos and the cost it incurred for the equipment; the findings of the research were utilized in developing a users' guide on the use VSM response to the need for an up to date and advanced intervention to enhance the social skills of CWA.

Based from the findings and conclusions of the study, the following are recommended: (a) additional interventions and activities supporting VSM like Pictorial Self-management or Social Stories addressing the CWA social skill impairments must be included on their Individualized Education Plan and other programs in the school since unmodified social skill impairments of CWA may impose a greater risk for their holistic development; (b) implementation and development of VSM are recommended for teaching desirable social skills since VSM is a result-oriented intervention in both home and school settings; (c) integration of supplementary interventions to yield more substantial changes along with the use of VSM; improvement of time-efficient and cost-efficient procedures to record, edit, and view the VSM videos must be developed to lessen the difficulties in

implementing the VSM; (d) and the conduct parallel studies on the use of VSM intervention in teaching self-help skills, fine motor skills or gross motor skills to CWA to assess the effectivity of the intervention in other impaired learning areas of the CWA.

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***A Priming Experiment on the Effects of Grading and Autonomy-support on Motivation***

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**Abstract**

Using a survey-based priming experiment, we explored the psychological effects of letter grades (ie. A, B, C to F) and autonomy-supportive teaching practices (i.e. practices that nurture inner motivations to learn by welcoming student thoughts, feelings and actions). Psychological research suggests that extrinsic motivators such as letter grades can thwart autonomous academic motivation and increase non-autonomous academic motivation. In contrast, empirical research in Self-Determination Theory suggests that autonomy-supportive teachers can enhance autonomous academic motivation and reduce non-autonomous academic motivation. We hypothesized that priming autonomy-support would buffer the adverse effect of grades on autonomous academic motivation. We randomly sorted 392 participants at three universities into three different study conditions ('no prime', 'grade-prime', 'grade + autonomy-support prime'). In the grade-prime, students were asked questions about their grade point averages whereas in the grade + autonomy-support prime, students were primed to think about autonomy-supportive teachers in addition to the grade-prime. Contrary to our predictions, priming students to think about grades had no effect on autonomous or controlled academic motivation. Furthermore, at one of the universities, priming students to think about autonomy-supportive teachers *increased* controlled academic motivation. The results of this study suggest that in some contexts, enhancing the salience of autonomy-supportive pedagogical techniques used by teachers can inadvertently create additional extrinsic pressures on students. The results of this study point to the need to conduct more multi-institutional research on academic motivation to enhance understanding of the wide array of pedagogical factors that may affect student's motivation.

Keywords: Evaluation, Self-Determination Theory, Assessment, Crowding-out, Psychology

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## **Introduction**

### **Autonomy-supportive teaching**

Self-Determination Theory, an empirically supported theory on motivation, differentiates between two different types of teaching practices. The first, autonomy-supportive teaching practices, nurture and support the inner motivations of students by welcoming student feelings, thoughts and actions, accepting negative feelings, using informational language, providing explanatory rationale for assignments or activities and providing meaningful choices. In contrast, controlling teaching practices use pressure to coerce students to think, feel or behave in particular ways by overemphasizing extrinsic rewards, failing to provide explanatory rationales and using controlling language (e.g. “You must do X, or else Y”) (Reeve, Bolt, & Cai, 1999; Reeve et al., 2014; Roth, Assor, Kanat-Maymon, & Kaplan, 2007).

Autonomy-supportive teaching practices lead to better student learning and well-being outcomes (Furtak & Kunter, 2012; Reeve et al., 1999) because they support three basic psychological needs: autonomy (sense of choice about what to do, think or feel), competence (sense of self-efficacy and ability to carry out tasks effectively) and relatedness (sense of connection and care to other people) (Ryan & Deci, 2000, 2017). Supporting these basic psychological needs also helps to enhance autonomous forms of academic motivation such as studying for the pleasure of learning or studying to attain personally endorsed meaningful goals. In contrast, controlling teaching methods thwart these basic psychological needs and enhance non- autonomous forms of academic motivation such as studying to get a high-paying job or studying only to satisfy parental expectations (Deci, Vallerand, Pelletier, & Ryan, 1991; Ratelle, Guay, Vallerand, Larose, & Senecal, 2007; Vallerand et al., 1992).

Beyond differences in individual teaching styles, that have been explored primarily in school classrooms, autonomy-supportive teaching practices and academic motivation may also vary broadly across different institutions. For undergraduate students, different universities may vary substantially in pedagogical methods, class sizes, and student demographics, which could influence autonomy-supportive teaching practices and academic motivation (Yasué, Jenó, & Langdon, 2019). Yet, few studies have explored autonomy-supportive teaching methods and academic motivation across different universities (Chamberlin, Yasué, & Chiang, 2018; Yasué et al., 2019).

### **Letter grades**

One key difference between institutions that could influence both autonomy-supportive teaching practices and academic motivation amongst students is the method used to evaluate student performance (Rohe et al., 2006; White & Fantone, 2010). While most universities provide some kind of letter grade, a small number of universities or programs do not provide letter grades (eg. Bennington College, Evergreen State College, Prescott College). There are varying perspectives on whether letter grades support or thwart basic psychological needs and autonomous academic motivation. Some suggest that grades can thwart basic psychological needs by making salient social comparison and external forms of motivation (i.e. rewards and punishments), “crowding-out” or undermining autonomous motivation and adversely affecting relationships with teachers and peers (Deci, Koestner, & Ryan,

2001; Pulfrey, Darnon, & Butera, 2013). Conversely, others suggest that grades can “crowd-in” autonomous forms of motivation by supporting feelings of competence (Cameron, Banko, & Pierce, 2001). These conflicting studies illustrate that how grades affect autonomous academic motivation may largely depend on the social and interpersonal context (Deci, Koestner, & Ryan, 1999; Festré & Garrouste, 2014).

### **This study**

In this study we conducted a survey-based priming experiment to explore the effects of grades and perceived autonomy-support on autonomous and controlled academic motivation at three universities in the Pacific Northwest.

We randomly sorted survey participants into three groups. The first group did not receive a prime (henceforth referred to as “no-prime” group). The second group was primed to think about grades in a controlling manner with items such as “How do you think your grade point average (GPA) compares to other student at your university?” and “Do you feel your current GPA is adequate for admission to graduate school?” (henceforth referred to as “grade-prime” group). The third group, “grade + autonomy-support prime”, received both the grade-prime as well as an additional prime in which students were primed to consider how autonomy-supportive their teachers are. The autonomy-support prime contained 14 items that measure the level of autonomy-support students feel from their instructors with items such as “I feel understood by my instructor” and “My instructor answers my questions fully and carefully” (Black & Deci, 2000). After the priming questions, each participant completed two measures of academic motivation: the Academic Motivation Scale (Vallerand et al., 1992) and the Learning Self-Regulation Questionnaire (Black & Deci, 2000).

Because past research has suggested that autonomy-supportive teaching practices tend to moderate the adverse impacts of grades on autonomous motivation (Dobrow, Smith, & Posner, 2011), we hypothesized that priming students with autonomy-supportive teaching practices would buffer the impact of priming students to think about their grades. Specifically, we hypothesized that “grade-prime” participants would report lower autonomous forms of motivation and higher non-autonomous motivation compared to the “no-prime” group but that students who received the “grade + autonomy-support prime” would have higher autonomous motivation and lower non-autonomous motivation than students in the “grade-prime” group.

In order to understand how various contextual factors could influence the effect of these primes, we conducted this experiment at three universities that differed in both their pedagogical context and grading practices (Table 1). One university only provided narrative evaluations and no grades (henceforth referred to as “Narrative”), another university provided grades or narrative evaluations (henceforth “Hybrid”) and a third university that provided only normative letter grades (“Grades”). End of course narrative evaluations provide written feedback of assessment tasks and also provide personalized comments with respect to growth in skills or attitudes throughout the course (Chamberlin et al., 2018). Both Narrative and Hybrid are small, primarily undergraduate liberal arts and science universities with less than 5 degrees that tend to attain high scores on the National Survey of Student Engagement (NSSE) in terms of effective teaching practices and supportive environments whereas “Grades” is a large, comprehensive university with more than 25 undergraduate and graduate programs.

	Narrative	Hybrid	Grades
Sample pop.	184	116	101
Student pop.	<5000	<1000	>30,000
Avg. class size	25	16	63
Admission requirement	No min. high-school GPA requirements, SAT considered	No min. high-school GPA requirements No min. requirement	Min. High-school GPA of 70% Other requirements vary by program
Evaluation method	Narrative assessment	Letter grades (20 to 29 of 32 courses)	Grades only
NSSE 'effective teaching practices'*	>85	>85	<25
NSSE 'supportive environment'*	>85	>85	<50

Table 1: Demographic and enrollment information for the three universities in 2016. Information was taken from publicly published data, registrar offices and directors of institutional research. \*(Hutchins, 2015). The percentiles were calculated relative to 66 Canadian higher-education institutions that provided their National Survey on Student Engagement (NSSE) scores to Maclean's Magazine.

## Conclusions

For autonomous motivation, there was no statistically significant difference between the three priming conditions at each of the three universities (Table 2). However, for non-autonomous motivation, there was a statistically significant interaction term between condition and university (Table 2, Figure 1). When we ran the analyses separately for each university in order to better understand the meaning of the interaction term, we found that condition had no effect on non-autonomous motivation for both Narrative ( $F = 0.05$ ,  $P = 0.95$ ) and Grades ( $F = 1.5$ ,  $P = 0.22$ ), but condition had a statistically significant effect at Hybrid ( $F = 8.15$ ,  $P = 0.0005$ ,  $\eta^2 = 0.13$ ). At Hybrid, post-hoc analyses suggested that there were statistically significant differences between no-prime and the grade + autonomy-support prime ( $t = -2.7$ ,  $P = 0.023$ ) and between grade-prime and the grade + autonomy-support prime ( $t = 3.97$ ,  $P = 0.0004$ ) but no difference between no-prime and the grade-prime ( $t = 1.1$ ,  $P = 0.52$ , Figure 1).

The students from the two teaching-focused primarily undergraduate universities with high scores on the NSSE, also indicated higher levels of autonomy support as compared to the larger comprehensive university with only letter grades. Post-hoc analyses suggested that participants at Narrative and Hybrid indicated similar levels of autonomy-support (Figure 2).

Variable	DF	Sum of Squares	F Ratio	Prob > F	Eta squared
<b>DEPENDENT VAR = AM</b>					
Age	1	1.8	2.1	0.15	0.005
University	2	30.6	18.3	<0.001	0.003
Condition	2	0.85	0.50	0.60	0.085
<b>DEPENDENT VAR = NAM</b>					
Age	1	0.75	0.89	0.34	0.002
University	2	4.5	4.5	0.012	0.0001
Condition	2	0.05	0.03	0.96	0.021
University x Condition	4	11.75	3.51	0.0078	0.033

Table 2. Results of priming experiments on the effects of age, university and priming condition

No-prime, grade-prime, grade and autonomy-support-prime on academic motivation.  
 AM = Autonomous motivation and NAM = Non-autonomous motivation

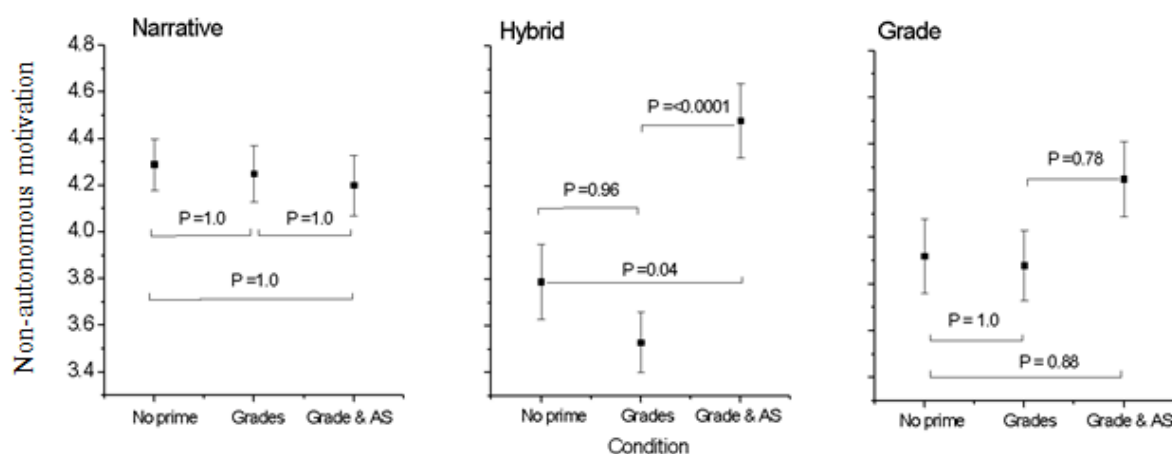


Figure 1. The effect of university and priming on non-autonomous motivation at three universities (left to right)

P-values are calculated from t-scores of post-hoc Tukey's tests. Grades = grade-prime. AS = Autonomy-support prime.

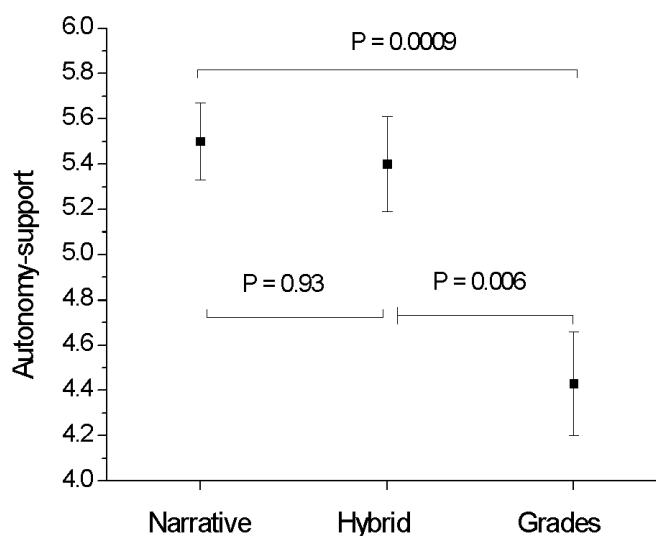


Figure 2. The differences in autonomy-support between the three universities  
As only a subset of the participants filled out the autonomy-support items sample sizes were as follows for Narrative (N = 51), Hybrid (N = 36) and Grades (N = 32).

The results of this study suggested that the grade prime had no impact on academic motivation for students at any of the three universities. These results contrast with studies that suggested that grades can “crowd-out” autonomous motivation (Pulfrey, Buchs, & Butera, 2011; Pulfrey et al., 2013). Although the grade-prime was designed to enhance extrinsic pressure, social comparison and normative evaluation, it may have failed to affect self-esteem contingencies. Past research that successfully used primes to affect behaviour or goals, linked task performance with valued traits such as IQ in order to affect self-esteem contingencies (Harackiewicz & Elliot, 1993; Rawsthorne & Elliot, 1999). Furthermore, especially given the small sample sizes, there may have been too much unaccounted variation to detect a significant priming effect. In contrast to experimental studies that demonstrated adverse impacts on academic motivation to carry out a particular task after grade-priming (Pulfrey et al., 2011), we examined how the grade-prime affected the student’s more generalized academic motivation (e.g. to attend university). Such motivations may be affected by a wider range of factors that we did not account for in this study (e.g. relationship with current teachers, past experiences in schools, values of parents, socioeconomic status, self-efficacy beliefs) (Dweck, 2006; Lam, Ruzek, Schenke, Conley, & Karabenick, 2015).

Contrary to our expectation, priming students to think about autonomy-supportive teachers had no positive effect on autonomous motivation and actually increased non-autonomous motivation at Hybrid despite the fact that participants at Hybrid indicated high levels of autonomy-support at Hybrid. This result suggests that students in some pedagogical contexts could be affected by external social pressures arising from thinking about an autonomy-supportive teacher. This unexpected result and especially the large effect size (even larger than the effect of differences between universities) could have been influenced by the specific educational context at Hybrid (eg. small class sizes, small university, project-based learning and collaborative



learning). Past research has suggested that students at Hybrid also cared deeply about their relationship to their peers and teachers irrespective of grades (Chamberlin et al. 2018). Social norms and trusted peers can influence attitudes and behaviours (Cialdini & Goldstein, 2004; Ham, Jeger, & Ivković, 2015; Jones, Andriamarovololona, & Hockley, 2008) relating to learning (Bartram, 2006; A. M. Ryan, 2000), however little research has focused on how interpersonal pressures can influence adult undergraduate students. The psychological impacts of interpersonal pressures from teachers or peers may be an important direction for future research at other universities with small class sizes or perhaps more interdependent cultures (Hitokoto & Uchida, 2015; Uchida, Kitayama, Mesquita, Reyes, & Morling, 2008) where relationships with other people could play a greater role in influencing academic motivation. This research is important to advance Self-Determination Theory because interpersonal “pressures” in the classroom could simultaneously enhance relatedness while also thwarting autonomy.

Given the wide-array of educational undergraduate environments and pedagogical approaches, our research points to the need to better understand academic motivation and extrinsic pressures influencing academic motivation in these different contexts (Lam et al., 2015; Urdan & Schoenfelder, 2006). Such research may help educators devise pedagogical practices that are suited to local contexts and effective in increasing autonomous academic motivation.

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***The Role of Lectures and Factors Affecting Individual Working Competency of Students at Thai Nguyen University, Viet Nam through Mathematical Modeling Process***

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**Abstract**

For university training, all teaching processes aim at developing and perfecting occupational competencies for learners. In the study of teaching mathematics at Thai Nguyen University, Vietnam, we consider mathematical modeling as a way to help students solve problems mathematically. Accordingly, the main role of teachers in these situations mostly include: to build learning environment, conduct research and practice, introduce methods and guarantee accurate content of mathematical theory. Through the process of implementing mathematical modeling, independent working competency of students is influenced by two basic factors named psychological factors and individual competency factors. The research results show that the main psychological factors include attitudes, motives and willpower while individual competency factors include the competence to recognize occupational situations, the competence to switch between the practice and mathematics, the competence to use supportive technology in the process of working with mathematical models and randomly opening data sets and critical thinking.

Keywords: Independent working competency, mathematical modeling, the role of lecturers

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## **Introduction**

Economic development entails structural changes and capacity requirements for workers. Students at higher education institutions, primarily and qualified human resources, always need to equip themselves with new skills and knowledge as this is very important for them to meet the current occupational situations (Dam, 2004), (Forrier, 2003). Therefore, education and training with the goal of developing competencies and meeting occupational requirements will be a fundamental element of students' career awareness (Berntson, Sverke, & Marklund, 2006). Moreover, in higher education, all teaching methods are aimed at helping learners to participate in social life as an independent and responsible citizen (Aebli, 1985), (Blum, 2015).

Mathematical modeling can be used in teaching processes at many levels and in many parts of the world. For undergraduate level, mathematical modeling has connected mathematics with almost all fields: science, computer science, engineering, economics, medicine and pharmacy, etc. Hence, mathematical modeling process is supposed to be taught in open situations, researches, analysis, and prediction of issues which will be appropriate for students' level and apprenticeship (Caldwell & Ng, 2004), (Galbraith, Henn, & Niss, 2007), (Kaiser, Blum, Ferri, & Stillman, 2011). When participating in the mathematical modeling process, the basic goal is to activate learners' cognition, then stimulate to carry out their own activities. However, it is important to keep a balance between the independent work of learners and the guidance of instructors in this teaching methodology.

Thai Nguyen University aims to be a center for training high-quality human resources for the midland and mountainous areas of Northern Vietnam and across the country. In this study, we consider the independent working capacity of Thai Nguyen University students under the impact of relevant factors considered in the implementation of the mathematical modeling.

## **Literature Review**

### **Mathematical Modeling Process**

Mathematical modeling process is a process of building a conversional model between practice and mathematics (Pollak, 1979), (Blum, 1988), (Schichl, 2004). There are plenty of ways to represent a modeling cycle of mathematical modeling process and to describe that cycle taking place in different stages but all start from a practical situation/ problem, come to the result-generation phase (building model - understanding in reality) and continue the cycle if the conclusions are inconsistent with reality (John Berry, 1995), (Coulange, 1997), (Peter Galbraith, 2006) (Greefrath, 2011).

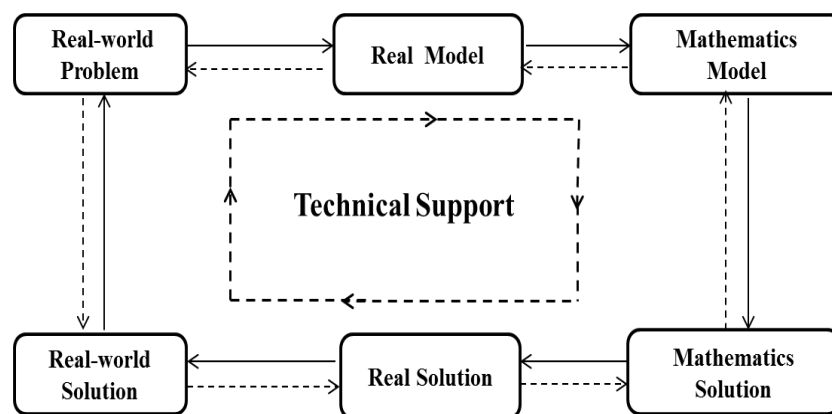


Figure 1. Mathematical modeling process supported by Information Technology

The Blum's mathematical modeling process is considered to be the basis for most mathematical modeling activities because it shows all three factors: the application of mathematics, linguistics and cognitive psychology (Blum, 2015). However, the process of mathematical modeling continues to be extended to one more field, the technological environment. When implementing the mathematical modeling, it is realized that there are many ways of solving problems through built models, and the use of mathematical techniques and tools is also different. Except for simple models which do not need much information technology (IT) support, IT is of great help for all other more complicated models (Borba & Villarreal, 2005), (Henn, 2007), (Geiger, 2011), (Greefrath, Siller, & Weitendorf, 2011), (Ang, 2010). IT support tools can be used for experiments, surveys, simulations, visualization or calculations. Therefore, it is no longer difficult to find ways to process data and calculate large data with the help of IT, the implementers of mathematical modeling will focus on finding optimal solutions to the problem.

For a growing and ever-changing data set, mathematical modeling process also begins to focus on the existence of reflection, meaning that in any step of the mathematical modeling process, it is important to review, test and be able to revert to implementation, if necessary (Galbraith, Stillman, Brown, & Edwards, 2007). In a modeling cycle, there can be many different representations and solutions but they will be sorted, selected or integrated. These representations are then analyzed, interpreted and tested so that they can be adjusted, modified or removed from use in the next steps of the mathematical modeling cycle (Kang & Noh, 2012), (Lesh & Doerr, 2003).

The teaching method at a university attaches great importance to promote learners' self-study and research as well as effectively mobilize the role of modern teaching facilities, techniques and technologies. Meanwhile, lecturers at a university are mainly high-level scientists and specialists who are attached to scientific researches. Therefore, the main task of teachers is to create a learning environment and conditions for learners to have opportunities to learn in a positive and creative way. The teacher's role must move from a catalytic and coordinating one to learner guiding and learner-centered function in the teaching process. In the new era, the value of lecturers is not only to convey knowledge but also to guide and support students in self-direction in learning, and they also need to help students adjust the orientation of

quality and the meaning of information sources (Su & Wood, 2012). The foundation of teachers at the university level is the level of scientists combined with teaching competence (Đúc, 2010), (Trang, 2018).

Consequently, when participating in the mathematical modeling process, students need to have specific competencies corresponding to each step or each stage of implementing a cycle. Lecturers at university level play a supporting, helping and guiding role for students to implement the process in order to develop the required competencies of the individual.

The effectiveness of teaching and learning process requires adequate facilities. This element is an essential component in ensuring successful education. The availability and use of school facilities has an important impact on student learning outcomes and development (Saeed & Wain, 2011), (Oliver, 2002), (Snipes & Thomson, 1999). External manifestations of facilities include classrooms, teaching equipment, learning materials, etc.

### **Independent Working Competency**

Competency is a set of characteristics or qualities of individual psychology, acting as an internal condition to facilitate the implementation of a certain type of activity. Competency is perceived to be related to the attitudes, motivations, and abilities that an individual meets the requirements of certain activities/ jobs in different situations, while at the same time guaranteeing the operation or the performance of working optimal (Burgoyne, 1989), (Greefrath & Vorhölter, 2016). Competency is individual characteristics, so there is a difference between the competencies of each person, expressed in actions and towards the working efficiency (Boyatzis, 1982), (Hoffmann, 1999), (Brophy & Kiely, 2002).

According to the assessment of students and employers, they all consider the ability to work independently and how to cope with the working pressure which is one of the important competencies to get a job and achieve results in working process (Robinson & Garton, 2008), (Rauner & Maclean, 2008), (Murray & Robinson, 2001), (Duoc & Metzger, 2007). Competency is both a premise and a result of activity. Competency is not only a condition for the activity to achieve results but also it develops within the activity itself.

Independent working competency also expresses through independent thinking and learning. Therefore, the ability to work independently can be considered in terms of readiness, motivation, activity participation and assessments (Tait & Knight, 1996). This competency represents the ability to set goals for working, clear planning, collect information, prepare resources, implement working and report, assess results independently and efficiently (Knowles, 1986). It includes some components:

(i) Ability to know what needs to be done and targets need to be achieved. This means that students can determine when they do their jobs, what their working goals are, what their results will be, how they do it.



(ii) Ability to divide specific tasks and managing time. When students have identified what they need to do, then divide their jobs in the most efficient way and start evaluating the performance level.

(iii) Ability to pursue working objectives when students have set goals in working, they must always stick to their goals to develop themselves.

In the mathematical modeling process, the working competency identical to the mathematical modeling competency of each individual represents the ability of thinking and implementation of the processes. The mathematical modeling competency does not have a particular structure, it consists of many factors, obtained from cognitive psychology, different types of thinking to transition from reality to mathematics and vice versa (Galbraith, Henn, & Niss, 2007), (Özdemir & Üzel, 2012), (Maaß, 2006), (Lesh, Galbraith, Haines, & Hurford, 2013). In the meantime, the willingness to participate in the mathematical modeling process corresponds with an individual's ability to build a model, interprets between the real world and the mathematical world, use supporting tools and work on the mathematical model, have accurate evaluation and reflection of that model in order to have suitable adjustment. That is, students can perform step by step following a cycle of the mathematical modelling process. As a result, the independent working competency of the mathematical modeling process is a synthesis of knowledge, skills, attitudes and willingness to effectively participate in the resolution of the initial issue.

Therefore, in the mathematical modeling process, it is necessary to identify factors that affect the evaluation of students' independent working competency. According to the analysis, the research team divides the competency into two factors: the individual psychological component towards the desire to address the issue, and the element of each individual to achieve the stages of mathematical modeling cycle to solve the problem (individual competency). The research model is suggested in figure 2.

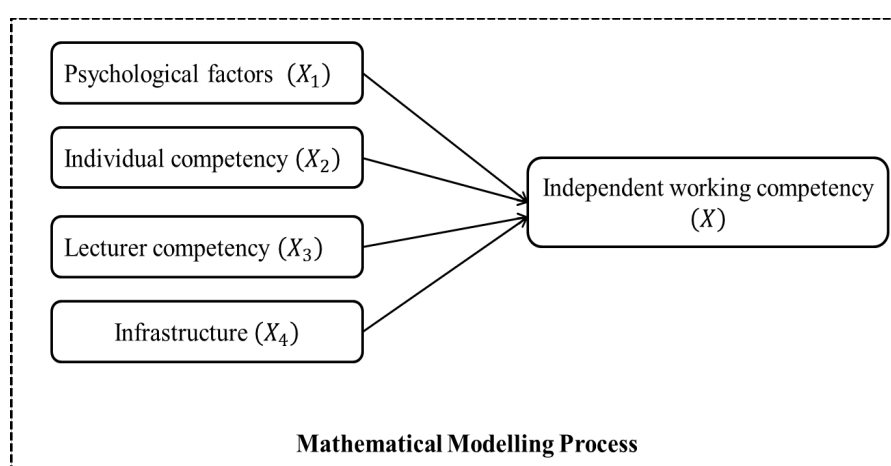


Figure 2. Proposed research model

## Research Methods

The study is conducted through 2 steps:

*Step 1:* Qualitative research by building and developing the concept system/ scale and observed variables and adjusting observed variables in accordance with reality.

*Step 2:* Quantitative research, using Cronbach's Alpha reliability coefficient to test how closely items in the scale correlate; exploratory factor analysis (EFA) is used to test influencing factors and identify the factors appropriate; at the same time, using multivariate linear regression analysis to determine the factors and the impact of each factor on the independent working competency of students of Thai Nguyen University through the process of learning.

Research theoretical model of independent working competency of students including 4 groups of impact factors:

Psychological factor ( $X_1$ ): measured by four observed variables from  $x_1$  to  $x_5$  (see Table 1).

Individual competency factor ( $X_2$ ): measured by five observed variables from  $x_6$  to  $x_{10}$  (see Table 1).

Lecturer competency factor ( $X_3$ ): measured by four observed variables from  $x_{11}$  to  $x_{14}$  (see Table 1).

Infrastructure factor ( $X_4$ ): measured by three observed variables from  $x_{15}$  to  $x_{17}$  (see Table 1).

In this study, the research team used the Likert scale to score from 1 to 5 to measure observed variables.

Table 1. Variables in the model

$x_1$ Attitude	$x_{10}$ Decision making competency
$x_2$ Demand/ Motivation	$x_{11}$ Building learning environment
$x_3$ Volition/ Action	$x_{12}$ Research and practice
$x_4$ Cognition	$x_{13}$ Introducing learning methods
$x_5$ Personality	$x_{14}$ Accurate the contents of mathematical theory
$x_6$ Competency to identify situations	$x_{15}$ System of lecture halls and classrooms
$x_7$ Competency to convert between reality and mathematics	$x_{16}$ System of teaching facilities and technical equipment
$x_8$ Competency to use supportive technology	$x_{17}$ System of teaching methodology
$x_9$ Critical thinking	

Since then, the model of independent working competency of Thai Nguyen University (TNU) students through the mathematical modeling process is established as follows:

Independent working competency of students  $X = f(X_1, X_2, X_3, X_4)$ ;  
 where  $X$  is a dependent variable and  $X_1, X_2, X_3, X_4$  are independent variables.

The research team conducted a survey of students in the second year (students who have studied the mathematics course), the total number of students of 7 member universities under TNU is  $N = 4900$  students with the following allocation

Name of University	Number of students
Thai Nguyen University of Information and Communication Technology	900
Thai Nguyen University of Technology	1400
Thai Nguyen University of Sciences	200
Thai Nguyen University of Economics and Business Administration	1200
Thai Nguyen University of Agriculture and Forestry	500
Thai Nguyen University of Education and Training	200
Thai Nguyen University of Medicine and Pharmacy	500
	<b>4900</b>

After processing the data, the team removed the invalid votes, the remaining sample was 4792 students.

### Research Results

The research team used SPSS 20.0 software to support the analysis; the results of implementing the research model are as follows:

First, we used Cronbach's Alpha model to test the reliability of the scale for measuring independent working competency of TNU students through the process of mathematical modelling with 17 observed variables of 4 factors. After three discovering factors analysis, in terms of variables - total correlation, all 5 variables were excluded from the model because of a value less than 0.3. The five variables are  $x_1, x_4, x_5, x_{10}, x_{15}$ . The remaining 12 measurement variables used in exploratory factor analysis (EFA), with Cronbach's Alpha coefficient reaching 0.723; proving that this measurement scale is usable. The results of exploratory factor analysis (EFA) after three tests are guaranteed as follows:

- Reliability of observed variables (factor loading  $> 0.5$ ).
- Testing the suitability of the model ( $0.5 < KMO = 0.723 < 1$ ).
- Barlett's test of correlation of observed variables (Sig  $< 0.05$ ).
- Test of cumulative variance = 65.272% (cumulative variance  $> 50\%$ ).

Table 2. Rotational component matrix

	Component		
	1	2	3
$x_1$	.861		
$x_2$	.789		
$x_3$	.772		
$x_6$		.834	
$x_7$		.806	
$x_8$		.762	
$x_9$		.701	
$x_{11}$			.821
$x_{12}$			.796
$x_{13}$			.857
$x_{14}$			.871
$x_{16}$			.702

Source: Results of exploratory factor analysis from survey data

According to the rotational component matrix, we have factor loading of variables in Table 2 which are greater than 0.5. Three factors are as follows:

- Factor 1 includes observed variables  $x_1, x_2, x_3$  named "*Psychology*".
- Factor 2 includes observed variables  $x_6, x_7, x_8, x_9$  named "*Individual competency*".
- Factor 3 includes observed variables  $x_{11}, x_{12}, x_{13}, x_{14}, x_{16}$  named "*Teachers' role*".

Based on the results of great value coefficients in the above table of component score matrix, we provide the following factor equation:

Factor 1, the factor "*Psychological factor*" are mostly affected by three observed variables  $x_1$  (Attitude),  $x_2$  (Demand/ Motivation),  $x_3$  (Volition/ Action). These factors all have a positive impact on factor 1, of which the "demand/ motivation" factor has the strongest impact on the "*psychological*" factor.

$$X_1 = 0.358x_1 + 0.479x_2 + 0.462x_3.$$

Factor 2, factor "*Individual competency*" are largely affected by four observed variables  $x_6$  (competency to identify the situation);  $x_7$  (competency to convert between practicality and mathematics),  $x_8$  (competency to use supportive technology),  $x_9$  (critical thinking). These factors all have a positive impact on factor 2, in which the "competency to convert between reality and mathematics" has the strongest impact on the "*Individual competency*" factor.

$$X_2 = 0.368x_6 + 0.473x_7 + 0.45x_8 + 0.302x_9.$$

Factor 3, the factor "*Lecturer competency*" are largely influenced by the five observed variables  $x_{11}$  (Building learning environment),  $x_{12}$  (Research and practice),  $x_{13}$  (Introducing learning methods),  $x_{14}$  (Accurate contents of mathematical theory),  $x_{16}$  (System of teaching facilities and technical equipment). These factors all have a

positive impact on factor 3, in which the "Accurate contents of mathematical theory" has the strongest impact on the "Lecturer competency" factor.

$$X_3 = 0.405x_{11} + 0.316x_{12} + 0.352x_{13} + 0.464x_{14} + 0.421x_{16}$$

Table 3. Component score matrix

	Component		
	1	2	3
$x_1$	.358	-.082	-.016
$x_2$	.479	-.132	-.127
$x_3$	.462	-.068	-.082
$x_6$	-.116	.368	-.126
$x_7$	-.039	.473	-.098
$x_8$	-.051	.450	-.077
$x_9$	-.158	.302	-.074
$x_{11}$	-.018	-.039	.405
$x_{12}$	-.057	-.065	.316
$x_{13}$	-.024	-.073	.352
$x_{14}$	-.011	-.029	.464
$x_{16}$	-.053	-.061	.421

Source: Results of exploratory factor analysis from survey data

Table 4. Results of linear regression analysis

Model	Unstandardized Coefficients	Standardized Coefficients	Sig.	VIF
	B	Beta		
(Constant)	1,709	-	,001	
$X_1$	,302	,528	,000	3,769
$X_2$	,389	,607	,000	2,124
$X_3$	,247	,478	,000	1,359
Sig.			0,000	
Adjusted R Square			0,609	

Source: Results of linear regression analysis from survey data

The regression analysis results in Table 4 show that the  $R^2$  coefficient is 60.9%, which means that 60.9% of the variation of the independent working capacity of Thai Nguyen University students can be explained by the factors included in the model; other affecting factors have not been studied. The coefficient Sig.F = 0.000 is much smaller than the significance level of  $\alpha = 5\%$  so the regression model makes sense, meaning that the independent variables influence the dependent variable X. Besides, the variance inflation factor (VIF) of the variables in the model is much smaller than 10, so we can conclude that the variables included in the model do not have multi-collinear phenomena. The above analysis results show that all 3 variables included in the model have statistical significance Sig. < 5%. From the above results, the regression equation estimated the factors affecting independent working competency of students of TNU through the process of mathematical representation set as follows:

$$X = 1.709 + 0.302X_1 + 0.389X_2 + 0.247X_3.$$

Based on the regression equation, the three variables included in the model are positively correlated with the independent working capacity of TNU students through the process of learning. In which the factor "*Independent working competency*" is the most influential factor (the non - standard correlation coefficient is 0.389), then the factor "*Psychological factors*" (corresponding to the coefficient) the non - standardized correlation is 0.302), the last is the "*Teachers' role*" factor corresponding to the non - standardized correlation coefficient of 0.247).

The linear regression model using OSL method is done with a number of assumptions and the model only really makes sense when these assumptions are guaranteed. Therefore, to ensure the reliability of the model, the research team also conducted the detection of violations of necessary assumptions.

The first assumption is the linear contact assumption. The method used is a Scatterplot scatter chart with normalized residual values on the vertical axis and normalized predicted values on the horizontal axis. Looking at Figure 3, we see that the remainder does not change in any order for the predicted value. Thus, the hypothesis of linear relation is not violated.

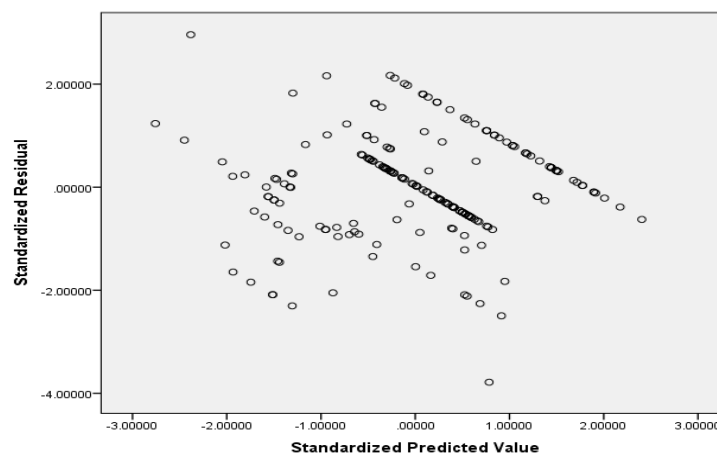


Figure 3. Random distribution graph of a standardized residual  
*Source: Data processing results of the author*

To detect the violation of the normal distribution assumption of residuals, we used two drawing tools of SPSS software: Histogram and Q-Q plot. Looking at the Histogram (Figure 4), we see that the remainder has a normal distribution with an average of almost 0 and its standard deviation is close to 1 (= 0.97034).

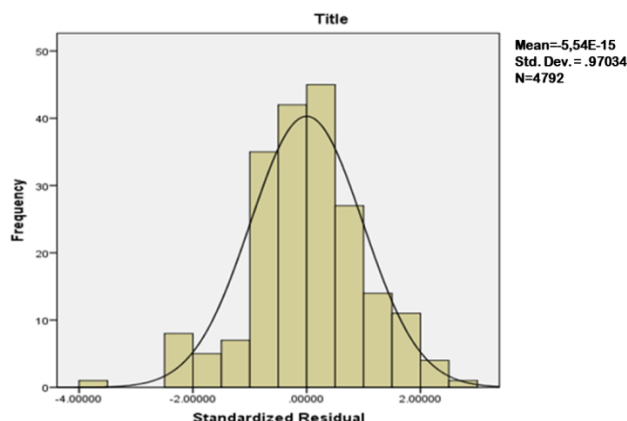


Figure 4. Frequency chart of standardized residuals  
*Source: Data processing results of the author*

Looking at the Q-Q plot (Figure 5) shows the actual observation points that are fairly close to the diagonal of the expected values, meaning that the residual data has a normal distribution.

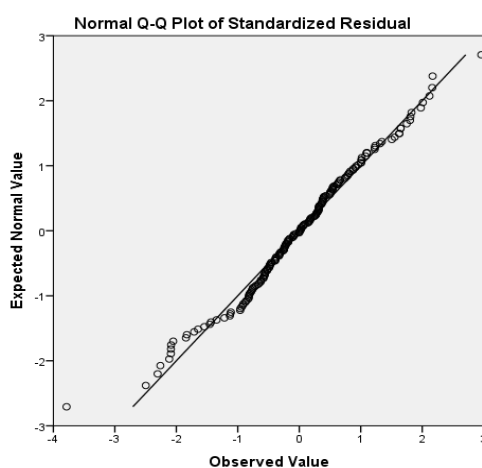


Figure 5. Comparison graph with normal distribution (p-p) of standardized residual  
*Source: Data processing results of the author*

## Discussion and Conclusion

Through the mathematical modelling process, some competencies of students are formed, adjusted and developed. According to the above analysis results, in the mathematical modelling process, the independent working competency of students at TNU depends on both external and internal factors. External factors relate to creating a relationship between lecturers and students (Su & Wood, 2012), and at the same time, building a learning environment with the provision and guidance of students with IT competency is an important factor. However, external factors only serve as a premise for the development of the independent working competency of each individual. It is important to distinguish between students working independently and the support of lecturers and students working alone (Blum, 2015).

The internal element is the capacity and psychology that individual students are affected. Competency requires the right attitude, motivation and experience to develop more deeply (Sydänmaanlakka, 2007). Therefore, psychological factors that affect students' ability to work independently are shown under three observed variables: Attitude, Demand/ Motivation, Volition/ Action. An individual's level of competency increases in the direction of being able to work or work independently (Fernando, 2004). Individual competency is not only the knowledge but also the ability to apply the knowledge gained in practice. Unsurprisingly, the use of technology as an effective assistive tools always prevails in the classroom at an increasingly advanced level (Beare, 1996), (Cheng & Wah, 1999), (Ferrucci & Carter, 2003).

In this study, the given model was only tested on the sample of TNU students. Therefore, it is possible that the model is appropriate in this case and the factors that give the test have an impact on the student's ability to work independently. For other research samples, the model may change and may not even retain the linear relationship among the proposed factors. The nature of higher education is the development of career competencies. All teaching methods should be student-centered. The impact of which factors, more or less on each competency that the teaching objectives specified, depends on the individual who participated in the study, corresponding to certain teaching method, given time and specific circumstances. Therefore, the proposed research model can be tested for different cases.



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***OP Observer: A Class Observation Tool for Measuring the Effectiveness of Teaching Practice***

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**Abstract**

The aim of this paper is to present an evaluation of the effectiveness of a class observation tool in measuring learner-centred practice at a New Zealand tertiary institution. This research arose from an awareness that many lecturers are still mainly providing teacher-centred classes, which have been proven to be less effective and engaging for the students' learning process. We believe that making this measurement tool more efficient will help capture more information that is beneficial for lecturers' reflective practice and will overall bring about a higher quality tertiary education for students. We designed this project in collaboration with a group of IT students and their lecturer at Otago Polytechnic, Auckland International Campus, New Zealand. We initially conducted class observations on a paper-based tool to identify teacher-centred and learner-centred activities used by lecturers. This was later turned into a Web-based class observation tool for more efficiency. We conducted 25 observations and the results were then discussed with the respective lecturers to involve them in a reflective session on the effectiveness of their teaching practice. Our experience with this tool helped to further create a mobile phone application (app), to make it more user-friendly. We believe that the function of this observation tool could be further extended/customised to also measure other aspects of teaching practice.

Keywords: Web-based class observation tool, effectiveness of teaching practice, learner-centred practice, reflective practice.

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## **Introduction and background**

### **The importance of learner-centred practice for better quality teaching**

The concept of learning and teaching has undergone many changes across time and, more recently, there is an increasing focus on learner-centred practice. There has consequently been a change in the role of the teacher as well, with a learner-centred classroom favouring the teacher as ‘facilitator’, rather than the more classic ‘instructor’. However, many teachers, especially in the tertiary education sector, still seem to prefer teacher-centred classes and the conveyance of their material to students through the classic ‘lecturing’ technique.

There have been different ideas to what could constitute more effective ‘learning’ for students. Moon (2004) draws attention to the difference between ‘learning’ and ‘teaching’, especially when teaching is meant as ‘instructing’. Instead of the classic ‘lecturing’ or ‘instructing’, she suggests ‘facilitating learning’, which she explains as “aiding or mediating learning in order to help the learner to learn more effectively.” (p.12). According to a definition provided by Kitson et al in 1998 (as cited in Harvey et al., 2002), ‘facilitation’ is “a technique by which one person makes things easier for others”.

Moon also suggests a multitude of other activities that could be part of a facilitative learning process, such as brainstorming, syndicate work, games and simulations (Moon, 2004, p.13). Through these activities, a facilitator can gain the more impactful role of ‘enabling’ students and getting them more actively involved in their own learning: “an ‘enabling’ facilitator role is more likely to be developmental in nature, seeking to explore and release the inherent potential of individuals.” (Harvey et al., 2002). The role of teacher as ‘instructor’ seems to be seen as an outdated version within the learning and teaching process. As Osterman (1998) points out, knowledge cannot be acquired in a purely theoretical context where it is passed from teacher to student. For learning to really take place, it requires student engagement and “it is necessary to enable the learner to take an active role in determining the direction and progress of learning” (Osterman, 1998, p.10).

This idea goes hand-in-hand with Osterman’s idea that a teacher should not assume that students do not possess any knowledge prior to joining their classes. Instead he argues that, in order to build new knowledge, the teacher always needs to rely on the previous or existing knowledge of students, or ‘prior learning’ (Osterman, 1998; Boud, 2004). In other words, effective classroom facilitation is about teachers taking a step back and getting the students to participate more actively in classwork, whilst at all times guiding them in the right direction. “[...]the facilitator’s role is concerned with enabling the development of reflective learning by helping to identify learner needs, guide group processes, encourage critical thinking, and assess the achievement of learning goals” (Harvey et al., 2002).

### **The importance of observations on a teacher’s professional development**

A possible cause for teacher-centred classrooms in tertiary education might be based on the idea that a lecturer’s job is to lecture, and not to facilitate. Another more likely cause for this approach could be what Maingay (1988) calls ‘ritual teaching

behaviour', where the teaching becomes routine and the teachers no longer reflect on their teaching methods (p.119). Maingay suggests class observations as a solution for this issue and argues that the observer could play an important role in making the teacher think about their professional practice. Ideally, this would enable teachers to get to what Maingay calls 'principled teaching behaviour' (1988, p.119), which consists of both regular classroom rituals, as well as more informed and conscious practice (teacher awareness of strategies). Referring especially to an ELT (English Language Teaching) context, Bowen and Marks point out that "[c]lassrooms have often been characterized as 'black boxes' because once the door is shut and the lesson starts, no one outside has any idea what goes on inside." (1994, p.7). This is why a class observation can be an effective tool in measuring a teacher's professional development. Malu (2015) argues that there should not be any difference in approaching professional development for the teaching profession compared to other practical fields such as medicine or police, and that teaching can also be improved by having more experienced professionals observing and giving constructive feedback.

The idea of peer observation has been discussed in literature as arguably a less intrusive, more effective way of offering constructive feedback in terms of teaching practice, "to improve quality of teaching" in a "non-threatening" way (Sullivan, Buckle, Nicky, & Atkinson, 2012). Maingay calls this "a rare, but very much to be encouraged situation." (1988, p.121). Observations are often used for teacher assessment, or evaluation purposes (Maingay, 1988, p.120), and can therefore become a daunting experience for the teacher being observed. The potential 'teacher resistance' to professional development in general might be stemming from a classic power relation (manager observing employee/team member). Rehman calls these "top-down models of supervision" and believes observations to be much more effective when the evaluation aspect is taken out of the equation (Rehman, 2018). "When professionalization activities had no summative bearing, the supervisor/supervisee interaction dynamic changed, and the working relation became much more collegial." (Rehman, 2018). Irrespective of the professional field, a well-conducted peer observation process "may be perceived by the teacher as a constructive, developmental adjunct to their teaching, which improves opportunities for student learning." (Sullivan et al., 2012).

Wilson's "team action" supports the idea that self-development could be improved by working with colleagues from the same field, in a less formal context (2001). "Teachers can sit in on each other's classes and use the joint experience of the lesson as the basis for a discussion on teaching and learning." (Wilson, 2001). This idea is further supported by Ahmed, Nordin, Shah and Channa (2018), who believe that no observation can be complete without a 'post observation conference' with the peer observer, with the aim to provide reciprocal constructive feedback and help with professional development. This informal collegial experience could eventually lead to a formal teacher development programme (Wilson, 2001).

### **The importance of observation tools**

The class observation process has been improved by using a number of observation tools developed by different educational institutions. The first generation of class observation tools were paper-based. The observer mapped the classroom environment and the student-teacher interactions on paper. For example, Te Kotahitanga

Observation Tool was used to measure the degree of teacher-student interaction in New Zealand schools (Berryman & Bishop, 2011). This tool was particularly designed to measure teachers' engagement with Maori students, and could gather evidence about the lesson, mapping student and teacher locations, measuring the cognitive level of the lesson, coding teacher-student interactions, identifying cultural visibility in the classroom, measuring the teacher's responsiveness and providing feedback to the teachers. More recently, the paper-based class observation tools have been modernised and digitised into more visual and interactive models.

Celik, Baran and Sert's (2018) recent article about mobile-app observation methods as opposed to other more traditional observation methods is one of the few examples in literature that describes a digital observation tool. VEO (Video Enhanced Observation - 2014) is the mobile application that they used in their experiment to discover if this was a better option than paper-pen and video observation methods, especially when it came to post-observation feedback accuracy (Celik et al., 2018). Used in ELT classes, it consists of a video recording of the lesson being observed, with annotations (tags) on the screen for better recalling of the activities and procedures that were used during the lesson.

Table 1 presents some other examples of class observation tools from literature currently in use.

Name of the observation tool	Digital or paper-based	Description
Peer Observation Evaluation Tool (POET) designed by Trujillo et al. (2008)	Paper-based tool	<p>The POET is a peer assessment tool for assessing teaching and learning in large classrooms. Its key strength is that it allows customisation of the peer assessment processes.</p> <p>Functionalities:</p> <ul style="list-style-type: none"> <li>• Pre-observation recording</li> <li>• Classroom observation recording (teaching strategies and presentation skills recording)</li> <li>• Classroom climate recording</li> <li>• Post-observation meeting recording</li> </ul>
Classroom Assessment Scoring System (CLASS) developed by Robert Pianta at the centre for Advanced Study of Teaching and Learning University of Virginia (2008)	Paper-based tool	<p>CLASS is an observation tool that can assess the effectiveness of interactions between teachers and students in classrooms.</p> <p>Functionalities:</p> <ul style="list-style-type: none"> <li>• Observing the classroom and recording notes</li> <li>• Recording audios and videos</li> <li>• Producing qualitative and quantitative data for analysis and recommendations</li> <li>• Gauging the teacher's effectiveness</li> </ul>



The Narrative Logs introduced by the University of Toronto (2017)	Paper-based tool	<p>Narrative logs record the verbal and non-verbal behaviour in a classroom. They are used to describe what the observer sees and hears rather than the observer's discernment.</p> <p>Functionalities:</p> <ul style="list-style-type: none"> <li>• Records the observer's comments or questions related to what is happening in the classroom</li> <li>• Very useful in guiding the post observation consultation and self-assessment</li> </ul>
The Lesson Observation App and Online Reporting Tool - VUWBO (2018)	Digital tool	<p>VUWBO evaluates the quality of teaching and curriculum implementation. It helps to identify teaching strengths and areas for improvement.</p> <p>Functionalities:</p> <ul style="list-style-type: none"> <li>• Observing classrooms and recording notes</li> <li>• Taking photos to support work scrutiny, discuss classroom layout or student behavioural interaction with the teacher</li> <li>• Creating reports for staff</li> <li>• Monitoring improvement over time</li> </ul>

Table 1: Class observation tools

### Peer observation process with OP Observer

The creation of the OP Observer digital class observation tool at our tertiary institution originated from the necessity to have an easier peer observation process than with our previous paper-based observation tool. Using a digital tool enabled us to better measure teacher performance, in order to give more accurate feedback.

OP Observer captured the learning environment in terms of the different types of learner-centred or teacher-centred activities and the movements of the classroom facilitator every 30 or 60 seconds.

Our peer observation had three stages (as shown in Figure 1):

1. Pre-observation: Lecturers were introduced to learner-centred practice through some reading and videos on Moodle (a short Moodle course). This was followed by an online questionnaire on Moodle. The staff experienced this process by themselves. After submitting the questionnaire, the class observation team (a team of peer lecturers within the institution) followed up with them by organising a professional feedback conversation to clarify any specific issues the staff might have had. During this conversation, staff were also asked to come up with

potential ways of incorporating learner-centred activities into their respective courses.

2. Observation: A class observation using the OP Observer tool. Their class facilitation was observed by a member of the class observation team. They were primarily observed on their application of learner-centred activities. A summary of the class observation results was then emailed to the respective staff.
3. Post-observation: The whole observation process was concluded with a professional feedback conversation between the observer and the respective staff member to create an action plan for continuous improvement in the application of learner-centred practice in their classes.

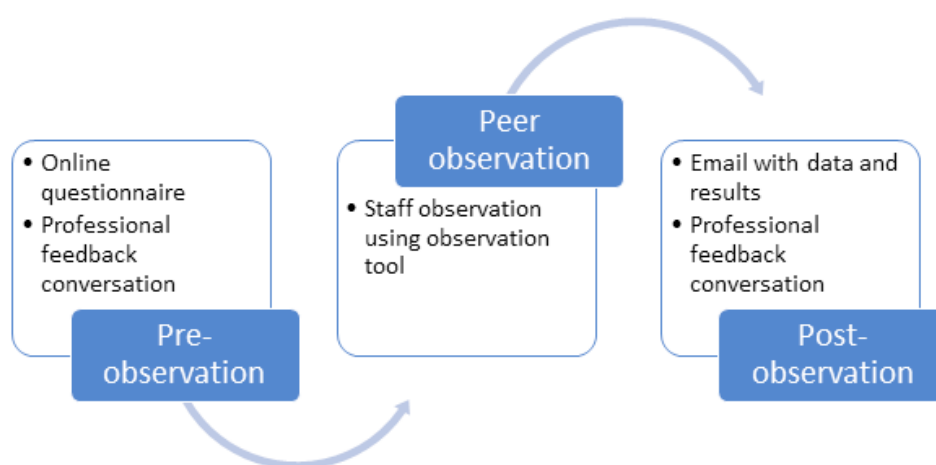


Figure 1: Peer observation process  
[adapted from Bell's peer observation process – as quoted in Sullivan et al., 2012]

## OP Observer development process

### Paper-based observation tool

Description: We started the staff class observations with a paper-based version to observe the teacher-centredness and learner-centredness of our learning and teaching environment. As shown in Figure 2, the classroom setup (classroom furniture, whiteboard, door and the positions of learners) was manually sketched. The lecturer's positions and class activity types were recorded every 30 seconds, while noting down the exact activity the lecturer was engaged in. The activities were divided into two groups: teacher-centred and learner-centred (see Figure 3 below). The average total observation time was 30-40 minutes.

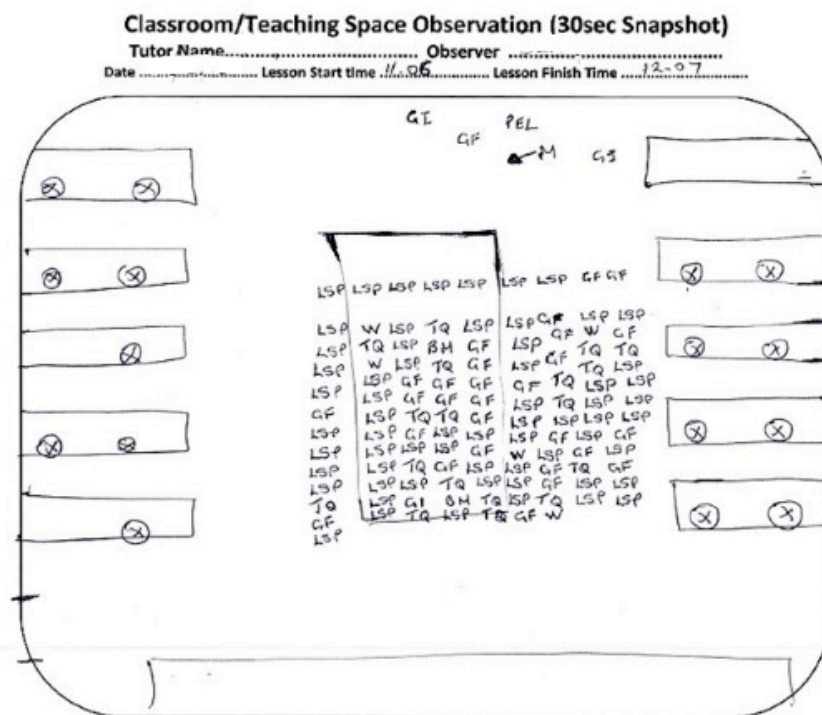


Figure 2: The original paper-based observation tool

Teacher Centred		Learner Centred	
1	One on one teacher individual student	Wv	Watching a Video or watching student activity
CD	Class teaching demonstration	PEL	Engaged in practical experiential learning activity
GI	Giving Instructions	REF	Reflective practice - Learners making meaning
Wh	Whiteboard writing (student copying)	GF	Giving feedback on learners ideas
TQ	Teacher asking questions	M	Moving around the learning setting
DP	Data Projector ppt teacher presentation	SQ	Teacher responding to student questions
BM	Behaviour Management	LSP	Listening to student presentations/ideas
L	Tutor lecturing		

Figure 3: Legend of teacher-centred and learner-centred activities

Feedback: The class observation team expressed that the paper-based observation process was time-consuming and that it was difficult to observe and take notes at the same time. Therefore, in order to improve the overall class observation process and provide better quality feedback for the lecturers, we decided to digitise the observation tool. We proposed to incorporate more built-in features such as being able to select types of teacher-centred and learner-centred activities, the classroom layout and the ability to map the teacher’s movements in the classroom. A summary of the observation results was expected to be produced in the digitised tool.

**OP Observer Web-based tool (version 1)**

Description: Moving on to the digitised version was only possible with the help of one of our IT lecturers and his students on the Graduate Diploma in Information

Technology programme. They created this web-based tool to accommodate our requirements, as part of their final project. The system administrators (the class observation team) were given the authority to add and update the observer and teacher details and access the observation results. This tool provided a digital platform to observe and record 30-second snapshots of learner-centred and teacher-centred class activities. As illustrated in Figure 4, the observation codes of learner-centred and teacher-centred activities were on the sides of the screen, while the classroom setup was based on simple letter icons created to represent the furniture such as tables, chairs, board and door. The observer was able to code and map the teacher's activities. The observation report was generated based on the percentages of the class activities facilitated by the teacher (see Figure 5 for the results sample).

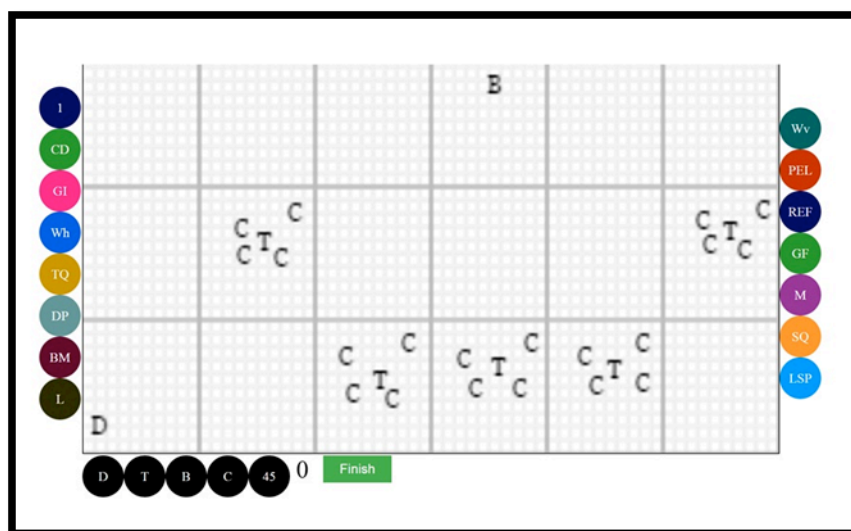


Figure 4: The Web-based class observation tool (version 1)

Observation Details

Code Name	Count	Percentage
Wh	2	8.7%
PEL	6	26.09%
L	1	4.35%
TQ	5	21.74%
SQ	2	8.7%
GF	5	21.74%
Wv	2	8.7%

Figure 5: Observation results screen

Feedback: After trialling the web-based class observation tool, we identified some areas for further improvement. Firstly, icons should be refined to reflect what they

really mean, for example chairs should look like real chairs. The OP observer tool should be able to capture the teacher's position in the classroom. It was noted that the 30-second snapshot time was too short to record any changes in teacher activities. Overall, we requested to increase the user-friendliness of the digital platform and produce a graphical report or diagram under results, for the teachers to better reflect on the student-centredness of their class deliveries.

### OP Observer Web-based tool (version 2)

Description: As shown in Figure 6, the updated version of the web-based observation tool was incorporated with more representative icons on the digital platform. The 30-second snapshot time was increased to 60 seconds, expecting to increase the accuracy of the observations.

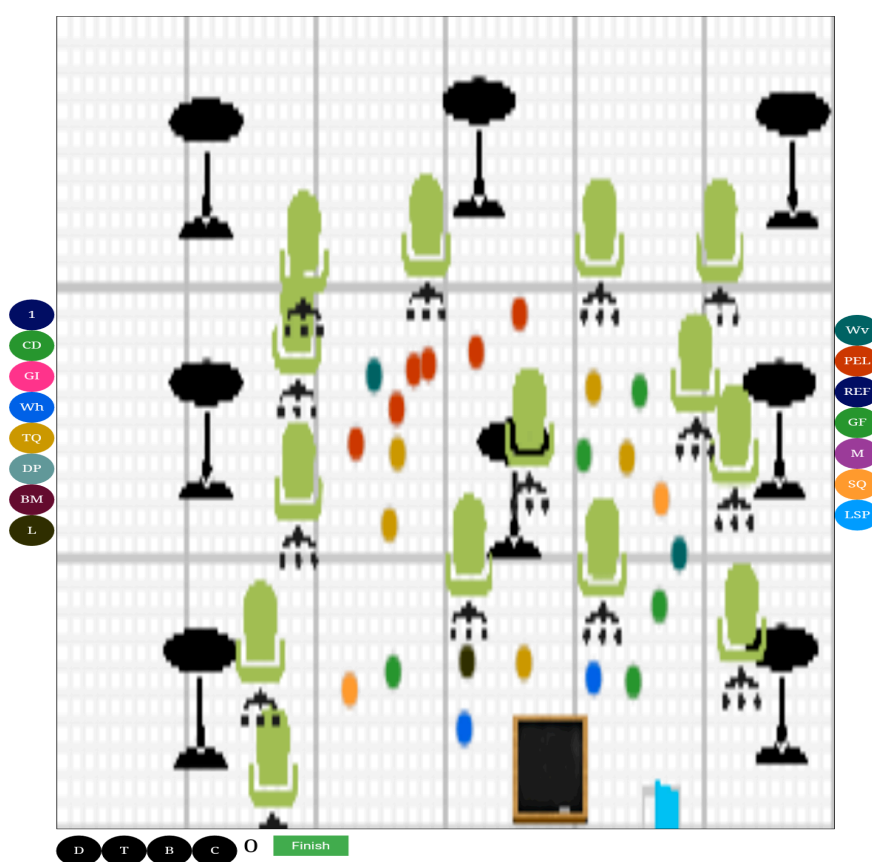


Figure 6: The Web-based class observation tool (version 2)

Application: This is the version we used for the 25 class observations as part of our peer observation process, as represented in Figure 7 below.

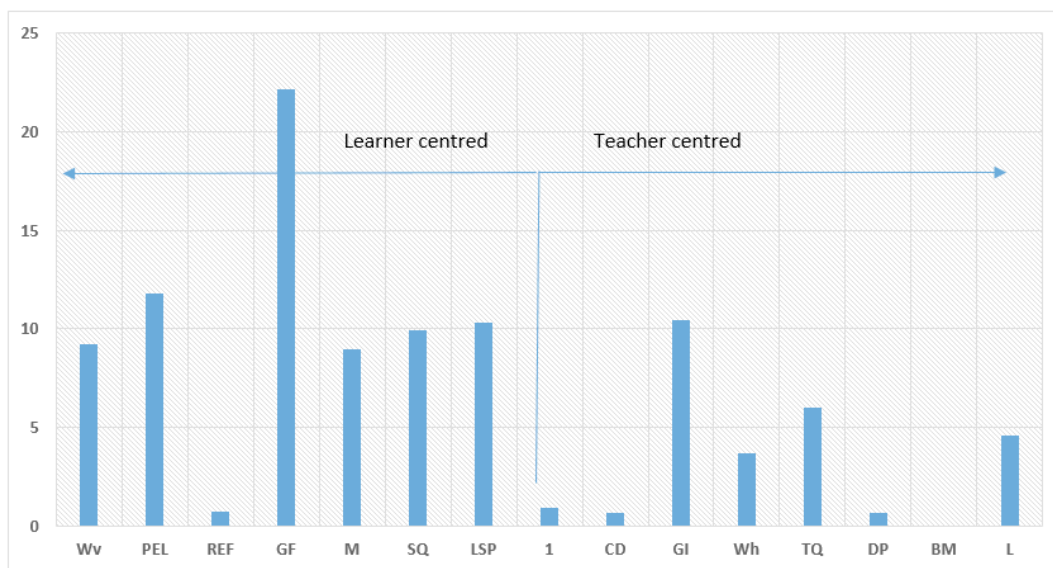


Figure 7: Observation results

The class observation results show that 27% of the class activities observed were teacher-centred and 73% of them were learner-centred. Giving feedback on learners’ ideas (22%), engaging in practical experiential learning activity (11%), listening to student presentations/ideas (10%) and teacher responding to student questions (10%) were the four key learner-centred activities observed. However, reflection activities represented only 1%.

Feedback: After experiencing the updated web-based version of OP Observer, we decided to transform the OP Observer web-based tool into a Mobile phone application. The feedback received from the class observation team is summarised in Table 2 below.

Suggested improvement criteria	Description
To increase the user-friendliness of the tool	Restricted application in landscape mode to gain more space to design the classroom layout.
	Better quality graphical icons and functionality (e.g. zooming and rotating icons).
	Improved data entry system allowing the observer to insert the teacher's details representing their departments.
	Having a system that automatically selects the date and time. This would provide more time for the observer to setup the classroom layout.
To improve the security of the system	Having a login ID and password to log in with the observer's own details.
	Increased privacy and confidentiality of the observation results. For example, the observer should only be able to view and access his/her own observation report.
	Creating an administration panel for analysis of all observations.
	Creating a central database to store, analyse and generate overall observation results.
To generate graphical reports for analysis	Generating doughnut charts to support accurate and fast analysis. A diagram/graph was still not inserted in version 2 as part of the results report.
	Generating output that provides the teacher with data on their performance in terms of overall teacher-centredness and learner-centredness, written feedback and a map of teacher's overall movements during the observation.
	Having a system to automatically send the post observation result (both qualitative and quantitative) to the teacher.

Table 2: Feedback summary

## OP Observer App

Description: The OP Observer App was developed relying on the feedback provided on the web-based observation tool. With the OP Observer App, the observer can conduct a class observation anywhere, anytime with a tablet or mobile device. The access to this tool is personalised with a registered user ID and password. The tool is capable of generating the observation start time, end time and date by itself. A virtual classroom layout can be easily designed with the 3D icons representing the furniture (Figure 8). The observation period is now customised (30 or 60 seconds). The activity code (learner-centred and teacher-centred) legend provides guidance to the observer throughout the observation process and is colour-coded for better visualisation. This tool has an undo button that helps to minimise any mistakes made by the observer. The results screen includes pie charts for both teacher-centred and learner-centred activities. After the observation is completed, an automatic email containing the results (percentage of the learner-centredness, classroom setup, photos and videos taken during the observation) is sent to the teacher. Overall, the OP Observer App significantly improved the security features and the user-friendliness of the interface.

The graphical output produced was highly readable. Appendix A provides a detailed presentation of this tool.

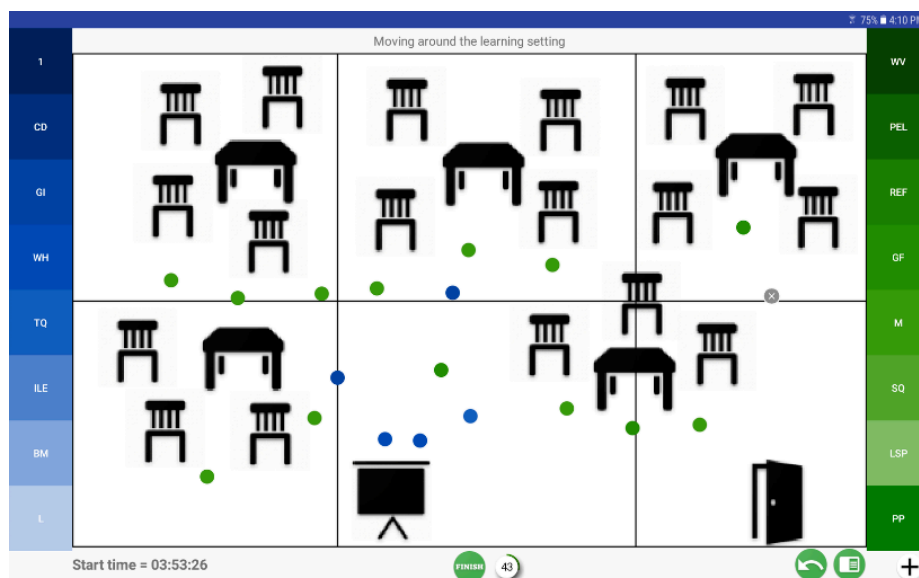


Figure 8: OP Observer App interface

### Discussion of the results

This study aimed to evaluate the effectiveness of a class observation tool in measuring learner-centred practice at a New Zealand tertiary institution. We presented the development process of OP Observer from its paper-based version to its newest version as a mobile application. The final observation tool developed (OP Observer App) was evaluated by the class observation team in terms of its ease of operation, usage convenience and visual appeal (Lee & Lee, 2016) (Appendix B).

**Ease of operation:** the evaluators reported that the operation procedure of this app was simple and that errors made by observers are easy to correct with the aid of the undo button in the app. However, there should not be any unnecessary steps in the operation. For example, the operation process can be made faster by having the login details already in the system. Also, the floor plans/classroom setup should be in the system in order to minimise unnecessary time taken to set up the classroom in the app prior to the observation.

**Usage convenience:** the evaluators noted that the OP Observer App was easy to install on any portable digital device. However, as the app does not provide a user manual, it cannot be used without a demo from the class observation team. It was suggested that a step-by-step instruction of use (or an example) should be provided to guide and help observers (for example a manual, a short video clip, or a flow chart). The app should be getting regular updates to keep in line with new software developments. The results page at the end is automatically connected to the observer's email address, so that it can be saved and sent for later use.

**Visual appeal:** all evaluators were satisfied with the visual appeal of the OP Observer App. They noted that the screen design/look was attractive to the user and the navigation process was simple and enjoyable. However, evaluators suggested that the



navigation could be further improved by having an indication of the previous and the next steps of the observation process. They appreciated the presence of a graphical representation of post-observation results that indicated both the teacher-centredness and learner-centredness of the learning and teaching environment in detail.

## **Conclusions**

It is challenging to determine the learner-centeredness of the programmes delivered in tertiary education. Therefore, a tool for observing, measuring and reflecting on the learning and teaching environment to improve learner-centredness is a valuable tool to help with this process. The OP Observer tool impacts on enhancing staff capability and ultimately student learning. The post-observation results can be helpful to identify areas for improvement and guide staff into further professional development. In addition, by recording this type of information, educational institutions can improve their learning and teaching performance. The development of this tool represented an excellent example of an interdisciplinary team project and overall, it helped create better staff relationships and inform staff goals. The fact that this whole process was done by a peer lecturer within the organisation, further increased its validity and overall staff motivation to improve their own teaching practice.

## **Recommendations for improvement**

The OP Observer tool could be further improved for higher quality observation and post observation results. Class observations can be planned, and reminders can be sent out to observers and teachers. This tool can include text boxes so that the observers can provide positive and constructive qualitative feedback to the teachers.

The OP Observer App is used to measure learner-centred and teacher-centred practice, but this is not the only variable that can be measured. It can also be used to measure other aspects of teaching practice, such as teacher-learner rapport, learner engagement and capabilities or skills development. It could even be adapted to observe the learners' behaviour as well (for example what the learners spend most of their time doing in class).

## **Acknowledgements**

We would like to thank Dr. Barry Law, former Innovation, Development and Change consultant at Otago Polytechnic Auckland International Campus, who came up with the initial concept of having an observation tool to measure learner-centred teaching practice. He designed the paper-based version of the tool and guided us throughout the development of the OP Observer tool.

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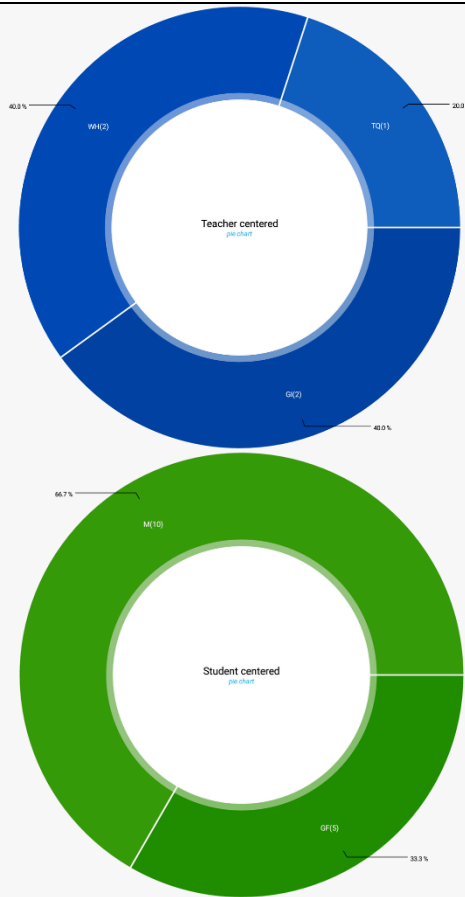
## Appendices

### Appendix A: Screenshots and description of OP Observer App

<p>OP Observer login page</p>	
<p>OP Observer user interface</p>	
<p>Virtual classroom setup with furniture</p>	

<p>Selection of appropriate student-centred and teacher-centred activity (legend)</p>																												
<p>Positioning of the teacher in the classroom with the activity being conducted</p>																												
<p>Completion of the observation process and selection of the digital file sharing method</p>																												
<p>Observation results screen with percentages of student-centred and teacher-centred activities</p>	<table border="1"> <thead> <tr> <th>Task Name</th> <th>Count</th> <th>Percentage(%)</th> </tr> </thead> <tbody> <tr> <td>one to one teaching</td> <td>0</td> <td>0%</td> </tr> <tr> <td>class teaching demonstration</td> <td>0</td> <td>0%</td> </tr> <tr> <td>Giving Instructions</td> <td>2</td> <td>40.0%</td> </tr> <tr> <td>White Board Writing</td> <td>2</td> <td>40.0%</td> </tr> <tr> <td>teacher asking question</td> <td>1</td> <td>20.0%</td> </tr> <tr> <td>creating an inclusive learning environment</td> <td>0</td> <td>0%</td> </tr> <tr> <td>behaviour management</td> <td>0</td> <td>0%</td> </tr> <tr> <td>Tutor lecturing / PPT presentation</td> <td>0</td> <td>0%</td> </tr> </tbody> </table> <p>TEACHER CENTERED (25%)      STUDENT CENTERED (75%)</p>	Task Name	Count	Percentage(%)	one to one teaching	0	0%	class teaching demonstration	0	0%	Giving Instructions	2	40.0%	White Board Writing	2	40.0%	teacher asking question	1	20.0%	creating an inclusive learning environment	0	0%	behaviour management	0	0%	Tutor lecturing / PPT presentation	0	0%
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behaviour management	0	0%																										
Tutor lecturing / PPT presentation	0	0%																										

Graphical representation of observation results



## Appendix B: OP Observer App feedback results

Criteria	Completed	Needs work	Comments/details
<b>Ease of operation</b>			
The operation procedure should be as simple as possible	**	*	Faster log in process Floor plans/classroom set up should be in the system
There should not be any unnecessary steps in the operation	*	**	Floor plan/classroom setup User credentials should be in the system
Errors should be easy to correct (undo button)	***		
<b>Usage convenience</b>			
The app should be easy to install on portable digital devices	**	*	Because it is an old version, it cannot be installed on new phones for example
Step-by-step instructions of use should be provided		**	Manual would help in the future A short video clip or flow chart can be provided No user manual provided Cannot be used without demo from observers
The app should be getting regular updates to keep in line with new software development		***	New staff members added or remove do not get updated Not the latest version currently
The results page at the end should be automatically connected to the observer's email address, so that it can be saved and sent for later use	***		At the moment it is only connected to Gmail
<b>Visual appeal</b>			
The screen design/look should be attractive to the user	***		
The navigation should be simple and enjoyable	**	*	How about showing the next step?
Graphical representation of teacher-centred and learner-centred activities should be provided (e.g. results screen)	***		

[adapted from Lee &amp; Lee, 2016]





***The Effect of Problem-Based Learning Instruction Activities  
in Linear Equations on Problem Solving Ability Analytical Thinking and  
Reasoning***

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The Asian Conference on Education 2019  
Official Conference Proceedings

**Abstract**

The purposes of this research were to compare the before and after problem solving ability analytical thinking and reasoning ability of Mathayomsuksa 1 students by using method of Problem-Based Learning Instruction with a statistic criterion. The subjects of this study were 30 Mathayomsuksa 1 students in the second semester of 2018 academic year from Srinakharinwirot University Prasarnmit Demonstration School Secondary. They were selected by using cluster random sampling technique. The experiment lasted for 10 periods. The One-Group pre-test-posttest design was used for this study. The instruments were the Problem-Based Learning plans in word problems of Linear Equations in One Variable. The data were analyzed by using t-test for dependent samples and t-test for one sample. The findings were as follows: 1. The mathematics learning achievement of problem solving ability for Mathayomsuksa 1 students after being taught by using Problem-Based Learning Instruction activities in Linear Equations in One Variable were higher than that before being taught and statistically higher than the 70% criterion at the .01 level of significance. 2. The mathematics analytical thinking and reasoning ability for Mathayomsuksa 1 students after being taught by using Problem-Based Learning Instruction activities in Linear Equations in One Variable were higher than that before being taught and statistically higher than the 70% criterion at the .01 level of significance.

Keywords: Problem-Based Learning, Analytical Thinking and Reasoning Ability

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## Introduction

The Thai Education system consists of 12 year free basic education: 6 years of “Prathom” (primary education, P1 to P6) and 6 years of “Mattayom” (secondary education, M1 to M6). There are over 37,000 Educational Institutions and nearly 20 million students in the Thai education system. The Basic Educational Core Curriculum 2008 (Revised version, B.E. 2017) emphasize the need for encourage learners to have skills that are essential for learning in the 21<sup>st</sup> century which are prepare students to have problem solving skills, analytical thinking and reasoning ability. The importance analytical thinking skill-oriented instruction has been highlighted in National Education Act of 1999 and the amendment versions 2019 (Ministry of Education, 2019) whereby teachers are required to incorporate analytical thinking process, situation confrontation practices, and application of knowledge in prevention and solution of problems in students’ learning process. Mathematics has a very important chapter that students will need to develop to become successful in the 21<sup>st</sup> century because math is a means of thinking, logical thinking methods, structure and linkages between the strong and clear concept (Jumaita [9]). The quality of mathematics education in Thailand on a national scale is still low observe from Mathematics mean score in Programme for International Student Assessment (PISA) 2015 only 415 which is far from standard level and average three-year trend score difference improve only 1 point. As a consequence of the PISA results, the thinking skill and problem solving abilities of students should be developed in order to fulfill Thailand educational goal. It is essential to develop the mathematics learning instruction that are considered important enough by both teachers and students at all levels from elementary through high school so that we are able to integrate analytical thinking and reasoning ability in our learning management.

One of the most effective learning instruction to improve the problem solving abilities is Problem-Based Learning Instruction. In this research, we use this learning instruction in word problems of Linear Equations in One Variable and worked with the exercises that enhance students to show more analytical thinking and reasoning ability. We aimed to compare before and after problem solving ability analytical thinking and reasoning ability of students by using method of Problem-Based Learning Instruction with a statistic criterion.

## Literature Reviews

Problem-based learning (PBL) as defined by Barrows [2] is also based on what learning science considers more effective ways to learn and acquire expertise. The essential ingredients are the problem-based learning process, carefully designed problems and a teacher as a skilled guide or coach (Barrows,[3]). There are distinct stages in an effective problem-based learning process. The first stage is where students discover daily life problems that should be solved as a trigger for learning. They identify the facts from the problem, generate or explore possible ideas or hypotheses, identify learning issues determining what they need to know to work out the problem and articulate an action plan to seek, evaluate, synthesize and apply the information that they need to manage the problem (Hmelo-Silver, [6]). In this stage, teachers can guide and prepare their students to pose thought-provoking questions and seek answers through the use of open-ended questioning and discussion techniques themselves. Throughout this stage, as students understand the problem better, they

generate hypotheses about possible solutions and identify knowledge deficiencies relative to the problem. These knowledge deficiencies become what are known as the learning issues that students research during their self-directed learning (SDL). During this stage, students learn to critically evaluate the knowledge they need independently, as well as make critical judgments about the application and suitability of that particular knowledge. Next, the student perform problem solving and apply new knowledge to problem. The process ends with each of the students and sometimes the tutor, providing feedback self and peer assessment on their individual and team members' work, seeking continuous improvement. Thus, we can explain the PBL cycle as shown in Figure 1.

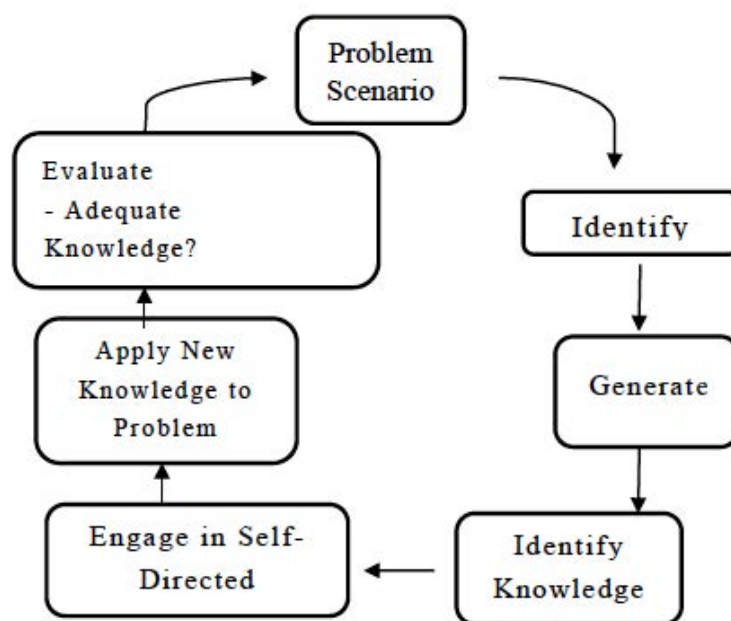


Figure 1: the PBL Cycle

In addition Jumaita N et al. [9] aimed to analyze the students' mathematical problem solving ability of class VIII-2 SMP Negeri 3 Bilah Hulu Labuhan Batuon linear equations and inequalities of one variable's material. The results of research shows the percentage of students' ability to understand the problem reached 87.10% and in the excellent category. According to Anderson [1] states that "problem-solving ability is a very important life skill that involves various processes such as analyzing, interpreting, reasoning, predicting, evaluating, and reflecting. Problem solving is one of the goals or fundamental component of the school curriculum in different countries".

Analytical thinking is a critical component of visual thinking that gives one the ability to solve problems quickly and effectively. It involves a methodical step-by-step approach to thinking that allows students to break down complex problems into single and manageable components. Analytical thinking is necessary when an ambiguous situation requires the learner to identify or create a problem to solve. Bailin, Case, Coombs, and Daniels [4] argued that analytical thinking involves the ability to respond constructively to others during group discussion, which implies interacting in pro-social ways by encouraging and respecting the contributions of others. This type of thinking also requires students to compare sets of data from different sources;

identify possible cause and effect patterns, and draw appropriate conclusions from these datasets in order to arrive at appropriate solutions.

Joanne K. [8] summarize some of the effective programs to teach problem-solving, reasoning, and thinking skills in a classroom environment at a school serving special needs children. He defined analytical thinking is a similar behavioral sequence, but involves a further element of inquiry and situations with less well-defined parameters and outcomes. Analytical thinking is necessary when an ambiguous situation requires the learner to identify or create a problem to solve. Reasoning, an essential element of both problem solving and analytical thinking, involves the manipulation of verbal stimuli to restrict response alternatives in accord with a problem's outcome.

### **Methods of the research**

Researchers utilized Problem-Based Learning Instruction to develop problem solving ability, analytical thinking and reasoning ability of Mathayomsuksa 1 students in the second semester of 2018 academic year from Srinakharinwirot University Prasarnmit Demonstration School Secondary, Thailand. Subjects in this study was conducted in class Mathayomsuksa 1 with 30 students. Researcher aimed to develop the mathematics learning achievement of problem solving ability, mathematics analytical thinking and reasoning ability. We consider word problems of Linear Equations in One Variable the difficult part of solving word problems is converting the words into equations. Moreover, students need to show and verify to be sure that their answers satisfy the conditions of the problem. The researcher has created the Problem-Based Learning lesson plans in word problems of Linear Equations in One Variable. We created 4 lesson plans in 8 periods with learning areas as following

- Algebra word problems
- Age problems
- Geometry problems
- Problems on fraction

There are two types of evaluation tools. The first type of evaluation tool is a 15 items full-fill test used to evaluate achievement of problem solving ability in Mathematics of word problems of Linear Equations in One Variable before and after being taught by using Problem-Based Learning Instruction activities. It had been tested for content validity with the Index-Objective Congruence (IOC) as within 0.50 to 1.00, item difficulty level as within 0.20 to 0.80, item discrimination factor as 0.40 to 0.75, and reliability value as 0.88. The second type of evaluation tool is a 5 subjective examination test used to evaluate the mathematics analytical thinking and reasoning ability of word problems of Linear Equations in One Variable before and after being taught by using Problem-Based Learning Instruction activities. It had been tested for content validity with the Index-Objective Congruence (IOC) as within 0.50 to 1.00, item difficulty level as within 0.20 to 0.80, item discrimination factor as 0.50 to 0.67, and reliability value as 0.77. The subjective examination test in the form of questions regarding the content of word problems of Linear Equations in One Variable. Problem in the form of contextual questions it needs to be grating test instrument problem solving capabilities analytical thinking and reasoning ability are presented in Table 1.

Table 1: Guidelines scoring of mathematics analytical thinking and reasoning ability

<b>Rated Aspect</b>	<b>Score</b>	<b>Information</b>
Understanding the problem by showing the concepts from problems and what the problem requires	2	Writing is known, gives a correct and logical reasons
	1	One wrote that note, one gives the right reasons
	0	There is no answer at all
Show linear equations that leads to solving problem	2	Writing a correct of linear equations
	1	Writing a partially correct of linear equations
	0	There is no answer at all
Show the analysis of guidelines for solving problems or showing step to solve linear equations	3	Showing correct analysis of guidelines or calculations and find correct answer
	2	Showing partially correct analysis of guidelines or calculations
	0	There is no answer at all
Show steps and providing the reason to check answers of linear equations	3	Show steps and providing the correct reason to check answers of linear equations
	2	Show step and providing the partially correct reason to check answers of linear equations
	0	There is no answer at all

Therefore, we can conclude the steps of this research following figure 2.

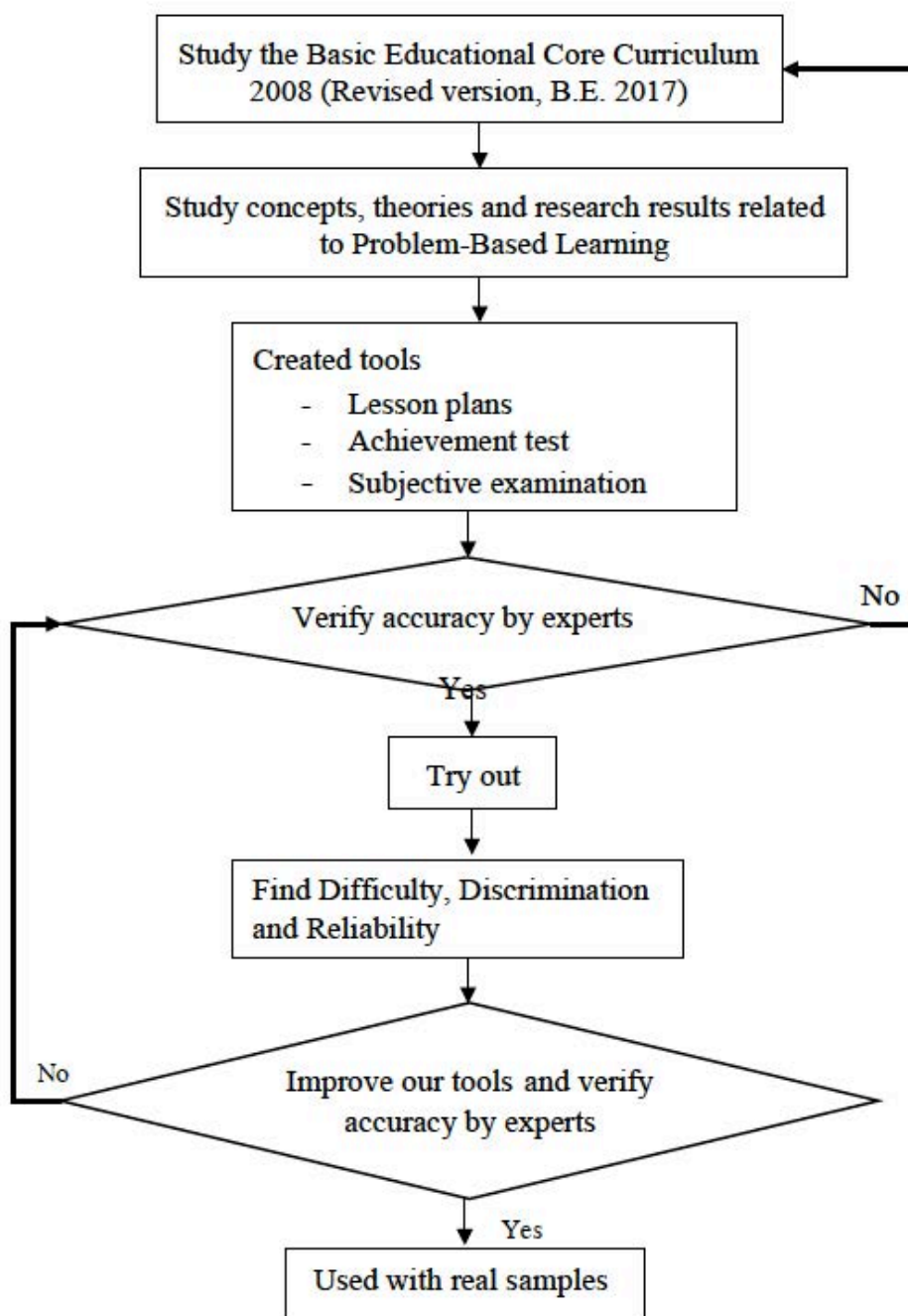


Figure 2: Steps to create and develop search tools

### Result of the research

Development of mathematics learning achievement of problem solving ability for Mathayomsuksa 1 students before and after being taught by using PBL Instruction activities in Linear Equations in One Variable was shown in figure 3.

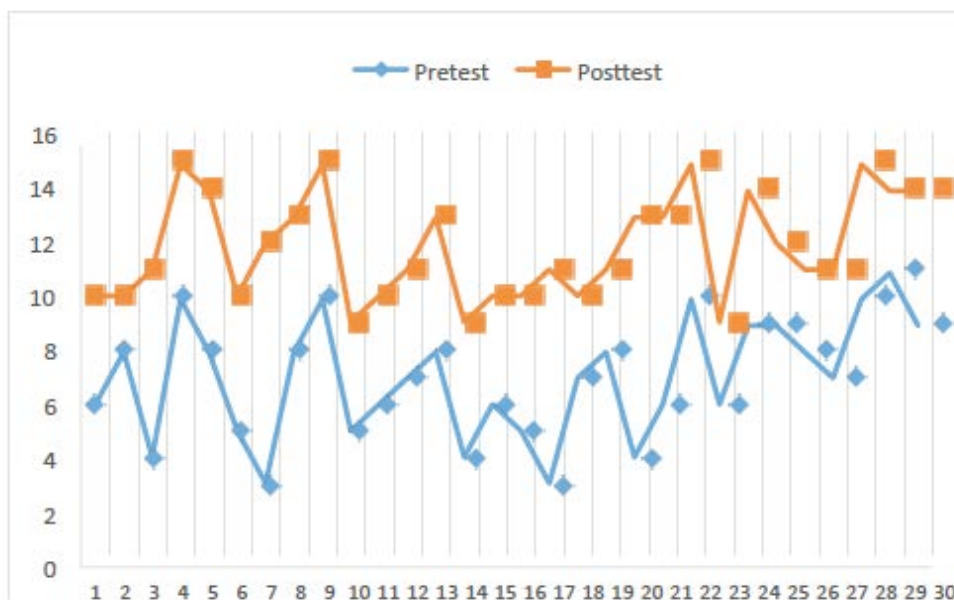


Figure 3: The problem solving ability for Mathayomsuksa 1 students before and after being taught by using Problem-Based Learning Instruction activities.

Fig 3 shown the problem solving ability before and after being taught by using PBL. The pre-test mean is 7 and post-test mean is 11.83 thus, the problem solving ability of everybody after activities was higher than before activities. The comparison of the pre-test and post-test problem solving ability score by using Problem-Based Learning Instruction activities was found at the significance level of 0.01, shown in Table 2.

Table 2: The mathematics learning achievement of problem solving ability for Mathayomsuksa 1 students by using PBL Instruction activities in Linear Equations in One Variable

Problem solving ability	<i>n</i>	<i>k</i>	$\bar{X}$	<i>s</i>	<i>t</i>
Pre-test	30	15	7	2.2	15.18**
Post-test	30	15	11.83	1.97	
df = 29		t at 0.01 = 2.756		**Significant	

Table 2 shown the problem solving ability post-test was higher than pre-test. The Problem-Based Learning Instruction activities can improve student’s problem solving ability. The two means was found to be highly significant that t-test for dependent samples was calculated by the following formula

$$t = \frac{\sum D}{\sqrt{\frac{n \sum D^2 - (\sum D)^2}{n-1}}}; \text{ df} = n - 1$$

Where

- t is a paired t test
- $\sum D$  is Sum of the differences between before and after being taught by using PBL
- $(\sum D)^2$  is Sum of the squared difference between before and after being taught by using PBL
- n is the size of the given sample

The comparison of the mathematics learning achievement of problem solving ability for Mathayomsuksa 1 students after being taught by using PBL activities in Linear Equations in One Variable statistically and the statistically 70% criterion, shown in Table 3.

Table 3: The mathematics learning achievement of problem solving ability for Mathayomsuksa 1 students after being taught by using PBL Instruction activities in Linear Equations in One Variable statistically 70% criterion

Points	<i>n</i>	<i>k</i>	<b>X</b>	<i>s</i>	$\mu_0(70\%)$	<i>t</i>
The mathematics learning achievement	30	15	11.83	1.97	10.5	3.7**
df = 29		t at 0.01 = 2.756			**Significant	

Table 3 shown the mathematics learning achievement of problem solving ability was higher than statistically 70% criterion. The means was found to be highly significant that t-score was computed based on the following equation

$$t = \frac{\mathbf{X} - \mu_0}{\frac{\mathbf{S}}{\sqrt{n}}}; \text{ df} = n - 1$$

- Where t is the t-distribution
- X** is the sample mean
- $\mu_0$  is the population mean
- S** is the standard deviation
- n is the size of the given sample

Development of mathematics analytical thinking and reasoning ability for Mathayomsuksa 1 students before and after being taught by using PBL Instruction activities in Linear Equations in One Variable was shown in figure 4.



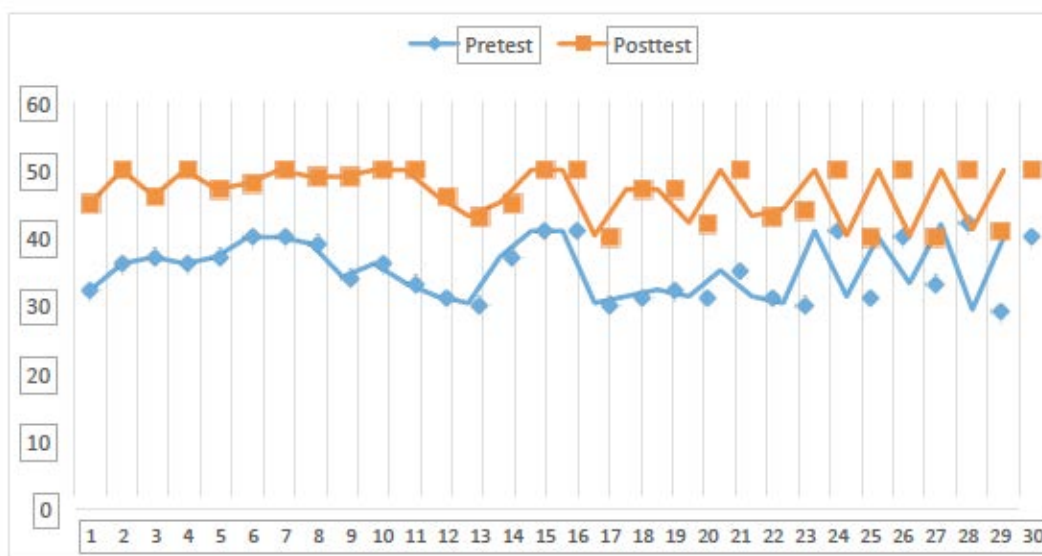


Figure 4: The mathematics analytical thinking and reasoning ability for Mathayomsuksa 1 students before and after being taught by using PBL Instruction activities

Fig 4 shown the mathematics analytical thinking and reasoning ability before and after being taught by using PBL. The pre-test mean is 35.2 and post-test mean is 46.73 thus, the analytical thinking and reasoning ability of everybody after activities was higher than before activities. The comparison of the pre-test and post-test analytical thinking and reasoning ability score by using PBL Instruction activities was found at the significance level of 0.01, shown in Table 4.

Table 4: The mathematics analytical thinking and reasoning ability for Mathayomsuksa 1 students by using PBL Instruction activities in Linear Equations in One Variable

Test	<i>n</i>	<i>k</i>	<b><i>X</i></b>	<i>s</i>	<i>t</i>
Pre-test	30	50	35.2	4.1	22.37**
Post-test	30	50	46.73	3.53	
df = 29		t at 0.01 = 2.756		**Significant	

The comparison of the mathematics analytical thinking and reasoning ability for Mathayomsuksa 1 students after being taught by using PBL activities in Linear Equations in One Variable statistically and the statistically 70% criterion, shown in Table 5.

Table 5: The mathematics analytical thinking and reasoning ability for Mathayomsuksa 1 students after being taught by using PBL Instruction activities in Linear Equations in One Variable statistically 70%

Points	$n$	$k$	$\bar{X}$	$s$	$\mu_0(70\%)$	$t$
The mathematics analytical thinking and reasoning ability	30	50	46.73	3.53	35	18.2**

df = 29

t at 0.01 = 2.756

\*\*Significant

Table 5 shown the mathematics of analytical thinking and reasoning ability was higher than statistically 70% criterion.

### Conclusions

In this research, a case has been developed for PBL as a powerful pedagogical approach to improve the problem solving ability analytical thinking and reasoning ability. The research had explain Linear Equations in One Variable lesson plans that merge the problem solving and analytic thinking which students can transfer word problem to linear equation (focused on how students use the algebra to find a method to solve equations) and reasoning ability (student need to give reason to support their own answers). Research outcomes are tied to learning goals and student are independent to think and solve problems and the answer also must show reasonable. Overall, then, the potential power of problem-based learning as an aligned educational system and pedagogy is in its curriculum focused on both essential twenty-first century knowledge and skills and on making these relevant to students' future career or work place contexts [7]. For future work, PBL can indeed be applied to other mathematics topics. It is especially useful for teaching problem solving skills in order to improve learning abilities of students.

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I would like to express my deep gratitude to my students, for their cooperation, enthusiastic and encouragement of this research work. My grateful thanks are also extended to Srinakharinwirot University Prasarnmit Demonstration School Secondary for their money support. Finally, I wish to thank my parents for their support and encouragement throughout my work.

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***Development of Learning Modules for Enhancing Classroom Action Research Skills of Student Teachers***

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**Abstract**

Classroom action research (CAR) skills are a crucially important quality that student teachers should possess in order to facilitate their own learning and career. This study aimed to design learning modules for enhancing the CAR skills among student teachers, and was divided into three phases. The first phase was the development of the design principle in order to form the conceptual basis for arguments in the learning modules. The second phase involved implementation of the learning modules on five groups of student teachers in diverse contexts. Data were collected using observation and assessment of CAR reports. After that, the data content was analyzed. The final phase dealt with the presentation of the new design principle by adopting lessons from the learning modules. There were six learning modules for CAR, and 14 weeks of treatment adaptation. The design principle of the learning modules created knowledge and skills for CAR as well as improving awareness, attitudes, self-awareness and research commitment. Second, the learning modules revealed that student teachers held the opinion that CAR was not difficult and they understood its benefits. The assessment revealed that student teachers had the right knowledge and products to follow the principles of CAR. Third, the new design principle was the interaction between students and the CAR activities, where consistency was necessary throughout the whole process.

Keywords: classroom action research skills, learning modules, student teachers

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## Introduction

Classroom action research (CAR) is an important tool for teachers to solve problems that occur in the classroom and develop learning management efficiency (Phillips & Russell, 1994; Wongwanich, 2010). It should be performed along with learning management, but nowadays teachers tend to conduct research only when they want to apply for academic positions and think that doing research is not their duty. They also view CAR as an additional workload (Hemsley-Brown & Sharp, 2004).

This problem reflects that teachers have a bad attitude towards doing research as they still do not realize its real benefits. Although relevant organizations, including schools and offices of the educational service area, have continuously carried out training courses on CAR skill development for teachers, those training courses only focus on providing knowledge and skills but pay no attention to instilling a positive attitude towards research. There are research findings that indicate that teachers have a negative attitude towards CAR (Borg, 2007). Therefore, supporting teachers to develop CAR skills alone is not enough to make them effectively use CAR to improve their learning management. Rather, it is necessary to make teachers develop a positive attitude towards CAR and also have the confidence to conduct it (McSherry, Artley, & Holloran, 2006).

In the context of Thai teacher training institutions and universities, student teachers need to be provided with CAR knowledge because it is considered as a basic knowledge for those who are going to be teachers in the future. Student teachers are trained in CAR both during instructional courses and teaching practice in educational institutions. During instructional courses, student teachers are educated in CAR through lectures, activities, and research exercises. During teaching practice, they will be trained to use CAR to solve problems in learning management. The present research on the development of learning modules for enhancing CAR skills aimed to develop the student teachers' research skills and abilities, make them aware of the value of doing research, and encourage them to continuously conduct research on learning management in the future when they work as teachers after graduation.

Based on a review of related research, it was found that learning modules for CAR used in Thailand and other countries mostly focus on developing knowledge and skills and are presented according to CAR procedures. There are only a few learning modules that suggest the importance of implementing CAR (Nugent, Malik, & Hollingsworth, 2012; Phillips & Russell, 1994; Rust, & Clark, n.d.). Thus, the use of activity sets can lead to the development of research knowledge and skills, but may not inspire student teachers to conduct research on a continuous basis thereafter.

The learning modules that were developed in this study can be divided into two parts. The first part focused on making student teachers aware of the consequences of their research and have a positive attitude towards research, which will make student teachers recognize their own research abilities and engage with their research (Adedokun, Bessenbacher, Parker, Kirkham, & Burgess, 2013; Brog, 2007; Dale, Fowler, Adhikari, Pinto, & Rose, 2010). The second part dealt with developing CAR knowledge and skills as well as other relevant characteristics in order to make student teachers able to use CAR to continuously improve their learning management in the future.

In order to design learning modules that focus on developing CAR knowledge, skills, and expected characteristics, it is important to apply both learning and psychological theories, such as social development, transformative learning, and motivation theories. Unlike traditional learning modules, it is impossible to design a new learning module with the use of CAR procedures alone because the expected characteristics are associated with psychological variables. Thus, in this research a design-based research approach was mainly used to develop the learning modules together with various research methods based on theoretical and actual contexts. Some theoretical principles and activities used in designing the learning modules were appropriately adjusted during the experimental process (Wang & Hannafin, 2005; Wongwanich, 2013). The design-based research approach requires a collaboration between researchers, as the designers, and practitioners, as the learning module users, in order to develop effective learning modules that are suitable for actual contexts (Alghamdi & Li, 2013; Wang & Hannafin, 2005).

The present research on the development of learning modules for CAR mainly expected to enable student teachers to gain CAR knowledge and skills, have the abilities to perform learning and teaching management through the research process, recognize the benefits of doing research, develop a positive attitude towards research, have research self-efficacy and research engagement, and use research to continuously improve their learning management in the future.

### **Research Objectives**

This research aimed to design and develop learning modules for enhancing the CAR skills among student teachers as well as to present learning modules adapted from the results of the design-based research.

### **Definition of Terms**

Learning module refers to a set of instructional activities developed for use in learning management about CAR. It was designed and developed using a design-based research approach in accordance with the relevant learning and psychological theories. The content of a learning module is about CAR, which can be called classroom research. Each learning module and relevant activities aimed to make the student teachers achieve CAR skills based on the design principle.

The set of CAR skills refer to the knowledge and understanding of CAR principles and methods as well as the ability to apply the theoretical knowledge to define CAR topics, design research methodology, and implement all CAR procedures until achieving the determined goals.

### **Characteristics Enhancing CAR Skills**

According to the relevant research and documents, there are many factors, both personal and environmental, that can enhance CAR knowledge and skills. These are summarized below.

Continuous research of teachers and scholars is associated with various factors, including external factors, such as support from related agencies, and personal factors, such as attitude towards research, research awareness, research understanding, and confidence in conducting research (McSherry, Artley, & Holloran, 2006). Therefore, in order to encourage teachers or individuals to do research, related parties should not only provide them with research knowledge and skills, but also give them the required support and make them have confidence and motivation to do research.

At present, related organizations mainly provide research knowledge to teachers with the aim to make them able to use research process to improve their teaching and learning. However, the problem is that teachers have no motivation or time to do research. They also think that research is not their duty but the responsibility of external organizations (Borg, 2007; Hemsley-Brown & Sharp, 2004; Wongwanich, 2010). This reflects that teachers are not aware that the research process can be used to develop their teaching and learning, but rather they still think that doing research and instructional development are separable from each other. Thus, supporting teachers to develop research knowledge and skills alone is not enough. Related organizations should also raise research awareness among teachers and make them recognize the importance of doing research. When teachers are aware of the benefits of doing research, they will seek more research knowledge, have motivation to conduct research, and develop a more positive attitude towards research (Dale, Fowler, Adhikari, Pinto, & Rose, 2010).

A positive attitude towards research refers to recognizing the importance of doing research and believing that doing research is interesting and can be applied to work, including feelings that occur when doing research. When researchers feel that doing research is interesting, fun, and useful, it indicates that they have a positive attitude towards it (Rezaei & Zamani-Miandashti, 2013).

Evaluation of the relationships between attitudes towards research and related variables, such as research self-efficacy, research anxiety, and research effort, revealed that when individuals have a positive attitude towards research, they will be more confident and believe that they can successfully conduct research (Li, 2012; Rezaei and Zamani-Miandashti, 2013). Therefore, in order to make teachers have the confidence to conduct research, it is essential to support them to develop a positive attitude towards research and feel that doing research is fun and interesting.

Research self-efficacy indicates a person's perception of his or her own research ability (Forester, Kahn, & Hesson-McInnis, 2004; Lambie, Hayes, Griffith, Limberg, & Mullen, 2014), which does not depend on his or her actual research ability. Some people may have a high research ability but low research self-efficacy. On the other hand, some people may have low research ability but high research self-efficacy (Griffioen, Jong, & Jak, 2013).

Research self-efficacy, or self-confidence in research, is a factor that affects the researchers' interest in and engagement with research (Lambie, Hayes, Griffith, Limberg, and Mullen, 2014; Rezaei and Zamani-Miandashti, 2013) and also contributes to the development of research knowledge and skills (Adedokun, Bessenbacher, Parker, Kirkham, & Burgess, 2013). Teachers or those who are continuously involved with research activities, including reading research papers,



conducting research, and utilizing research results, are likely to have engagement with research (Borg, 2007).

Based on a review of the relevant research and documents, it can be summarized that in order to develop people to have research skills and abilities to improve their own profession, it is necessary to not only provide them with knowledge, but also pay attention to their psychological characteristics and research awareness, which will enable them to have a positive attitude towards research, enjoy doing research, have self-confidence in doing research, and continuously engage in research activities. If related organizations can develop people to possess desirable characteristics for enhancing research skills, they will be able to improve their professional skills and research knowledge in a sustainable way.

### **Concepts and Theories Used as the Guidelines for Developing Learning Modules**

Before developing learning modules, the researchers studied the concepts, theories, and documents about characteristics that can enhance CAR skills and also explored the components and development process of learning modules. Moreover, learning modules on CAR in foreign countries were synthesized to be guidelines for developing learning modules in this study. These are detailed as follows.

### **Components of Learning Modules**

The development process of learning modules for CAR is similar to the process of learning design (Richey, 2000). This is because learning modules can be used as a medium to create CAR knowledge and skills. Previous theoretical concepts and research revealed that the main components of learning modules consist of (i) objectives, (ii) knowledge, (iii) media or activities that can enhance the students' learning, and (iv) assessment tools to measure the students' achievement based on determined objectives in each learning phase (Brown and Eberwein, 2010; Danks, 2011; Richey, 2000). Teachers are required to facilitate and provide guidance to students and allow them to fully show their potential, during the implementation of learning modules.

Regarding the learning modules for CAR used in foreign countries, it was found that most learning modules aimed to develop CAR knowledge and skills of teachers and relevant personnel based on the CAR process. For example, the learning modules of Nugent, Malik, and Hollingsworth (2012) are comprised of three main modules; (i) background and significance of CAR, (ii) duties and roles of administrators regarding CAR, and (iii) five CAR procedures, comprised of (a) identification of problems and research questions, (b) operational planning, (c) implementation and data collection, (d) report and feedback, and (e) improvement planning and execution. This is similar to the learning modules of others (McNiff, 2010; Rust & Clark, 2006), which are composed of the definition and characteristics of CAR, CAR procedures, important things to pay attention to, and CAR and professional development.

In addition, based on the synthesis of all published learning modules, it was found that the content of most learning modules are organized by adhering to CAR procedures. Yet, there are only a few learning modules that introduce the importance of CAR implementation. Moreover, no learning module pays attention to

systematically building a positive attitude towards research and research self-efficacy in order to develop research knowledge and skills. Many research studies suggested that it is essential to encourage students to develop desirable characteristics, such as a positive attitude and awareness towards research, research self-efficacy, and engagement with research. Thus, the CAR learning modules in this study were mainly developed based on the concepts and theories about those desirable characteristics, which included (i) the social development theory of Vygotsky (1978; cited in Khammani, 2002), (ii) transformative learning theory of Mezirow (1978; cited in Prajankett, 2014), and (iii) the motivation theory of Shunck, Pintrich, and Meece (2008).

The social development theory of Vygotsky (1978; cited in Khammani, 2002) places importance on building interpersonal interactions, which is the basis of learning, and fulfilling the gap between the actual learning level and expected goals by creating learning groups that are conducive to group learning. In addition, the learning groups help in designing the means for earning stimulation according to the content that focuses on developing the students' knowledge and skills.

The transformative learning theory of Mezirow (1978; cited in Prajankett, 2014) emphasizes that students' behavior can be changed if there are changes in their beliefs and frames of references. Teachers have to investigate the students' misunderstandings and find ways to solve those misunderstandings. Moreover, teachers need to ensure if their students' beliefs and understandings are correct or not and try to correct their false beliefs.

The motivation theory of Shunck, Pintrich, and Meece (2008) indicated that motivation resulting from goal-directed actions can control behavior. Every student has motivation, but the form of their motivation varies according to the situation. Thus, the behavior of each student is driven by different motivations. This theory focuses on conducting activities that are in line with the students' interest, making the students develop learning and work goals, giving students chances to participate in creating learning initiatives, enhancing self-efficacy, developing students' internal motivation, and encouraging students to have curiosity and to participate in learning activities. Once students have learning motivation, it will contribute to the development of awareness, self-efficacy, and a positive attitude.

## **Research Framework**

The development of CAR learning modules in this study gave importance to making the students develop their research knowledge and skills through various variables. This was because many previous research studies and related documents suggested that learning management should focus on supporting students to have a positive awareness and attitude towards research as well as research self-efficacy and research engagement. Once students possess these characteristics, they will be able to develop knowledge and skills in a sustainable way.

To enable the students to develop research knowledge and skills in a sustainable way, the researchers applied the theories and concepts about desirable research characteristics, such as research awareness, positive attitude towards research, research self-efficacy, and research engagement, to design and develop learning

modules in order to confirm the reliability and ensure that each developed learning module was different from the existing learning modules in the field. The details of the research framework are summarized schematically in Fig. 1 and outlined below.

### Research Methodology

The learning modules in this study were developed according to an educational design-based research approach. The research methodology was divided into the three phases of (i) the development of design principle and prototype of learning modules, (ii) the experimental implementation of the prototype, and (iii) the presentation of the adjusted design principle.

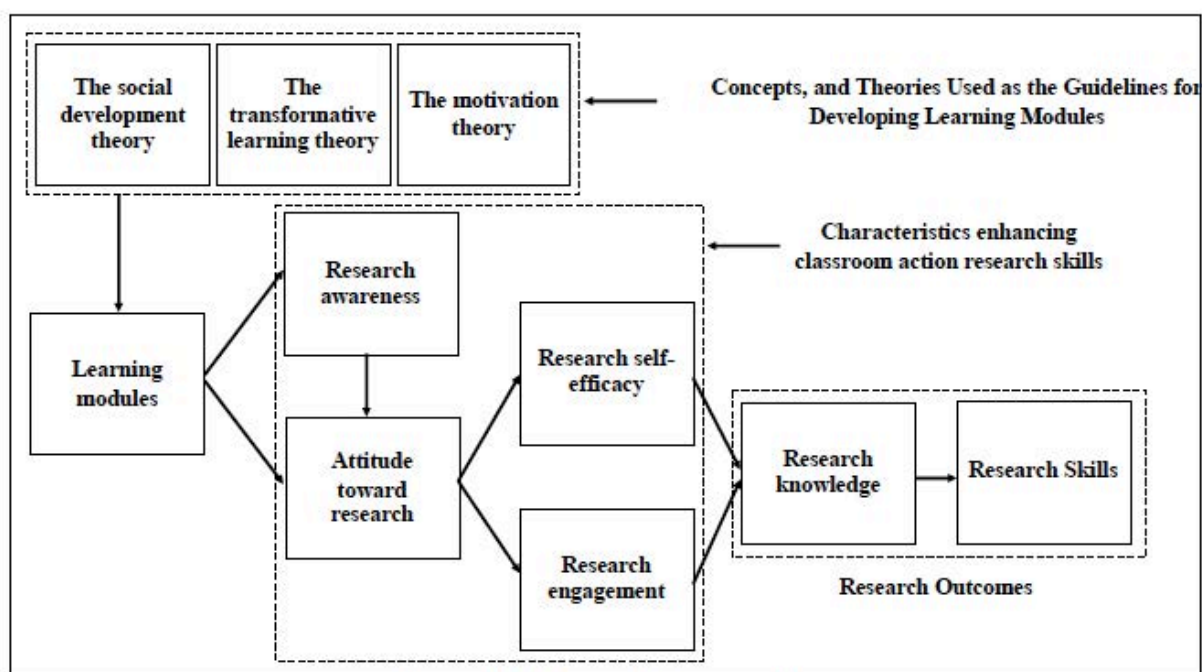


Figure 1: Research Framework.

#### Phase 1: Development of the design principle and prototype learning modules

In this phase, the design principle was initially developed to form the conceptual basis for arguments in learning modules. Then, the prototype learning modules were created based on the drafted design principle. This phase took about 3 months, covering brainstorming of ideas among the research team that consisted of lecturers from the Faculty of Education, Chulalongkorn University, and experts in design-based research. The research procedures were as follows.

1. Synthesize the theories, documents, and research related to the development of CAR skills in Thailand and other countries.
2. Develop a draft design principle, including all related elements based on the concept of Van den Akker (1999).
3. According to Van den Akker (1999), a design principle must consist of the characteristics of innovations or learning modules, students' results, and arguments.
4. The arguments in the learning modules were composed of substantive and procedural design principles.
5. Adjust the draft design principle by brainstorming ideas about the arguments or the beliefs of the researchers, based on related theories, including the social development, transformative learning, and motivation theories.

6. Develop the six prototype learning modules for enhancing CAR skills. This process took 14 weeks to complete.
7. Verify the appropriateness, content validity, and usage possibility of the prototype of learning modules through brainstorming the ideas among experts in research, learning activity management, and innovative learning media as well as the reflection and discussion about the prototype in order to make it suitable for use in actual situations.

## **Phase 2: Experimental implementation of the prototype**

The results of Phase 1, about the structure, principle, concept, and activities of the prototype CAR learning modules were experimentally evaluated in different contexts within three semesters (18 months). The prototype CAR learning modules were tried out on the third-year students taking the CAR course. The students were divided into experimental and control groups. During the experiment and at the end of each semester, meetings and brainstorming sessions were held among the researchers in order to adjust the prototype learning modules before continuing the experiment in the next semester.

### **Participants**

In the first round (the first semester of the academic year 2016), the prototype learning modules were evaluated during August–December 2016 (4 months) on 17 fourth-year students majoring in early childhood education.

For the second round (second semester of the academic year 2016), the prototype learning modules were evaluated during January–May 2017 (5 months) on two groups of students. The first group was eight fourth-year students majoring in secondary education (science). The second group included five fifth-year students majoring in special education.

In the third round (first semester of the academic year 2017), the prototype learning modules were evaluated on three groups of students. The first group included 27 fourth-year students majoring in primary education. The second group was four fourth-year students majoring in special education. The third group included two fifth-year students majoring in educational psychology.

### **Research Instruments**

In this study, an observation form was mainly used to collect the students' outcomes, comprising their research awareness, attitude towards research, research self-efficacy, and research engagement. The obtained results were used to improve the prototype learning modules. The students' end result of using the prototype learning modules, which was their research knowledge and skills, was examined using a knowledge and performance assessment form (classroom research report). In order to ensure the validity of the research instruments, three research experts were asked to examine the congruence between the content of the research instruments and the predetermined definitions as well as the appropriateness and accuracy of language.

## **Data Analysis**

The quantitative data were analyzed using descriptive statistics (frequency, percentage, mean, and standard deviation). The content analysis method was used to analyze the qualitative data.

## **Phase 3: Presentation of the New Design Principle**

The lessons learned from the three evaluation rounds during the academic year 2016–2017 (Phase 2) were synthesized to improve the design principle based on the implementation of learning modules.

## **Developing the New Design Principle**

The results of the three evaluation rounds, the theories and principles used in designing instructional activities and media, and the students' outcomes were used to discuss the effectiveness of applying learning theory and other relevant theories to design learning modules, the problems and obstacles in the implementation, the precautions, the recommendations for teaching and learning management, and the process and outcomes resulting from the implementation of learning modules in each period. This was performed in order to analyze and synthesize the implementation of learning modules in different contexts and present a new design principle according to the design-based research approach.

## **Research Results**

The research results were divided into the three parts of (i) the design principle and prototype CAR learning modules, (ii) the students' outcomes when using the prototype learning modules for enhancing their CAR skills, and (iii) the lessons learned for the presentation of the new design principle of learning modules for enhancing CAR skills.

### **Part 1: Design principle and prototype of learning modules**

The researchers initially developed the design principle and prototype learning modules to try out with different subjects and situations. The details of the drafted design principle and prototype of learning modules are as follows.

#### **Drafted design principle and prototype of learning modules**

At the first stage of the development of learning modules, the researchers jointly drafted a design principle according to the concept of Van den Akker (1999), which consisted of the following elements: 1) characteristics of innovation (learning module), 2) students' results, and 3) arguments that were composed of substantive design principles and procedural design principles. The details of the drafted design principle are summarized in Table 1.

Table 1: Drafted design principle of learning modules for classroom action research

	Arguments	Processes
<b>1</b>	<b>Building positive awareness and attitude toward CAR</b>	
	Students will have positive awareness and attitude toward CAR, when they are aware of its benefits and importance.	
	<b>Samples of activities</b> <ul style="list-style-type: none"> <li>▪ Showing examples and outcomes of CAR.</li> <li>▪ Setting common goals.</li> </ul>	<b>Steps</b> <ul style="list-style-type: none"> <li>▪ Let students consider the processes and outcomes of CAR.</li> <li>▪ Analyze and criticize CAR by focusing on key points.</li> <li>▪ Set common goals of conducting CAR in the current and future courses.</li> </ul>
<b>2</b>	<b>Building research self-efficacy</b>	
	Students will develop self-efficacy in CAR when they have opportunities to think about and practice doing research under the guidance of teachers on a continuous basis.	
	<b>Samples of activities</b> <ul style="list-style-type: none"> <li>▪ Investigating and adjusting CAR understandings.</li> <li>▪ Practicing doing a systematic CAR.</li> </ul>	<b>Steps</b> <ul style="list-style-type: none"> <li>▪ Use activities to analyze and adjust CAR understandings.</li> <li>▪ Give students opportunities to determine goals and design CAR on their own.</li> <li>▪ Teachers provide systematic and continuous guidance.</li> </ul>
<b>3</b>	<b>Building research engagement</b>	
	Students will have engagement with CAR, when they get to do research under circumstances that are conducive to problem-solving and continuous development.	
	<b>Samples of activities</b> <ul style="list-style-type: none"> <li>▪ Continuously practicing each step of CAR.</li> </ul>	<b>Steps</b> <ul style="list-style-type: none"> <li>▪ Teachers set up problems and scenarios for students to design CAR procedures that are logically linked to each other.</li> <li>▪ Add more scenarios to make students further develop their CAR design.</li> <li>▪ Teachers provide continuous guidance at every step.</li> </ul>
<b>4</b>	<b>Providing knowledge and skills in conducting research</b>	
	Students will gain knowledge and skills in conducting research and teaching specific sciences when they have opportunities to learn through real experiences that are related to their contexts and interests.	
	<b>Samples of activities</b> <ul style="list-style-type: none"> <li>▪ Continuously practicing each step of CAR.</li> <li>▪ Assigning students to conduct CAR on a topic that is related to their contexts.</li> </ul>	<b>Steps</b> <ul style="list-style-type: none"> <li>▪ Teachers set up problems and scenarios for students to design CAR procedures that are logically linked to each other.</li> <li>▪ Determine CAR topics based on students' contexts and interests. Encourage students to build on existing knowledge through CAR.</li> <li>▪ Teachers provide continuous guidance at every step.</li> </ul>

## Part 2: Students' outcomes on the implementation of the prototype learning modules

The results obtained from the three evaluation rounds in different contexts were synthesized in order to find the students' outcomes and the problems and obstacles in the implementation of the prototype learning modules, which would be used to further improve the learning modules. The results gained through the observation and performance assessment are summarized below.

From the post-teaching reports on the three evaluation rounds, there were many aspects concerning the activities and the usage of the prototypes that needed to be adjusted, such as insufficient implementation time, inconsistency between the students' contexts and the determined plan, and the students' lack of prior knowledge. Thus, many activities were adjusted to be able to enhance the students' knowledge. Moreover, online activities were additionally emphasized in order to fasten the implementation of the prototype among a large group of students and quickly provide feedback to the students. The details of the adjustments are summarized in Table 2.

Table 2: Synthesis of the adjustment of the prototype learning modules after the three rounds of experiments

	Things to be adjusted	Causes	Adjustment
<b>1</b>	<b>Unsatisfied outcomes</b>		
	1.1 Activities that emphasize the connection of ideas.	From the observation of the animation media created by the students, it was found that the students have insufficient abilities to link problems and connect related ideas together.	As the linking of ideas is very important to conducting CAR, the researchers set up questions for the students to brainstorm their answers and create a diagram connecting all related problems.
	1.2 Students' lack of prior knowledge.	Students had misunderstandings about the concept of variables, which led to a problem in determining research variables.	The researchers added crossword games in order to encourage the students to analyze each variable through various hints.
<b>2</b>	<b>Classroom Implementation problems</b>		
	2.1 Adjust the examples and activities in each module to be relevant to the students' field of study.	At the beginning of the development of learning modules, the instructional videos selected by teachers were prepared for use. However, some students were found to have experiences in that area. Thus, the activity was changed to letting the students create their own scenarios.	Let the students reflect on what they have learned about the problems in classroom through animation media.
	2.2 Adjust the activities in each learning module to be more online.	In order to enhance continuous learning, the researchers adjusted the activities in some modules to be more online.	Adjust the activities in the practice of treatment and data collection module and the data analysis and report writing module to be more online.

### Part 3: Lessons learned for the presentation of the design principle of learning modules

The outcome of this research includes both the development of the students' CAR knowledge, skills, and attitude as well as the design principle resulting from the lessons learned during the research process. The details are summarized as follows.

Based on the synthesis of the activities that were adjusted during the three evaluation rounds in different contexts, it was found that the design principle of learning modules for CAR should focus on creating interactions among individuals and between students and activities. All activities should be connected from the beginning to the end and also implemented based on continuous feedback of teachers in order to make the students develop the ability to connect ideas. The design principle should pay attention to creating connections or linkages of knowledge and learning content in each course so as to make the students understand the whole process. In addition, the design principle should place importance on giving the students motivation to conduct CAR, develop purpose-based actions, and recognize that doing research is not an additional burden. Both teachers and students should be encouraged to develop knowledge, creativity, innovative ideas, and problem-solving skills in order to successfully conduct CAR. Relevant media and documents should be prepared and

provided. There should be activities to change the beliefs and understandings of related persons into the same direction. The details of the synthesis are shown in Table 3.

Table 3: Synthesis of the adjusted design principle of learning modules

Existing design principle (before using the learning modules)	Methods	New design principle (before using the learning modules)	Data source				
			1	2	3	4	5
<ul style="list-style-type: none"> <li>Focus on methods or activities that help create interactions between individuals.</li> </ul>	<ul style="list-style-type: none"> <li>Use activities that enhance interactions among students and encourage students to think and perform.</li> </ul>	<ul style="list-style-type: none"> <li>Enhance continuous interaction between students and activities from the beginning to the end in order to develop the ability to connect ideas.</li> <li>Focus on teachers' continuous feedback.</li> </ul>	✓	✓	✓	✓	✓
<ul style="list-style-type: none"> <li>Fulfill a gap between existing learning level and expected learning ability.</li> </ul>	<ul style="list-style-type: none"> <li>Explore prior knowledge in each subject and provide new knowledge through systematic guidance.</li> </ul>	<ul style="list-style-type: none"> <li>Focus on creating connection or linkage of knowledge and learning content for students.</li> </ul>	✓	✓	✓	✓	✓
<ul style="list-style-type: none"> <li>Create motivation for conducting CAR.</li> </ul>	<ul style="list-style-type: none"> <li>Use activities that emphasize the importance and benefits of CAR.</li> </ul>	<ul style="list-style-type: none"> <li>Apart from emphasizing the benefits of CAR, it is necessary to highlight that conducting CAR is not an additional burden.</li> </ul>	✓	✓	✓	✓	
<ul style="list-style-type: none"> <li>Create motivation for conducting CAR.</li> </ul>	<ul style="list-style-type: none"> <li>Organize activities that suit students' interest and encourage students to select a topic that they are interested in.</li> </ul>	<ul style="list-style-type: none"> <li>Support teachers and students to develop knowledge, creativity, innovative ideas, and problem-solving skills in order to successfully conduct CAR.</li> </ul>	✓	✓	✓	✓	✓
<ul style="list-style-type: none"> <li>Design to suit individuals with good attitude toward CAR or those who are interested in conducting CAR but do not know how to start.</li> </ul>	<ul style="list-style-type: none"> <li>Focus on knowledge sharing process.</li> <li>Use activities that not make students afraid of conducting CAR.</li> </ul>	<ul style="list-style-type: none"> <li>In each learning module, relevant media and documents should be prepared and provided to students. Allow students to exchange ideas about the strengths and improvement of activities.</li> </ul>				✓	
<ul style="list-style-type: none"> <li>Change the previous belief that doing CAR is difficult and time consuming.</li> </ul>	<ul style="list-style-type: none"> <li>Change the previous belief that doing CAR is difficult and time consuming.</li> </ul>	<ul style="list-style-type: none"> <li>Change the previous belief that doing CAR is difficult and time consuming.</li> </ul>	✓	✓	✓	✓	✓

Note: 1 = fourth-year students (early childhood education), 2 = fourth-year students (secondary education), 3 = fifth-year students (special education), 4 = fourth-year students (primary education), 5 = fourth-year students (special education).



## **Discussion**

The results of the present study can be summarized in the three parts of the development of learning modules for CAR, the differences between the developed learning modules and other learning modules, and the characteristics of activities in the learning modules for CAR. The details are as follows.

### **Development of Learning Modules for CAR**

The learning modules for CAR, which were developed, tested in different contexts, and adjusted according to the design-based research approach, was composed of the six modules of: (i) introduction to CAR, (ii) problems and variables, (iii) development of research problems, framework, and design, (iv) research procedures, practice of treatment, and data collection, (v) data analysis and report writing, and (vi) discussion, reflection, and treatment adaptation. Each module consisted of activities, objectives, beliefs or theories that were the basis of each activity, learning media, and usage process. This is considered consistent with the main components of learning modules proposed by Richey (2000). Relevant beliefs or theories were used as the basis of activities, such as a group discussion that enhanced interactions among the students and between the students and teachers in order to fulfill the gap between the existing learning ability and expected goals according to the social development theory (Vygotsky, 1978; cited in Khammani, 2002). In addition, when implementing the activities in different contexts, it was found that most activities were similar to the prototype learning modules. However, some examples and discussion topics between the students and teachers needed to be adjusted in accordance with the students' background in order to boost their understanding.

### **Differences between the developed learning modules and other learning modules**

Other learning modules for CAR, which have been published since 2000, mostly focus on providing core knowledge of CAR and adhere to the CAR procedures, starting from identifying problems to adjusting research design, which is basically similar to the developed learning modules. However, the thing that makes the developed learning modules different from other learning modules is that the activities were designed based on the contextual background of students, apart from the relevant beliefs and theories. For example, there was an activity that supported the students to exercise their analytical thinking skills using simulated scenarios in order to motivate the students to have a positive real experience according to motivation theory (Shunck et al., 2008). In addition, unlike other learning modules, the developed learning modules place importance on the students' end result, which includes not only research knowledge and skills but also research awareness, a positive attitude towards research, research self-efficacy, research engagement, and knowledge and skills in teaching.

### **Characteristics of activities in the learning modules for CAR**

Each developed learning module consisted of both offline and online activities. The online activities can be performed to enhance learning beyond the classroom and facilitate knowledge sharing among students and between students and teachers

through diverse programs and applications. Moreover, there are some activities that focus on face-to-face learning and need to be fully conducted offline.

In addition, online activities in the developed learning modules were also a medium for learning and exercising analytical and critical thinking skills with the teachers acting as facilitators of learning. Another highlight of the developed learning modules was the variety of online and offline activities, such as Plicker Coggle Charade and Realtimeboard applications. Therefore, teachers can apply these activities to learning management in a creative and diverse way. This is considered in line with the motivation theory that aims at creating a positive learning atmosphere to enhance the students' self-efficacy.

### **Recommendations**

1. The research results indicated that both the students and teachers could apply the obtained knowledge and skills to their own context. Therefore, the developed learning modules should be further implemented at university and school levels in order to enhance the research skills of students and encourage teachers to continue conducting CAR.
2. The learning modules in this study used contextual background and relevant beliefs as the basis in designing and developing activities. Thus, in order to effectively implement these learning modules, teachers should study the characteristics of each activity, contextual background, and beliefs about the online and offline learning media that are introduced in the learning modules prior to their actual implementation.

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***The Development of Terminology Learning System for Thai Classical Dance through Learning Management System***

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**Abstract**

Effective use of a learning management system for self-paced learning can provide a valuable opportunity for students to make progress at a pace that is commensurate with their prior knowledge. To facilitate self-paced learning, this study aims to develop the terminology learning system for Thai classical dance through learning management system. Based on the Randomized Solomon four-group design, the study was implemented on a group of 100 students from Music and Performing Arts program, the faculty of Fine Arts, Songkhla Rajabhat University. The findings of the study revealed that the terminology learning system for Thai classical dance can be used to enhance the quality of teaching and learning. Acting as a powerful agent, it is most associated with 1) Electronic bulletin board ; 2) Test instruments including Pre-test and Post-test ; 3) Lessons comprising ; (1) a detailed analysis of posture for Thai classical dance ; (2) a set of illustrations of male and female gestures ; and (3) demonstration videos in the response of forward and backward replays linked on YouTube for interactive learning. Two experimental and two control groups were involved in this study. The findings revealed that after engaging with the learning system; the experimental groups showed higher achievement results when compared to the control ones. As for a study period, the experimental groups were able to complete their course within one week whereas the control ones needed two consecutive months to complete the course. Moreover, according to the achievement scores, the experimental groups showed higher statistical results than the control ones in all aspects. With regard to satisfaction with learning and practice system for Thai classical dance, the findings indicated all at the highest levels.

Keywords: Learning Management System, Terminology Learning System, self-paced learning, Thai classical dance

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## **Introduction**

Thai Classical dance dates back more than 500 hundred years when the area of present-day Thailand, Cambodia and Laos was ruled by various kingdoms. One of the most notable was the Kingdom of Siam. With little tradition of spoken theatre, dance was the main dramatic art form (Sukawanich, 1982). In view of teaching Thai classical dance in practice, teachers generally use the method of lecture and demonstration. In other words, the teacher leads while the students follow.

The teaching and learning is considered successful from generation to generation due to their memory, imitation and practice. Traditionally, the teachers of Thai classical dance have to pay attention and observe their teachers from the old generation and teach their students accordingly. The more they can observe and memorize, the more they can improve their students in terms of Thai classical dancing postures efficiently. This kind of traditional teaching method is perceived as the limitation especially when the teachers miss to observe and pay attention to those; it may eventually disappear or be less memorized from generation to generation. Moreover, regarding the students, they certainly have different learning styles. While some students just understand the first step of classical dance, the others may almost finish all the tasks. In addition, students might prefer to review and practice a number of times to improve the performance at their own pace.

Therefore, in this study, there is a shift from using the traditional methods to a more modernized system, known learning management system; in this regard called the terminology learning system for Thai Classical Dance. To enhance the quality of learning system, it will be accompanied with the improvement of the traditional form of teaching and learning, rendering it into a more modernized process including modern teachers, high-motivated students, modern university, and advanced educational technology (Aljraiwi, 2017). It is worth mentioning that the past decade has seen enormous development in the use of learning management systems (LMS) in higher education institutions, with support provided to teachers and students during the implementation periods (Dahlstrom, Brooks, & Bichsel, 2014). This, accordingly, provides the potential for rich learning environments both on campus and on those studying at home. Indeed, a learning management system, or LMS is typically used in schools for online and blended courses, and when used properly, it can be a valuable tool that increases the effectiveness of learning while reducing costs and time spent on teaching and learning (Weaver, Spratt, & Nair, 2008).

Thus, the main aim of using the terminology learning system is to provide a valuable opportunity for self-paced learning. Moreover, the students are able to make progress at a pace that is commensurate with their prior knowledge. With self-paced learning, the students will definitely use it to meet their needs and different learning styles.

## **Objectives of the study**

1. To develop the terminology learning system for Thai classical dance through learning management system.
2. To determine the potential of using the terminology learning system for Thai classical dance.

## Methodology

### 1. Research Design

In this study, the researchers adopted the true-experimental design and the Randomized Solomon four-group design as well as using classroom web applications on teaching and learning to enhance students' academic performance.

### 2. Sampling Method

Based on the true-experimental design and the Randomized Solomon four-group design, the study was implemented on 100 students from Music and Performing Arts program, the faculty of Fine Arts, Songkhla Rajabhat University.

The Solomon four-group design is purposively a standard pretest and posttest two-group design and the post-test only control design. The various combinations of tested and untested groups with treatment and control groups can be used to ensure that confounding variables and unnecessary factors have not influenced the results. Using the purposive sampling method, a sample of 100 students was selected as shown in Table 1.

**Table 1**

*the Randomized Solomon four-group design*

Group	Pre-test	Intervention	Post-test	Number of students
(R) E <sub>1</sub>	O <sub>1</sub>	X	O <sub>2</sub>	25
(R) C <sub>1</sub>	O <sub>1</sub>	-	O <sub>2</sub>	25
(R) E <sub>2</sub>	-	X	O <sub>2</sub>	25
(R) C <sub>2</sub>	-	-	O <sub>2</sub>	25

Where:

R = Random sampling

E = Experimental group

C = Control group

O<sub>1</sub> = Pre-test

O<sub>2</sub> = Post-test

X = Intervention using terminology learning system for Thai

classical

dance through learning management system

Table 1 illustrates the features of each of the four groups in the Solomon four-group design. The basic components of a true experiment include a pretest, posttest, control group, and experimental group. By having one set of experimental and control groups that complete the pretest (Group 1 and Group 2) and another set that does not complete the pretest (Group 3 and Group 4), true experimental designs require random assignment.

In the Solomon four-group design, two groups are treated as pretest, experimental group intervention, and posttest. The other two groups do not receive the pretest, although one obtains the intervention. In other words, control groups do not receive an intervention, and experimental groups receive an intervention.

The four groups have four different learning and practices as follows:

1. Group E1: pre-test, intervention, post-test
2. Group C1: pre-test, no intervention, post-test
3. Group E2: no pre-test, intervention, post-test
4. Group C2: no pre-test, no intervention, post-test

### 3. Research Instruments

Acting as a powerful agent, it is most associated with:

- 3.1 A learning management system designed for the terminology learning system for Thai classical dance
  - a) Lessons comprising
    - i) A detailed analysis of posture for Thai classical dance
    - ii) A set of illustrations of male and female gestures
    - iii) A set of demonstration videos in the response of forward and backward replays linked on YouTube for interactive learning
- 3.2 Test instrument including
  - a) Pre-test and Post-test: 100 students in Music and Performing Arts program, the faculty of Fine Arts, Songkhla Rajabhat University
- 3.3 Assessments for a learning and practicing system of Thai classical dance
  - a) Quality Assessment: 3 experts in curriculum, teaching, and assessment
  - b) Satisfaction Assessment: 35 teachers and 35 students in Music and Performing Arts program, the faculty of Fine Arts, Songkhla Rajabhat University

Regarding the test instrument, to establish the content validity of the test instrument (Pre-test and Post-test), the Content Validity Index (CVI) was used based on the ratings from three experts. With reference to Polit and Beck (2006), CVI is regarded as the index of interrater agreement that expresses the proportion of agreement concerning the item relevancy. Lynn (1986) also stated that CVI is a commonly used approach to content validity to facilitate the rejection or retention of items.

This instrument was validated by the experts comprising three lecturers in the field of Thai classical dance teaching from Thailand to ensure that it was relevant in measuring the students' performance. The experts were required to rate the relevancy of the items with the validation form with 4-point scale (1=not relevant; 2=somewhat relevant; 3=quite relevant; 4=highly relevant). Some items have been amended based on the recommendations by the experts. On the basis of the feedback received from the experts, the instrument has been revised, and items have been finalized, accordingly.

As shown in Table 2 below, S-CVI for the test instrument relevancy is 0.97 based on the rating of the three experts. The rating of 0.97 is satisfactory based on the S-CVI guideline in item acceptability suggested by Davis (1992). It means that the test instrument was relevant in measuring the students' performance.



**Table 2**  
*S-CVI of the Test Instrument*

<b>Test Instrument</b>	<b>S-CVI</b>	<b>Mean Expert Proportion</b>
<b>Rating</b>	0.97	0.97

Note: S-CVI, content validity index for the scale.

\* Waltz et al. (2005), p. 155.

## Data Collection Procedure

### 1. Survey Set-up

The set-up stage is a very important part intended to assist the researchers in identifying the key factors in planning the research project by document analysis and information to determine the direction of the study.

### 2. Data gathering instruments

It is divided into two main parts, namely the test instrument and the questionnaire. It aims to gather the information related to dance information, students' performance and satisfaction from the stakeholders after using the terminology learning system for Thai classical dance through web application.

### 3. Determining the potential use of the terminology learning system for Thai classical dance through learning management system

The processes are as the following:

#### 3.1 Main system and database system design

#### 3.2 Content Validity

The assessments were sent to three experts in the field of curriculum, Thai classical dance teaching, and assessment with a request for feedback on the relevance of each item (impact assessment). The experts were also asked to evaluate whether the items covered the important aspects or whether certain components were missing. They could also add comments on any item.

#### 3.3 Trial the system in order to acquire an effective set of activities and performance as well as some improvements

#### 3.4 Making some amendments based on the results from the trial.

#### 3.5 Administering the assessment to 100 students in Music and Performing Arts program, the faculty of Fine Arts, Songkhla Rajabhat University

The details are as follows.

a) The Student Login. It requires the registration to confirm identity at <http://ppsthaidance.skru.ac.th/>. Once, they register, they can easily login to learn and practice the lessons at their convenience. When entering the homepage, the students must enter their username and password by clicking the login button. The username and password is previously provided by the teacher.

b) After login process, the subject will appear as My Courses and Dance Courses, respectively.

c) When entering a course, the main details of the learning system are shown as follows: 1) Bulletin; 2) Quiz; and 3) Lessons

d) News section. This part is important when the teacher would like to inform the students or post news and information related to the course.

e) The tests in the learning system: pre-test and post-test

Pre-test and Post-test are similar to checklists in that they can measure student needs before a lesson and tutorial and then evaluate how well the lesson and tutorial met those needs.

f) Content

The students can choose the topic that they want to study by clicking on the desired topic. As for the content, it is divided into 3 topics, which are 1) head and shoulders 2) arms and hands, 3) feet and legs. Each section consists of a description with illustrations and demonstration video.

### 3.6 Data analysis and interpretation by means of descriptive statistics

## Research Findings

The findings of the study revealed that, to develop the terminology learning system for Thai classical dance through a learning management system can be used to enhance the quality of teaching and learning. The findings are presented as follows.

**Table 3**

*Students' Achievement among Four Groups*

Group	Percentage	Mean	SD	Study period	Study time	Place
<b>Experimental group 1</b>	97.87	29.36	2.94	1 week	Not controllable	Not controllable
<b>Experimental group 2</b>	99.00	29.72	3.29	1 week	Not controllable	Not controllable
<b>Control group 1</b>	88.67	26.60	2.47	2 months	In class	In class
<b>Control group 2</b>	88.80	26.64	2.75	2 months	In class	In class

As shown in Table 3, it revealed that after the study process using the terminology learning system for Thai classical dance, the mean scores obtained from the two experimental groups are somewhat similar at 29.36 and 29.72, respectively. In addition, interestingly, the two control groups shows the same results as their mean scores are similar at 26.60 and 26.64 respectively. However, when compared across the groups, the experimental with the control groups, the results yielded differently. Both experimental groups show considerably higher mean scores when compared to the control ones (29.36, 29.72, 26.60 and 26.64, respectively). Regarding the study time and place, the experimental groups are not controllable, whereas the control group are controlled to be in class only. Lastly, as for a study period, the first experimental group could complete their course within one week while the control one need two consecutive months after completing the course.

**Table 4**  
*Students' Achievement regarding Categories of Classical Dance*

Classical dance performance	Assessment	E1			C1			E2			C2		
		Mean	S.D.	%	Mean	S.D.	%	Mean	S.D.	%	Mean	S.D.	%
head and shoulders	Pre-test	3.16	1.5	39.5	3.0	1.1	38.5	-	-	-	-	-	-
	Post-test	5.76	1.42	72	4.3	0.9	54	6.1	0.9	76	5.5	1.4	69.5
Arms and hands	Pre-test	4.60	2.6	46	4.4	1.5	44.4	-	-	-	-	-	-
	Post-test	7.44	1.44	74.4	7.3	1.5	73.6	7.9	1.9	79	7.0	1.9	70.8
feet and legs	Pre-test	4.40	1.9	44	4.0	1.8	40.8	-	-	-	-	-	-
	Post-test	9.24	1.3	92.4	8.0	1.5	80.4	8.7	1.3	87	7.1	1.5	71.6
Total	Pre-test	18.1	5.2	51.8	17	3.2	48.5	-	-	-	-	-	-
	Post-test	29.3	2.9	83.8	26	2.4	76.0	29	3.2	84	26	2.7	76.1

As shown in Table 4 above, when compared across the categories of classical dance: head and shoulders, arms and legs as well as feet and legs, respectively, the findings revealed that that both experimental groups had higher academic achievement than the control groups. It is worth to mention that the first experimental group (E1), after receiving intervention, showed higher students' average mean scores of post-test than pre-test in all categories ; for example, head and shoulders (M= 5.76, SD = 1.42 ; M= 3.76, SD = 1.57). Similarly, arms and hands, E1 showed higher students' average mean scores of post-test than pre-test (M= 7.44, SD = 1.44 ; M= 4.60, SD = 2.65).

Remarkably, when compared the first experimental group (E1) with the first control group (C1), the results from post-test revealed that E1 had higher average mean scores (M= 5.76, SD = 1.42 ; M= 4.32, SD = 0.90) meaning that after receiving intervention, the students were able to achieve higher scores from post-test as compared to no intervention support during their study period. Above all, the results showed both experimental groups had higher average mean scores r than both control groups in all categories.

In addition, the researcher determined the satisfaction of the learning management system by administering the questionnaire to 35 teachers and 35 students. The results are presented in Table 5 below.

**Table 5**  
*Satisfaction of the Terminology Learning System for Thai Classical Dance*

Content	Mean	SD	Satisfaction level	
<b>1. Content</b>				
1.1 The content is suitable for the students.	4.82	0.39	Most	
1.2 The content is easy to understand.	4.71	0.46	Most	
1.3 The language used is correct, concise and clear.	4.75	0.47	Most	
1.4 The sequence is clear.	4.62	0.54	Most	
1.5 The content helps understand more about dance practices.	4.75	0.43	Most	
1.6 The content is valuable as a medium of teaching and learning.	4.71	0.16	Most	
	<b>Total</b>	<b>4.73</b>	<b>0.21</b>	<b>Most</b>
<b>2. Design and implementation</b>				
2.1 The video is clear and attractive.	4.67	0.53	Most	
2.2 The sound is clear.	4.63	0.59	Most	
2.3 Time in each dance position is appropriate.	4.60	0.55	Most	
2.4 The overall screen design looks comfortable and eye-catching.	4.68	0.55	Most	
2.5 The title of each song is attractive and easy to understand.	4.68	0.55	Most	
2.6 The font size and image formats are clear and easily readable.	4.68	0.50	Most	
2.7 The system works continuously without interruption	4.68	0.50	Most	
2.8 The system is user-friendly.	4.71	0.43	Most	
	<b>Total</b>	<b>4.67</b>	<b>0.05</b>	<b>Most</b>
<b>3. Advantages</b>				
3.1 It is effective in teaching and learning Thai classical dance.	4.81	0.43	Most	
3.2 It is regarded as a useful teaching tool.	4.75	0.52	Most	
3.3 It is beneficial for self-paced learning.	4.77	0.46	Most	
	<b>Total</b>	<b>4.72</b>	<b>0.06</b>	<b>Most</b>

As shown in Table 5, in terms of the content of the system for Thai classical dance, the results revealed that the overall results are at the highest level of satisfaction in all aspects with an average mean score of 4.73 and a standard deviation of 0.21 (M= 4.73, SD = 0.21).

Likewise, as for the design and implementation, it was found that the overall results were also at the highest level of satisfaction with an average mean score of 4.67 and a standard deviation of 0.05 (M= 4.67, SD = 0.05).

Finally, regarding the advantages, the overall results were at the highest level of satisfaction in all aspect with an average score of 4.72 and a standard deviation of 0.06 (M= 4.72, SD = 0.06).

### **Discussion and Conclusion**

This study aimed at using the terminology learning system for Thai classical dance through learning management system to help enhance the quality of learning and practice. The proposed learning system offered tools to facilitate the student's learning at their own pace. Two experimental and two control groups were involved in this study. The findings revealed that after employing the learning system, the experimental groups showed higher achievement results than the control groups in all aspects. Likewise, according to the achievement scores, the experimental groups showed higher statistical results than the control ones in all areas.

Furthermore, as for a study period, the experimental groups completed their course within one week while the control ones needed two consecutive months to complete the course. With regard to satisfaction with learning and practice system for Thai classical dance, the findings indicated all at the highest levels. The research findings correspond to several studies such as a study by Ali et al. (2013) that teachers can use the terminology learning system to enhance the students' performance. Hence, it can be concluded that the system is considered effective and beneficial for teaching and learning Thai classical dance.

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***Insights on the Finnish Field of Learning Analytics – Applications and Ethics in Adaptive Education Models***

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**Abstract**

Learning Analytics provide better means of interaction and guidance between educators and students. Through data, we can elaborate on our understanding of the way a student learns and progresses in the education environment or learning management system. Adaptive and blended learning as modern education models can further emphasize the role of learning analytics: since the teacher is no longer present physically in all (or any) learning scenarios or is partially available, the significance of data collection, analysis and reaction models have become crucial. Moreover, we can also administer pre-emptive measures to ensure continued progression by using the data in prediction models. In this presentation, we describe a learning analytics project between several Finnish universities of applied sciences named APOA. The focus is on several empirical experiments conducted in one of the participating universities. We discuss the design and the setup of the cases along with our findings on the effectiveness to student performance and motivation, and teachers and students' perceptions of the experiments. Moreover, the ethical aspect of the experiment is observed along with limitations of the cases. We conclude by providing our lessons learned and by offering some hints and tips for other researchers, who might be conducting similar experiments later.

Keywords: Learning analytics, standardization, adaptive education models, distance learning, online learning, privacy, education ethics

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## Introduction

Although the concept is quite new, learning analytics itself is not a novelty. Teachers have evaluated their students and their performance with whatever means they have come up with, such as traditional exams, notes and attendance sheets. The summaries of student's performance have just taken a lot longer to produce. Today the same data (and more) is collected through different educational systems. The ECAR study (2019) concluded that at Satakunta University of Applied Sciences, 69% of the students had used a learning management system (LMS) in all their courses during the past year with 91% using it on most of their courses. (ECAR 2019) Considering that the university is polytechnic in nature, this makes for an interesting premise.

Various countries and their educational institutes through the last decade have begun to take an interest in learning analytics as a possible way to monitor, study and improve the quality of education. The term learning analytics has been defined by Siemens (2013) as the measurement, collection, analysis and reporting of data about learners and their contexts, for purposes of understanding and optimizing learning the environments in which it occurs. The data collected from systems used in education is used to expand our understanding of our students, faculty, education methods and effectiveness of the education in general. For example, through data we can study the students behavior, habits and progression in studies, faculty's teaching methods and their effectiveness but also on a grander scale general information on graduation averages, learning preferences of students via different education models and university's students overall succession in studies (Clow, D. 2013).

Since digitalization has settled into our societies, the amount of data we have around us should be to some extent utilized for the betterment of our society and learning analytics should be no exception. Now the amount of data available for use in analytics is almost infinite. However, the application of all said data is still unclear since all the ways and applications for data in analytics have yet to be found. In addition, said masses of data contain trash data, which is invaluable for now, and sensitive data, which cannot be used to the fullest because of regulations, laws and ethics.

### *Previous Research on Learning Analytics*

The concept of Learning Analytics (LA) has been confirmed to have a visible impact on the learner engagement and academic outcomes as proven by several studies including Corrin et al. (2016), Schmitz et al. (2017) and Donggil S. (2018) to name a few. The defined subject of Learning Analytics and ethics has also been studied by a few research groups such as Slade & Prinsloo (2013), Siemens G. (2013) and Pardo & Siemens (2014). The fore-mentioned studies have already concluded that learning analytics can be considered a legitimate field of research that has an increasingly vital connection to privacy, data ownership and ethics (Siemens G., 2013), and that with large data handling becoming a standard practice higher education institutions should consider forming ethical frameworks for offering appropriate ways, strategies and methods in the application of learning analytics (Slade & Prinsloo, 2014). So, at the time of this study the integration of learning analytics is seen as an essential part of the frame which around future education systems are built upon. In previous studies learning analytics has also been noted to follow the levels of complexity from

descriptive to diagnostic, predictive and finally prescriptive of which we will mostly focus on the first descriptive level of analytics in this study. (Banerjee et al. 2013)

### *Learning Analytics in Finland*

The Finnish higher education is split with the dual model, universities of applied sciences having a focus on pragmatic education responding to working life requirements. (Ministry of Education and Culture Finland, 2019) The degree programmes in Finland generally are diverse and some of them are heavily legislated by educational laws and requirements. Also, with an open university model, the studies are usually offered to anyone regardless of their educational background. The open university gateway to a higher education degree means that the studies are also offered with an adaptive teaching model where the students can for example maintain their full-time employment while studying. This creates a fundamental need for an adaptive education model, since the background of everyone requires a different approach. In turn, this also necessitates the use of learning analytics.

The research and study of the field is done by several entities; most of the universities conclude their own studies. A national division is directed by the Ministry of Education and Culture with the aim of operating as a collaboration group between several education institutes in the field. Formed in 2016 by the University of Turku, the Center for Learning Analytics is dedicated to the research and development of the field in all levels of education with the vision of improvement of the Finnish educational system. The Center also acts as a mentor to the APOA project. Between universities we have APOA, AnalytiikkaÄly and eAMK projects. (eAMK 2019) Previously a project named Adaptable Learning Paths (fin. Poluttamo) was focused on developing practical means and models to help secondary school students control their educational progress specifically under transition phases between levels of education. (Poluttamo 2018) The APOA project (*Avain Parempaan Oppimiseen Ammattikorkeakouluissa*, eng. Learning Analytics in the Universities of Applied Sciences) is one of the two ongoing studies focusing on the standardization of learning analytics in higher education institutes along with its counterpart AnalytiikkaÄly (*IntelligentAI*). Universities are represented by the AnalytiikkaÄly project and universities of applied sciences by the APOA project. (APOA, 2019) Both of the projects have the same goal; standardization of learning analytics in higher education. In practice this consists of piloting and engaging users of learning analytics through a pedagogical perspective, creating new ways to support higher education studies with learning analytics applications and practices, combining existing national and university-level databases, systems and tools with the application of learning analytics in mind and supporting the continued development of individual educational paths. (APOA, 2019) (AnalytiikkaÄly, 2019) Individual education paths are also considered an essential part of the adaptive education models in the project and as such the study subject is relevant.

### *Ethics and Privacy in Learning Analytics*

The premise in which data is used for analysis does not bode without some concern raised about data protection and personal information privacy policies. The ethical part consists of the way data is collected, handled and stored, and who has access to data in all stages. Institutes collecting data in any way should make it clear for which

purpose they are collecting it, be it for reporting, business analyses or learning analytics. The European GDPR data protection legislation has made things for learning analytics in Europe much more complicated. (European Commission, 2019) Universities in Europe must consider how to create applicable recommendations and policies for the effective and ethical use of learning analytics in the universities. GDPR made it that data protection in the EU area now has stronger rules on handling of personal data. The regulation made it so that companies in the EU cannot collect data without permissions, must be able to present all available data on individuals on their request to them (as the owners of their own data) and should limit their data collection to essentials only. Therefore, companies and business, including educational institutes, have all had to create a new data policy to accommodate the new regulations. To learning analytics this means that no data can be gathered without consent and we must limit our collection of data to as few sets as possibly to avoid profiling of individual students.

### *Adaptive Education Models with Learning Analytics*

Some could argue that modern adaptive education models paired with learning analytics is the perfect culmination of teaching, where learning methods can adapt to everyone's needs making the learning experience more efficient. In addition, adaptive education models can accommodate to the usage of multiple models or types of teaching in the same course. The students can in a way choose their paths to course completion depending on their preferences and learning habits. In Finland it is quite common in higher education for the student to be presented options for completion at the beginning of the course which can be as follows;

1. Traditional lecture type course where the student attends classes and takes an exam
2. Blended course where the student attends some lectures and does part (or all) of the course assignments in LMS system
3. Distance course where the student *can* partake in lectures but can also participate in them via an online conferencing system and do assignments via LMS system
4. Online course where the student can participate in online lectures or recorded lectures and do the assignments remotely via LMS
5. Completion through recognition of prior learning practices where the student has already substantial knowledge and experience on the subject and wishes to prove said expertise by taking an exam

In the scenarios 3-5 the student can essentially complete the course without being physically present. The scenario 5 also contains on-the-job learning. In the scenarios 3 and 4 the student will be accumulating the greatest amount of data since most of the activities regarding course progression will be done through some system and as such accumulates logs. While in the scenarios 1 and 2 some data will be generated these will not offer substantial certainty about the student's performance nor behavior. As such it should be discernible that learning analytics is best paired with course types 3, 4 and 2 in some extent for the greatest effectiveness. As such in courses that follow the adaptive education model where students can progress in different paths towards course completion the amount of data on each student varies greatly and the potential benefit of learning analytics accordingly.

It should be noted that that while the most amount of data will be gathered through the fore-mentioned scenarios it does not inherently mean that enough data is gathered since the student can display minimal presence in the systems used to gather data for learning analytics. This is highly dependent on the amount of accessible materials, assignments and other points of interest in the course that could potentially log data. Course design also plays a key role in generating relevant data that can be used for learning analytics. Course can be implemented with analytics tools without considering course design, but in doing so a lot of unnecessary and irrelevant data can be gathered.

## Methods

Prior to the use of so-called lower level analytics tools in our educational systems, surveys were conducted about the expectations of the faculty (teachers) regarding analytics and their application in fore-mentioned adaptive education courses. One key factor that was measured was the increase in the instances of lower level analytics tools in our LMS prior, during and after we had given training to the faculty about the applications. After the conclusion of the courses, the surveys were replicated with the teachers to measure their change in opinion, understanding and application. In addition, the participating students were surveyed after the conclusion of the courses about their opinion about the experiment regarding the visibility and aid of the learning analytics and whether they thought the impact of such tools is crucial for more personal and in-depth learning experience. As the focus of the study was not only on the application of learning analytics in different education models and situations, but also in the ethics of data gathering and personal privacy, the data gathered from the study could be effectively processed to provide results for the subject as well. We also surveyed the opinions of the students about the ethical side of the study which consisted of their perceived possibilities and threats about learning analytics.

### *Participants*

The participants for this study were four teachers each from different degree programs and fields of expertise with very differing teaching methods. One of the previous used adaptive teaching models consisting of contact lessons, distance lessons and independent study as a part of the course. Two teachers opted to use distance learning only since the courses in question has only been done via the said method during previous terms and one also held the course via traditional contact lessons only. Three of the courses were for students studying for their bachelor's degree, one for master's degree. The third bachelor course begins later in January 2020 so we can only use the expectations of the completed at this point. Out of the 138 in the remaining three courses 46% (62) answered our survey:-

Table 1: Pilot courses

Course #	Course A	Course B	Course C	Course D
Level	Bachelor	Bachelor	Master	Bachelor
Course type	Blended	Online/Distance	Distance	Online
Student #	77	35	26	TBA 2020/01

### *Measures*

Surveys formed a part of the results in the study but also measured will be the actual data around the courses grade averages and activity. These could be reflected to some extent on the consecutive runs of the same courses by the same teachers during terms prior. Additional information for the results were provided by an additional study about the opinions of new students on learning analytics as well as the ethics of data privacy. The results were then mirrored on the assumptions, expectations and actual data surrounding the topic of the study. This included the teacher interviews prior to introducing learning analytics, student's assumptions on learning analytics without prior knowledge and the data provided by the LMS, examination and student management systems.

For the ethics portion of the study the goal was made simple; produce recommendations for the ethical framework for the use of learning analytics in higher education, to be further used in the ongoing project. As the project consists of numerous Finnish universities of applied sciences also participating in the creation of the recommendation, the recommendation on our part as of now would consider how learning analytics should be used in higher education and what we should generally take into account regarding privacy, training and application in learning analytics. This meant also taking into consideration the GDPR legislation of the European Union.

### *Procedures*

At the first part of APOA project was found out teachers' expectations about learning analytics; what were the most important things they should know about students and their studying? In a previous survey made by the project regarding the subject it was established that students and teachers views on what analytics should do for them aligned quite well. (Teräs, H. & Teräs, M. 2019) The views were highly focused on the pedagogical quality and its improvement. These seven most important themes were found:

- 1) Student group data about their previous studies and background already before course starts. This information is needed for course design.
- 2) Learning and analytics design: how to plan the course so, that analytics data would be useful.
- 3) How to plan learning path and make it visual to students and teachers
- 4) Supporting communication between students, student group and teacher.
- 5) Feedback systems (automatic feedback to student who (f. ex.) has not yet started the course, feedback to support student's reflection during the course and for teacher to find students who need help)
- 6) Visualization of students learning – the way to see what students have learned
- 7) Usage of materials (were they useful, when were they read and how long students read them).

Our projects previous student workshop showed students had ten themes as opposed to the teachers seven. Identical themes from the student workshops were learning paths, feedback, materials, and visualization of learning. (Teräs, H. & Teräs, M. 2019) It is these themes that we intend to measure from the teachers in the pilot courses

through the surveys, proposed hypotheses and application of lower level descriptive learning analytics tools.

### *Prior to the courses*

We surveyed the teachers involved in the project about the assumptions and expectations regarding learning analytics. What they think it is? How does it work? How can they improve their courses? All based on their idea of what learning analytics is and how to implement it. We used the previously mentioned seven themes as a starting point for the surveys.

One relevant point the teachers brought up in the surveys was the desire to develop learning. By developing learning through the use of learning analytics the teachers expressed their desire to help students develop their own ways of assessing themselves in their study through the use of learning analytics and that the teachers role would become something more of a supporting figure in the endeavor. This would support the themes of learning and course design, but also contain the entirety of expectations surveyed previously in the project. The pilot teachers clearly expressed the need for learning analytics as a means for teachers and students to better their performance. On the other hand, they also expressed their worry regarding the amount of contribution it would need to create a so-called perfect environment for the use of learning analytics. Considering that the course would need to be fully structured around the most efficient use of the learning analytics tools it would require a considerable amount of time designing. Time required for designing is also considerably extended when the teacher in question has a multitude of different courses to hold, each of which would essentially require a new course design based on the effective use of the analytics tools which in turn would of course vary by the course requirements, details, assignment types etc. The courses created and used in the project would be based only on the extent of knowledge regarding course and learning design and learning analytics of each teacher.

Several hypotheses were proposed to the teachers as means measure their assumptions and expectations. The hypotheses were based on learning analytics and ethics. The last four were proposed by the teachers themselves. These would be reflected upon after the pilot courses had been completed. The hypotheses were as follows:

1. *Visually seeing the course progression will motivate the student towards course completion.*
2. *The student is solely responsible for his progression towards course completion.*
3. *Personal feedback is essential for good performance in a course.*
4. *Students performance in general is better in courses applying learning analytics.*
5. *Learning analytics benefit students especially during self-study periods.*
6. *Learning analytics initial time investment does not surmount the benefits of use.*
7. *The student does not know how to benefit from learning analytics.*
8. *Learning analytics encourages students to evaluate their own performance realistically.*

Students were not surveyed in the similar manner prior to the courses but for the ethics proportion of the study we did include a survey after the courses regarding the student's extent of knowledge on the topic of learning analytics, data protection and ethics.

#### *After the courses*

After the courses were completed the teachers were interviewed in a similar manner about learning analytics and what had changed between the duration of the courses using lower level analytics tools. Students were surveyed in this part of the study to see mostly did the teacher follow through the course using the tools and how they manifested in the student's point of view.

Going back to the teachers seven themes, assumptions and expectations of teachers stated previously prior to the courses as the benchmark for this analysis, we can at this point already see the pedagogical benefit the teachers attained. Six of the seven themes were seen actualized after the courses; the only one absent was the first theme of student awareness from teacher's point of view as the teachers did not have access to prior data about the students before the courses. Learning design and study process were fulfilled early on during the creation of the courses, feedbacks were used throughout the courses as a way to support the student's progression, course completion analytics tool gave the students a way to evaluate and monitor their own progress, interaction was guided by the analytics tools and material usage was visualized for teachers via activity heat-mapping.

Out of the eight proposed hypotheses three (1,3 and 5) were considered fulfilled by the teachers after the courses;

- *Visually seeing the course progression will motivate the student towards course completion.*
- *Personal feedback is essential for good performance in a course.*
- *Learning analytics benefit students especially during self-study weeks.*

Furthermore, during the interviews with the teachers after the courses it was agreed that learning analytics give substantial benefit when handling larger groups which have students in need of tutoring and guidance. With the learning analytics tools the students requiring assistance were more easily identified and could also be to some extent, guided in quantities rather than one at a time reducing the total amount of time teacher spends guiding students in one course. All teachers also expressed their interest on using the analytics tools in the future and further developing their courses to support them.

The student's opinions on the use of learning analytics are almost unanimous. The students who partook in the courses with lower level analytics tools agreed that the learning path towards course completion was constantly visible which was generally favorable.



### *New students survey*

Prior to this study we did a workshop regarding the ethicalities of learning analytics and this was reflected on the general survey we did. While the pilot course students were surveyed on the effect of learning analytics, data protection and ethics in general the survey made for the new students that began their studies this Fall semester was heavily focused on the ethics of learning and data analytics. The amount of answers we got this survey was 398.

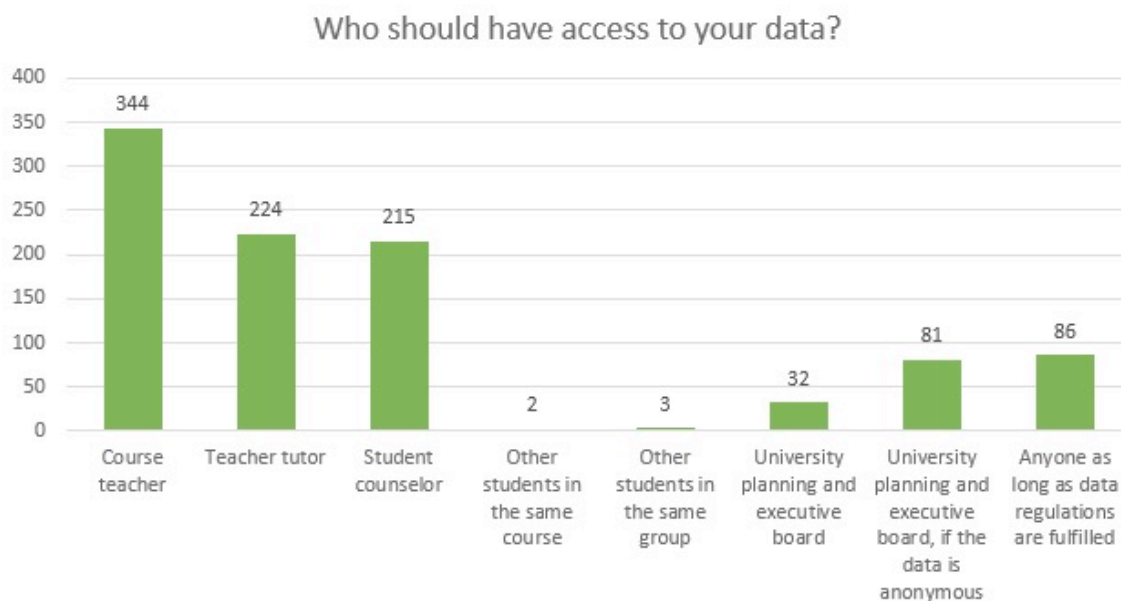


Figure 1: Who should have access to your data?

Ethical considerations from the students were very broad in nature. We could clearly see a divide in the knowledge between students who are studying in a technologically inclined degree program compared to other sciences. Still the students of today seems to be quite aware of data abuse, the need for data protection and regulation as well as consider the ethicality of analytics and the extent of it. Everyone mostly agreed to the idea of giving their educational data for learning analytics seeing the benefit in it. 83% (330) of the new students knew that the digital study environments (LMS, examination system, conferencing software) collect data as activity logs but only 23% (93) knew about learning analytics as means to harness said data.

The ethics discussion in the survey also covered the threats and possibilities offered by use of analytics in general. As learning analytics is a sub-field of data analytics one can say it has the potential for something great in the form of predictive and prescriptive application but also quite the opposite possibilities such as data theft, abuse and misuse. The new students were asked about the following regarding data and learning analytics:

*“My consent on the use of my data is highly dependent on the application.”*  
Agreed by **91%**, 9% did not know.

*“I believe I can be profiled through data combination from several data sources.”*

Agreed by **52%**, 34% did not know and 14% disagreed.

*“I need to know what data others have about me (data-symmetry).”*

Agreed by **85%**, 13% did not know and 2% disagreed.

*“The amount of data on one individual affects the performance of analytics.”*

Agreed by **72%**, 29% did not know and 1% disagreed.

Threats students saw learning analytics can pose were the fore-mentioned data theft, abuse and misuse, but also data leaks, breach of personal privacy and excessive guidance were present. The need for additional computing capacity and servers which could potentially fail and result in loss of data were mentioned. Possibilities included better and more personal guidance, student motivation through visible progression and more efficient studies through digitalization. Out of the 131 (33% of 398) students that replied to this topic 50 (38% of 131) did not see neither threats or possibilities, threats only 30 (22%), possibilities only 28 (21%) and both threats and possibilities 26 (19%). As such more threats than possibilities were presented by this sample. To end on a positive note, out of the 398 students in the survey 348 (87%) wished for the teacher to follow their course progression.

## Conclusions

In conclusion we achieved results for all our outlined goals in the study; the goal which was to outline from an ethical point of view how we should handle learning analytics in an educational environment that consists of multiple and adaptive education and teaching models. The results of the study should benefit all projects, research and study into the field of learning analytics. Considering the ongoing nature of our project we must also highlight some questions we intend to answer in the future while continuing the project.

Learning analytics is something teachers and students alike expect to benefit from. Teachers focus on the subject is more towards the development of learning and course design while the students are more on personal betterment. Learning analytics may be implemented on any institute easily given the abundance of available tools and software, but another matter altogether is the amount invested in learning the most efficient way to apply said analytics tools. The learning path had to be reformed to supplement the analytics tools. Teachers in this study had previously been accustomed to using modern LMS, examination and conferencing software to deliver the courses but regardless training was required. Since the beginning of the project we have offered various lower level analytics tools and training for teachers and have since seen a steady growth in both interest and application of said learning analytics tools.

Teachers in this study were all positively taken by the lower level learning analytics tools and will be further developing their own ways of using learning analytics as a part of their courses. The students generally were favorable towards the use of learning analytics with minor observations; the data should only be processed on a need basis and they should be informed about the use of learning analytics and its nature, extent, prior.

Recommendations for anyone partaking in the application of learning analytics would be as follows; generally learning analytics pave the way for more effective courses but at the expense of requiring a new course and learning design for it to make any sense. The amount of time educators must invest initially into learning analytics tools in different systems will eventually pay off and will benefit teachers and students alike. Teachers in this study were fortunate enough to have gotten project hours to spend on their course design and training which lowered the bar for the initial stages of the application.

For the future the study has proposed these questions about learning analytics that we will be addressing; Should learning analytics be made a permanent part of the learning design given how data-oriented our society is or should we still be able to choose to study without overly exact analytics tools? And at which point can we progress from just using lower level descriptive analytics tools to diagnostic, predictive and further to prescriptive models? When do we have a definite amount of data from a student's learning path?

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***Teaching Students with Autism Spectrum Disorder (ASD): An e-Module for Teacher Training in Lao's People Democratic Republic***

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**Abstract**

The global prevalence of autism spectrum disorder (ASD) has increased markedly in recent decades. However, many mainstream teachers are lacking knowledge and skills to teach students with Autism Spectrum Disorder (ASD) in inclusive settings, particularly in countries with limited resources. To address the issue, we designed an e-module called 'The Story of Khamdy', which will be made available in the Facebook Social Learning Platform for free access. A novelty of this e-module is the presentation of a story through the compilation of over 200 pictures that illustrate the everyday experience of a boy with ASD called Khamdy and how his parents and teachers helped him cope with different daily living challenges. The acquisition of knowledge from the story was reinforced by 100 quiz questions which were designed to facilitate knowledge recalling and retention. The generalization of knowledge was enabled by the application of CCAF model (the initials stand for context, challenge, activity, and feedback) in the design of the assessment questions of this e-module. In a preliminary study, the efficacy of this module was assessed to inform the effectiveness of this e-module as a virtual interactive e-learning application for the purpose of ASD teacher training in Lao's People Democratic Republic, a country categorized as one of the least-developed countries by the United Nations.

Keywords: Autism Spectrum Disorder; Lao PDR; Teacher Training

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## Introduction

Today, there is increased awareness about Autism Spectrum Disorder (ASD). However, many teachers reportedly do not have adequate knowledge and skills to teach students with ASD in inclusive classrooms (Low, Lee & Che Ahmad, 2018, Low, Lee & Che Ahmad, 2019). ‘The Story of KhamdyTM’ is a 20-unit teacher training module about effective social communication and inclusion for young children with Autism Spectrum Disorder (ASD) (Low et al., 2019). The main component of this module is a 20-unit story which illustrates the everyday experience of Khamdy, a boy with Autism Spectrum Disorder (ASD), and how his parents and teachers helped him manage different learning and daily living challenges. The topics covered in this module include disputing the myths of ASD, identifying the early signs of ASD, early diagnosis and intervention, support for family, preparing for inclusion, social communication strategies, learning skills, friendship and bullying prevention, and transition to puberty and adulthood. Through a series of illustrations with easy-to-understand descriptive texts, this module aims to provide a meaningful and engaging way of learning about effective social communication and inclusion for young children with ASD. The module consists of four components:

The entire module is presented through a Social Learning Group called “The Story of KhamdyTM” via the Facebook platform. It utilises the advantages of eLearning to enable module learners access the learning materials at any convenient time and locations. Guided by the general principles of Universal Design for Learning (UDL), each component is specially designed to optimise the learning outcomes (Rao, Edelen-Smith, & Wailehua, 2015) Multiple modes of presentations are used to deliver the module content, including video, infographics and texts, in order to offer learners a variety of ways to interact with the module contents. Additionally, the quizzes and assessments comprise questions in different testing formats that help learners engage with the materials and personalise their learning.

Facebook is chosen because of its popularity, familiarity, accessibility and affordability to communities of many countries, particularly to those in developing and the least developed countries. This means that barriers such as acquisition of complex technological skills can be reduced drastically. Secondly, Facebook has a relatively strong sustainability record and policies that allow free access and maintenance of pages, all of which are important for ensuring the sustainability of this module in the long term. YouTube and Google Form are embedded in the module to complement and enhance content delivery.



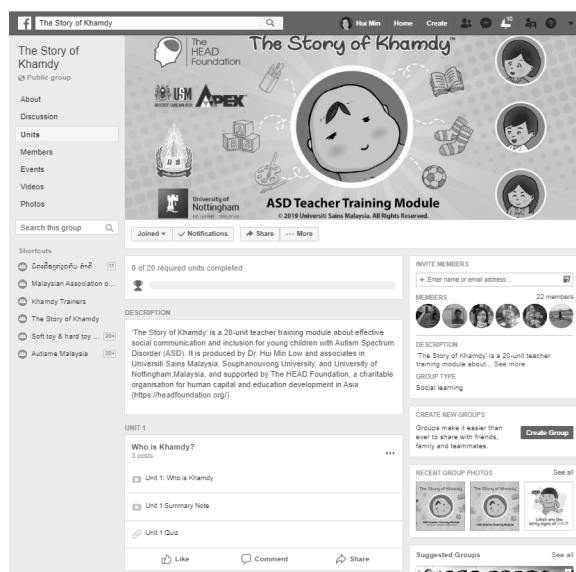


Figure 1 Facebook Social Learning Group

Module learners are encouraged to pace their own learning according to their convenience, schedule and learning capacity. For instance, learners can choose to complete a few units in a day or pace their learning across several days within a week or two. Pacing their learning across a few days instead of cramming all 20 units into one day will also allow learners sufficient time to process and retain the information effectively, as well as to reflect and apply the knowledge gained. To test the efficacy of using this e-module for teacher training, a preliminary study was conducted with a sample of teachers in Luang Prabang, Lao PDR.

## Method

110 teachers from 25 schools in Luang Prabang were recruited by District Department of Education in Luang Prabang, Lao PDR to participate in this teacher training. Among these teachers, 87 of them completed the pre- and post-training knowledge assessment, using the Lao language version of Autism Stigma and Knowledge Questionnaire, ASK-Q (Harrison et al., 2017). The permission of translation was obtained from the ASK-Q developer. ASK-Q consisted of 49 items which assessed three specific domains of ASD knowledge, namely knowledge of diagnosis (18 items), etiology (16 items), treatment (14 items) and a general question about ASD knowledge (i.e., “I have prior knowledge of autism”). Among the 48 knowledge specific items in ASK-Q, there were 29 correct statements (e.g., Some children with autism may lose acquired speech) and 19 incorrect statements (e.g., Autism is preventable). Reserved coding was conducted for items with incorrect statements using the Excel template created by Harrison et al. (2017). Given that, only a unitary set of binary responses (i.e., ‘1’ and ‘0’) was produced, in which ‘1’ reflects having had the correct knowledge; while ‘0’ reflects not having had the correct knowledge. Composite scores were computed to represent the overall ASD knowledge and also the knowledge specific scores (i.e., knowledge about diagnosis, etiology and treatment).

## Results

Comparison of pre-training and post-training ASK-Q results (N=87) revealed statistically significant knowledge gain in the all the three knowledge dimensions,  $p < .001$  (refer to Figure 2). Specifically, the most notable knowledge gain was recorded for the dimension of diagnosis; from only 34.3% of teachers having had adequate diagnosis-related knowledge before the ASD teacher training to as many as 68.8% of them having had adequate diagnosis-related knowledge after the training (34.5% increase). This was followed by increase in the dimension of treatment-related knowledge (from 7.5% with adequate knowledge to 21.9% with adequate knowledge), and lastly in the dimension of etiology-related knowledge (from 1.4% with adequate knowledge to 7.5% with adequate knowledge).

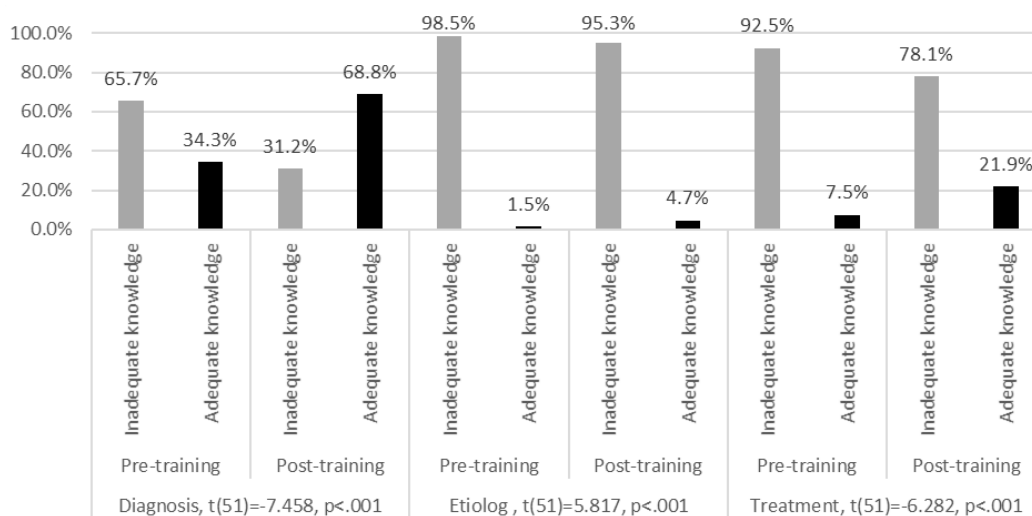


Figure 2 Pre- and post-training knowledge levels

## Discussion and Conclusion

The creation of The Story of Khamdy™ is unique in several aspects. First, it is the first teacher training module on the topic of ASD that delivers information about ASD through a pictorial narrative approach (Low et al., 2019). The teacher training using this module is done through the process of telling a story using colorful illustrations which portray the every life experience of a child named Khamdy and how his parents and teachers supported him in this growing and learning process. Second, to make the teacher training fun and entertaining, the story is told using 20 multimedia videos which incorporated animation effects, audio narration and background music. The multimedia effects were added to add extrinsic motivation to the teacher training and ease memory retention. Third, this module is one of the most comprehensive teacher training modules on the topic of ASD as the content covers 140 information about effective social communication and inclusion for young children with ASD, including as many as 92 activities that teachers can replicate with young students with ASD in schools.

The findings from the preliminary study demonstrated that The Story of Khamdy™ is effective in promoting positive knowledge gain in a sample of teachers in the Lao PDR. Statistically significant knowledge gain was recorded across all knowledge

specific domains measured, namely knowledge about diagnosis, etiology and treatment of ASD. In conclusion, it is hoped that this module offers a means of easily accessible and sustainable teacher training on the topics of effective social communication and inclusion for students with ASD in the Lao PDR and other countries alike.

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***The Development of Professional Learning Communities (PLCs) in the Philippines: Roles and Views of Secondary School Principals***

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**Abstract**

There is a growing body of literature that recognizes the importance of teacher engagement through professional learning communities (PLCs) as a new approach to teacher professional development. Unlike traditional approaches to teacher professional development, PLCs redefine professional development from programs that regard teachers as passive learners to programs that regard teachers as active learners responsible for their professional development. The study explored the roles and perspectives of secondary school principals in the development of PLCs in the Philippines. It is an underlying assumption that principals' understanding of their roles in the implementation of teacher professional development policies in schools is central to the formation of PLCs. This raised two important questions: How did principals view and implement national policies on teacher professional development in the school level? And, how did they perceive and establish PLCs in their schools? The study utilized a qualitative research methodology based on an interpretive paradigm. Through the use of semi-structured interviews alongside policy analysis, three main themes emerged: lack of continuing teacher professional development programs in the Philippines; varying views of principals in the development of PLCs in schools; and, effective leadership styles as key to support continuing professional development of teachers. The lack of continuing teacher professional development programs suggests that principals in the study failed to establish PLCs in their schools. This offers some important insights on the leadership experiences of principals in the implementation of national policies on professional development and how it affects their roles in supporting teachers' continuing professional development.

Keywords: professional learning communities, professional development, professional learning, principal leadership, school leadership, community of learning

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## **Introduction**

The Philippines is going through massive transformation in its education system, from drastically changing the basic education curriculum, mass hiring of teachers and principals in the public schools, building of thousands of classrooms and to establishing more schools. These changes are part of the government's commitment to expand the access of the public to quality education. Despite this intent to increase the quality of education, it has been observed that less attention is drawn to improving the quality of teaching and learning. Many different educational reforms have been introduced, but most of them were focused on organizational changes, rather than looking closely at the problem behind the poor performance of many schools.

More than ten years ago, the Philippines had one of the best performing education systems in the South-East Asia. In 1998, a study conducted by the Graduate School of International Development of Nagoya University, Japan, showed that the literacy rate in the Philippines was quite high compared to other Asian countries (Toyooka, Kim, Tsuchiya, Ogura, & Kondo, 2000). In fact, the enrolment rate at the primary and secondary level of education was at 99.9% and 77.8 % respectively, ratings which were higher than Singapore's and the rest of the ASEAN countries (Toyooka et al., 2000). Almost ten years after the Nagoya University study was conducted, the quality of education in the Philippines deteriorated. The Australian Educational Researcher Journal reported in 2007 that the Philippines was lagging behind other countries when it came to basic education (Orleans, 2007). "The Philippines ranked almost at the bottom of the list of seventeen (17) nations that took part in [this] large-scale evaluation of educational achievement" (Orleans, 2007, p. 33). The reason behind this poor student achievement, as Orleans (2007) argues, is accounted for by factors outside and inside the classroom. When it comes to factors inside the classroom, he points out that teacher quality most affects student performance.

Improving teaching quality has always been one of the major challenges of the Philippine education system. Although efforts such as providing sufficient school infrastructure such as buildings and classrooms has been made in order to achieve quality education (Department of Education, 2014), the availability of resources to help teachers improve their performance is still considered poor. As a result, the Enhance Basic Education Act of 2013, commonly known as the K to 12 Law, has been implemented in the hope of creating massive school reform. This reform included a drastic shift in the basic education curriculum, vast organizational change, and massive hiring of teachers, among others. And in order to aid teachers through the transition in the curriculum, they were provided with various workshops and training. The downside of this training, however, was that teachers were only given one week to digest their learning. A week after that, they were sent back to their schools to don a new role. Hence, teachers were experiencing enormous pressure in meeting the new expectations of their roles.

## **The Philippine education system today**

The K to 12 Law has brought about substantial reforms in the Philippine education system today. For decades, the Philippines has been the "last country in Asia and one of only three countries worldwide with a 10-year pre-university cycle (Angola and Djibouti are the other two)" ("K to 12 General Information | Department of

Education,” n.d., n.p.). This was changed in 2013, when the government approved into law the Republic Act No. 10533 or the Enhanced Basic Education Act of 2013. This law required the country’s education system to comprise the following:

At least one (1) year of kindergarten education, six (6) years of elementary education, and six (6) years of secondary education, in that sequence. Secondary education includes four (4) years of junior high school and two (2) years of senior high school education. (Aquino, 2013, p. 1)

Besides increasing the number of years in the basic education sector, the Department of Education also formulated a new curriculum design which aimed to enhance the global competitiveness of the Filipino graduates. Beginning from the kindergarten and the first three years of the primary education, the Mother Tongue- Based Multilingual Education (MTB-MLE) will be used. This means that instructional materials and the mode of teaching will be localized. Teachers will be using the mother-tongue or the language first learned by the child as the medium of instruction. Many researchers, especially language experts, argue that the MTB-MLE is an effective way to help children transition their learning from Filipino to English, as their cognitive and reasoning skills are developed when they learn how to operate equally in different languages (Renomeron, 2014). In addition, they also find this effective in restoring and preserving the country’s native language. Difficulties arise, however, when some of the early childhood education teachers are not familiar with the children’s native language, and the books used for instruction are not in the children’s mother tongue. Currently, the MTB-MLE instructional materials are printed in only twelve languages, as they are the only languages recognized by the Department of Education. This is another drawback of this program, given the Philippines is home to a total of 182 native spoken languages (Collin, 2010).

Furthermore, the secondary education sector faces an equally challenging transition into the implementation of the new curriculum. Increasing to two more years in high school translates to an increased number of enrolments which requires more schools, more classrooms, more teachers, and more school leaders. In order to respond to this challenge, the Department of Education constructed more classrooms, hired more teachers, and invested a billion pesos more of the budget in the basic education sector (Department of Education, 2015). In addition, every school’s human resource was also improved by providing relevant content and pedagogy training to teachers and leadership skills enhancement for principals.

### **The Issue**

The Philippines is currently undergoing a massive transition in its education system as it commits to transforming Filipino children into globally-competitive lifelong learners. The provision in the law to provide teachers and school leaders with the relevant and necessary training to help them deliver the expectations of the curriculum shows that the government understands their critical role in its success. While principals have indirect influence on students’ achievement, they have a crucial responsibility in helping teachers effectively perform in their roles. As Morrison and Cooper (2008) suggest, principals “exercise significant positional power and

influence” (p. 106) in helping teachers make lifelong commitment in improving their practice.

The state mandates all educators to participate in the in-service training and workshops for their professional development. However, these are traditional approaches, which have received many criticisms from educational researchers, as they tend to become costly, fragmented, brief, inconsistent, and disconnected from actual classroom practices (Chalmers & Keown, 2006; Schlager & Fusco, 2003; Villegas-Reimers, 2003). In my experience as a secondary school teacher in a public school, for example, most of our professional development activities required attendance outside the school. This entailed budget for my transportation and accommodation, which are rarely subsidized by the school. Additionally, these professional activities are, most of the time, in the forms of direct instruction of theoretical insights through seminars and workshops. As teachers, we are left with the responsibility of translating these theories into practice. As a result, teachers who have difficulty in translating new learning into their practice tend to go back to their old ways.

There has been an increasing interest in professional learning community (PLC) as an effective approach for teachers’ professional development. Unlike training, workshops, conferences and other means for teachers’ professional growth, many researchers claim that PLC creates conditions in schools that help teachers learn and grow professionally (DuFour, 2012; Roberts & Pruitt, 2009; Sergiovanni, 2009). These conditions are creating a culture of collaboration, shared leadership, shared vision, and collective learning, among others.

In light of this, this study aimed to gather and explore the possibilities of the development of PLCs in the Philippines by looking through the views and perspectives of secondary school principals. In order to unravel these views and perspectives, this research was guided by the following research questions:

1. What are secondary school principals’ perspectives about existing policies for teacher professional development in Philippine public schools?
2. How do secondary principals implement these policies in their schools to support the professional development of teachers?
3. How do principals view professional learning community (PLC) as an approach to support teachers’ professional development?
4. Have the secondary school principals established PLCs in their schools to facilitate teachers’ professional development?
5. If yes, what are specific steps secondary school principals have undertaken in facilitating PLCs? If no, what are the constraints and affordances they perceive in developing PLCs in their schools?

### **The Significance Of The Study**

The study aims to contribute in the growing area of research exploring the concept of professional learning communities as an approach to teachers’ professional development in schools. Specifically, this may help secondary school principals view professional development from a different angle. It is the intention of the study to open their eyes to seeing new and exciting opportunities to help their teachers grow



and develop professionally.

In addition, the findings of the study could make an important contribution to the policy makers for training and professional development of teachers in the Philippines. It is for the reason that to date, there has been a paucity of current research literature that explores the views of principals in the development of PLCs in the country. The study is the first of its kind, as previously published studies on teacher professional development have not tackled PLCs using the context of the Philippines. Furthermore, this research will be beneficial for teachers, as the development of PLCs in schools would entail having a staunch support system for them. The very presence of PLCs in schools will make teachers feel valued, appreciated, and supported as they strive to effectively improve the quality of learning in their classrooms.

Finally, and most importantly, the study may indirectly benefit students, as it aims to help improve the conditions of teaching through the formation of PLCs at school level. It is understood that when teachers feel valued and supported in their work place, they are more likely to be motivated to better perform their roles.

### **The Context**

The Philippines is an island country located in the South East Asian region. It is an archipelago that consists of 7,107 islands. This archipelago is divided into three major island groups, which are Luzon, Visayas, and Mindanao. The country's capital city is Manila, which is located in the central part of Luzon. Besides the three major island groups, there are also many smaller islands that have their unique characteristics, languages, religion, and culture. The Philippines is a tropical country, which means it only has two seasons—wet or dry.

The dry season is from January to May, while wet season is from June to December. During the wet season, the winter monsoon triggers monsoon rains that normally carry strong winds and higher sea levels. The Philippines sits inside the typhoon belt; hence it suffers annual onslaught of heavy and dangerous storms from the months of July through December. It is not uncommon for public schools to suspend classes for a couple of days or weeks depending on the expanse of the typhoons' devastation. These natural calamities and disasters are threats to the people's well-being, as it derails socioeconomic progress and requires complex recovery interventions (Frankenberg, Sikoki, Sumantri, Suriastini, & Thomas, 2013). For example, in November 2013, the Eastern Visayas region was badly hit by typhoon Haiyan. Haiyan was one of the strongest typhoons ever recorded to hit land (Lum & Margesson, 2014). It damaged 2500 public schools and destroyed 12, 400 classrooms ("Two years after Typhoon Haiyan, the school rebuilding goes on," 2015).

In particular, this research takes place in Masbate, the southernmost island province in Luzon. Masbate is administratively part of the Bicol region. However, because of its proximity to Visayas (the second major group of islands in the Philippines), Masbate shares common biogeographic and sociolinguistic features with the people of Visayas. Similar to other islands in the rest of the country, Masbate's topography ranges from hilly to mountainous in the upland areas, with narrow coastal plains in the lowland areas. These topographical features strongly impact on the delivery of essential

educational services to the people (Aruhu, 2010; Bosamata, 2011).

The province of Masbate comprises 20 municipalities and one city. These twenty municipalities have 565 public elementary schools and 115 public secondary schools as of 2016 (DepEd Masbate Province, 2016). All of these schools in these municipalities are under the authority of the Masbate province division. On the other hand, the city division of Masbate has 34 public elementary schools and 8 public secondary schools (DepEd Masbate City, 2016).

### **The Research Paradigm**

The study draws on the foundations of interpretive paradigm. It is founded in the researcher's belief that "society does not exist in an objective, observable form; rather, it is experienced subjectively because individuals give it meaning by the way they behave" (Savin-Baden & Major, 2013, p. 6). People make deliberate choices and these choices are strongly influenced by how they perceive their current realities. The reality is socially constructed (Rowlands, 2005), and while facts about behavior may be established, those are always context-bound and do not necessarily apply to everyone and every time (Savin-Baden & Major, 2013). Therefore, understanding these realities necessitates holistic views and the use of an interpretive paradigm that acknowledges the "intimate relationship between the researcher and what is being explored, and the situational constraints shaping the process" (Rowlands, 2005, p. 81).

The researcher's theoretical lens depends on what the researcher wants to know in conducting the research. That is, what one wants to know determines how one should go about it (Trauth, 2002). Essentially, the aim of this research is to understand the lived experiences of the principal participants with the current policies on professional development of teachers. Gaining understanding of the principals' lived experiences will help the researcher build theories around the possibilities of the development of PLCs in the schools where these principals work. The association with the principals' lived experiences and understanding in order to shape theories that will guide the research is called the interpretive paradigm. This is how the interpretive paradigm operates: "the researcher works directly with experience and understanding to build theory on them" (Cohen et al., 2007, p. 22).

In addition, employing an interpretive paradigm in a research work requires discipline. The researcher must also be patient, honest, courageous, persistent, imaginative, sympathetic, reflective, and have the view of conducting research with people to learn with them and not to conduct research on them (Savin-Baden & Major, 2013). This is parallel to what Schwartz-Shea and Yanow (2012) point out what interpretive researchers must not do, and that is bring their own hypothesis, concepts, or ideas in the field to test them. Rather, they enter the field to understand how these ideas and concepts are used and let the hypothesis itself "emerge from the field" (p. 18). Hence, this necessitates the interpretive researcher to employ a data generation method that allows her or him to become part of the research setting (Burton et al., 2008).

## **The Participants**

The participants in the study are all principals in their respective schools. Individual semi-structured interviews are carried out in each school. Three among the five participants are female and two are male. In total, there are five principals who participated in the individual interview. Two of the principals had at least five years of experience as a school leader, while the other three had more than twenty years of experience in a school leadership position. Engaging with these principals with varied years of experience in school leadership service is an opportunity to gather a rich amount of data regarding their diverse professional development experience.

## **The Data Generation Methods**

The researcher in qualitative research could either employ interactive or non-interactive data generation methods. Interactive techniques require the researcher to interact with the subjects being studied, such as conducting an interview, while non-interactive techniques lack such interaction, as in review of documents (Wiersma & Jurs, 2009). In the study, the researcher intends to engage in both techniques of generating data by doing interviews and document analysis.

## **The Interviews**

Interviews are one of the most popular methods in generating qualitative data. Menter, Elliot, Hulme, Lewin and Lowden (2011) point out that this popularity is due to its flexibility. They argue that:

Interviews are one of a range of methods intended to gather information that is illuminative and goes beyond the descriptive in order to help us understand why people think or act in certain ways to help explain why something has or has not worked. (Menter et al., 2011, p. 126)

This is one of the primary reasons why the interview is the most suitable approach for the study. In this approach, the researcher has the opportunity to go beyond the surface level of the participant's response and use probing questions to explore deeper into their perceptions and views. Ary, Jacobs, Sorensen and Walker (2014) point out that this is especially true, because interviews are the main tools used by researchers to "gather data from people about opinions, beliefs, and feelings about situations in their own words" (p. 466). Through interviews, researchers can better understand the respondents' experiences and how they interpret those experiences.

In its simplest definition, an interview is a conversation between two individuals; one is asking the question, or is also known as the interviewer, and the other one responds to the question, or is also called the interviewee (Savin-Baden & Major, 2013). Interview, however, is not just an ordinary conversation, because it has to be purposive, question-based, and there is the expectation that the responses of the interviewee are as explicit and as detailed as possible (Cohen et al., 2007). When it comes to qualitative interviewing, Punch and Oancea (2014) argue that the conversation is more focused on grasping the meaning and building knowledge together.

Many researchers claim that using interviews as research methods has numerous advantages. Savin-Baden and Major (2013) emphasize one distinct strength of interviews is its ability to yield information that directly answers the research questions. It is aforementioned that one benefit of using interviews is that it provides flexibility to the researchers, where they can probe and follow up on the interviewee's answers in order to yield deeper information. In a like manner, interviewees can also ask for clarification from the interviewer if they do not understand the question. This way, the researcher is able to gather more accurate information from the interviewees (Menter et al., 2011). On the contrary, the flexibility of interviews could also be disadvantageous for the researcher. "Interviewers' flexibility in sequencing or wording questions can result in substantially different responses, thus reducing the comparability of responses" (Cohen et al., 2007, p. 353). Another weakness of using interviews to generate data is that it is time-consuming and expensive (Menter et al., 2011; Savin-Baden & Major, 2013). Besides the researcher needing to adjust to the availability of the respondents, it also takes time and resources when the researcher begins the data analysis. Lastly, Yin (2013) cites that one of the dangers of employing interviews is the tendency for participants to only provide information that they think the researcher wants to hear, or to put themselves in a good light, instead of providing the accurate information. To avoid this, the researcher must have a "good background of information, to follow up with questions that reflect knowledge of a different interpretation, and, if all else fails, to triangulate response through other interviews or document reviews" (Newby, 2010, p. 342).

Moreover, interviews come in various types. Menter et al. (2011) cite three main types of interviews: structured, unstructured, and semi-structured. In a structured interview, respondents are asked a consistent set of questions, like that of a questionnaire (Conrad & Serlin, 2011; Menter et al., 2011). The unstructured interview, on the other hand, has no predefined set of questions resulting in informal conversations with the respondents (Cohen et al., 2007). In the study, the semi-structured interview is employed to still be able to engage respondents in a conversation while ensuring that it is kept systematic.

## **Conclusion**

The study examined the roles and perspectives of secondary school principals in the development of professional learning communities (PLCs) in the Philippines. It specifically investigated the approaches of secondary school principals to the formation of PLCs in their schools. The underlying assumption was that principals' understanding of their roles in the implementation of existing teacher professional development policies from the Department of Education is central to the successful formation of PLCs. It is in this light that the first and second research questions were aimed at exploring the perceptions of the principals about the existing professional development (PD) policies for teachers, and their approach to implementing them.

While the participants have provided rich insights towards the research questions, it cannot be overlooked that a limitation of the study lies in the relatively small sample size. As mentioned earlier in the third chapter, purposive sampling was used so that the data generated by the study would be reflective of the diversity of backgrounds of the schools where these principals came from, and be of benefit to a diverse audience. Despite this intention, the small sample size did not allow the generation of a more

holistic view of the experiences of the principals, as they represented only a minute number of the general school population in Masbate. A larger number of participants—that perhaps included head teachers and classroom teachers—could potentially have provided a wide range of professional development experiences that would have resulted in more inclusive findings.

To some extent, the study was also limited by the lack of information on PLCs in the Philippines. This was evident in principals' limited understanding on how PLCs operate. Such limited understanding also became one of the challenges encountered by the researcher during the field interviews. Lastly, the study did not employ multiple interactive data collection methods. The use of these could have provided a more effective approach to capturing data on a larger, deeper and richer scale from the participants. Notwithstanding these limitations, the study has proved effective and successful in providing significant insights into the experiences of principals in the development of, and approaches to PLCs in the Philippines.

The most obvious finding to emerge from the study was the lack of continuing professional development programs for teachers in the Philippines. It has been shown in the findings that there were a number of reasons for this. Firstly, the principals in the study identified that the overwhelming school responsibilities, strong respect for hierarchical authority, and insufficient pre-service education of teachers were the major barriers that made it difficult for them to introduce and implement professional development programs for teachers. These findings were drawn from the experiences of the principals as they implemented the Results-based Performance Management System (RPMS) and the National Competency-based Teacher Standards (NCBTS), the two-main teacher professional development policies for public schools. Secondly, despite having a wide range of professional development activities available for teachers, the nature of these opportunities is still the same traditional directed instruction, which has been hugely criticized in the education literature. This suggests that in spite of the many policies aimed at teacher professional development reform, the idea of Timperley et al. (2007) still holds true—that the problem does not lie in the type of programs or activities teachers engage in but in the content of these activities that would lead and motivate teachers to change their current practices.

The second major finding was the lack of continuing professional development programs. This suggests that the principals in the study are not able to establish PLCs in their schools. Nonetheless, the principals shared significant insights into what counted as important factors that would help in the creation of PLCs, and what they believed would be the potential barriers that they might face upon creation of these communities. It emerged from the findings that having a culture of collaboration in a school and a staff's openness to change are two significant characteristics that support the formation of PLCs. These are attributes which principals considered to be most effective in engaging teachers in continuing professional development. The principals believed that being open to change would make it easier for teachers to embrace changes in the teacher professional development framework of the school.

It can be argued too that this research has shown that the culture of collaboration, as demonstrated by teachers, is connected to the unique Filipino culture of 'Bayanihan'. The 'Bayanihan' is an invaluable aspect of Filipino culture where people are always ready to help carry each other's burden. This spirit of collegiality exemplifies the

collaborative relationship that is present in PLCs. The implication of this for schools in the Philippines is that the willingness of teachers to help each other could be a driving force for the successful formation of PLCs in the country.

In spite of the abovementioned factors that may contribute to the formation of PLCs in their schools, the principals identified a number of barriers which they claim are deterrents. The absence of concrete policy guidelines and limited school funding were articulated as two major concerns. The findings have shown that principals' strong respect for hierarchical authority instigated their reluctance to establish learning teams within their schools. This finding may have a strong implication in relation to the level of confidence of the principals in their leadership. Moreover, limited school funding was also viewed as a barrier to the formation of PLCs, because the principals anticipated that establishing professional learning teams would require human and physical resources, which are costly. The new Learning Action Cell (LAC) policy reinforces this, as it requires principals to use their existing school funding or to generate external grants in order to sustain the activities related to the formation of LACs. This may be problematic, as incorporating LAC expenses into the existing operational expenses of the schools may increase the principals' stress level at the work place.

Finally, the findings of the study also reinforced the idea that effective leadership style is a key to the successful formation of PLCs or to support teachers in pursuing continuous growth and development in their professional career. The findings suggest that these effective leadership styles are role modelling, collaborative leadership, ethical leadership, and good management skills. Although it cannot be argued that top-down leadership predominantly exists in school organizations involved in the study, it was found that it served a good purpose, as teachers and the other school staff looked up to their leaders as role models. The downside of this, however, is that some principals considered strong culture of hierarchy in the organization as an obstruction to the promotion of culture of collaboration inside the school. This highlights the importance of a leadership style that recognizes teachers as leaders of their own learning. In addition, the study has raised an important question about the nature of ethical leadership—that advancing a school's common good also translates into creating teachers who are leaders of their own learning and who are aware that making themselves better is their moral and ethical responsibility. Lastly, a further and significant finding of the study is that when schools adopt PLCs, the leader must have a repertoire of strategies and management skills to be able to respond to different school situations. Overall, this strengthens the idea that continuing professional development should not only be focused on teachers but more so on the development of school leaders.

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## *Exploring Saudi Arabian Teachers' Changing Understandings of STEM Education*

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### **Abstract**

In 2016, the Kingdom of Saudi Arabia (KSA) developed a bold plan, 'Vision 2030'. This plan seeks to establish a strong foundation for future economic prosperity based on a transformational shift from the current natural resource-based economy to a knowledge economy (Wiseman, Abdelfattah & Almassaad, 2016). In addressing these reforms, the KSA Ministry of Education has engaged a number of global universities to design and implement teacher professional learning for KSA educators to build the new knowledge and skills needed to innovate the traditional curriculum. The Faculty of Education, Monash University, was engaged in this initiative, designing a 44 week program exploring technologies and pedagogies of STEM education and the implications for KSA schools. The cohort of 25 technology, mathematics and science Saudi educators experienced many STEM learning opportunities, including 17 weeks immersion in STEM education classes in Australian schools. The program was intended to positively impact teacher professional growth, evidenced by a change in participant thinking about understandings of STEM education. The intensive nature and duration of the professional learning program presented a unique opportunity to map changes in teacher thinking. This research seeks to capture such change using a mixed methods approach (anonymous surveys and regular focus group meetings). Of particular interest are the development of personal confidence with STEM teaching and the changing understanding of the interdisciplinary nature of the subject. Initial survey data reveals the vast majority of the KSA educators report a limited understanding of STEM education and low levels of self-confidence in teaching STEM classes.

Keywords: STEM education, teacher thinking, professional learning

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## **Introduction**

Education in the Kingdom of Saudi Arabia (KSA) is currently undergoing a period of unprecedented change as the pressures of globalisation challenge traditional cultural norms, gender stereotypes, identity and labour markets. Since 1950, the government export revenue has been increasingly reliant on the sale of its extensive reserves of oil and natural gas which are estimated at present (Dudley 2018) to comprise between 16% and 18% of the world's total proven remaining reserves. Initial oil exploration was undertaken in the 1940's by the Arabian American Oil Company (ARAMCO) and a shifting mix of American and Saudi interests followed with changing profit sharing arrangements. In 1988, the industry was completely nationalised through a buyout by the Saudi Royal family establishing the State owned Saudi Arabian Oil Company (Saudi Aramco). Saudi Aramco remains the most profitable company in the world, valued between \$1.2 to \$2.6 trillion dollars and earning more than twice that of its nearest rival company Apple Inc. in 2019. More recently Saudi Aramco has released a prospectus offering 0.5% of its shares to private investors with the potential to be the largest public share offering in history.

Following a sustained downturn in the export price of crude oil between 2014 and mid-2015, there was growing concern within the country of the continued dependence on petroleum revenue, which at the time contributed more than 90% to its total export income (CEIC 2016). With the downturn of traditional markets in America and Europe, and softening prices in Asia, the KSA Gross Domestic Product per capita fell by 2.8% between 2016 and 2017 (CEIC 2016). In response to the uncertainty around KSA's future economic prosperity, 'Vision 2030' (Khan, 2016) was announced in 2016 by the Crown Prince and Chairman of the Saudi Council of Economic and Development Affairs, Mohammed bin Salman bin Abdulaziz Al-Saud.

The KSA economic blueprint, Vision 2030 is wide ranging with no less than 96 objectives, the majority of which are designed to stimulate social, educational and economic changes that will ultimately reduce the KSA's continued dependence on petroleum revenue (Moshashai, Leber, & Savage, 2018). The reforms, as these take effect, are projected to reduce the excessively high public sector spending and grow new opportunities within the private sector for establishing manufacturing markets and stimulating technology innovation. Fiscal commentary at the time of the Crown Prince's announced reforms was widely supportive of the proposals, advocating that the KSA's economic prosperity relied increasingly on educating and skilling its citizens to play a more active role in building a knowledge based economy (Nurunnabi, 2017).

### **Promoting educational change through teacher leadership**

Given the acknowledged urgency for education and social reforms (Wiseman, Abdelfattah & Almassaad, 2016), the KSA Ministry of Education actively engaged several reputable tertiary educational providers in Australia and internationally to design and implement a number of customised teacher professional learning programs. Most programs have focused on building the leadership capacity of participating KSA teachers by assisting them to explore opportunities for desired educational change. The Faculty of Education, Monash University, successfully tendered with such a program; Building Leadership for Change through School Immersion (BLCSI). This program

has now been offered twice, the first program in 2017 involved 50 Saudi teachers for 30 weeks and the following program in 2018, involved 24 Saudi teachers for 39 weeks. Both programs catered for generalist teachers with a focus on building professional knowledge, leadership and pedagogy through a mix of presentations from leading educational researchers, and expert school practitioners. Importantly, each program provided in excess of 13 weeks of immersion in either Australian Primary or Secondary school settings.

In 2019, following the success of these two programs, the KSA approached the Faculty of Education, Monash University, to offer a longer 44 week program catering for 20 generalist Saudi teachers. In addition, the Faculty was invited to design a parallel program for 25 Saudi teachers with a focus on STEM Education. The intention of this additional program was to build Saudi teachers' understanding of STEM education, in particular the potential benefits for student learning and development. The outcomes from this program are the basis of this research study. All three researchers bring reputable knowledge of STEM education through their extensive experience in the design and delivery of Monash Graduate Certificate Courses in STEM Education and multi-day professional learning programs offered by the Faculty of Education, Monash University, for Australian Primary and Secondary STEM teachers.

### **The Kingdom of Saudi Arabia educational context**

The experience of a teacher in KSA is predominantly a solitary one enacted mostly between themselves and their class with few opportunities for professional collaboration. Classroom instruction is customarily teacher centred and didactic in nature with an emphasis on strict adherence to National set curriculum and content coverage in State prescribed textbooks.

Two of the researchers have previously been involved in both Monash University BLCSI programs in 2017 and 2018. These experiences have provided each with rich insights into the complex nature of the KSA's education systems, culture and social norms and the challenges the Saudi teachers face in attempting to introduce system wide change across their schools on return. Schooling in the KSA occurs in gender segregated schools with same gender teachers, in strict adherence with cultural principles. Many of the KSA teachers from earlier programs have frequently acknowledged their teaching experience is, as El-Deghaidy & Mansour report, "*classroom teaching... (is) mostly done independently as teachers prepare and deliver their lessons individually*" and that "*it is not common for teachers across disciplines to sit together and identify cross-cutting content or skills*" (El-Deghaidy & Mansour, 2015). Anecdotal discussions with BLCSI teachers suggest that these findings, although once widely enacted across most schools in the KSA, are now beginning to be challenged with the introduction of new pedagogies in many of the larger schools in city centres. However, many of the current 2019 program teachers acknowledge that such frequent and routine professional isolation poses major challenges for their introduction and integration of STEM Education across classes or year levels in the KSA schools.

The KSA Ministry of Education's interest in STEM Education appears largely motivated by the expected economic benefits of a future workforce proficient in 21<sup>st</sup>

century skills and capabilities. These outcomes have been widely promoted in numerous western government industry and education reports over the last decade (West 2012; Freeman, Marginson, & Tytler, 2014). In 2013, a position paper released by the Australian Government's Office of the Chief Scientist (Chubb, 2013), proved instrumental in fostering a ground swell of Government interest and debate in Australia around STEM education. In this paper, the then Chief Scientist, Professor Ian Chubb, argued the importance of encouraging future Australian students into STEM disciplines in order to skill them to play vital roles in economically beneficial STEM industries (Head, 2014). In many countries this position continues to drive Government policy perspective, where education focused on STEM Education is accepted as one of the most beneficial methods of building human capital for labour market readiness, productivity, and innovation (Ramirez, Luo, Schofer & Meyer, 2006). Building teacher capacity to implement effective STEM education is vital to achieving such intentions. There is a need to learn more about how teachers develop deeper understandings about STEM education and how they use this knowledge to reconsider their practice to enhance learning opportunities for students in school based STEM education programs.

## Methodology

This study explores the impact of intensive professional learning in changing Saudi Arabian teachers' attitudes towards, and understandings of, STEM education. Particular attention was paid to how the teachers conceptualised STEM Education and their understandings about how STEM Education could be implemented within the constraints of the KSA curriculum. The following research questions form the basis for this study;

1. What are the KSA teacher understandings of STEM Education when they commenced the BLCSI STEM program?
2. What changes occur in participants' attitudes and knowledge about STEM Education over the duration of the BLCSI STEM program?

The challenges associated with STEM Educational design, the program cultural context and the lengthy 44 week program duration, were seen by the researchers as providing an invaluable opportunity to undertake a longitudinal study investigating teacher professional growth. Apart from research by El-Deghaidy & Mansour, there appears to be little published educational research investigating STEM Education in the KSA context. For all 25 participating Saudi teachers (7 females and 18 males) English is a second or third language so they were provided with a research explanatory statement translated into their first language, Arabic. All consented to take part in the research in line with research ethics approval granted by the Monash University Human Research Ethics Committee (MUHREC).

The study involved a mixed methods approach with the principal research focus being the evaluation of overall change in the nature of the participants' collective understandings of STEM Education rather than individual changes. The researchers were also keen to identify any key program activities or experiences that participants' felt best helped them to clarify, challenge or improve their STEM Education understandings. Two qualitative data collection instruments were utilised for this study. Baseline data were collected using a written survey (S1) comprising 20 questions in Arabic administered in the first few days of the program. It was deemed

important at this early stage that participants were permitted to use their native language, to ensure that their proficiency in English did not compromise the quality of their responses. All data collected throughout the research was de-identified apart from gender. Data was then translated into English by an external translator and then collaboratively analysed by the researchers.

Following the completion of the initial survey, two focus group (FG) meetings were held at week 20 (FG1) and week 27 (FG2) comprising of separate groups for both males and females consistent with Saudi cultural norms. These discussions groups were conducted in English with common key questions and the participants' comments were recorded, de-identified and transcribed for analysis. Because of the rich and diverse nature of the data collected, the researchers found it helpful to adopt a grounded theory approach to identify a number of emerging themes around which the findings could be aggregated for analysis. The emergent themes to date include; current understandings of STEM Education; challenges and opportunities associated with implementing STEM Education in a KSA context; and, exploring useful pedagogies to enhance STEM Education in a KSA context. Some of these themes will be discussed further in the findings and results section of this paper.

At the conclusion of the program in early 2020 the initial survey will be administered again, (S2) this time in English given the improved English language proficiency of the participants. The completed surveys comments will again be recorded anonymously and compared collectively with the initial survey findings.

## **Findings and Results**

### **Initial benchmark survey- current understandings of STEM education**

An analysis of the initial survey (S1) reveals some insights into the teacher cohorts' background and initial thinking. The vast majority were teachers with between 5 to 12 years experience in schools in either rural or remote areas of the KSA. Only 3 teachers acknowledged having 4 years or less teaching experience. The majority were Computers Science subject specialist teachers with the next most prevalent specialism being Mathematics followed by 2 Chemistry and a single Biology teacher. The predominance of Computer Science subject teachers in the cohort possibly reflects the KSA Ministry of Education's belief that effective STEM Education requires a strong knowledge of computer coding.

When asked to describe what they believed STEM Education means, the dominant view expressed was *“the teaching of science, technology, engineering and mathematics as one subject and in one framework and using teaching methods to integrate these different specialities”* (S1M). Approximately a quarter described it similarly as *“the use of technology in the learning and teaching of a few school subjects and connecting them together”* (S1M). The remainder were less clear with some prepared to state that they, *“Honestly do not know but I have heard before that it involves the programming of robots”* (S1M). In response to the survey question, *“What characterises STEM Education and makes it different from other kinds of instructional methods”?* a little more than half described it similarly, *“As the integration of four subjects into one unit in an effective way”* (S1M) or *“Involving the use of technology in education”* (S1M). The remaining teachers described it similarly

as a learning that is, “Active, interactive learning through real objects’ (S1M) and involving “a lot of real skills that are connected to real life and the environment” (S1F).

Participants were asked to visually convey their thinking about ‘STEM Education’ by drawing a simple representative diagram which described the relationship between each of the disciplines. The results were diverse with no consistent model appearing to be favoured. This may reflect the cohorts’ limited contact with any such representational models prior to commencing the program. Several images did display a bias towards the importance of Mathematics as evident in the bottom row of Figure 1. However this may be more attributable to the high proportion of mathematics teachers present in the cohort. A frequent justification was “Mathematics is the foundation, and it connects with the other sciences. The other sciences connect directly with each other or through mathematics” (S1F). Another common explanation of this view was “I think that technology is the link between all of them and that math is probably more associated with engineering” (S1M).

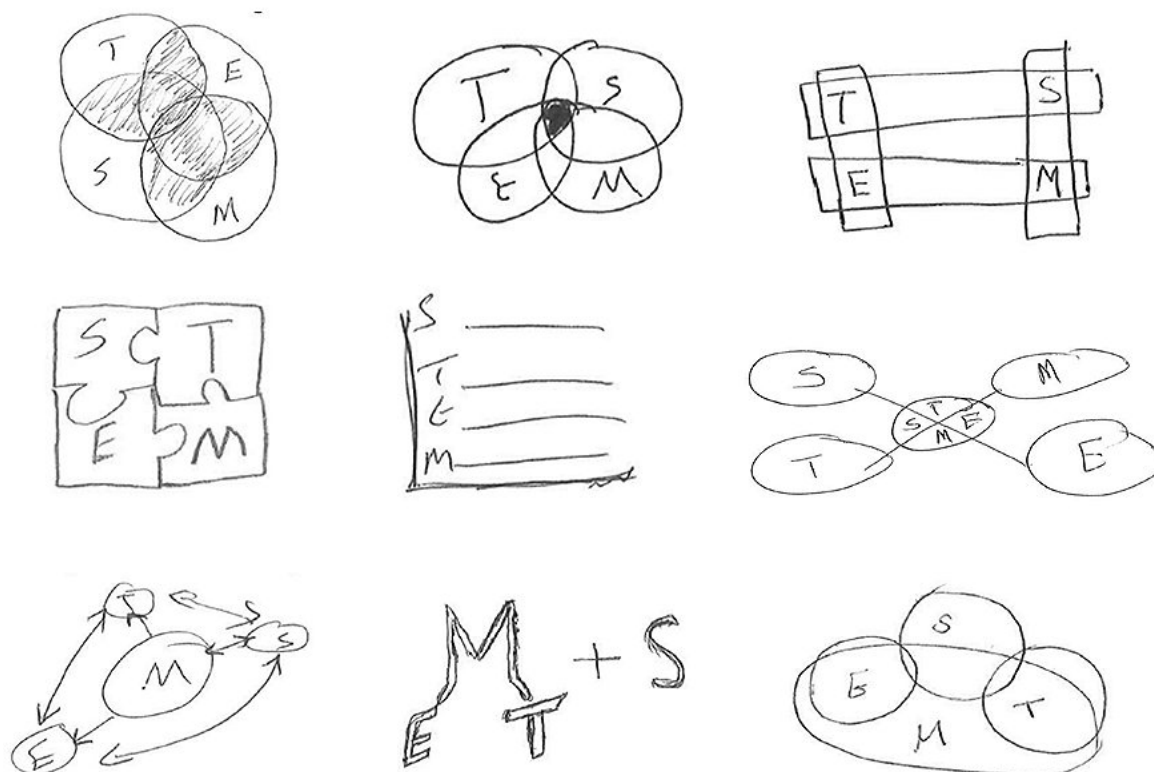


Figure 1: Teacher visual representations of STEM Education.

Finally an overall analysis of the initial survey (S1) data suggests that while most Saudi teachers were aware of the term, ‘STEM Education’ understandably most had very limited or naive understandings of what a STEM Education lesson might look like or how such a program might be integrated into the KSA curriculum or school lessons. All participants acknowledged never having taught STEM classes in their KSA schools or to having seen classes taught in other settings. An early common belief among the participants, although not universally held, was that STEM Education required a large school wide program that was project based, dependant on expensive digital technology, with classes of students working on coding robots with support



from expert digital technology teachers. Typically this was expressed as, *“I thought that STEM had to be at a grand scale, like a bigger project, you can’t tackle it in the class and has to be in collaboration with a lot of teachers. That’s the idea that I had back in my country. ....But now I can see that student STEM can happen everywhere, anywhere you want it to be can happen in a small scale, or even on a larger scale”* (FG2).

### **Focus group findings**

The data collected from the focus group meetings provided valuable insights about how the Saudi teachers’ understandings of STEM Education were beginning to change. In general, focus group comments reflected that teachers were demonstrating broader thinking about what mattered in effective STEM education classes. While the initial survey (S1) data indicated that teachers were initially concerned about what discipline content knowledge to teach in STEM, the focus group data revealed many teachers were now considering that STEM Education needed to comprise more than just teaching blended discipline content knowledge. The data showed an emerging shift towards considerations about teaching in ways to enhance student learning, skills and capabilities. As one participant states, *“It’s about the journey. Not about the destination. So if the student is giving, is doing well, and is practising well, he’s getting more skills like communication, collaboration and ... critical thinking and also the creativity and a lot of the 21 century skills”* (FG2M). Teachers were also discussing the importance of developing learning opportunities in contexts which would enable their students to engage with relevant and personally meaningful learning experiences while building key thinking skills. In the focus group discussions, teachers talked about the importance of student engagement and making learning relevant to the everyday lives of students. A typical comment was, *“How the environment can help us. Connect the students with the environment using STEM disciplines like ... to teach the student the importance of farming, the importance of composting and e-waste. CERES is a good community. It’s a pretty rich community for STEM experience but also it’s kind of presented like a Saudi Arabia for small community or even just small aspect of life, like garden in the school or composting”* (FG2M). Teachers also appeared to be considering how these learning experiences could be developed to support particular cognitive and affective intentions for student learning.

### **What matters in STEM education?**

In the initial survey data, teachers described the importance of teaching content knowledge in each of the STEM disciplines and indicated an awareness of the importance of establishing links between these areas of learning, although as previously discussed, a range of understandings was clearly evident. The focus group data however, revealed that for some teachers the importance of skill development was also being considered as a critical part of STEM education. In focus group discussions, some teachers were able to identify the particular skills they considered as essential for students in a changing world.

Many teacher comments conveyed this change of emphasis; discussions also revealed that teachers were aware of this shift in their personal thinking. One participant described how her initial thinking about STEM education had focused on, *“how to solve a problem using science, technology and math and also engineering”* (FG1F).

However, after participating in the early stages of this professional learning program she described how her thinking had moved beyond an intention to build student content knowledge in each STEM discipline. She states, *“Now, I understand it's more than just science, technology and math. It's more about building skills for the students or for the learner, like, how to communicate better, how to use technology better and how to prepare the students for college, for future jobs to be not only dependent on one field”* (FG1F). The potential to link these areas through skill development seemed to present for this teacher, a way to enable students to access and develop thinking across areas rather than be limited or dependent upon only discipline. Another teacher's comments reveal a similar perspective. *“I was thinking (about) how to make the four aspects of STEM math, technology, engineering and science related, related and teaching to each other,....(now) I have a clearer understanding. After the workshops we attend, after the places we visit, that stem it's all about building skills, problem solving, creativity, critical thinking, and all about making students get skills, besides the curriculum as explicit teaching”* (FG1M). These types of comments demonstrate how teachers were beginning to consider the importance of skill development in STEM Education. *“Firstly, I have the idea about STEM. If you want to apply STEM in your class, you must join each subject in the same lesson but now my ideas have changed. It has to do with a focus on the skills, not the subject information but skills, how can I build the skills into the student?”* (FG2M).

The ability of the teachers to clearly identify a range of skills aligned with STEM Education is evident. For some teachers this awareness is accompanied by the realisation that such teaching intentions extend beyond explicitly delivering curriculum content. *“(It is important that) ... he knows how to apply all the knowledge. If it's just teaching without knowing - you will lose this knowledge. I will forget it after one hour on but if I connect it to my life, for example, to make some plants the garden or take something in the house or make ... a maker space .... Then the students will see something in front of him so he will grow and share the knowledge”* (FG1M).

The data also revealed a shift away from the idea that STEM learning experiences need to be based around expensive equipment and large scale projects. *“(Before) I was thinking to apply STEM, you need special places or special apps, but now I can understand that I can do it anywhere. Yeah, and any place”* (FG1F) and, *“The teachers need to start in any class with a problem, big problem, to ask the students a question, to help them to think and to find a solution for this problem”* (FG1M). There appeared to be an increased awareness of the ‘everydayness’ of STEM of how it surrounds us all but needs to be made explicit for students. By noticing STEM in the world around them, the teachers began considering the opportunities this afforded to STEM teaching. *“Because when you use STEM, a part of STEM is technology to digitalise because we are in the modern world right now, we work using technology* (FG1F).

These considerations indicated a shift in teacher thinking from a focus on STEM teaching to STEM learning. Some teachers appeared to be thinking about the conditions they need to create to enhance student engagement, highlight relevance and encourage students to better invest in their own learning. The implications of such considerations for teaching approaches were also being considered. *“STEM is more active than a traditional class and enjoyable. That's what I notice about a lesson in the STEM. It has been interesting, exciting”* (FG2M). Shifting to more active ways of

learning held obvious challenges for teaching but some teachers articulated how important it was that students develop ‘understanding’ as a key outcome. *“And it's very important for the student to understand how to ....not only be users. How to work this technology (in ways that) can benefit their field or their world or something”* (FG1F). The focus group data also indicated that some teachers were placing a value on independent thinking as a learning outcome, yet achieving this required teachers to think and work differently. *“Sometimes we just give the students the instructions, and the students will do that and the result will be we will give them the result will be like that. But now ... just give the students the problem and they will think in different ways”* (FG2M).

## Discussion

These new ways of thinking about STEM learning and teaching held a number of implications for the Saudi teachers and these implications began to emerge from the data analysis as a series of tensions between traditional practice and new preferred ways of working.

### Challenges and opportunities associated with implementing STEM Education in a KSA context

Teachers discussed a need to develop effective STEM learning and teaching by being more flexible in their teaching so as to provide more effective conditions to enhance student interest and engagement. Yet it became clear that a growing tension exists between this aspirational teaching approach and the reality of delivering their existing more prescriptive curriculum. While watching teachers in Australia work in ways which were responsive to student learning needs, some Saudi teachers were reminded that they did not always have the same opportunities to work in similar ways. *“I think back home we are stuck in our curriculum but here you have the flexibility to change your curriculum in the ... the lesson that you want to give the students. So it's a bit hard to apply STEM there (in KSA), but also you have to be creative to manage your class ... to also manage your lesson”* (FG1F). The data indicated that teachers recognised this as a concern and were considering how they may be able to address this issue. *“So I think this is the thing that is not clear for us at the moment. Because we have also curriculum, specific curriculum in KSA so that we don't have flexible curriculum. Yeah. How to do that? How we can do that without problem”?* (FG2M).

There was another tension that became clear in the data analysis related to assessment and planning. Teachers described how present Saudi student assessment requirements dominated their teaching. *“But for my country .....it's all about the assessment, the result”* (FG2M). Yet some teachers were beginning to see that this focus needed to be broadened to include skills development and this required them to rethink their planning and invest time to develop new learning experiences. Determining how both content knowledge and skill development could be successfully achieved required a different approach to planning and this was challenging for many of the teachers. The data revealed they were grappling with what aspects of learning should take precedence and how time should be allocated in their teaching. *“I think is not all the time, you can (only do) some parts of a STEM project in it (class time) but some you can't. That's what I think and maybe it's wrong? So, I think sometimes you need to use your traditional way to teach. Yeah. I don't know”* (FG2M). While many teachers had

identified that they needed to think and work differently, the opportunities to do so and the time they needed to rethink their planning was limited and this concern emerged in the data. *“It seems to me that a lot of time of preparation of planning”* (FG2M).

Class sizes of around 40 students, the number of classes teachers were required to teach and a desire to implement new projects and activities, also emerged as a tension in the focus group data. *“It’s a challenge with the big number of classes ... for the STEM project, how I make the project and with clear activities. The students (need to) know what must be learnt and what is the information ... the goals for this activity”* (FG2F). Time spent on learning experiences and the allocation of resources for STEM education appeared to be impacted by this concern. *“I think one of the most challenges in (the) KSA is it’s too expensive to use ... to buy the materials or to build the sensors or resources”* (FG2M).

Tensions continue to emerge as teachers described; the need to attend to existing prescriptive curriculum when seeing a need to be more flexible in their teaching; when the assessment outcomes, which are highly prescriptive and valued, do not include skill development; the demands of large class sizes; and, the need for expensive resources.

### **Summary and conclusion**

This study aims to explore the impact of intensive professional learning in changing Saudi Arabian teachers’ attitudes towards, and understandings of, STEM education. The initial survey (S1) data attempted to gain insight about the ideas the participants held about STEM education at the beginning of the program. The data analysis revealed Saudi teachers shared some common ways of thinking about STEM Education with most able to identify the four discipline based STEM areas of science, technology, engineering and mathematics. Most participants also expressed an idea that these areas would in some way be integrated, although a diversity of thinking about the types of links and how they could be enacted between these areas was evident.

The focus group data, collected after the initial survey but still within the early stages of the program, revealed that some shifts in thinking were beginning to emerge. Teachers were now considering the role of skill development in STEM Education and the importance of ensuring the nature of the learning experiences were relevant and meaningful for students. These ideas indicated a shift in teacher thinking from considerations about teaching content to considerations about teaching to enhance learning. The focus group data also revealed the teachers were considering how STEM Education could be implemented within the constraints of the KSA curriculum and this was raising a number of tensions for them in terms of the need for flexible and responsive teaching and a need for broader considerations around assessment and planning. While the results in this paper only represent teacher feedback in the early stages of the program, the data does provide evidence that teachers are beginning to broaden their thinking about what matters in STEM Education. The final stages of the research will involve further survey data and the analysis will continue to explore changes in the KSA teacher thinking about STEM Education.

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***Perceived Benefits and Challenges of Flipped Classroom:  
Voices from Teachers in Hong Kong's Higher Education***

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**Abstract**

Flipped classroom is increasingly being adopted in higher education institutions worldwide. Many studies on flipped classroom focused on evaluating its impact on students. Relatively little is known about the perceived benefits and challenges of flipped classroom from the teachers' perspective. The present research conducted in-depth interviews with 28 teachers from diverse academic disciplines in five different universities in Hong Kong. These teachers were recruited to share their experiences in adopting flipped classroom in their practice. Flipped classroom was found to be associated with many benefits to the teachers, such as gaining the flexibility in the use of class time, increased opportunity for the teachers' professional development, and enhanced interaction with students. However, there are challenges in integrating flipped classroom in their teaching practice. Specifically, many found it challenging to motivate students to engage in the pre-class learning material. Their workload also increased when implementing and managing the flipped classroom. It was difficult for some of them to adopt the new teaching approach. The teachers also shared a variety of strategies to overcome these challenges. Possible measures of institutional support to help teachers to reap the benefits of this new learning approach while mitigating the challenges will be discussed.

Keywords: Flipped classroom, higher education, eLearning, teaching strategies

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## Introduction

Flipped classroom is an innovative pedagogy that is emerging in higher education institutions worldwide. It reverses the traditional lecture-based style teaching by requiring students to learn basic materials prior to class, so that class time can be reserved for high-order cognitive activities such as group discussion and hands-on exercise. According to Brame (2013), four key elements are essential to the flipped classroom approach:

1. *Exposure*. Students should be provided with first exposure of learning material prior to class, most commonly in form of videos.
2. *Incentive*. Students should be given an incentive to prepare for class.
3. *Assessment*. There should be a mechanism to assess students' understanding of the material.
4. *Activities*. In-class activities that focus on higher level cognitive activities should be designed.

Existing literature indicate that flipped classroom has the potential to deliver a wide range of positive impacts on student learning. A number of studies show that student's motivation, level of engagement, and interaction have improved as a result of flipped classroom (Zainuddin & Halili, 2016). Students' perception toward flipped classroom are generally positive (Bishop & Verleger, 2013), and there are some indirect evidence that students' academic performance improved as a result of flipped classroom (O'Flaherty & Philips 2015). Many studies on flipped classroom focus on evaluating its impact on students. Relatively little is known about the perceived benefits and challenges of flipped classroom from the teachers' perspective.

## Research Question

Since teachers' belief and attitude are important factors in the success of pedagogical innovation (Long, Cummins & Waugh 2017), this study aims to gather university teachers' perception toward flipped classroom. Specifically, what kind of benefits have they experienced from the flipped classroom approach? What kind of challenges have they faced?

## Method

To address these questions, this study uses a qualitative approach. In-depth, semi-structured interviews were conducted with 28 teachers from diverse academic disciplines in five different universities in Hong Kong. Academic disciplines covered include science, business, engineering, social science, education, humanities, law, and medicine. These teachers have used the flipped classroom approach for at least one semester in their course. On average, the teachers flipped 3.3 weeks of the course (out of about 12 weeks in a typical semester). Each interview lasted for approximately 60 minutes. The interview questions covered the basic course background, the course design, the perceived benefits and challenges of the flipped classroom approach, as well as teachers' reflection toward the flipped classroom experience. All interviews were transcribed, and then coded using the NVivo 12 software. Informed by a grounded theory approach, the axial coding method were used to establish common themes from the transcripts (Strauss & Corbin, 1990).

## Results

### Perceived benefits to teachers

Among the many benefits of flipped classroom to teachers, the following three categories were most commonly reported by our interviewees:

1. Flexible use of class time
2. Teacher professional development
3. Enhanced interaction with students

First, many teachers (n=15) reported that they could use class time more flexibly after using flipped classroom. This is not surprising because students were expected to view learning material before class, thereby freeing up some class time that would otherwise be reserved for lecture. Second, many teachers (n=15) also found the process of making pre-class learning material a valuable experience for professional development. It gave them an opportunity to learn how to make good videos, as well as to rethink how to organize teaching material concisely. Third, some teachers (n=10) enjoyed the enhanced interaction with students enabled by the flipped classroom approach, as more time were available for classroom discussion. As students came to class with solid prior knowledge from their preparation, the quality of classroom interaction and level of engagement improved.

### Perceived challenges to teachers

The most commonly reported challenges of the flipped classroom approach to teachers are:

1. Increased workload
2. Difficulty in motivating students
3. Difficulty in adopting the flipped classroom approach

First, 18 teachers mentioned that implementing flipped classroom brought an increased workload to them, especially for those who were doing it for the first time. Teachers had to spend a lot of extra time and resources making or updating pre-class material (most commonly in form of short videos). Second, many teachers (n=17) reported difficulty in motivating students, as some students were reluctant to prepare for class in advance or participate actively in classroom activities. While such challenge are not unique in the flipped classroom approach, its impact is more salient because students may get lost completely in classroom activities if they have not prepared for class in advance. Third, some teachers (n=12) also found it difficult to adopting to the flipped teaching approach. For example, one frequently reported difficulty is to design interesting classroom activities relevant to the pre-class learning material.

## Conclusion and suggestions

Our findings revealed a number of perceived benefits and challenges of the flipped classroom approach from teachers' perspective. In general, the teachers interviewed had a positive perception toward the approach. They recognized the increasingly important role that technology will be playing in education and the huge potential for its wider use. In order to fully reap the benefits of the flipped classroom approach

while mitigating the challenges, further institutional support to teachers are needed. Such support may be in form of funding or technical support in making pre-class learning materials, professional development courses, and formation of community of practice to provide peer support. Successful implementation of flipped classroom depends not simply on the effort of teachers, but also support from their institution and acceptance from students.

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***Employing English Picture Books in Classroom Teaching:  
Taking a Suburban Area in Mainland China as the Study Context***

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**Abstract**

This paper reviews empirical articles and concludes that English picture books are suitable for English as a second language learner due to its orchestration of image and words. However, research on classroom use of English picture books for young Chinese children's English learning is still very much in its infancy, especially in suburban area of mainland China where parents are mainly from working class. By integrating children picture books into English classroom teaching, this study recruited 4 students who age 8 (born in 2011, Grade 2, young elementary school students) and did not formally learn English before. Under the framework of action research and the concept of scaffolding, this study hopes to discuss the following three main themes: (a), whether classroom's use of children's picture books are effective to young English learners' language growth as a scaffolding tool; (b), if parents are able to accept it as one of the teaching materials used by teacher in class; (c), whether teachers find it effective to enhance student's literacy skills with the aid of picture books. The finding indicates that by integrating picture books with textbook in classroom teaching, students' English proficiency level is seen as obviously improved. Reports from students, parents and teachers' comments indicate that this pedagogical innovation is accepted and beneficial. This paper also offers instructive implications for practitioners and other stakeholders in areas where educational resources are relatively scarce, collaborative effort should be devoted to promote increasing opportunity to get access to English picture books for students.

Keywords: children's picture books, English learning, English proficiency level

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## Introduction

Several studies have demonstrated that picture books can facilitate children in improving reading literacy (Suhua, 2013; Aukerman & Chambers, 2016; Roslina, 2017; Koss & Daniel, 2018). Picture books are also suitable for English learners (Hashim, 1999) since many of them offer repetitive sentence patterns, genuine conversation, and interesting stories, which make it easy to remember sentence pattern and practice speaking (Henry & Simpson, 2001). Picture is another beneficial factor that could facilitate to aid learners conquer fear of facing an entirely strange reading context and further decoding meaning through the visual channel, especially for those who are not proficient in the target language. (Birketveit & Rimmereide, 2017).

Currently, the advantages of English picture book have generated growing attention among Chinese researchers, teachers, and parents. Compared with school textbook that consist of limited vocabulary and extracted short texts, picture books have intact stories with richer vocabulary and complex plots, which are beneficial for students to get access to the authentic English language. In mainland China, most English course books used in primary schools consist of relatively shorter dialogues, songs or extracts of stories, which included limited varieties in vocabulary and sentence expressions. In order to provide students with more authentic and genuine language exposures, many teachers, have attempted to introduce English picture books to the classroom.

Nevertheless, it is noted that English picture book teaching is still in its infancy in English education in China. Real difficulties such as restricted channel of purchasing English picture books or lack of understanding towards picture books still exist. Huang (2014, cited by Xiao, 2019) claimed that young Chinese students tend to have poor performance in reading and show little interest in reading materials. In addition, schoolteachers and readers do not take English picture books seriously.

To date, few studies have specifically investigated the effect of integrating picture book with systematic textbook teaching in mainland China. In terms of research objects, fewer have studied Chinese students in suburban areas, who from low social-economic status (SES) families. However, when it comes to childhood English learning, SES is considered as a crucial factor. According to Fernald, Marchman and Weisleder (2013), lower SES children lag behind higher SES counterparts in their vocabulary size and verbal processing efficiency as early as 18 months of age. To conclude, research on the classroom use of English picture book for young Chinese children's English learning is still deficient, especially in suburban area of mainland China.

To fill these research gaps, this research aims to explore the following questions:

- (1) Do students find picture books interesting and feel motivated to learn English?
- (2) Are parents able to accept it as one of the teaching materials used by teacher in class?
- (3) Do teachers find it effective to enhance student's literacy skills with the aid of picture books?



## Theoretical Framework

The study employs the concept of scaffolding (Wood, Bruner & Ross, 1976), which puts forward an idea that in an educational setting, a scaffolding process enables a child or a novice to solve a problem, carry out a task or achieve a goal which would be beyond his unassisted efforts. The concept of scaffolding comes from Vygotsky's definition---"ZPD", which describes the "distance between the actual development level and the level of potential development as determined through problem solving under guidance or in collaboration with more capable peers" (Vygotsky, 1978, p.86). By employing picture book as a scaffolding tool to support students with English learning, the present study hopes to illuminate its effect in classroom teaching.

## Literature Review

Having been regarded as a means to elevate the social status and economic mobility and ultimately more financial and social success among Chinese people, English learning is considered as a necessity in modern society (Weikung, 2017). In China, English course starts from primary school, usually from third grade while schools at developed areas may start from the first year of primary school. Instead of grammar-oriented teaching, communicative language teaching approach is favored as a mainstream teaching pedagogy in primary schools. As Huang and Chang (2004) have elucidated, communicative-based teaching provides students with more authentic communicative opportunities compared to merely teaching the language form for the sake of acquiring the grammatical and structural rulers. Consequently, teachers are advised to change their teaching approaches in classrooms to provide students with more authentic and genuine language exposure (Hwang, 2005) so that improve students' reading literacy.

The positive link between students' language learning and the application of picture book has been widely discussed before. A picture book is an art work that embedded with the interplay of word and pictures (Anna & Hege, 2017), "the simultaneous display of two facing pages, and the drama of the turning page (Bader, 1976)." According to Birketveit and Rimmereide (2017), through challenging learners to read longer and authentic picture book that tend to have more complex and richer vocabulary than traditional course books, the majority of learners enjoyed choosing picture book by themselves and felt that their English had been improved.

The benefits of reading picture books are also illustrated in opening a window for children to get access to diverse culture, people/race and countries. According to researchers Tschida, Ryan, & Ticknor (2014), "One book may not represent the miniature of an entire culture, but together with others they could give learners a snapshot of various different cultures", which can help English learners to establish their understanding about the world (Koss & Daniel, 2018). In China, students who live in suburban country have relatively less opportunities and resources to get in touch with English language. Yet children's literature could provide readers with an entry key to step into different worlds and discover the similarities and differences (Bishop, 1990), connect with the outside world, and establish a global perspective, which is of great significance for a language learner. On the other hand, picture books that depict resilient characters help to build learners' ability to overcome hardships from school or family and maintain positive attitude for life. A resilient EL is able to

develop coping mechanism when facing difficulties during learning new language or cultural shock (Koss & Daniel, 2018).

Even though professional capacity of English teacher could have great impact on students' learning, parents' role in supporting children's picture book reading could not be ignored. Many of participating parents in previous studies, are usually educated university graduates, some even gain master degrees from overseas countries (Suhua, 2013). Few have recruited parents from lower SES family to study English picture book's effect on English learning. According to Wigfield, Essoles, Schiefele, Roeser, and Davis (2006), parental factors are crucial in influencing children's motivation and achievement.

To conclude, while some studies utilizing picture book as a tool in improving second language learning, most of them focus on learners for whom English is their native language, little is known about the classroom use of English picture book for young Chinese children's from suburban area of mainland China, which makes this research imperative and valuable.

## **Methods**

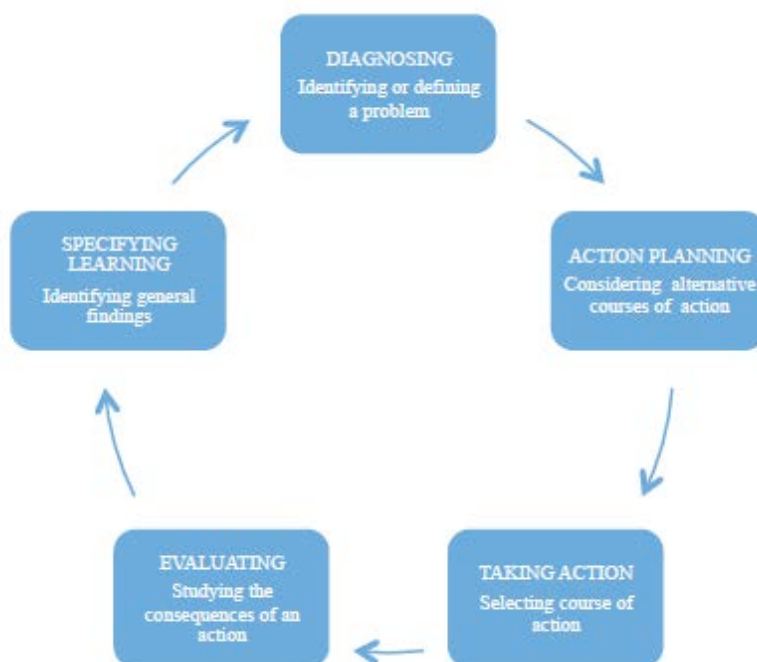
This study employed action research (AR), in which writer act as researcher as well as teacher. "We do not teach and research in a vacuum" (Phillips & Carr, 2010). Van Looy and Goegebeur (2007) held that action research, when applied for teaching, is a bridge that can connects professional practice and research communities. It is through this method that teacher could be able to put the theory into practice while at the same time tests and evaluates abstract idea by the way of planned work.

By consciously designing a process of diagnosing, action planning, taking action, evaluating and specifying learning, like the metaphor of the "spiral of steps" in Lewin's research, in this research teacher researcher hopes to understand deeply on picture book's teaching effect and students' English achievement when applied to classroom teaching.

## The Framework of Action Research

Table 1

*Detailed Action Research Model (adapted from Gerald)*



### Setting & Participants

This study is conducted in an after-school English learning center, which is located in suburban area in Xiamen, China. Different from the United States, families who live in the suburban area of China are usually from working class in low social-economic statuses, less educated, and grasp little knowledge of English language. More than half percentage of parents graduate from middle school or technical college and have little knowledge of English. The after-school English learning center is located within an affordable housing district, which aims to service the neighboring age-appropriate students and enlightening their passion for English. There are different classes designed for students with different needs. The class size is from 4 to 10, with one teacher.

The participants recruited in the study are students in an after-school English learning center, who live at nearby villages. There are a total of 4 students in this class: 2 are male and 2 are female. All of them age 8 (born in 2011, Grade 2, young elementary school students) and did not formally learn English before. Table 4 listed the students' profile (Names indicated below are pseudonym).

Table 2  
*Four participants' profiles*

Name	Gender	Age	English proficiency before entering picture book program (reported by mother)
Vivian	Female	8	Zero basis
Alex	Male	8	Capable of some simple words and greetings
Daniel	Male	8	Zero basis
Elsa	Female	8	Capable of some simple words and greetings

Parents were also asked to fill out a questionnaire about basic background and their expectation towards kid's English learning when entering this program. Table 5 showed the basic information of the recruited parents.

Table 3  
*Parent's basic information*

Parent	Education degree	Age	Job
Elsa's mother	College	34	Government employee
Daniel's mother	High school	32	Supermarket Sales
Alex's mother	Junior high school	34	Restaurant waitress
Vivian's mother	High school	32	Small business

### Data Collection

With a qualitative research methodology, the study involved the following three data sources: parents, students and teacher.

**Parents.** The first data was a paper-based parental questionnaire (See Appendix B) inquiring about child's basic information (name, birthday, gender, and sequence of birth), English-learning condition and parent's basic information (relationship with child, highest education background, occupation, age), and their attitude towards children English learning. The first draft of the questionnaire was reviewed by researchers in the field of childhood English education to remove ambiguous or irrelevant items and finalize the content and design. It includes 15 questions in total. Parents will also be interviewed exclusively in the fifth week. Questions focus on their observation, comments and suggestions about English picture book program. It will be conducted via App WeChat---a free application for instant message service. It includes five questions in total (See Appendix C). Parents are encouraged to send their feedback as much as possible.

**Students.** The second data resource will be students' opinion about English picture book, and a student post-test on the text content. An interview (See Appendix D) will be conducted during the program and questions concentrate on what students think of the class, what they like and dislike, how they assess picture book's role in English learning, which picture book is their favorite one and so on. A Post-test will be conducted on the last week.

**Teacher.** In this project, I will observe class interaction and take detailed notes after every class. The notes will focus on picture book's usage, student's response, what

answers the critical question and what I consider needing further improvement. (See Appendix E)

### **Data Analysis**

Due to the characteristic of action research, the ongoing data analysis will be conducted immediately. “Just collecting data isn’t doing research. There has to be ongoing analysis, the thinking about and with data.” (Phillips & Carr, 2010) It will proceed in the whole research and could be divided into three periods. This ongoing data analysis as well as data interpretation will be done based on the principal of trustworthiness. Throughout the process, I will keep reflecting and checking the data, as what have been said, “A habit of mind”.

### **Findings**

The analysis of the picture books’ classroom use will be divided into two parts: first is about the student English proficiency level; second is about picture books’ acceptance by students, parents and teachers.

### **Student English Proficiency Level**

English proficiency level represents how well students are able to understand and use English. It serves as a direction that can help teacher to adjust instruction to the linguistic needs of students.

**Week1.** From the initial meeting, it is observed that four students’ EPL almost belong to zero basis level, although two mothers reported that their kids have been capable of speaking some simple basic words. These four students did not have their own English names, nor did they take initiative to greet teacher in English. During teacher’s self-introduction section, they learned “yes” and “no” the first time to judge some of the characteristics of teacher. When presented first picture book---*Pat the bunny*, which included very basic words like book, face, look, play, etc., they did not know them, nor were they able to describe the picture book in their own words.

**Week 2 to week 5.** From week 2 to week 5, continuous progress has been seen among students in various aspects. Vivian and Daniel showed their self-confidence towards English since week 2 and Alex and Elsa keep involved in English learning. Four students were capable of reading text rather fluently and confidently and started to label objects in picture book.

In week 4 and week 5, students were observed to label objects that they have learned in textbook. For example, they would blurt out single word such as animals, colors, numbers, and body parts when they see the illustration in picture book, like “dog”, “head”, and “green”. After teacher’s exemplification, they would imitate and use more than one word to describe. For instance, they say, “*A brown bear*”, “*A yellow and green giraffe*”. In general, four students use single word more frequently than a complete sentence.

I utilize four picture books in class this period. An apparent phenomenon is that students start to identify images on picture book with simple English words and especially show attachment to sing songs adapted from picture book.

For instance, Elsa is able to sing the whole adapted song *Brown bear, brown bear, what do you see* without referencing to book. What's more, they learn more expression from picture book, which greatly enrich their vocabulary and improve oral speaking. To give an illustration, they have learnt to say "*I can do it*" from picture book *From head to toe*; when I ask students question in class, they will reply with it.

In students' interview conducted in week 5, students were asked question whether they like English or not and why. Four students all agree with one voice.

Alex explains, "*Xue Yingyu hen youqu.*" (*Learning English has great fun*)

Elsa relates to her school study, and says, "*Zheyang mingnian xue yingyu jiu hui hen qingsong.*" (*It will be much easier by the time they start learn English at school next year.*)

When asked if they would like to keep learning English and grow to be as fluent as a native speaker, Alex, Daniel and Elsa agreed to the statement and explained as follows:

Alex: "*Yinwei xiang kaoshang hao daxue, hai keyi qu qita guojia wan.*" (*I want to go to top university and travel to other countries.*)

Elsa: "*Yihou keyi zuo zai bangongshi, chui kongtiao, er bushi dang gongren.*" (*I would like to be a manager, sitting in office and enjoying air-conditioner instead of being a worker in the future*)

Nevertheless, Vivian frowned at teacher and said, "*Laoshi, wo hai bu zhidao da'an. Yinwei wo buzhidao wo neng bu neng xue hao.*" (*Teacher, I don't know the answer since I am not sure whether I can learn English or not.*)

**Week 6.** Week 6 is the final test week of picture book program. For the past weeks, we have learnt to the first lesson of Unit 5. Students are familiar with the conception "Zoo" and know many animals. Thus, I would like to use a wordless picture book named *1,2,3 To the Zoo* to test their English proficiency degree. Their answers indicate that students can use what they learn from textbooks to describe, such as using phrase "color+animal", or signal word "and" to describe two characteristics of object. Secondly, student's vocabulary is not limited to textbooks (13/30), but with a larger portion from picture book (17/30), such as lion, bear, white, ten, etc. Thirdly, students' oral expression is still limited to simple vocabulary or phrases. They did not say completely sentences in the test.

## Acceptance of Picture books

### Student's part

**From strangeness to recognition.** The first time when I use the word “huiben” (English: picture book) in class, Alex, Vivian and Daniel show confusion to what is named Huiben. Elsa narrated that she knew English picture book since she attended a camp in the past but she was also not sure about how to define a book as picture book. As a result, the time I displayed picture book---*Pat the bunny* to them, they showed great curiosity and delight towards it. I wrote in my reflection as “I can easily feel their eyes shining the moment they see the book.”

In the process of reading, students raised their questions and comments on picture book.

*Student Vivian: “ Zhe ben shu tai ke'ai le. Wo conglai mei kanguo zheyang de shu.”*  
(The book is so cute; I never saw such a book before.)

*Student Elsa: “Wo xihuan mo tuzi de mao.”*(I like to touch the Bunny's fur.)

*Student Alex: “Limian haiyou yi ben xiaoxiao de shu. Shangmian jiang shenme? ”* (A miniature book is inserted in the book. What does it say?)

At the third contact with picture book, before teacher brought in a new picture book---*From head to toe*, teacher researcher asked question about how they defined picture book. They gave the following different answers.

*Student Alex: “You dongwu de shi huiben.”* (“Books that have animals are named picture book.”)

*Student Daniel: “You shi hou ye huiyou ren.”*(“Sometimes it also includes people.”)

*Student Vivian: “Huiben doushi yingyu de.”*(“Picture books are all written in English.”)

**From understanding to like.** In the fourth lesson, students express their desire to read other picture books which are displayed on the book cabinet of learning center. During reading, they would predict what's happening in the book, discuss with classmates, and further confirm their interpretation from teacher. Each class when we finish text learning, they know that it will be picture book time and they will curiously ask which book I bring to the class.

From student interview conducted in the fifth lesson, students were asked question “how do you think of English picture book?” Three of them answer “*Hen haokan* (Very interesting)”, Vivian answer “*Yiban* (Just so so).” When being asked “do you think learning English picture book will be helpful for English learning”, four students all reply yes and even exaggerate by saying “*Feichang feichang feichang da* (Very very very huge)”.

In the last week, teacher asks students to define again what picture book is. This time, their answer is dissimilar:

*Elsa: “You tuhua he wenzi de. (It includes picture and words).”*

*Alex: “Tu shi hua de. (The picture is painted.)”*

## Parent's Part.

**Before implementation.** Based on parents' reply in questionnaire, it shows that they all agree English learning play a crucial role in kid's future development. As for using English picture book in English class, three parents choose the option "Very good, very creative", Vivian's mother chooses the option "Not so sure", no one chooses the option "prefer to use tradition English textbook".

When being asked if teacher uses English picture book for teaching, which aspect you regard as important for kids? Three mothers choose option "help establish English reading habit". Apart from this answer, Alex's mother also chooses option "improve English writing ability". Vivian's mother chooses option "broaden vocabulary" and "enhance the confidence of oral English performance". To conclude, parents place higher emphasis on developing English reading habit.

**During implementation.** I would deliver teaching report that included learning content and home assignment to parents via online conversation group after every class. Besides report, I also informed them of additional information about picture book, such as how to get free online resources and the benefits of adopting picture books as study material for children. Parents did not make any comments on the extra information but shortly reply "Thanks teacher". They did not further ask any questions about English picture book, such as how to choose an appropriate English picture book for their kids or how to use it at home.

**After implementation.** In the last week, I conducted an individual parental interview to the four mothers. Parents are all in favor of children's remarkable progress, and they think children like learning English very much. They reflected that their children were very active with readouts via electronic phones at home. Every day children would request to read and send recordings to teacher. When being asked "Will they support teacher keep using English picture book in class?" four of them showed support to this project. As for question "Will you talk with your kids about English, such as text content or picture book?" Elsa's mother and Daniel's mother said yes, while Vivian's mother and Alex's mother said no.

**Teacher's part.** Can English picture books be well integrated to classroom teaching and contribute to the improvement of students' EPL? Is it sustainable and embedded with referential significance for other classes? These questions are essential for this research.

Teacher researcher reports her thoughts in reflection that it is of great benefits for classroom teaching since it could improve students' learning motivation and increases their involvement. For instance, when I introduced picture book named *Does a kangaroo have a mother, too?* "Students are really involved in the book and keep asking how to pronounce new animals in the book, and they would like to read out the sentences while they see the book."

Another recurring theme in my reflection is witnessing their growth in expressing themselves by using English. For instance, in week 3 I asked students to use English to describe whatever they see in classroom. It happened to be a rainy day and many moths fly into classroom (We change the class time to evening on that day). Alex says,



“I see an insect.” “I do not expect they would speak out a complete sentence as well as correctly use insect to refer to moth. It makes me feel surprised and very happy.”

In the reflection of the third week, I started to realize the problem and wrote, “It maybe because of my lack of familiarity with picture book, I did not choose the core portion from picture book that I would like to share with students as what planned to be before starting program. Instead I always introduced the picture book from beginning to the end for the past three classes, which took me a great deal of class time. Perhaps I should make adjustment through selecting the most crucial part that I want to combine with the text content and design relative activities.”

## Discussion

This research contributes to our understanding of whether picture books’ classroom use among students in suburban area of China is feasible and effective. The analysis revealed that with the scaffolding of picture books, four students have made apparent progress in English proficiency level in the past six weeks. The students are positive about the use of picture books in classroom and report that it is of great benefits for them to learn English. As for parents, they express support for teacher’s plan of picture books use but they are not really engaged in it. Lastly, teacher reflects that the classroom use of picture books is conducive in several aspects, yet to some extent increasing extra workload. From the above finding, I would argue that by integrating picture books with textbook in classroom teaching, students’ English proficiency level is seen as obviously improved. Reports from students, parents and teachers’ comments on picture books’ use tell us that this pedagogical innovation is accepted and beneficial. As a result, I would suggest that teachers could adopt picture books as a scaffolding material in teaching after abundant plan and preparation.

Drawing on classroom evidence, I maintain that picture books are conducive to expand students’ vocabulary and enrich expression of English. Compared with picture books, conversations or passages in textbooks are usually limited in language expressions, which hinder the possibility of students’ fully expressing themselves. Yet picture books are abundant of authentic words and sentences that are originated from specific contexts and topic, by employing picture books in class, students are invited to learn more expressions and explore new interesting stories, which make up the deficiency of traditional textbooks. For instance, by learning *Does a kangaroo have a mother, too*, students are exposed to many different lovely animal babies and mothers, such as giraffes, penguins, lions and etc., which are not taught in textbooks. Through witnessing the maternal love between animals revealed in picture books, students can also learn to express their love for mothers in English. Therefore, it increases the opportunity for students to pick up languages that are close to their daily life.

Based on the student interviews, it can be concluded that picture books can also improve students learning motivation. Under the guidance of teachers, students apply what they learn from the content of the textbooks to study picture books. In the process of application, students would feel the beauty of picture books as well as a sense of learning achievement. They read, sing, and act out as the illustration do, all of which further enhances their interest in learning English. For instance, when reading the picture book *From head to toe*, students were captivated by the funny movements of animals. They learn to read out the sentences while intimating different

actions of various animals. Students' involvement in class activity and likeness towards English and picture books in turn encourages teacher to continue implementing the pedagogy.

For the pedagogical innovation, parents are supportive yet do not devote extra energy and time on it. As we all know, primary students' learning needs the joint efforts and input from different parties, which include parents, teachers, and school. From parents' response, we can see that parents rely more on teachers' teaching, and parents' direct participation and investment are relatively few. When teachers attempted to create more communication opportunities, such as providing classroom feedback and introducing the benefits of English picture books, parents did not really take active part in the interaction. More often, they would express gratitude to teacher's work. This may also be related to SES and parents' educational background. In this class, one of our mothers graduated from junior high school, two from senior high school and one from university. They may want to further communicate with teachers, but they don't know what to start with. A parent once told me that she was afraid that her wrong pronunciation would affect her kid, so she dared not speak English with her child. To conclude, parents' response and low involvement degree stand as a key feature of this study. It also represents the English learning condition in suburban area of China that parents largely rely on teachers' teaching in class.

The reflections from the perspective of teacher shed light on a satisfying yet time-consuming working condition in terms of integrating English picture books into conventional teaching. It requires teachers to have relative knowledge reserve, and at the same time arrange time to design effective classroom activities to combine picture books with class so as to improve students' language ability and their learning interests. As a result, sufficient preparation, such as teaching seminar with colleagues, school support and parents cooperation are needed to guarantee the successful implementation of pedagogical innovation. Training institutions like ours may be relatively flexible to put new pedagogy into practice, yet if placed in school, it would be harder for teachers to complete normal teaching task from school authority and make new teaching innovations at the same time.

### **Conclusion & Recommendation**

This research takes a community English training center in a suburban area of China as research object. By introducing picture books into English teaching, the researcher hopes to help students improve their English ability and learning motivation. From the research result, it is proved that this teaching attempt is very innovative and effective. It can not only help build children's English language reserves, but also plant children's desire towards English and English reading literature.

In addition, this study has helped to address the shortage of previous studies on the picture books' function in the area of second language acquisition which mostly focus on parents who receive higher education. The findings of this paper unravels the real circumstance of parents and students from lower SES families, such as students' initial definition of English picture books and parents' low degree of engagement. The result also reaffirms the conclusion that students who are from lower SES families experience the worse print climate—few books, magazines and newspapers. Therefore, I think that in areas where educational resources are relatively scarce,

collaborative effort among educational administrators, school and teachers should be devoted to promote increasing opportunity to get access to English picture books for EL students. In order to support teachers with English picture books teaching expertise, workshops are needed for teachers, colleagues to discuss their accumulated experience and know-how. In other words, more support should be provided to teachers to know about picture books, the benefits of incorporating it to English teaching, and how to put it into classroom use.

This study has found that parental involvement in suburban areas is relatively limited due to their available time or individual ability. I would like to suggest that teachers could establish a more efficient interaction mechanism with parents, by which giving parents more clear guidance and effective suggestions on the aspect of English learning.

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## Appendix A

### Picture books used in Classroom English teaching



## Appendix B

### Pre-parental Questionnaire

Firstly, please answer the information about your child:

1. Name: \_\_\_\_\_ 2. Birthday: \_\_\_\_\_  
3. Gender: \_\_\_\_\_ 4. Birth order: \_\_\_\_\_

Secondly, please reply to the information about you and your family:

1. Your relationship with your child is (father/mother/grandfather/grandmother, etc.).
2. Your highest educational background is:  
 Junior high school or below  senior high school or technical secondary school  
 university or college  postgraduate or above
3. Your age is: \_\_\_\_\_
4. Your job is: \_\_\_\_\_
5. A. Has your child participated in extracurricular English training before?  Yes  No  
 B. If so, how many hours have your child been trained?  
 0 - 36 class hours  36 - 72 class hours  72 - 120 class hours  
 more than 120 class hours
6. How is your child's current English proficiency?  
 Zero Foundation  
 Some simple English vocabulary and greetings  
 Can sing complete English nursery song and say simple dialogue and communication  
 Can tell English stories
7. What do you think is your child's interest in learning English?  
 very much  general  not very interested
8. A. Have your children been exposed to Chinese picture books?  Yes  No  
 B. If so, do your children like Chinese picture books?  
 very much  general  not very interested
9. A. Have your children been exposed to English picture books?  Yes  No  
 B. If so, do your children like English picture books?  
 very much  general  not very interested
10. What do you think of learning English picture books in English class?  
 It's a very novel and good attempt.  It's not sure.  I would prefer traditional English textbook.
11. If the teacher uses the original English picture book to teach in class, where do you value the promotion of children? (Multiple choice)  
 Enlarging vocabulary  
 Develop reading habits in English  
 Improving English Writing Ability  
 Enhancing the confidence of stage performances  
 Others, please specify: \_\_\_\_\_
12. What position do you think English plays in children's future development?  
 very important  general  very important

## Appendix C

Parental feedback in week 5

1. What do you think of your children's attitude towards English learning now?
2. Do you think your child's English has made progress?
3. Do you see children practicing English at home?
4. Will your child talk to you about the English she/he has learned?
5. What problems do you think children have in learning English?

## Appendix D

### Student Interview

1. Do you like English? Why?
2. Do you think your English has made progress?
3. When you go back home, do you speak English, listen to English or watch English programs?
4. What aspects of English do you think you are not very good at now?
5. What do you think of picture books?
6. Do you think that learning English picture books is helpful for learning English?
7. If you recommend to your partner, which picture book would you like to recommend to your partner?
8. Do you find it difficult to learn English?
9. Do you want to continue learning and become a good English speaker?

## Appendix E

Format of Teaching Reflection:

Date	
Teaching material	
Picture book's name	
Student's response	
Teaching strategy	
What answers the critical question	
What needs further improvement (data collection strategy, lesson plan, etc.)	



***From Teaching to Learning; Becoming Coach for Learning by Doing to Build Educational Capacity in Nepal***

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**Abstract**

Transformation from a teacher to a learning facilitator is a challenging task; the essence of learning is complex, because at the center of it are sets of actions and thoughts interrelated to each other in different ways. There are various ways for the learning facilitator to support the learner depending on the educational design and the personalities involved. This transformation is needed because the world is becoming more interconnected and its problems are more complex. The skills to support learning of problem solving and development are essential in preparing students to develop solutions for changing needs of the society. This study describes experiences of teachers who are developing skills from instruction-based teaching to facilitation-based learning to be able to coach students in interdisciplinary project studies. Data has been collected in Nepal during BUCSBIN-project (2017-2020) which is a Finnish capacity building project to support Nepalese HEIs to transform their education and support entrepreneurship. Multiple data collection methods have been used; feedback surveys, interactive feedback methods, in-depth interviews and written self-evaluations. Data was collected from 105 respondents between April 2018 and November 2019. Results show that most participants identify finding a new framework for their work. A considerable amount of the respondents was also reflecting on their professional and personal development. This study focuses on examining the results more closely and reflecting on the trainer's own experiences. Both qualitative and quantitative data is used when reporting the results.

Keywords: Learning facilitation, transformative learning, teacher education, teacher identity, future higher education, Nepal

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## 1. Introduction

Higher education institutes are challenged to transform their way of teaching and learning to fit better to the needs of changing work life and societies. This means that teachers also need to change their way of working; transferring knowledge is not sufficient and purposeful, since the knowledge is easily found. What educators need to do is to prepare our students to future worklife; with appropriate skills, competences and attitudes.

All over the world university teachers are not trained as teachers. They are often professionals eager to share their knowhow with the students. As Brancato (2003) has stated “educators are often ill-prepared to teach; they identify more with their disciplinary interests and less with teaching practice”. From the students and society’s point of view it is problematic to have teachers who are themselves more interested about delivering soon expiring information than capable to empower students to learn how to learn. Especially because many of the existing professions will be disappearing; many situations the knowledge and skills taught to students are already inaccurate before students are graduating e.g. in UK more than 30% of the graduates find themselves miss-matched for a job when they graduate (Universities UK, 2015). Instead to educate students to specific knowledge, they should be trained e.g. to find and assess the relevant information, to work as an interdisciplinary team member, to better understand who they are and to be able to develop new ways to solve needs of the societies and communities.

Many of us teaching today have been taught in teacher centered way - teacher speaking and telling what students should learn. According to Cranton & King (2003) we value the scientific knowledge and strongly believe that the role of the teacher is to speak and share the knowledge and the role of students is to listen and remember. Many of us are aware that this is not the best way to learn, but we keep on doing it, because that is the way we have been learning ourselves. However, when thinking that students of today will be future professionals, solving problems that we have no idea today, for them learning should be process of communication, where remembering, applying, understanding and further developing should be the driving force of learning. The nature of learning should be reflective, because we never know what are the needs of future are.

## 2. LAB Studio Model

The LAB studio model (LSM) is based on learning by doing and reflective learning which suggests a more practical approach to professional education and aims to bridge the gap between academia and the work life. Schön (1983) summarizes this process as reflective practice or “knowing- and reflecting--in--action”. The LAB studio model combines together an international and interdisciplinary group of students to work together on solving real problems from the society, organizations or companies. Students work in teams. Learning is based on reflective practice both on an individual level as well as on a team level. LSM has been developed by Oulu University of Applied Sciences (Oamk) from Oulu, Finland. LSM enables learning of 21st Century Skills in higher education by educating self-directed learners who are active and concerned citizens (Karjalainen, Seppänen & Heikkinen, 2016).

Learning in LAB Studio Model is led by students and fostered by a LAB Master, who acts as a supervisor of learning and directs the students to find and build new knowledge, skills and attitudes. A LAB Master is always a part of a team, preferably interdisciplinary, of coaches and tutors, who are either experts of required fields e.g. health, marketing or ICT (coaches) or experts of team development process (tutors). A LAB Master needs to be able to enable learning by doing of the students, design learning processes and suitable methods, be in contact with companies and organizations as well as work with tutors and coaches for the best learning results from students learning point of view. The roles and responsibilities of a LAB Master could be perhaps best explained as being a chameleon who changes according to the needs of students, other team members or companies / organizations.

### **2.1 LAB Studio model processes and practices**

It has been recognized that there are five distinct processes that are supported by the learning activities and managed by the LAB Masters which run through the LSM based studies in a reflective practice. These include the personal development process and professional learning process which require the participant to inspect how they deal with novel situations and often the interdisciplinary group sheds new light to their own skills as they may solely represent their field of study. Product development process starts from a problem and by iteratively building understanding with prototypes finishes with a demo. As the learning happens in teams there is also a team development process that has reflective phases in it. Lastly the entire group of teams forms a supportive, collaborative and encouraging learning community. Each process has its moments of reflection.

### **3. The BUCSBIN Project**

BUCSBIN (Building University Capacity for Business Incubation in Nepal) -project (2017-2020) is a project funded by the Ministry for Foreign Affairs of Finland as a part of The Higher Education Institutions Institutional Cooperation Instrument (HEI ICI). HEI ICI supports cooperation projects between higher education institutions in Finland and the developing world that are designed to enhance higher education provision in these countries. The projects support the higher education institutions in developing their subject-specific, methodological, educational and administrative capacities. (Finnish National Agency for Education, 2019.)

BUCSBIN-project participants have been teachers and administration staff from two higher education institutes in Kathmandu, Nepal. Project aims to develop skills, knowledge and disposition toward project-based learning to implement LAB Studio Model (LSM) based studies. BUCSBIN training has been conducted by Finnish LAB Masters from Oamk.

In BUCSBIN the goal of the training was to prepare teachers to have mindset and skills to run education focusing supporting future needs and competences. LSM challenges teachers to employ a learner centered approach and coaching methods to become a learning facilitator. Figure 1 shows the timeline of the training process. The process has been modelled based on the Learning by doing approach similar to the experience of a student in an LSM based study. The level of difficulty of the tasks, personal responsibility and amount of freedom raise gradually. In the initial phase

participants would hear keynotes and see activities. Later participants would get a student experience in a workshop setting. After the participation experience organizations chose a smaller group of participants to continue developing their skills towards becoming LAB Masters. Together the LAB Master apprentices and Finnish LAB Masters ran workshop for Nepali and international students in June 2018. For October 2018 workshop the Nepali LAB Master Apprentices were in charge of planning and running the workshop with Finnish LAB Masters observing and giving feedback.

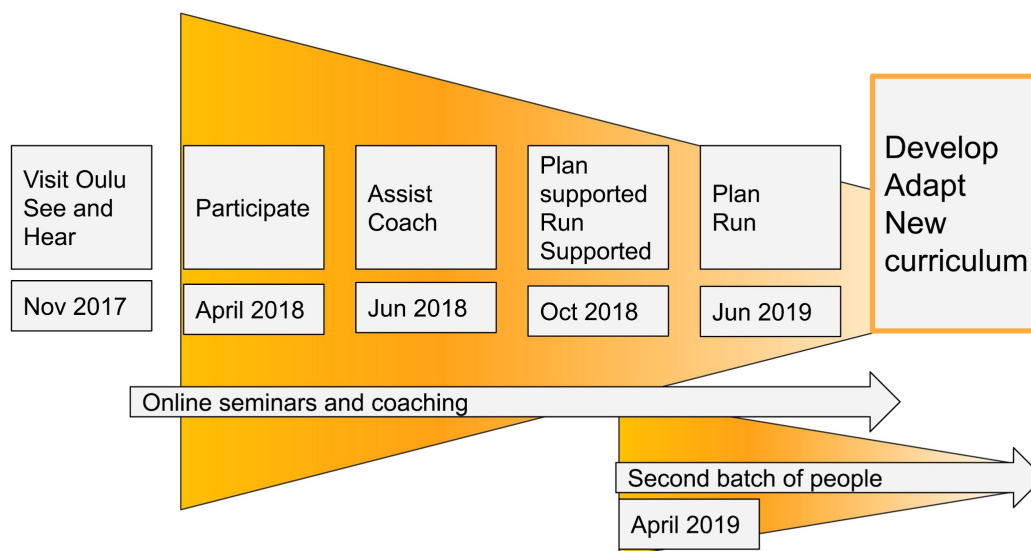


Figure 1: Training process in the BUCSBIN project

#### 4. Transformative learning

What then are the learning that should happen in a teacher, when transferring from teacher centered way to become a learning facilitator? Transformative Learning Theory has been developed since 1970's and it has been the most commonly used adult learning theory (King, 2002). Transformative learning is a reflective process (Figure 2), where values, assumptions, beliefs and ways of doing things are questioned. It is a way of learning where the teacher is asking from him/herself questions like "What happened here?", "Why is this important?" or "How come I'm thinking this way? In that process of change that is leading the teacher to open up one's own frame of reference, shift from the old habits to better working habits and to find alternative ways of learning and teaching. (Cranton & King, 2003.)

According to Mezirow (2000) changing perspective, leading to transformative learning happens seldom. Transformative learning could be the result of two different kinds of processes; either it happens quite suddenly (epochal) and it is connected to a life crisis or major life transition or it is a slower process (incremental) where accumulation of transformations in meaning schemes will happen over time. Transformative Learning focuses on how to learn to discuss, reflect and act on one's

own purposes, values, feelings and meanings rather than things one has assimilated from others without critically evaluating them.

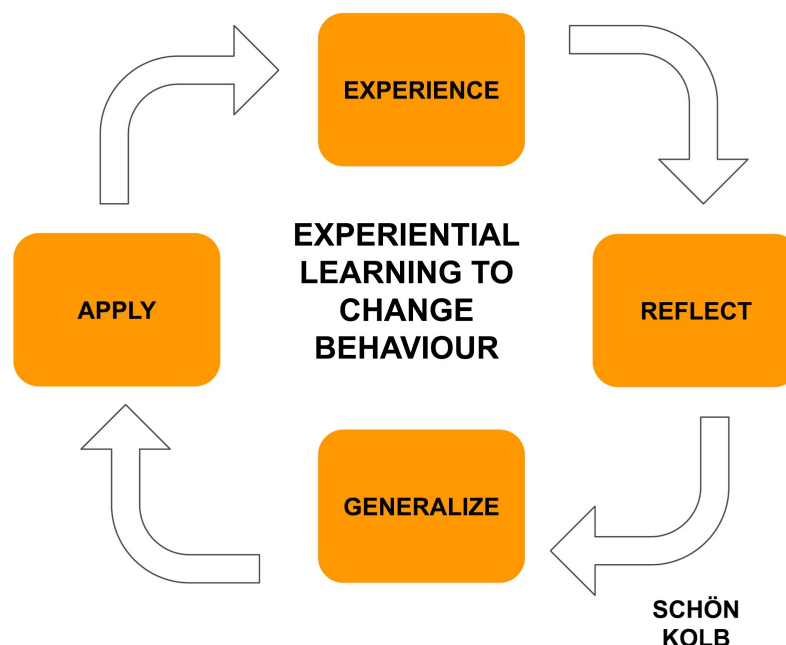


Figure 2: The Reflective cycle

## 5. Methodology

### 5.1 Purpose of the study

This study is to describe the experiences of teachers who are developing skills from instruction-based teaching to facilitation-based learning to be able to coach students in interdisciplinary project studies.

### 5.2 Sources of data

Data was collected between April 2018 – November 2019. Participants of this study are teachers and other faculty members from two higher education institutions from Nepal. One of the higher education institutions is a private institution with 20 full time staff members. The other higher education institution is a public one with 492 staff members. Data was collected by electronic survey (n=83), by written self-evaluations (n=8) and by in-depth interviews (n=14). For the electronic survey there were also other participants from other higher education institutions as well as from companies. All together there were 105 persons. In Table 1 the participants are presented based on what phase of data collection they were participating and what was their background organization.

### 5.3 Instruments

Three data collection methods were used: an electronic survey, written self-evaluations and in-depth interviews. The data by the electronic survey (n=83) was collected after participants participated in a four-day workshop and pedagogical

seminar in April 2018 and April 2019. The electronic survey was sent to the participants a few days after the workshop and they could answer it anonymously. In June 2019 written self-evaluations were done after participants of this study (n=8) were observing and coaching students a student pilot. Self-evaluations were sent by email to one of the researchers. The last part of the data was collected by having in-depth interviews (n=14) in October-November 2019. These interviews were taken by both researchers. They were recorded for research purposes.

Data collection method	Why method was used	Private HEI	Public HEI	Other participants	All together
Electronic survey	Collect feedback, to understand the starting points of learning of participants	24 (29%)	47 (57%)	12 (14%)	83 (100%)
Written self-evaluation	To support and force participants to reflect		8 (100%)		8 (100%)
In depth interviews	To understand the learning process of LAB Master apprentice	2 (14%)	12 (86%)		14 (100%)
		26	67	12	105 (100%)

Table 1: Data collection methods and participants

Data was analyzed by using content analysis. Content analysis was used to analyze both quantitative (Pietilä 1973) and qualitative data (Janhonen & Nikkonen 2003). Content analysis is used when data needs to be categorized in a certain way. In this research quantitative analysis to used mainly for understanding better who the participants were. Qualitative content analysis has been used for qualitative data from self-evaluations and for analyzing the interviews.

## 6. Results

Based on the analysis from the interviews few key findings were found; different personal paths to enter the education, importance of personal experiences about the pedagogical method and team teaching.

Teachers had basically two different paths to join the teacher training; either they have themselves somehow recognized personal need and hope to change as a teacher or they were told by their management to join the training. Those teachers who had personal interest to change have not only been reflecting about what has happened with their students in learning situations, but also how their own ways of teaching and attitudes towards learning itself have changed. These teachers joined the educational process early and were committed to self-development.

*“In our context we never learn how to become a teacher. So you choose to become a teacher, and there is such a degree there and becoming a teacher is that you remember the best teacher you had and you try to imitate, so that was how it was. So I was trying kind of imitating my professors, like balancing to find different projects, but then I was not, I was really strict and rude kind of a teacher before BUCSBIN happened to me.” (LAB Master apprentice 3)*

*“And then workshop happened in Summit. So that point was quite changing, transforming for me because I understood a lot of things. Like I also understood how you can do bad [as a teacher].” (LAB Master apprentice 3)*

*“You do not become a LAB Master overnight. But it is a long process, like me, I was participant first, then observing event and coaching and do things as a coach. It is a gradual process, that you have to go through step by step. There are so many things you have to learn like the process and the tools and activities and everything. So it is not something that can be done in a day or two. It takes time.” (LAB Master apprentice 1)*

On the other hand, there are also teachers who have been joining the educational program from the beginning and their take-away was only copying and using new methods on their own courses.

*“Of course, I have been giving feedback to the students ... But I was not doing it in a systematic way. But once I get to know, when I observed the BUCSBIN, it was that, that is the correct method of doing it. So it gave me chance for providing methods and the system I was particularly using for my own course.” (LAB Master apprentice 2)*

Teachers who have had support and resources from their organizations have been able to realize a larger scale change in themselves and in their institutions.

Another finding was that at the beginning of the process, it is important to have personal experience about learning by doing since many teachers did not have experience about this. We realized that one's own experience as a participant and experience of assisting the workshop facilitator are needed to have more clear understanding what this kind of learning is about.

*“Listening was not enough, obviously. Because we are listening someone else, somebody is telling us things. But when we go and experience the things on our own, it is then when we learn.” (LAB Master apprentice 1)*

*“The entire concept of learning by doing was very useful because rather than simply reading books or literature we remember it one day and will ultimately forget it the other day. But if we try to apply or execute our knowledge then, we get so attached to it with both my minds and heart that the knowledge forever will remain within us.” (Workshop participant 1)*

*“There are many tools used in the workshop that I believe I can take into my classroom and my daily life. Time management and the saying that there is*

*'never enough time' is a philosophical take away. Hopefully my classes become more interesting. I have more empathy towards my students and shall always look to improving learning experience by trying to see it from their point of view.*" (Workshop participant 2)

Many participants raised the issue of team teaching as a new and sometimes challenging way of working while recognizing its value. Communication among the teacher team is essential for a successful program and being able to teach an interdisciplinary team.

*"Even the coordination bit, the coordination, the planning, the communication. Because communication between the two lab masters I think that is something very, very important. And if like you know, because honestly speaking, there has been some problems between [LAB Master Apprentice] and [LAB Master Apprentice], even in communication and stuff like that. Which made it difficult for coaches as well."* (LAB Master apprentice 1)

*"Communication and transparency, that is really important. So that is also important. Coaches are not a problem in case of KUSOM, but like those people who take that role, they need to be responsible and accountable for it. That is really important."* (LAB Master apprentice 2)

## 7. Conclusions

To change one's mind is not an easy process and it takes time. Furthermore, the transformation might take even more time in Nepal as the style of learning, interaction and the cultural norms in Nepal are more hierarchical. To our surprise the concept of reflection was not familiar to all the teachers who were participating in our trainings. We should have anticipated this and included so more pedagogical foundations in our trainings.

It has proved sometimes challenging to go from educating followers to collaborating as peers after the training. LAB Apprentices this refer to the trainers and look for approval for their adaptations to the LAB Studio Model even though adapting to local needs has been recognized as a need from the beginning. Another factor in unwillingness to adapt the model might be that it is hard to abstract up from one experience and as trainers we have not been able to differentiate between the model and one instance of the model. This presents a challenge for future training projects and inquiry.

The educational process, (Figure 3) that has been developing during BUCSBIN, challenges the participant to explore one's existing ways to think, act and identify oneself as a teacher. It also forces participants to think in a different way one's relation with learners. Some of the participants are ready to start a process of transformation, for others it might not be needed and for some it might be just for a moment a thing that disturbs their way of thinking. Transformation has happened in those teachers who have felt a personal need to change and have had the support from their peers and their organization to use the time. Based on the data gathered, we know that for these teachers who have been brave to take this path of changing



oneself, it has been a positive experience that has raised their professional self-awareness and made them more permissive for themselves and for their students.

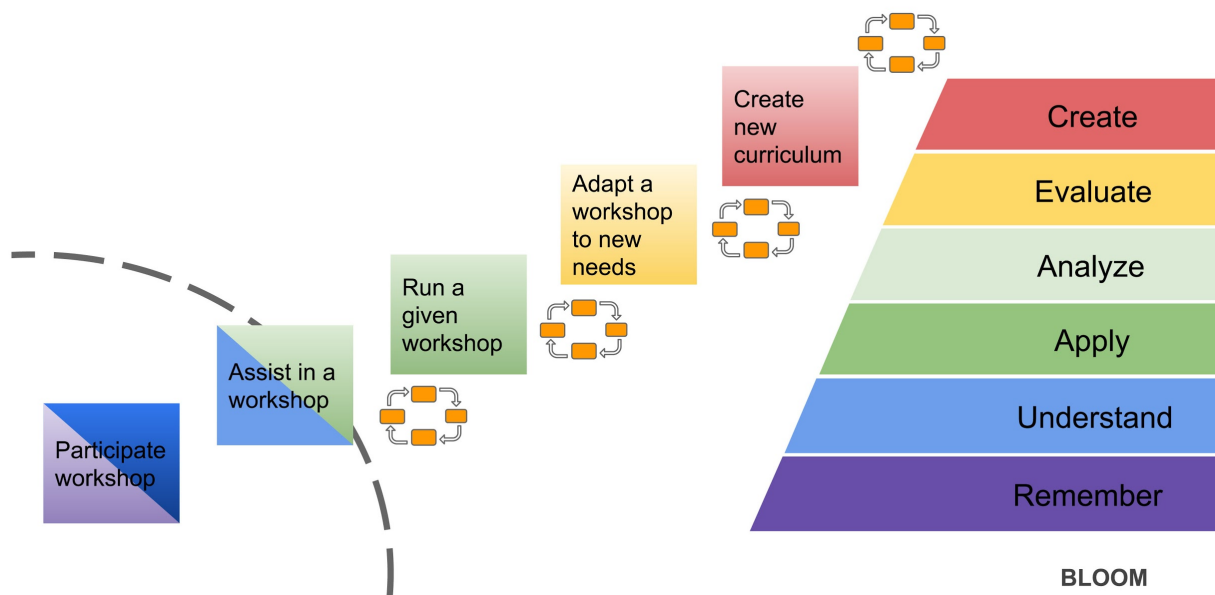


Figure 3: Activities enabling learning and Bloom’s Taxonomy

In the future we are hoping to continue developing the learning model and better supporting teachers willing to develop themselves as teachers. We are also looking forward to go deeper into the data and explore it better.

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***Understanding, Designing and Developing Assistive Technology for Students with Dyslexia in a Singapore Classroom***

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Official Conference Proceedings

**Abstract**

When developing assistive technology (AT) for individuals with learning or developmental difficulties, considering input from various stakeholders in the planning process increases the likelihood of sustainable AT programme implementation (Stoner, Parette, Watts, Wojcik & Fogal, 2008; Wong & Cohen, 2015). The study seeks to understand AT use in dyslexia intervention so as to effectively design and develop an innovative AT platform for primary school students with dyslexia. Focus group discussion sessions were conducted at the Dyslexia Association of Singapore (DAS) with 9 Educational Therapists (EdTs) to discuss the challenges faced by dyslexic children, their experiences, feedback and concerns with AT platforms, as well as existing intervention methods. Observations of DAS students (n=13, male=9, age range=7-12-years-old) during their regular intervention sessions with the EdTs were carried out to understand AT use during the sessions. Finally, in a User Feedback Study, the same students from the observation sessions tried out different form factor versions of a reading tool that we are developing that facilitates word recognition and comprehension using the latest optical-character-recognition and text-to-speech technology. Qualitative thematic analyses of the data suggest that the current AT used in existing intervention is insufficient for addressing the specific reading and learning difficulties of the students, mainly due to a lack of resources, accessibility, and knowledge. Comparative analyses suggest that the development of a mobile application would be best suited to address these aforementioned limitations. The functional and logistical requirements expressed by the EdTs and students would serve as guidelines for further AT development and implementation.

Keywords: Dyslexia Intervention, Assistive-Technology, Mobile-Interventions

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## Introduction

Dyslexia is one of the more prevalent forms of specific learning disabilities (SLD) that affects approximately 10% of the population (Hulme & Snowling, 2016). In recent times, there has been a surge in employing assistive technology (AT) to improve students' reading and learning in dyslexia intervention programs (Jamshidifarsani, Garbaya, Lim, Blazevic, & Ritchie, 2019). AT is generally defined as an equipment or device that can be used to overcome one's disabilities, perform specific tasks or improve their functional capabilities (Ahmad, 2015). Current AT in dyslexia intervention allows for access to printed text, such as Text-to-Speech software, reading and phonetic apps (Landulfo et al., 2015; Lindeblad, Nilsson, Gustafson & Svensson, 2016). Studies have reported that AT-inclusion in classrooms has improved reading, writing and comprehension for dyslexic students (Nordström, Nilsson, Gustafson, & Svensson, 2018; U.S. Department of Education, 2007; Wood, Moxley, Tighe & Wagner, 2018).

Besides improved reading and learning outcomes, AT use can also help to address students' psycho-social and behavioural needs (Lindablad et al., 2016). Compared to their typical-developing (TD) peers, dyslexic individuals display higher anxiety and lower levels of self-esteem and motivation, which can lead to the task avoidance in reading and schoolwork (Carroll & Iles, 2006; Terras, Thompson, & Minnis, 2009). This decreased exposure to reading and language further widens the achievement gap between dyslexic versus TD students. By developing AT that is perceived to be effective, meaningful, enjoyable, and acceptable, dyslexic students would be more willing to use AT in reading and schoolwork, which in turn promote greater independence in reading and learning, and subsequently, increase motivation and engagement. As dyslexia intervention is usually fairly intensive and requires therapist instructions, AT use can help to alleviate instructor load and allow for reduced or little instructor involvement (Vaughn et al., 2003; Firth, Frydenberg & Bond, 2012).

In light of these positive reports of AT use for dyslexia remediation for both students and educators, there have been many assistive and educational tools developed to address dyslexia-related deficits, such as technological devices, educative platforms, and smartphone and tablet apps. As of 2000, there has been a growing interest in technology-based intervention in the past few years (Jamshidifarsani et al., 2019). There is a plethora of apps available for download in app stores that are touted as suitable for individuals with dyslexia. In spite of that, there is a limited number of AT-based ones that are truly suitable for dyslexia. In a meta-analysis of 531 apps, Dawson, Antonenko, Sahav and Lombardino (2016) found that 24% of the apps developed had an oversimplified conception of dyslexia and neglected the fact that a holistic and multisensory approach is optimal for learning. Only a small percentage of apps have been developed with input/collaboration from dyslexia experts. Collaborative efforts between developers and dyslexia experts are important to ensure that the app is appropriately designed for the target audience.

Our project thus aimed to develop an AT platform that would meet users' needs by getting inputs from both dyslexic students and their Educational Therapists (EdTs) during the design and development process of an AT platform. EdTs are trained professionals who provide specialised and targeted support to dyslexic students beyond their daily curriculum (Landulfo, Chandy & Wong, 2015). The perspectives

of the EdTs are important because they help tailor appropriate interventions to individual learning. They have a deep awareness of the needs of the dyslexic students and the challenges that these students face. Getting prospective input from various stakeholders, such as the dyslexic students and teachers, is necessary for the long-term successful implementation of AT (Borg & Östergren, 2015). Thus, understanding both the students and the EdTs' perspectives is one of the important steps toward developing an AT program that can be effectively utilized during the therapy sessions, as well as in the larger classroom and home contexts.

Three studies were conducted at the Dyslexia Association of Singapore (DAS) – (1) Focus Group Discussion Study, (2) Observation Study and (3) User Feedback Study. The purpose of the first two studies was to understand the AT-based dyslexia intervention landscape in Singapore, so as to be better able to create an AT device that could address the specific needs of stakeholders (in this case primary-school students with dyslexia and intervention therapists) and incorporate successful features of existing intervention methods. Thus, we explored the difficulties and challenges faced by children with dyslexia and EdTs, the perceived benefits and limitations of existing non-AT based intervention methods as well as current experience and perception of AT use in dyslexia intervention in Singapore. In addition, getting the EdTs' feedback on AT intervention would provide us with guidelines for the reiterative development of our existing device prototypes. This input would help to directly address any gaps or limitations in existing AT-based intervention so as to better support learning and reading in primary-school children.

Similarly, acceptability of AT by a dyslexic child needs to be considered when developing the AT. A user feedback study was carried out to determine students' preferences for the form factor of an assistive device. Feedback and reception towards two device form factors were presented. This would allow us to determine which version of an assistive reading device could be developed further.

## **Part 1. Focus Group Discussion (FGD) and Observation Study (OS)**

### **Methods**

#### ***Participants***

Nine EdTs from DAS were recruited across two-DAS approved centres for participation in two FGD sessions. The EdTs' years of relevant experience ranged from 2 years 7 months to 37 years. The centres were selected by DAS, based on location to account for scheduling and travel constraints of the EdTs. The FGDs lasted for 1 hour 13 minutes (n=3) and 1 hour 30 minutes respectively (n=6).

Thirteen students (4 females, 9 males) were recruited across six DAS centres for participation in the OS. The students ages ranged from 9 to 12 years old (Primary 3 to Primary 6). Students whose parents provided consent were allowed to participate in the OS.

## ***Procedure***

For the FGD, IRB-approved consent forms were disseminated to the EdTs prior to the FGDs. One researcher facilitated an open-ended discussion in each FGD session with the therapists who consented to study participation. Two more researchers were present as note-takers to take note of key discussion points and the EdTs' responses throughout the session (Krueger & Casey, 2001). During the FGD session, the EdTs were also given the opportunity try out two AT devices – 1) a C-Pen Reader Pen (a commercially available handheld scanner pen with an in-built dictionary), and 2) a mobile application with a detachable prototype version of a finger-worn camera that we were developing. The EdTs were asked for their feedback, suggestions and concerns on the devices. Each FGD was audio recorded and subsequently transcribed. The transcriptions were reviewed alongside the notes and coded separately by the two researchers who collected the data. A third coder, who had not been involved in the data collection process, reviewed what the two researchers had coded. The final themes and topics extracted were derived from discussion and consensual agreement amongst the three researchers.

Observation sessions were carried out during the regular intervention sessions at DAS. Students at DAS attended dyslexia intervention for either one-hour twice weekly or two-hours once a week. Each student was observed for a total of 2 hours. One researcher sat passively at the back of the classroom to ensure minimal interference in the class activities. Observational notes were made specifically about AT use in the classroom and the child's behavior in response to AT use. The observation sessions were audio-recorded if permitted by the students' parents. Recordings were later reviewed alongside the researchers' notes to corroborate the observations. Findings from the OS served to supplement our understanding of the findings from the FGDs.

## **Results**

Findings from the FGD and OS were consolidated and qualitative thematic analysis of the FGD and OS transcriptions and notes was carried out (Braun & Clarke, 2006). Based on our research questions, themes and topics were extracted, coded, discussed and subsequently agreed upon by the researchers. The findings were categorized into 4 broad themes: 1) Challenges faced by dyslexic students, 2) Perception of existing non-AT intervention methods, 3) AT use in dyslexia intervention, and 4) Feedback on AT introduced.

### ***1) Challenges Faced by Students with Dyslexia***

In line with the literature, dyslexic students in Singapore experience similar difficulties in academic, socio-emotional and cognitive aspects (Carroll & Iles, 2006; Hulme & Snowling, 2016; Terras et al., 2009). Dyslexia-associated deficits with reading and learning such as poor phonological awareness, comprehension, spelling, word recognition, fluency and vocabulary were cited. Students had poor attention, memory, self-esteem, confidence, and motivation. Anxiety (particularly academic-related anxiety), task avoidance and an aversion to reading were also common problems faced.

## **2) Perception of existing non-AT intervention methods**

*Socio-emotional benefits:* The EdTs lauded the importance of current intervention in addressing the students' socio-emotional challenges as it allowed the child to develop confidence in the classroom. This in turn would foster a sense of academic self-esteem that could subsequently increase the child's intrinsic motivation and interest in reading and learning.

*Importance of individualised student-centred intervention:* Existing DAS intervention programs, curriculum and strategies were perceived to be effective due to the incorporation of Universal Design for Learning (UDL) principles in class (Messinger-Willman, & Marino, 2010). Differentiated intervention methods were tailored to the child's learning profile to better address learning and motivation. The small teacher to student ratio at DAS (maximum of 1:4) was seen as beneficial compared to the large class sizes in mainstream schools as it allowed for more individualized teaching.

*Lack of integrated support across the family, school and DAS:* The EdTs indicated that although they equipped the students with learning and reading strategies, there was still a need to rely on external efforts, such as the home and school environment, to implement and reinforce these strategies. Multi-directional communication between the home, school and intervention environment is important for ensuring consistency in learning. However, the current lack of an integrated learning and support environment limits the child's learning progress.

*Insufficient time:* The EdTs also deemed the current intervention duration of 2 hours a week as insufficient. However, school and external commitments constrained the time in which students are able to attend intervention sessions.

## **3) AT Use in Dyslexia Intervention**

*Experience with AT used:* The present dyslexia intervention classroom experience with AT is limited mainly to the projector, laptop, iPad, and commercially available mobile applications. Online platforms and browsers like YouTube or Google were used to search up word definitions or show educational videos and examples. Interactive websites with quiz or game platforms were also used to facilitate classroom learning and participation.

*Perceived benefits of AT use:* The EdTs perceived AT as being useful for student motivation and engagement in the classroom (see Table 1). The integration of different sensory modalities and teaching methods through AT allowed for the reinforcement and repetition of concepts learned. AT use was typically enjoyed by the students and could also foster a sense of autonomy by allowing for independent learning.

Table 1. Sample of Responses Regarding Perceived Benefits of AT Use

<b>Socio-Emotional Benefits</b>	<i>"I think using assistive technology, AT in short, iPads right, the first advantage is that it makes them motivated to learn. So we'll settle their emotional part, because they all come with a barrier. They hate to read. All our kids, they don't like to read. So with something different, and with the colors and all that, it's visual and they can touch. I think that is good motivation, for a start." (EdT05)</i>
<b>Independent Learning</b>	<i>"...You can go over it again if let's say the word they forgot in that sense, so they have the autonomy in that sense to read by themselves? Yeah, so I think that's one benefit." (EdT3)</i>

*Limitations for AT implementation:* There was a perceived apprehension of introducing AT in the DAS classroom as students are typically not allowed to use AT in their mainstream curriculum (see Table 2). Discrepancies between the assessment format versus instruction in mainstream education were a possible deterrence for the students' and EdTs' receptivity towards AT adoption. Additionally, the EdTs indicated that AT use in the DAS classroom is typically guided and does not fully allow for independent learning. The perceived limitation of AT as being less effective or more time consuming due to support challenges and the pervasive need for guided use could be a deterrence for AT adoption. Other concerns about AT implementation included affordability and the potential social stigma of AT use.

Table 2. Sample of Responses Regarding Limitations for AT Implementation

<b>Lack of permissibility in school</b>	<i>"I'm quite apprehensive when I ask my kids to type their essay on a laptop or iPad, because once they are so used to typing essay, they lost the touch of using pen and hand to write, and that will affect their speed when they're doing the examinations, during the examinations." (EdT01)</i>  <i>"So I think a lot of the things that we try, or rather, what we have implemented over here, we have moved along with edutechnology, but the question is always, are they allowed to do the same in school. Like what EdT06 said, the assessment differs you see. We encourage the use of AT, but are they allowed to use the same AT for tests and exams?" (EdT04)</i>
<b>Affordability</b>	<i>"To have a device which needs them to purchase it, if students are on the lower economic scale, are they going to be able to purchase it?" (EdT04)</i>
<b>Social Stigma</b>	<i>"Give colors and make it more trendy. Because, you know why? I'm afraid that people will laugh at them when they wear this device." (EdT01)</i>

#### 4) Feedback on AT Introduced

The EdTs were asked for their feedback on C-Pen and the mobile app to get a better understanding of the features and functions that could be incorporated when developing our AT device (see Table 3). The EdTs indicated the importance of an AT being able to scan individual words and longer chunks of text or sentences



continuously. Some EdTs suggested that the AT should also provide learning features such as the word definition and examples in the forms of images, sentences or even videos. Other EdTs, however, expressed that depending on the child’s proficiency, an assistive reading device that could focus on single word recognition instead would be ideal, as the additional definitions and examples provided might not be necessary. The overall recommendation was for the device to provide options for the user to access different learning features as needed. Device output should incorporate both auditory and visual stimuli to facilitate multisensory learning. Auditory output should also be adjustable for aspects such as speed, volume, accent or gender of the voice output. Depending on the age group, a reward or feedback system would be useful for student motivation and engagement. The EdTs indicated that AT development should consider its applicability in the local context. The audio output of the device should also be customized for the local context as different accents could affect the intelligibility and comprehension of AT. The EdTs also indicated that different languages should be ideally accounted for to address the multilingual needs in the Singapore context. An AT that recognized multiple languages or offered language translation features was suggested.

Other considerations included the affordability, durability and physical appeal of the device. The EdTs voiced their difficulties of using the finger-worn camera to focus on a specific word. An intuitive device for student use was recommended to reduce the need for extensive guidance or support when using the device.

Table 3. Sample of Responses Regarding Feedback on AT Introduced

<p><b>Adapting for local Singapore contexts</b></p>	<p><i>“Sometimes they can’t make out what it says. It boils down to the accent.” (EdT02)</i></p> <p><i>“Can it be dual language? Like translated to Malay or Mandarin? Cos most of them are Mandarin-speaking or Malay-speaking. So when you point to the word, it gives the meaning, and you can select the option where it can be translated to Mandarin or Malay? Any other language?” (EdT02)</i></p> <p><i>“That is also not a local accent.” (EdT04)</i></p>
<p><b>Additional Learning Features</b></p>	<p><i>“Probably, yea, if there’s more functions, it’d be better, like meanings, context, clues” (EdT02)</i></p> <p><i>“I think you’re saying this as a device that helps in word recognition, right? Further than that, it doesn’t have a definition to it; an explanation part. If there can be some exploration on that side?” (EdT03)</i></p> <p><i>“Yea, again, so putting it in context, and if I’m going to read a text, and then there is this one word that I don’t know and I scan it and it gives me all the other information. I’m going to be losing whatever that I’ve read earlier on. I’m not going to be following the story. So, I agree with EdT06. A reader should just function as a reader...” (EdT04)</i></p>

	<p><i>“So you were saying that if it’s word by word, I think, yea, it will be very useful maybe for the preschool kids if they want to learn, maybe not preschool, maybe upper primary when they want to learn sight words on their own at home, they can go through it. But, probably, like they were saying the definition part, if there is a function where they can switch off the definitions and then maybe only when they need the definition, they can switch it back on, something like that, but I don’t know whether it would be too complicated. Sometimes, they know they meaning of the word, but they’re just unable to read the word, for the upper primary that is.” (EdT08)</i></p>
<b>Reward System</b>	<p><i>“Oh! How about motivation? Like there’s something that says...ok but that’s for preschool, because they are really rewarded by motivation right? So if you say, “Oh you did it!”, you know usually apps have this, if they get that formation correctly then, “You did it! Wow well done!” I think that helps my kids.” (EdT03)</i></p> <p><i>“But older kids they don’t like ya?... They may say its childish.” (EdT01)</i></p>
<b>Physical Appeal</b>	<p><i>“Attractiveness” (EdT02)</i> <i>“Appealing” (EdT03)</i></p> <p><i>“I think the main thing is that it has to be compact. Easy to keep. Not cumbersome, not chunky.” (EdT02)</i></p>
<b>Ease of Use</b>	<p><i>“Camera to finger is very cumbersome ...As it is sometimes, writing from left to right is already very difficult for them (the students), so to toggle, and looking at EdT05’s struggles with pointing, and this is an adult here, struggling with pointing the camera at the word, with a child, it’s going to be even more challenging.” (EdT04)</i></p>
<b>Affordability</b>	<p><i>“So, I mean, this will be helpful for them, but if it’s going to cost, I don’t think they have, we have access to it.” (EdT05)</i></p>

## Part 2. User Feedback Study (UFS)

### Methods

#### Participants

The same students who participated in the OS also participated in the UFS.

#### Procedure

The study was carried out at either the start or end of the respective regular intervention sessions. Each session lasted for ten minutes to ensure that students did not miss out on their class time or to minimize the duration of staying back. Students were asked about their watch-wearing preferences and habits, and their general use and attitude towards technology and learning. The researcher introduced the two form

factors of the AT that we were developing – a wearable smartwatch and a mobile application. Students were then asked to try on the wearable smartwatch by themselves and to use the mobile application to identify a list of printed words. Questions about the ease and comfort of use of the device, likes and dislikes, as well as explicit preferences and reasons for either the wearable or the mobile app were then asked.

### **Materials**

#### **2) *Wearable FingerReader***

The Zeblaze Thor 4 Pro 4G, which is a commercially available smartphone watch, was modified to serve as a form-factor design prototype. The Thor 4's in-built camera unit was extended from the main watch body and retrofitted into a 3D-printed ring. This version of the wearable FingerReader prototype did not have the word recognition software installed.

#### **2) *Mobile Application***

A mobile application for word recognition was developed and installed on a smartphone. A Galaxy J4+ Dual-SIM SM-J415F/DS operating on Android OS version 8.1 was used. Students were able to use the smartphone's in-built camera to capture the image of the word and read the identified words on the screen out loud.

### **Results**

*Familiarity and liking towards mobile phones over watches:* Overall, the mobile phone was more familiar to students and all students enjoyed using it. Six students indicated that they liked wearing a watch, as it was useful for telling the time. Students who liked or were indifferent (n=2) to wearing watches indicated that they wore watches occasionally, due to it being more expensive or only if they "*felt like it*". Five students who did not like wearing watches cited that wearing a watch was uncomfortable and it "*hurt (their) hand*", was "*quite hot*" or would "*have a mark*". Watch wear was also considered unnecessary as they could use a mobile phone for telling time instead. Comparatively, all students expressed liking or were comfortable using smartphones and/or tablets. All students had indicated prior experience of using a smartphone and/or a tablet device, typically for gaming, video-watching, web-browsing, communication and social interactions.

*Comfort and ease of use of mobile app over wearable:* The use of the mobile phone was more intuitive and comfortable compared to the wearable smartwatch. Following the experimenter's demonstration of the mobile application, only three students required additional instruction or guidance on how to focus the camera on the worksheet. The remaining students did not have any difficulties with using the mobile app. All students indicated that the mobile phone was comfortable to use.

Conversely, students had more difficulties wearing the watch on their own. Nine students required assistance from the researchers in adjusting the watch-strap and the camera-ring attachment. As the camera was extended from one port, the wearable design could only cater for right-hand wear. Students who preferred wearing the

watch on their left hand (n=8) tended to wear the watch upside down, thus requiring further assistance in adjusting the fit and orientation of the device. Students also indicated that the wearable was not comfortable to wear. The comments made about the comfort of the wearable were as follows (Table 4):

Table 4: Sample of Comments on the Comfort and Ease of Wear of the Wearable Device

<b>Comfort</b>	<ul style="list-style-type: none"> <li>• <i>“(The wire is) too long”</i></li> <li>• <i>“(The ring) is pulling my finger out”</i></li> <li>• <i>“It feels a bit strange”</i></li> <li>• <i>“It feels disturbing...I don’t like to put things on my hand, so it feels like something new for me when it’s like that...can I take it off?”</i></li> <li>• <i>“This feels so weird...my finger...it’s a bit uncomfortable because the finger keeps pressing on my (child gestured to ring component and finger)”</i></li> <li>• <i>“It’s very hard (to move my finger around) because...usually I can move all the way, but this thing keeps (gestured to wire)...it’s like controlling me, it’s like when I want to move, then oh, cannot.”</i></li> <li>• Found it light (n=2), heavy (n=7) or were indifferent to the weight of the watch (n=4)</li> </ul>
<b>Ease of wear</b>	<ul style="list-style-type: none"> <li>• <i>“Very big...I don’t think I can wear it”</i></li> <li>• <i>“What kind of watch is this? It only works with adults’ hands, not my hand”</i></li> <li>• <i>“Usually I wear watch, but now I don’t, so I might have difficulties wearing this”</i></li> </ul>
<b>Ease of Use</b>	<ul style="list-style-type: none"> <li>• (Mobile app was) <i>“more easier and simpler to use”</i></li> </ul>

*Student feedback on wearable device and mobile app:* Students were explicitly asked which form factor they preferred and to provide their reasons for liking and/or disliking each version (see Table 5). An equal number of students preferred the wearable smartwatch (n=5) and the mobile phone (n=5), while three students indicated they liked both versions. Students who liked the mobile phone indicated that the app installed on it would be a helpful reading tool.

Additionally, a mobile phone was *“easier and simpler to use”* than the watch. A key deterrent for using a mobile app was the fact that the use of mobile phones was typically prohibited in school. One child also indicated that the additional features of a mobile phone could result in greater distraction as compared to a wearable’s singular function.

With regards to the wearable device, one student preferred the wearable as it was more convenient – *“Easier to use the watch because you don’t have to walk to get your phone and then take a picture”*. Another student indicated that he liked the wearable as it allowed for word recognition to be more focused – *“because it only points to one word”*. The remaining two students were unable to provide specific reasons for their preference. Other reasons for disliking the use of the wearable were

lack of familiarity of the device, discomfort of wear, and possible social stigmatization.

Table 5: Sample of Student Feedback on Wearable Device and Mobile App

<b>Factors</b>	<b>Student Feedback on Wearable Device and Mobile App</b>
<b>Usefulness of Mobile App</b>	<i>“It’s helpful...If you cannot read, then you can take your phone and you can take a picture and it helps you to read”.</i>
<b>Concerns over aesthetics of the wearable</b>	<i>“People would think that you’re different...you’re strange...because who would wear something like this that is connected to a watch. This looks like a ring, and this looks like a watch, who will wear a ring that is connected to a watch?”</i>

## Conclusion

As part of our device development process, our study aimed to understand the current landscape of dyslexia in Singapore, particularly pertaining to AT. Understanding the existing difficulties and challenges faced in existing dyslexia intervention, and the limitations of incorporating AT in interventions would allow us to develop AT as an effective problem-based solution. EdT and student responses towards AT and our specific device prototypes also provided first-hand feedback on the stakeholders’ requirements for AT.

The challenges faced by the EdTs in the Singapore intervention classroom were found to be similar to those experienced in typical dyslexia intervention sessions. The need for intensive and explicit instruction from EdTs (Vaughn et al., 2003; Firth et al., 2012) was limited by the lack of time the students could attend remediation. Better familial and school support has been associated with better academic and socio-emotional outcomes for dyslexic individuals (Chen, 2005; Horn, Denessen, Bakker, van den Bergh & Voeten, 2010). However, the lack of reinforcement of concepts and strategies learned outside of the DAS classroom in the home and school environment also hinders the child’s learning progress. Developing AT with differing levels of support access would allow students to become independent learners despite lacking familial, school or institutional support and resources (Moar, Currie, & Drewry, 2011).

Despite the awareness for the potential of AT-based intervention in overcoming the barriers of reading and literacy and socio-emotional or behavioural challenges, there are constraints that limit effective AT implementation in both intervention and mainstream classrooms. Taking into account the feedback provided by the EdTs and the students with regard to our device prototypes, the development of a mobile app would be more suited to circumvent the aforementioned challenges of AT and non-AT dyslexia intervention than a wearable device.

The fear of possible social stigmatization from using AT could also deter individuals from adopting it (Daley & Rappolt-Schlichtmann, 2018; Parette & Scherer, 2004). Fostering social acceptability is thus important for promoting sustained AT use (Landulfo et al., 2015). Development and use of a mobile app would likely be more socially acceptable compared to a wearable. A wearable would be more conspicuous and novel-looking compared to a generic mobile phone. This is supported by our findings where concerns were voiced on the aesthetic of the wearable device but not on the mobile phones.

Additional limiting factors for AT-implementation include the lack of skilled personnel for training support or the lack of knowledge on how best to incorporate the use of AT (de Witte et al., 2018; LoPresti, Bodine & Lewis, 2008). The need for guided AT use and user training for educational institutions and parents poses manpower and time limitations. The additional time and manpower support needed for adopting a specialised device like a wearable FingerReader are factors that hinder effective AT accessibility (de Witte et al., 2018; LoPresti et al., 2008). A mobile app would require little to no training time due to its ubiquitous familiarity.

The lack of affordability of AT could also prevent individuals from accessing such AT, especially those from lower socioeconomic backgrounds who already lack resources to begin with (Borg et al., 2015; Rohwerder, 2018). As the market for AT development is relatively niche, developers of novel AT, especially local and smaller technology companies, face possible difficulties of economics of scale (de Witte et al. 2018). The comparative higher cost of developing and manufacturing a wearable device thus limits the number of individuals who can afford it. In contrast, the widespread ubiquity of mobile phones or tablets make them a more affordable option. Users could also download a mobile app from available app stores at a fraction of the price or even for free.

For future directions for our AT development, we propose that the development of a mobile app would be the most suited to addressing the barriers for AT implementation due to its intuitiveness, familiarity, affordability, and perceived social acceptability. Positive aspects of intervention, such as feedback or a reward system would also be more easily incorporated in a mobile app via gamified elements. Multi-sensory learning could also be customized to each individual's preferences in a mobile app, and this could also allow for increased user-engagement and knowledge retention. A mobile phone with the app would also allow for more versatile use than a functionally specific wearable. Future software improvements and upgrades would be more easily accessible on a mobile phone than on a wearable device as users would only have to download updated app versions from the app store. Software improvements for a wearable might not be as easily accessible without having to purchase a new device, as updated versions of the software might not be optimised or compatible with older hardware versions. The flexibility of being able to improve and adapt the mobile app software would allow us to better cater to users' needs effectively. Developing a mobile app that could overcome the other limitations, such as bridging or reducing the necessity for communication between home and school environment would be ideal. Taking into account the other featural and functional requirements listed by the EdTs, the results of these three set of studies would serve as a guideline for future development of a mobile app that is optimally suited for dyslexia intervention.

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## ***Participation Factors of Education Service Officers in Lifelong Learning***

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### **Abstract**

Lifelong learning needs to be practiced by education service officers (ESO) so that they remain relevant to the changing world of education globally. This study was conducted to identify factors that encourage and hinder the participation of education service officer's in lifelong learning. A total of 400 ESO was involved as respondents in this study. This study was a quantitative research that uses the survey method. Data were collected through feedback from the respondents using questionnaire. Quantitative data were analysed using the Statistical Package for Social Sciences (SPSS) software version 24.0. The results showed that the overall factors that encourage participation of ESO in lifelong learning (LLL) are at high level. Whereas the barrier factors that obstruct ESO participation in LLL are at a moderate level. The final analysis revealed all 31 items are suitable to measure the encouragement and barrier of participation in lifelong learning. This study can provide information for training centres and institutions to plan appropriate course and training that fulfil the needs of the ESO. Meanwhile ESO and schools' administration can take into account the barrier factors that hinder the ESO participation in LLL. At the same time, education service officers can plan their own learning using the information given.

**Keywords:** Lifelong Learning, profesional development, teachers

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## Introduction

Lifelong learning (LLL) has been linked to human capital development ever since. This is because according to Bostrom and Schmidt-Hertha (2017), LLL is associated with human capital as one learns and develops new skills that can be used in the workplace. Human capital development is a country's success in developing both economically and individually through LLL (Ministry of Higher Education Malaysia, 2011; World Economic Forum, 2017). In Europe, LLL has been seen as a way to raise human capital since 1919 after the first world war through a military education scheme by emphasizing the learning of lifelong adults (Field, 2001). However, LLL's discussion ceased until 1990 when a special body of government was in charge of decision-making and the position to formulate policies. In this regard, LLL is often discussed and even the European Commission has designated 1996 as the Year of Lifelong Learning in Europe (Gass, 1996). Through this conference, two (2) resolutions were made to promote the first LLL, to motivate individuals to engage in LLL and the second to enhance the role of institutions through education and training to develop LLL.

To the contrary, in order to promote LLL in Malaysia, the government emphasized the provision of facilities for the people to gain knowledge and improve their skills through the Third Plan (2001-2010) under the Eighth Malaysia Plan, 2001-2005 (8<sup>th</sup> Malaysia Plan, 1993). Through this plan, the formation of a knowledgeable society is through education by acquiring knowledge while increasing productivity through the use of ICT. However, the 8MP does not emphasize on how to develop individual involvement in LLL. As the emphasis is more on institutions in developing LLL through education and training, the LLL agenda is incorporated into the National Higher Education Strategic Plan (Ministry of Higher Education, 2007). Under this plan, it is the intention of the nation that LLL practices can be incorporated into Malaysian culture through institutions of higher learning (HEIs) (Ministry of Higher Education, 2007). As such, the plan also outlines several strategies for LLL into Malaysian culture. Among the LLL strategies are: 1. The infrastructure is enhanced so that lifelong learning becomes a tool for enhancing knowledge and skills based on interest; 2. Increase promotions to enhance community participation and awareness of lifelong learning; 3. Continuation and recognition of lifelong learning and 4. Financing support provided. This shows that the public's awareness and motivation to engage in lifelong learning is an important strategy.

To ensure this strategy is achieved, the Blueprint on Enculturation of Lifelong Learning for Malaysia (2011-2020) was developed with a list of activities and programs to be undertaken (Ministry of Higher Education Malaysia, 2011). In addition, the plan also addresses issues and challenges that need to be addressed in LLL. However, the plan emphasizes the functions and roles played by higher education institutions both public and private as well as other educational institutions such as community colleges that offer various training and skills. This makes the focus of LLL available only to those who are pursuing training and study at the institution level after graduation.

Recognizing the weaknesses in extending LLL does not cover all societies, especially those who have dropped out of school or who have not continued their studies after graduation, resulting in the need for comprehensive human capital development. This

is based on the report of the Eleventh Malaysia Plan (11MP) which states that community development is the development of human capital beginning in schools including students, students, teachers and educators. The plan also reports that the development of human capital is achieved by improving education delivery through improved access and quality education under the government transformation program (GTP) in line with the National Philosophy (FPK) aspiration (Economic Planning Unit, 2015). Therefore, in order to provide quality education, teachers must practice LLL because through LLL the teachers can improve themselves and their profession as envisaged in the Teacher Development Professional Development Plan (PIPPK) (Ministry of Education Malaysia, 2016). This shows the country's commitment to improving the quality of teachers as this quality improvement is prioritized in the Malaysian Education Development Plan through professional development (Ministry of Education Malaysia, 2012; Ministry of Education Malaysia, 2013).

The PIPPK urges teachers to take LLL as a practice by emphasizing the development of training and learning throughout their service. In line with what Khair said (Ministry of Education Malaysia, 2016), teachers need to increase their knowledge professionally so that they become more effective and relevant throughout their service (Ministry of Education Malaysia, 2015). It is also in line with a study conducted by Abdul Rahim Hamdan and Lai, (2015) that shows that teachers involved in developmental courses show effective teaching or effective teacher learning. This involvement is driven by various factors for the purpose of self-development (Ates & Alsul, 2012; Day, 2015; Jarvis, 2014) as well as the professional development (Aldridge & Hughes, 2012; Celebi, Ozdemir, & Elicin, 2014; Tikkanen, 2017). However, there are also circumstances in which learning and training are hindered by the obstacles inherent in both the institution and the self (Hovdhaugen & Opheim, 2018; Woonsun, 2014).

Based on this discussion, it can be concluded that in developing countries, human capital development is an important element to focus on. This development should start at the school level again through quality education. In order to ensure that quality education is provided, the quality of teachers is a priority. Quality teachers are those who improve their knowledge and skills in accordance with current changes. Therefore, ESO need to be involved in LLL. Therefore, a study was conducted to identify the factors that enable a person to engage in LLL.

## **Methodology**

This study was conducted based on past study readings that have shown that the factors listed prove to be influenced the involvement of education service officer (ESO) in LLL. Based on past studies, factors such as personal development (Aldridge & Hughes, 2012; Ates & Alsul, 2012; Celebi et al., 2014; Laal & Laal, 2012; Zhang, Parker, Koehler, & Eberhardt, 2015) and professional development (Celebi et al., 2014; Cetin & Cetin, 2017; Kim & Kim, 2015; Kramer & Tamm, 2017) are among the factors that influence one's involvement in LLL. In fact, the involvement of ESO's is also hindered by various obstacles (Hursen, 2014; Instefford & Munthe, 2017; Knipprath & De Rick, 2015; Manea, 2014; Woonsun, 2014). This suggests that these factors have been identified as factors that influence individuals' decisions to engage in LLL. Therefore the ontology of this study is positivism (Crotty, 2015). This is to get feedback from education service officials about their agreement on the

questionnaire used. Accordingly, a set of questionnaires was developed and adapted from Roger Boshier (Boshier, 1977). The 5-point scale questionnaire was distributed to education service officials and this indicated that respondents were not influenced by the researchers. This suggests that the epistemology of this study is objectivism (Crotty, 1998, 2015). Therefore, this study was conducted quantitatively.

### Population and sample

This study was conducted in Selangor, one of the 13 states in Malaysia. In fact, according to data released by the Education Planning and Research Division (EPRD) (2018), the number of teachers in Selangor is the highest in Malaysia at 61,987 people which is 14.71% of total teachers in Malaysia. Given that this state consists of 10 districts, the sample involved in this study represents the diversity of ESOs. The number of ESOs involved as survey respondents is at least 382 for the population size of 61,987 (Education Planning and Research, 2018) according to the Krejcie and Morgan (1970) sampling method. However, the sample involved was 400, so that the findings of the study could represent the whole population using the appropriate statistical tool (Slevitch, 2011).

The sampling method involved in sample selection is the random sampling method. This method enable all individuals in the population have the same opportunity to be chosen (Sekaran & Bougie, 2016).

### Validity and reliability

The validity test of the questionnaire was conducted to ensure that the questionnaire developed is measuring the stated constructs (Taber, 2013) using the techniques of a group expert (Fraenkel, Wallen, & Hyun, 2012). A total of 2 linguists who has 15 years of experience working with instruments translated the questionnaire into the national language of Malaysia namely Bahasa Melayu with back to back translation procedure (Brislin, 1986). The instrument consisting of 46 items was further examined by a group of 3 content experts using a 4-point scale (R. Lynn, 1986). The results of the expert evaluation showed that construct validity item (i-CVI) were equal to 1 for 25 items of encouragement factor. While 8 items with an i-CVI value of 0.67 were modified in terms of language fit. While item validity instrument (s-CVI) for this questionnaire was excellent because it exceeded the acceptance level above 0.80 which is s-CVI = 0.92 (Polit & Beck, 2006). Whereas the i-CVI and s-CVI for the all barrier factor item are 1. This item has been distributed to 250 education service personnel to increase observation power (Hair, Black, Babin, & Anderson, 2014). Only 23 items out of 33 items in the encouragement factor were retained and 8 of the 13 items in the barrier factor were retained after the exploratory factor analysis (EFA) was conducted.

The communalities value of the encouragement factor was high between 0.535-0.825, 4 factors with eigenvalues greater than 1 were found. This factor explained 71.96% of the total variance with 53.2% being ICT skills, 7.99% pedagogical skills, 5.76% problem solving skills and 5% onself. The Kaiser-Meyer-Olkin (KMO) value of the impulse factor was 0.94 and the Barlett test was also significant [ $\chi^2 = 4793.18$ ,  $p < .05$ ]. The communalities value of the barrier factor was also high between 0.5119-0.783 and 2 factors with eigenvalues greater than 1 were found. This factor explained 66.7%

of the total variance with 52.12% is institutional barriers and 14.65% is individual barriers. Whereas the KMO for the barrier factor was 0.82 and the Barlett test was also significant [ $\chi^2 = 969.69$ ,  $p < .05$ ].

A pilot study was conducted on 40 ESO to determine the reliability. The overall Alpha Cronbach value of this questionnaire was excellent (Taber, 2017) or very good (Pallant, 2016; Vierra, A., Pollock, 1992) with a value of  $\alpha = 0.933$ . Mean items ranged from 2.9 to 4.525 and standard deviations ranged from 0.505 to 1.165.

## **Conclusion**

### **Finding**

To measure factors that encourage ESO's to engage in LLL, twenty-three (23) items were evaluated and the findings divided the twenty-three (23) items into four (4) components namely ICT skills, problem solving skills, pedagogy skills and oneself. Based on the findings of this study, it can be concluded that the four components of the motivational factor are high. This explains that ICT skills, problem solving skills, pedagogical skill and oneself drive ESO's to participate in LLL.

This finding is similar to some other studies that have examined the factors of involvement in LLL. Among them, studies showed that one of the factors influencing engagement in LLL is skills enhancement (Aldridge & Hughes, 2012; Clain, 2016; Kaur & Beri, 2016). This explains that ESO's are engaged in LLL to enhance their skills. In fact, the demand for these skills also suggests that factors that contribute to LLL are based on Self-determination Theory that aims to improve one's competence through improving skills (Deci & Ryan, 2000; Ryan & Deci, 2002).

This is because engagement is driven by demands for ICT skills, problem solving skills and pedagogical skills. This shows that ESO's are motivated to engage in learning and training to improve their professional practice. The same finding was also stated by Abdul Rahim Hamdan and Lai (2015) who highlighted professional improvement through involvement in learning and training. The findings of this study are also in line with the intention of the Ministry of Education Malaysia for ESOs to constantly improve their professional practice through LLL as stated in the Malaysian Education Development Plan (Ministry of Education Malaysia, 2013) and Teacher Development Professional Development Master Plan (Ministry of Education Malaysia, 2016).

Aside from the skill factor, the factors that drive the involvement of ESO's are also due to oneself. This factor is similar to the studies by Ates and Alsal (2012); Laal and Laal (2012) and Laal, Laal, and Aliramaei (2014). This also explains that engagement in learning or training is an internal impulse that individuals feel for themselves. This finding is in line with the theory of self-determination by R. M. Ryan and Deci (2002) who described self-motivation as being motivated to engage in something.

The results showed that the education service officers mean rating on education service employee engagement was between 4.122 and 4.19. These overall mean values indicate that the encouragement factors of ESO's involvement in LLL are high and that the highest level is derived from problem solving skills components (Mean =

4.19), followed by pedagogical skills (Mean = 4.17), oneself (Mean = 4.123) and ICT skills (Mean = 4.122).

Based on these four components, problem solving skills are a key factor driving educational service ESO's involvement in LLL. Problem solving skills include organizational problems and problem solving related to the technology environment. Feedback from educational service officials indicates that problems exist in the organization due to low student identity, which makes it difficult to resolve. In addition, ESO's were found to be less motivated to engage in LLL due to ICT skills than any other skill factor. Feedback from education service officials indicates that ESO's do not want to be involved in LLL due to ICT skills whereas these are the currently much needed skills to enhance learning and facilitation.

In addition, the findings show that factors that hinder the involvement of ESO's in LLL are at a moderate level. To measure factors that prevent ESO's from participation in LLL, eight (8) items were evaluated and the findings divided the eight (8) items into two (2) components, namely institutional (structural) and individual barriers. The findings shown that both constructs are at a moderate level. This explains that the institution and the individual itself prevent ESO's from engaging in LLL.

The results showed that the overall barrier factors had a mean score of 3.34 and all constructs under this factor were in the simplest interpretation. The constructs with the highest score were the individual barriers (Mean=3.6), followed by institutional barrier with mean score 3.075. This finding shows that the barrier for ESO involvement in LLL is at a moderate level. It was found that ESO barriers to engaging in LLL were more than factor. These constraints include workload (OECD, 2017) due to time constraints and failure to manage assignments are hindrance for ESOs to engage in LLL (Woonsun, 2014). Both of these are barriers at the individual level which plays a role in motivating the ESOs. Given that these barriers are a factor that causes low motivation among ESOs, this has led to them being unmotivated to engage in LLL. In fact, ESOs are also hindered from participating in LLL due to lack of appropriate learning materials and appropriate trainings (Norfadzilah Abdul Razak, Noor Azlina Mohamed Yunus, Nini Hartini Asnawi, & Nor Lela Ahmad, 2014).

However, it is undeniable that the role of institutions also influences ESO involvement. The ESO argues that their previous negative learning experiences have made them reconsider continuing their studies and that this is an obstacle for them to engage in LLL, as it did in Belgium and Ireland (Arnason & Valgeirsdottir, 2015; Knipprath & De Rick, 2015). In fact, ESOs are also hampered from engaging in LLL as they feel that institutions do not provide sufficient guidance and information if they wish to engage in LLL (Norfadzilah Abdul Razak et al., 2014). Moreover inadequate information is also a barrier to ESO involvement in LLL (Desjardins, 2015; Kilpi-Jakonen, Vono de Vilhena, & Blossfeld, 2015).

## **Implications**

Accordingly, the findings of this study might help school administrators, the District Education Office and the State Education Department empower the education and training of ESO's as a way to enhance their skills and keep them relevant. This is in



line with the statement made by the Director General of Education Malaysia in his speech (Ministry of Education Malaysia, 2016). In addition, the findings highlight the role of institutions and training providers to play a more proactive role in furthering the involvement of ESO's in LLL. It indirectly achieves global goals for institutions to improve their role in Malaysia that has not been achieved since the resolution of the Lifelong Learning Year 1996 (Gass, 1996).

Some implications and suggestions are highlighted through the findings of this study. These implications and recommendations are expected to enhance the involvement of ESO's in LLL and avoid barriers to engagement. In addition, these implications and recommendations can also contribute to policy makers especially the ministries, Teacher Education Division (BPG), Aminuddin Baki Institute (IAB), Scholarship and Financing Division (BBP), State Education Department (JPN), Office of Education Education and training units at the school level in connection with this study. In this regard, the implications and suggestions of this study are to develop ESO's throughout the service.

### **Limitations**

Formal and informal involvement in LLL in this study was limited to 12 months before the study was conducted and the age of ESO's. Earlier studies showed that a survey conducted on one's involvement in LLL was 4 months before the study was conducted. However, according to Goglio and Meroni (2014) the 12-month period is more inclusive and tends to provide higher proportions because the likelihood of finding individuals who have participated in LLL in the previous 12 months. Thus throughout the survey each respondent measured their involvement in formal and informal learning for the 12 months before the study was conducted.

The age at issue was the age of the respondents involved as a sample of the study. Engaged in LLL consists of those who have exhausted their compulsory learning. Engagements according to Goglio and Meroni (2014) are those aged 25 to 64 who are involved in LLL. This is because, 25 years old is the boundary because it is the end of formal higher education. Meanwhile, the 64-year-old is the last of the European labor force. According to the OECD (2017), ages 25 to 64 are categorized into young adults and older adults who are productive age. However, for the purpose of this study the age of engagement is between 25 and 60 years. This is because according to the Services Circular Number 11 of 2011 (Public Service Department, 2011) the maximum retirement age for civil servants in Malaysia is 60 years.

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***Evaluating the Anti-Bullying Act Of 2013  
and Its Implementation in Philippine Public Schools***

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**Abstract**

School, as a simulation of society, is a place of development for young learners. However, it may also create an environment unhealthy to students caused by bullying -- making it a crucial concern for schools due to victims exhibiting psychological or social repercussions. Thus, the 'Anti-Bullying Act' (RA 10627) was passed into Philippine law in 2013, aiming to prevent such and to further protect learners' rights. Upon its enactment, however, an increasing trend in school bullying became evident despite the measures applied, with social media as a contributor. This status quo may give an impression that the Philippine society is still struggling to understand the problem and in finding resolutions to this escalating concern. This paper discusses the conceptual challenges bullying poses for school policy efforts; evaluate the impact of the law and its Implementing Rules and Regulations in public secondary schools; and propose recommendations such as 'immediate intervention strategies'. Foreign legislation addressing school bullying also serve as a cross-reference vis-à-vis RA 10627. While this paper seeks to contribute to the existing literature of bullying and strengthening policies against it, it is likewise a fresh attempt at examining the consequences that may arise when conflicts and other legal issues come into place. What is clear is that, there is a need today to properly re-examine the policies protecting the children of the nation in light of the growing understanding that every learner is special.

Keywords: bullying, school policy, doctrinal and non-doctrinal legal research

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## Introduction

Republic Act 10627 or the Anti-Bullying Act was passed into law in 2013, with hopes of protecting the rights of students. The 2015 Department of Education Report, however, showed an even increasing trend in bullying in schools despite the measures implemented by the Department and the Congress. In 2014, the recorded bullying incidences totaled to 6,363 or around 31 cases per school day, 21 percent higher than the previous year (Diaz, 2015). It then skyrocketed to 19,672 cases in the school year 2016-2017, translating this to 97 reported incidents of bullying on the said 202-day school year.

School Year	Reported Cases of Bullying in the Philippines
2012-2013	5,236
2013-2014	6,363
2014-2015	11,448
2015-2016	29,723
2016-2017	19,672

Figure 1. Source: Deped Consolidated Report on Bullying

These figures raised concern among parents and school authorities though many of the cases were already attended to, knowing that the biggest threat to the school children is not street criminals but rather their fellow students. Moreover, Eighty percent of teenagers aged 13 to 16 have been cyberbullied through social media, according to a 2015 survey by child-care nonprofit Stairway Foundation Inc. The data presented may give one an idea that the society as a whole is still struggling to understand the problem and in finding resolutions to the escalating social concern.

It then begs the question of why such data are present despite the implementation of RA 10627 and the efforts of the Department of Education. Therefore, there is the need to shed light to this issue as said law may also bring disadvantages such as using the law to commit false accusations and the alleged taking away of most of the responsibilities of parents in disciplining their child. Another issue pertaining said law is its limitations where it only addresses student-student bullying. As such, bullying involving a college student, or one committed by or against a teacher, is also not covered. Moreover, RA 10627, in some of its provision, is a violation of the Article III, Section 4 of the 1987 Constitution of the Philippines stating that, "No law shall be passed abridging the freedom of speech, of expression, or of the press."

Finally, there would also be the need to review specific child protection policies implemented in schools as protocols provided by the Implementing Rules and Regulations stemmed from RA 10627 may not be strictly aligned to a school's policy.

This research paper proposal aims to evaluate the impact of RA 10627 in secondary schools' policy of preventing bullying. It will also examine the weaknesses of the law and how it may be prevented from being exploited as well as its possible remedies.



This study seeks to answer the following questions:

1. How is RA 10627 implemented in public schools in terms of:
  - a. Policies adopted
  - b. Mechanisms to Address Bullying
  - c. Committees involved
2. What are the limitations and legal consequences that may arise when conflicts and other issues come into place?

### **Conceptual Conundrum**

Bullying is not a new phenomenon, it is a well-studied social issue, but it is still prevalent to date. It is estimated that 246 million children and adolescents experience school violence and bullying (UNESCO, 2017). Moreover, in a study of Glew et al. (2000), around 17% in Australia, 19% in England, 15% in Japan, 14% in Norway, 17% in Spain and 16% in the USA. The prevalence of bullying appears to be high at age 7 and ages 10 to 12 (Glew et al., 2000; Nansel, 2001) with boys as the more likely perpetrators and victim than girls.

The conventional definition of bullying includes three characteristics: (1) intentional aggression, (2) a power imbalance between aggressor and victim, and (3) repetition of the aggressive behavior (Olweus, 2013; Solberg & Olweus, 2003). Cornell and Limber (2015) stated that each of these criteria poses challenges for law and policy.

The first criterion of intentional aggression is broadly inclusive and means that bullying can be physical, verbal, or social in nature (Gladden et al., 2014). As such bullying can overlap with many other proscribed behaviors such as criminal assault, extortion, hate crimes, as well as sexual harassment. In fact, in some of its forms, bullying can be difficult to distinguish from ordinary teasing, name-calling or from pushing to graver physical acts. Delineating children's friendship quarrels from painful social ostracism may prove to be difficult on the part of the untrained teachers.

As for the second criterion, the requirement for a power imbalance between aggressor and victim, is at the core of the concept of bullying. This element actually distinguishes it from other forms of peer aggression. However, assessing power imbalance is difficult. While judgments about physical size and strength are feasible in cases of physical bullying, bullying is most often verbal or social and requires a determination of a power differential that requires an assessment of peer status, self-confidence, or cognitive capability (Cornell & Cole, 2011; Olweus, 2013).

A further complication is that interpersonal power is not a static quality because it can vary across situations and circumstances. A person surrounded by friends gains temporary power over an adversary. An anonymous individual posting to a website has power to make hurtful remarks that may not have been possible in a face-to-face situation.

Meanwhile, the third criterion - repetition - is viewed as a vital element for intervention. Hence, this might complicate enforcement of antibullying policies because observers have the added burden of detecting multiple incidents of abusive behavior before they can conclude that bullying has occurred. Recognition of a

repetitive pattern to bullying, on the other hand, may be helpful in ruling out less serious behaviors (Solberg & Olweus, 2003). Majority of definitions recognize that a single incident can be sufficiently harmful or likely to be repeated that it can be regarded as bullying (Gladden et al., 2014; Olweus, 2013).

### **Peer Aggression**

Taking the definition and its elements into consideration, not all negative actions committed against individuals or groups presumed to be of weaker strength may be called bullying. Aggressive behaviors are considered bullying when performed over and over and to a less influential person or group of individuals. Aggression, meanwhile, that intends to cause injury, physical and emotional pain, including a degree of fear or intimidation, is called peer aggression. The nature and purpose of bullying and peer aggression are the same- to cause harm, pain or injury, but the former is committed in the context of repetition and imbalance of power between the victim and perpetrator (Cascardia, 2014).

### **Effects of Bullying**

Bullying and peer aggression expose children, particularly the victim, to several consequences such as depression, anxiety, loneliness, psychosomatic sickness, low self-esteem, and absenteeism. The prevalence of bullying is quite high among kindergarten children and adolescents that are aging eight to 12 years old (O'Malley, 2014). Researchers defined peer victimization as the "physical, verbal or psychological abuse of victims by perpetrators who intend to cause them harm" (Olweus, 1993; Graham, 2006; O'Malley, 2014). As such, it refers to the experience of the victim of being the target of persistent harassment by individuals who are not siblings and usually not from the same age groups. Victimization differs from simple peer conflict because of the presence of an imbalance power relation and the objective of harming the other party.

Psychologists view bullying as aggressive behavior that works within relationships of power and abuse. Rodkin, Espelage and Hanish (2015) stated that bullying can be cultivated by both the presence and absence of the network of friends. Youths who bully other children may either be socially marginalized young people who are exposed to violence and those who find temporary gratification in bullying other youth. The proponents further suggested the application of relation approach in understanding this type of aggression.

In a 2016 Cebu-based research about the effects of bullying by Laus, results revealed that bullying exists in the school with classmates as the perpetrators; direct verbal and relational are the most common forms of bullying; both sexes are involved in bullying and peer victimization, and, there is a significant relationship between bullying and victimization. Results underscored the need to implement a bullying prevention program focusing on awareness of the problem and their long-term impact to students is highly recommended. Moreover, there proved to be a need for the school to organize a peer counseling group to address the high rate of bullying cases reported only to their peers instead of school officials.

Moreover, in a research by Adams and Lawrence (2011), it claimed that the effects of bullying lasts into college. The said study had 269 undergraduate students examined whether those bullied in schools continued to show the effects after they enrolled in an institution of higher education. Thus, it was suggested that the negative effects of bullying in junior high and/or high school indeed continues into college.

### **Philippine Laws on Bullying**

Section 2 of RA 10627 states that “bullying” shall refer to any severe or repeated use by one or more students of a written, verbal or electronic expression, or a physical act or gesture, or any combination thereof, directed at another student that has the effect of actually causing or placing the latter in reasonable fear of physical or emotional harm or damage to his property; creating a hostile environment at school for the other student; infringing on the rights of the other student at school; or materially and substantially disrupting the education process or the orderly operation of a school; such as, but not limited to, the following:

- a. Any unwanted physical contact between the bully and the victim like punching, pushing, shoving, kicking, slapping, tickling, headlocks, inflicting school pranks, teasing, fighting and the use of available objects as weapons;
- b. Any act that causes damage to a victim’s psyche and/or emotional well-being;
- c. Any slanderous statement or accusation that causes the victim undue emotional distress like directing foul language or profanity at the target, name-calling, tormenting and commenting negatively on victim’s looks, clothes and body; and
- d. Cyber-bullying or any bullying done through the use of technology or any electronic means.

### **Cyber-bullying**

Aside from the physical bullying evident in schools, another form of bullying continues even in the virtual realm, such event is called cyber-bullying. A crucial factor in such increase in cyberbullying is the rapid growth in children’s access to the internet and other ICTs. A recent estimate suggests that one-third of internet users worldwide are below 18 years of age. (UNESCO, 2017)

The Anti-bullying Act of the Philippines (2013) also takes into account harassment repeatedly expressed through” the use of technology or any electronic means” as bullying (Republic Act 10627, 2013). Such acts can range from simple sending messages containing threats, sexual and racist comments, to ganging up in public forums like group chats and social media, and publishing blogs or posting false statements aimed to embarrass the victims in web pages.

This covers social bullying aiming to belittle another individual or group or gender-based bullying which humiliates another on the basis of perceived or actual sexual orientation and gender identity. (Sec. 3, B-1, RA 10627, Implementing Rules). However, this law only addresses student-student bullying. Hence, a teacher who belittles a student in Facebook or any other social media account, on account of

grades or class performance, social standing or gender may not be held liable under this law.

### **The Revised Penal Code and The Cybercrime Prevention Act**

One who publicly or maliciously imputes to another a crime, vice, defect, real or imaginary, or any act, omission, condition, status or circumstance tending to cause the dishonor, discredit or contempt of a natural or juridical person, or blacken the memory of one who is dead may be liable for libel under the Revised Penal Code. (Art. 353, RPC) These acts, when done in social media, will be punished more severely in addition to the civil action for damages which may be brought by the offended party. (Sec. 4 (c-4), RA 10175)

Cyber-libel holds liable only the original author of the post (Sec. 5 (3), Implementing Rules of RA 10175). Meanwhile, slander may also be applicable to one who, in heat of anger, utters statements that are highly defamatory in character. (Art. 358, RPC).

It must be taken into consideration that Republic Act 9344 or the Juvenile Justice Law of 2006 sets the minimum age of criminal liability at 15 years old. In its provisions, those between 15 to 18 years old may be detained in youth centers and go through rehabilitation programs. While, those under 15 years old are exempted from criminal liability and may undergo intervention.

### **Foreign Legislations addressing School Bullying**

During the International Symposium on School Violence and Bullying in Seoul, South Korea in 2017, a published report documented the specific legislations pertaining to or addressing school violence and bullying of different countries.

In 2004, the Republic of Korea established the anti-school violence and bullying law, on the prevention of and countermeasures against violence in schools and the Act has since been revised to ensure it continues to respond appropriately. Its purpose is “to protect the human rights of students and raise students as healthy members of society through the protection of victim students, the guidance and education of aggressor students, and mediation between victim students and aggressor students”. It requires development of a master plan which includes research and education, support and rehabilitation, partnership between agencies and educational institutions and placement of school counsellors.

Similarly, in Sweden, the 2009 Discrimination Act and 2010 Education Act prohibit any forms of discrimination and bullying in schools and, educational institutions have an obligation to investigate and report all incidents of bullying and to have an annual plan to prevent and address it. The Act also prohibits reprisals against those who report incidents of bullying and the right to damages if a school does not comply with the regulations.

In Mexico, the 2014 Law on the Protection of the Rights of Children and Adolescents required authorities to establish strategies for the detection, prevention and elimination of bullying. According to this law, public servants and school staff should be trained to be able to manage bullying and mechanisms that provide care,

counselling and protection of children experiencing harassment or violence in schools should be established.

The Department of Education in the USA has taken a range of policy actions to fight bullying and cyberbullying which covers the following: requiring public elementary and secondary schools to report incidents; helping develop a standard definition of bullying; hosting summits aimed at bullying prevention; creating training modules for school bus drivers and classroom teachers; producing Indicators of School Crime and Safety; as well as supporting the Stopbullying.gov website including hosting webinars on cyberbullying.

### **Number Matters**

In the consolidated report of Department of Education (DepEd) as seen on figure 1, bullying cases on both elementary and high school of private and public schools on 2013-2014 rose by 21% or a total of 6,363 cases, compare with the 5,236 on 2013. This translates to 31 daily bullying cases from a divisor of 201 school days. Moreover, the data kept on increasing, reaching 29,723 cases in the school year 2015-2016; while the recent from their report listed 19,672 cases of bullying in school year 2016-2017.

While the numbers do not necessarily reflect a significant percent of the total school population, it must be taken into consideration that students are initially ashamed of reporting an incident of bullying. Also, such incident usually happens privately.

### **Methodology**

This research employed both doctrinal and non-doctrinal legal research. A doctrinal legal research through analysis, attempts to test the logical coherence, consistency, and technical soundness of a proposition or doctrine. While non-doctrinal research involves study of social impact (existing or proposed) or of “self-auditing of law” (Aynalem & Vibhute, 2009). Primary sources for this research are statutory materials such as the constitution and legislative acts, and case reports. Secondary sources, on the other hand, consist of law commentaries and law journals.

Further, an evaluative model of legal research aims at expounding the logical coherence of concepts, elements, facts and interests of legal phenomenon individually, or those outside the legal system. (Aynalem & Vibhute, 2009)

### **Conclusion**

One of the many challenges encountered in the implementation of RA 10627 is the proper procedure in dealing with cases of bullying in schools. Even in the existence of school manuals and student handbooks in both public and private schools, there is no complete provision regarding the procedural steps in responding to bullying incidents which must be clearly explained and published for the stakeholders to recognize and follow. Grievance teams, Anti-Bullying committees, and school policy enforcers should design a comprehensive procedure that will ensure a positive outcome, adequate follow up and that relationships are restored for all involved.

Considering such challenges encountered, a more comprehensive approach is needed to protect any student who is bullied. While the spirit of the law shows the intent of the framers to prevent bullying, the language becomes susceptible to misinterpretation.

The implementation, as such, becomes problematic as the law is now construed in different manners. Worse, its conformance is not attained due to limitations. With the given evidence, it may be recommended that amendments be made to RA 10627 to wit:

1. An amendment changing the definition of bullying as provided in sec 2 (1) of RA 10627. Study the best definition applicable in the Philippine context. One possible amendment shall highlight the second element – power imbalance;
2. Add a procedural provision on how to properly address bullying cases and another provision for cyber-bullying. Therefore, the IRR shall include training of all school staff to detect, prevent, and respond appropriately to bullying. Such training would include the distinction between bullying and other illegal behavior;
3. Expand the law’s coverage to include college, tech-voc schools (TESDA sites); resolve issue on conflict with the freedom of speech; look into the possibility of teacher bullying and teachers being bullied;
4. Empower the stakeholders by frequently involving them in anti-bullying campaign in schools. The Child Protection Committee (CPC) shall continuously engage the students, parents, community, and the like to ease the reporting, hearing procedures as well as counseling;
5. School policies should instruct school staff to assess students who are bullied for possible mental health and academic problems and shall immediately provide support and referrals for these students and their parents, as needed. Conversely, policies should also direct staff to provide support and referrals for students who engage in bullying (Kowalski et al., 2012; U.S. Department of Education, Office for Civil Rights, 2010);
6. Sanctions should be intensified. Leniency of such regulations only results in improper compliance for RA 10627; thus, the safety of learners is compromised. Section 14 of the Implementing Rules and Regulations stating the sanctions for non-compliance should be strictly observed, if not elevated.

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***Trends & Futures of International Higher Education Partnerships & Collaboration:  
Comparative Potential Pathways for African & Asian Centres of Excellence***

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**Abstract**

In a world characterized by the potential and promise of dynamic change and increasing complexity, it is paradoxical that amidst notable and significant levels of economic development, creation and growth of wealth, and lowering of global poverty, there yet remains the scourge of wide-spread inequality, exclusion and escalating levels of violence. These changes impact many communities globally, further compounding their vulnerability. (“Rethinking Education: Towards a Global Common Good?”, UNESCO Report, 2015). In international higher education delivery, other significant factors affecting global dynamics include technological innovations, digital options and platforms like the internet, which render geography irrelevant. Additional workplace demands include the need to build capacity in communication and critical thinking skills that are driving post-traditional forms of higher education. However, these are more easily acquired from informal learning experiences than through formal institutions. Questions therefore arise pertaining to relevance of international education, in a world where information is expanding exponentially, and shared through gaming, virtual reality, text messaging, social reading, and social networking. In such contexts, would formats beyond traditional semester systems work best in educating the next generation of business and community leaders? In a time of 24/7 “point, click, study,” just-in-time training, and asynchronous learning, our presentation explores and contrasts Asian and African approaches to internationalisation of business education, and inquires if traditional “bricks and mortar” concept of universities and higher education institutions (HEIs), will remain a viable option for collaborative international education partnerships.

Keywords: Collaboration, internationalization, partnerships

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## Complexity and paradox

In a world characterised, and sometimes mesmerised, by the potential and promise of dynamic change, it is paradoxical that amidst significant levels of economic development and wealth creation, and lowering levels of poverty, there is yet persistent inequality, exclusion and escalating levels of violence, which affect many communities worldwide, heightening vulnerability (UNESCO, 2015). International human rights frameworks, while being championed as enshrined freedom for all, continue to be challenged at different levels of implementation. Religious and cultural intolerance is increasing, coupled with political and economic conflicts, largely mobilised along group and personal identity lines. Meanwhile, technological progress is bringing communities closer together by facilitating connections and greater access to knowledge.

Within this context, this thought piece responds to the call for collective dialogue and action, as expressed in a United Nations policy paper entitled *Rethinking Education: Towards a Global Common Good?* (UNESCO, 2015). The paper acknowledges that current global changes signal new, unfolding contexts, with vital implications for our approaches to problem solving. It proposes more attention should be given to a 'humanistic vision' of development, based on 'respect for life and human dignity, equal rights, social justice, cultural diversity, international solidarity and shared responsibility for a sustainable future' (UNESCO, 2015, p. 84).

Recognising the value of a human rights based perspective to underscore equity and sustainability in development agendas, promoting collaboration and partnerships is a necessary approach to collective accountability and the distribution of global common resources and goods. Collective societal endeavours in a changing world are imperative to address the critical problems we all face.

While acknowledging that the world has made significant strides through scientific and technological advancement, the UNESCO Report alludes to the dual potential to realise extreme, idealistic and dystopian possibilities. It emphasises the need to develop close familiarity with the opportunities and risks associated with ensuring benefits are available to all, 'in an emancipatory, just and sustainable way' (UNESCO, 2015, p. 84). The effective management of this fine balance of making inclusive wealth and prosperity possible should be a fundamental purpose in this global age.

**Emerging global conditions require a deeper understanding of perspectives and discourse regarding the nature of human development, and our collective roles and responsibilities to actualise solutions.**

The contemporary context of complexity and societal transformation demands that we rethink, with great urgency, the purpose and organisation of our development efforts and growth actions. Real outcomes from tangible interventions are the difference, in a literal sense, between life and death for multitudes. Hence, there is a need for new avenues of exchange that enable closer collaboration and cooperation among individuals and institutions in development planning and implementation. Emerging global conditions

require a deeper understanding of perspectives and discourse regarding the nature of human development, and our collective roles and responsibilities to actualise solutions.

In response to the above, higher education is increasingly faced with the need to address the international education dimension, fuelled by the need for cross-border and interdisciplinary collaboration. At the forefront of considerations are the growing demand for well-prepared graduates who can respond to global trends through expanded understanding and experience of international, intercultural and global realities and opportunities (APAIE, 2017). International higher education within a turbulent economic and political climate is also uniquely positioned to direct an interchange of ideas towards long-term policy formulation by creating better educated and more thoughtful public citizens who can peacefully tackle cultural differences. Contextual readiness to foster this capacity is spurred by the intellectual and actionable will of learners across the world, who are now better equipped to take advantage of this positioning.

### **International higher education changing demographics: Where are we now?**

International higher education is big business with US\$32bn contributed to the world economy by international students in 2015 to 2016. This amount is projected to reach US\$1-trillion over the next decade (Dennis, 2018).

The Organization for Economic Co-operation and Development (OECD) estimates current numbers of internationally mobile students at more than 5m. It notes that there will be more than 8m students studying outside their home countries by 2025.

Countries such as Indonesia, Malaysia, Thailand and Vietnam that are among the fastest growing economies, with expanding middle classes and populations. They are expected to dominate the international higher education market, where previously North American and European students did. With an estimated growth of the Asian middle class from 600m in 2010 to 3bn in 2030, this group will represent 66% of the total middle-class population in the world. Accompanying this population growth are parallel shifts in international and regional student mobility as an impact of economic buying power. These trends are compelling China, a leading exporter of students, to also focus on the reverse trend and become a major importer of students, with an enrolment goal of 500 000 international students by 2020 (Dennis, 2018).

**These trends are compelling China, a leading exporter of students, to also focus on the reverse trend and become a major importer of students, with an enrolment goal of 500 000 international students by 2020.**

With an expanding middle class also present in Africa, seeking an international experience has fuelled student mobility on the continent, and higher education institutions (HEIs) are being pushed to offer academic programmes that include affordable, flexible and relevant international experiences. A pertinent concern therefore is: Where do these international students study, and what other global trends are likely to contribute to future African international student mobility? (Dennis, 2018).

Changing landscapes and ripples in the expansive macro-environment impact on international higher education institutions as well as geopolitical competition, iterating waves of migration, unpredictable security threats, growing income gaps and technological innovation. In the same breath, international educators are tasked with exploring ways to eliminate social fissures that have contributed to the rise of nationalism, nativism, xenophobia and multiple 'isms' that are flaring up around the globe. As the UNESCO Report indicates, 'the changes in the world today are characterized by new levels of complexity and contradiction' and these changes 'generate tensions for which education is expected to prepare individuals and communities by giving them the capability to adapt and to respond' (UNESCO, 2015, p. 9).

These factors and demands are complicated by an inexorably complex, interactive and inter-cultural space, increasingly mediated by technology.

The role of technology in educational delivery is a significant factor within fast-changing global dynamics, with particular impacts for the African region. Digital options and platforms such as the internet have surpassed physical geography, influencing the ways higher education is consumed. While students will continue to study abroad, they may never leave their home countries in order to do so. According to the *Digital Learning Compass: Distance Education Enrollment Report 2017*, 30% of students worldwide are enrolled in at least one online course. To bridge the digital divide, the introduction of artificial intelligence may, if correctly applied, provide additional opportunity to upskill Africans and develop expertise in under-resourced areas.

**To bridge the digital divide, the introduction of artificial intelligence may, if correctly applied, provide additional opportunity to upskill Africans.**

HEIs have a unique opportunity to optimise technological potential in order to engage with a new population of learners. To do this, they need to overcome traditional challenges of enrolment; they need to invite and engender interaction with greater and diverse numbers of learners, and they need to attract a growing group of mobile international students. These trends are in keeping with the upward population growth trends that will see an African region with the most youthful population worldwide by the year 2025. This growing population warrants attention in view of growing skills development imperatives.

### **Business requirements: internationalization**

As part of the approach to education, teaching and research employed by African universities, there is the need to sharpen the requisite tool box of interpersonal, professional, research and technical skills graduates require in order to be successful in an internationalised world. University, political, economic and corporate leaders can jointly set an agenda to better prepare graduates to contribute to the needs of social and community upliftment.

The priorities for higher education, and especially for international education, in this environment include:

- **Ensuring equitable access** to higher education for diverse groups of students
- **Developing and adhering to a broader approach to internationalisation**
- **Valuing and promoting international education in all disciplines**
- **Foregrounding partnerships and collaboration** to optimise resources and talent.

Higher education must be aligned with the needs of future professionals who will be stemming from incoming graduating cohorts. It is the ambitious, forward-thinking and agile HEIs, organisations and governments that will take advantage of the disruptive changes in the market, and create unique opportunities for entrepreneurship and innovation with benefits for broad communities.

Useful questions for international educators to ponder are: How will higher education be re-imagined in a global context? How can universities prepare global-ready graduates?

Traditional approaches to international education may no longer be viable, and in rethinking internationalisation, flexibility is required to allow adaptation to a rapidly changing world. With increasing technological innovations, will the traditional bricks-and-mortar concept of universities remain a viable option for higher education? How will international education be affected as access to information and learning is expanding exponentially? What formats, beyond traditional education systems, may best fit the next generations?

Jane Knight's often cited definition of internationalisation of higher education (2005) has been expanded upon to state that:

'Internationalization is the intentional process of integrating an international, intercultural or global dimension into the purpose, functions and delivery of post-secondary education, in order to enhance the quality of education and research for all students and staff, and to make a meaningful contribution to society' (De Wit, Hunter, Howard, & Egron-Polak, 2015).

For businesses, a future view of the role of international higher education may suggest the importance of partnership and collaboration between corporate practitioners and academic providers. This collaboration bridges the theory-practitioner gap supporting relevant skills building of graduates, and meeting corporate interests.

Partnership models may include regular opportunities for learners to apply the knowledge they have acquired in a variety of industries internationally, throughout the duration of their studies. Companies benefit from learner knowledge, have exclusive access to fresh ideas, as well as exposure to the capacities of developing professionals and the talent pool internationally. For learners, opportunities for real-world consulting will sharpen capacities and preparedness to enter and succeed in the job market.

## **Emerging notions of post-national citizenship**

International higher education provides graduates with high employability and skills while also fostering responsible citizenship and solidarity in a global world. International higher education plays a crucial role in the changing nature, definition and formation of citizenship, with the emergence of transnational and post-national forms of citizenship.

Students with international exposure have international mindsets that can more readily recognise our shared global commons as an increasingly complex web of connections and interdependencies. International higher education cultivates an experiential awareness that in a shared world, individual choices and actions may have repercussions for people and communities – locally, nationally and internationally.

International higher education celebrates cultural diversity, and promotes the sharing of diverse perspectives between educators and learners from a variety of backgrounds. It is an approach to learning that allows for the inclusion of diverse participants, and encourages appreciation of differences and similarities across social and cultural spaces.

Rising migration flows highlight the challenges of intercultural encounters, and there is a need for more cultural tolerance in a world where diversity is a reality. We are witnessing a rise in cultural chauvinism and identity-based political mobilisation that present serious challenges to social cohesion throughout the world. While cultural diversity is a source of enrichment, it can also give rise to conflict when social cohesion is under strain. International higher education can contribute to better preparing young professionals for diverse workplaces and more diverse societies generally.

To keep pace with global changes, it is anticipated that a new category of learners will emerge and begin to shape our societies – professional, life-long learners who are also global citizens.

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New communication technologies and social media are an essential catalyst in this transformation, with new spaces, relations and dynamics offered by digital media. Increasing integration of technology into our everyday lives, and the availability of multiple intercultural interactive spaces will diffuse traditional interpersonal barriers.

## **Towards networks, partnership and collaboration**

Amidst the global risks we have the capacity to generate solutions, create knowledge and collaborate, which are essential building blocks for sustainable futures. The international higher education community can assist in developing creative and critical thinkers who can solve problems and construct conducive dialogue spaces to address shared critical challenges in the economic, social and human development of world societies.

The internationalised workplace is demanding skills such as intercultural communication, diverse team management and visionary leadership. Such leadership necessarily includes multiple perspectives, sets strategic and future goals collaboratively through dialogue, and enables integrated implementation of solutions. Foundations for this skill set are rooted in the international higher education experience.

A future of individuals, communities and societies interconnected beyond the limits of the national state will demand an awareness of global citizenship, enabling them to contribute to new modes of identification and resource mobilisation, and recognise that massive collective effort and commitment will be required to address current problems facing the world.

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***Developing Teachers' Computational Skills through a Systematic Professional Development Course in Malaysia***

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**Abstract**

In this paper, we describe a 3-day workshop as part of a school teacher professional development course in introducing teachers to computational thinking (CT) concepts in Malaysia. The workshop emphasizes problem solving that utilizes teachers' prior knowledge in their subject area, together with CT skills to help them understand the nature and scope of problem. A total of 54 school teachers, with the majority being non-computer science major graduates were involved in this workshop. Two survey questionnaires have been used, a pre training survey- to observe teachers' perceptions of their knowledge and skills and a post training survey – to view the teachers' perceptions of the training. The survey results showed that the teachers' perceived their knowledge and skills to be poor in the pre training survey while they commented that the workshop was satisfying in the post training survey. This study contributes to the teachers' professional development through the introducing of CT across many discipline subjects.

Keywords: Teachers training, computational thinking, teacher professional development

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## 1. Introduction

In August 2016, the Prime Minister of Malaysia announced that Computational thinking (CT) would be integrated into the country's school curriculum in January 2017 (Abas, 2016). Since 2017, the new standard based curriculum for primary and secondary schools has adopted the CT skills in phases which started with standard one pupils (aged 7 years old), form one (aged 13 years old) and form four students (aged 16). The implementation of CT in Malaysia can be divided into two forms: being directly taught in computer science (CS) classes or through the use of CT concepts in other subjects such as in Science, Technology, Engineering, and Mathematics (STEM) subjects. There are four CT concepts stated in the standard curriculum, namely abstraction, generalization, pattern recognition and decomposition, which need to be exposed to students. The plan to embed the CT concept in all subjects are closer as it is essential to build a good foundation for the young generation in building their competitive edge in the fast-paced digital era. As CT is an unfamiliar discipline to many teachers (Bower et al., 2017), training teachers to understand CT before transferring the skills to students is essential (Yadav, Gretter, Good, & McLean, 2017).

For that purpose, the Ministry of Education (MOE) through Malaysian Digital Economy Corporation (MDEC) have appointed Master trainer (MT) among selected university lecturers in Malaysia to give training for school teachers throughout the country. To select MTs, candidates were selected by their qualifications and working experiences. MTs also needed to undergo a few workshops and trainings as well as successfully complete systematic task evaluations before they were endorsed as a MT. The strict selection process was held to ensure that the selected MTs are qualified to train teachers nationwide as achieving the goal of CT for all requires a tight collaboration between teachers and experts (Yadav, Hong, & Stephenson, 2016). The successful selected MTs were then asked to give training to teachers throughout the country. Training for teachers are ongoing trainings that the MOE has held to ensure that teachers are aware of applicable CT concepts in their teaching and learning process.

The idea for the workshop for all teachers evolved from perceived needs in primary and secondary schools when the CT skills have been embedded in the curriculum. With this in mind, the workshop has been developed with a three-fold agenda: synthesize CT into teaching, transfer CT skills to students and have the technical skills and problem solving ability.

In this paper, we give a brief overview of the workshop and survey results from our 2018 teachers training held at Universiti Pendidikan Sultan Idris (UPSI), one of the Centre of Professional Developments (CPD) appointed by MDEC. CT has become very popular as the concept of it has been integrated in many countries as part of their new national curriculum standards (Balanskat, & Engelhardt, 2015).

## 2. Literature Overview

Obtaining the skills for 21<sup>st</sup> century skills that are broader than digital skills, knowledge and attitudes are essential for a student (Laar, Deursen, Dijk, & Haan, 2017) who should be able to work collaboratively, independently and creatively in

future. Jobs that have emerged today such as programmers, data scientists, mobile app developers, software engineers are some of the jobs that have never existed before. Nevertheless, many existing jobs today such as basic-level medical practitioners, junior lawyers, factory workers, fast food workers, cashiers, posties, and many more are facing extinction. As technology moves very fast especially in the Artificial Intelligent (AI) field, there is a huge opportunity for creating new jobs via technology when some of the existing jobs are eliminated (Levy, 2018). Therefore, it is vitally important to impart appropriate education to the future workforce (Mohaghegh, & McCauley, 2016). But, how can we equip students with these skills for the better of their future? This is how the idea of CT takes places where it involves software-integrated education exposed to students at young age.

There are many definitions of CT. However, The International Society for Technology in Education (ISTE) and the Computer Science Teachers Association (CSTA) have collaborated with leaders from higher education ministries, industries, and K–12 education to develop an operational definition of computational thinking. They collectively define CT as “a problem-solving process that includes (but is not limited to) the following characteristics: Formulating problems in a way that enables us to use a computer and other tools to help solve them. logically organizing and analyzing data, representing data through abstractions such as models and simulations, automating solutions through algorithmic thinking (a series of ordered steps), identifying, analyzing, and implementing possible solutions with the goal of achieving the most efficient and effective combination of steps and resources, generalizing and transferring this problem solving process to a wide variety of problems”. They added that “these skills are supported and enhanced by a number of dispositions or attitudes that are essential dimensions of CT. These dispositions or attitudes include: confidence in dealing with complexity, persistence in working with difficult problems, tolerance for ambiguity, the ability to deal with open ended problems, and the ability to communicate and work with others to achieve a common goal or solution” (ISTE & CSTA, 2011).

Embedding CT across curriculum might be a promising way, however, it would be unreasonable to expect teachers to incorporate the CT concepts into their practice without adequate training to support them in teaching the skills. The vast majority of teachers perceived that they are not prepared in developing CT competences in their students (Corradini, Lodi, & Nardelli, 2017). A proper workshop should be designed to teach the new skills to teachers so that they can deliver and transfer the skills effectively to their students.

When the new curriculum is introduced, the majority of teachers are more cautious and have more concerns (Howard, & Mozejko, 2015) as they may be required to apply different teaching approaches (Hsu, Chang, & Hung, 2018). Mostly, they have lack of confidence in delivering the new teaching materials (Bower et al., 2017) as more time is needed to prepare themselves (Israel, Pearson, Tapia, Whefel, & Reese, 2015) limited technological skills and knowledge (Bower et al., 2017) as well as insufficient resources and supports for both contents and pedagogical (Yadav, Gretter, Hambrusch, & Sands, 2016). Thus, the fact that many teachers try to avoid teaching the course resulted in a shortage of qualified teachers to deliver the new curriculum (Peng et al., 2014). Providing teachers with adequate training is essential to increase their confidence level as well as to achieve the desired students’ outcomes.

### 3. Methodology

#### 3.1. Course Organization

The 3-day workshop consisted of 54 participants that were split into 4 batches (2 Primary Schools, 1 Secondary School and 1 Matriculation Centre). The first three batches had their workshops in April 2018 while the last batch attended the workshop in July 2018. The systematic workshop schedules prepared by MDEC consisted of understanding CT through a theoretical introductory session, unplugged activities, scratch programming practical sessions and also a Teaching demo session. The CT concepts used in this workshop were abstraction, decomposition, pattern recognition, logical thinking, algorithm and evaluation.

##### 3.1.1. Unplugged activities

As CS unplugged can be used by anyone regardless age, and the materials can make people interested to learn more about CS (Thies, & Vahrenhold, 2016), these activities are included in the training. There were three unplugged activities that were carried out during the training. The first one was “CT Realization” which was developing algorithm through an “act like a computer” and “act like a programmer” game. In this activity, two groups worked in pairs: one group acted as a programmer who wrote algorithm, and the other group acted as a computer who executed the algorithm. The programmer group was given a black and white picture as shown in Figure 1. Then, they were given the grid paper and coloured cutting shapes. With these materials, they wrote an algorithm to produce the same picture as given earlier. The computer group was given only the grid paper and coloured cutting shapes. The programmer group then read all steps written in the algorithm loudly and the computer group started following the steps. If they managed to obtain the same result, then, the algorithm was said to be a good algorithm. The group switched their roles with a different picture. This activity was performed to build awareness of the CT skills that they should use in solving the problem. It was also meant to show that executing an algorithm is a strict process where it should be understandable for a computer to carry out the task. Figure 1 shows an example of the materials used for the activity.

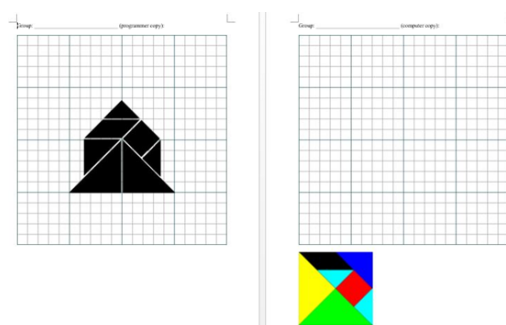


Figure 1: Materials used for the “act like a computer and a programmer” activity.

The monster face was the second unplugged activity where the participants tried to execute a given algorithm to see whether they could get the correct result. Compared

to the first activity, this activity used simpler pre-defined steps as shown in Figure 2. The participants were also asked to produce a similar algorithm with pre-defined steps for their friends to try.

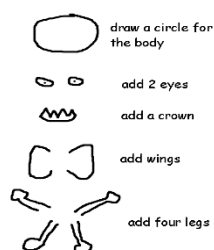


Figure 2: An example of pre-defined steps prepared to help in writing the algorithm.

The last unplugged activity was writing an algorithm with very limited instructions: use arrow symbols (left, right, up and down) and the keyword “fill in” only.

Assuming that a cursor starts from the first box at the top-left corner, the participants were asked to write an algorithm to produce the given output as shown in Figure 3.

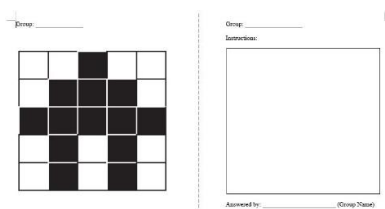


Figure 3: A limited instruction activity.

Exploring CT skills with the unplugged activities were very good exercises as it gives opportunities to participants in exploring CS in a meaningful and engaging ways (Bell, & Vahrenhold, 2018).

### 3.1.2. Scratch Session

A practical session was needed to expose participants with the CT concept. In this practical session, participants were taught about the scratch program and ways to write an algorithm using the program. Along the way, the participants were always asked to really understand what they were doing, drafted the solution by writing an algorithm first before putting them on the Scratch program. All Scripts in Scratch such as Motion, Looks, Sound, Data, Events (broadcast), Control (sequences, selection and iteration control structures), Sensing, Operators and More Blocked were used. There were many projects of different difficulties given to the participants, from easy to the difficult ones by using the appropriate scripts.

### 3.1.3. Teaching Demo session

A walkthrough to the existing curriculum of the national standard textbook was done to see how CT was embedded and how teachers can relate the content to student's daily life experience. Discussions on how to improve the existing contents were also held. On the last day, participants were required to use the improved version for teaching contents that they have discussed earlier for their teaching demo. Here the

concept of CT used in the teaching demo presented was discussed among all participants.

### **3.2. Surveys**

The Pre-survey questionnaire was sent to the participants before attending the workshop to get each participants' professional background, prior knowledge on CT and expectations on the workshop. The post-survey questionnaire was completed on the last day of the workshop. Based on the preliminary investigations, we clarified research questions as:

RQ1 : How the teachers perceived their competence to teach CT?

RQ2 : How the teachers perceived the CT training?

RQ3 : Are teachers aware of what they have learnt during the workshop?

#### **3.2.1. Survey participants**

The participants for this study were 54 multi-disciplinary school teachers who had attended the workshops. The Primary school teachers teach students aged 7 to 12 years-old, and the Secondary teachers teach students aged 13 to 17 years-old. The Matriculation centre basically provides pre-university courses that allows students (aged 18 to 19) to pursue a degree upon successful completion of a 1 or 2 years program at the centre. The participants were chosen by the State Education Department (JPN) of Perak, Boarding school Management Division of MOE and Perak Matriculation centre. Table 1 provides details of the participants.

Table 1. Demographic information of participants (n = 54)

Gender	Female : n= 30, Male: n= 24
School type	Primary Schools: n= 29, Secondary Schools : n=12, Matriculation: n=13
Teaching experiences	>10 years: n=24, 8-10 years: n=6, 4-7 years: n=10, 1-3 years: n=10, <1 year : n=4
Highest qualifications	Degree: n= 37, Diploma: n= 4, Master: n= 13
Majoring	Language (Malay/English/Tamil) : n= 14, Maths and Science (Science/Maths/Biology/PE): n=15, Music and Art : 6, Technology (IT/CS/Multimedia/Engineering): n=19
Main Teaching Subjects	Arabic language : 3 Basic Computer Science: 8 Computer Science: 13 English: 10 Islamic Study: 1 Malay language: 4 Maths: 3 Physical Education:3 Science: 7 Tamil language: 1 Music: 1

### 3.2.2. Instrument

The pre-survey questions were designed using a three point Likert scale with teachers responding to “poor”, “fair” and “good” for their perceptions of certain knowledge and skills, while the post-survey questions used a five point Likert scale with teachers responding to each question by choosing from “strongly disagree” to “strongly agree” options. The open ended questions were also posted in both pre and post-survey questionnaires.

### 3.2.3. Survey data analysis

For this research, only frequencies, mean and standard deviations were used. The data gathered from an electronic survey was transformed to IBM SPSS Statistics.

### 3.3. Certification process

After the training ended, participants were required to submit an assignment consisted of one scratch project (with a few checklist to be followed), teaching proposal and a video that showed how they had integrated CT in their teaching. The participants were required to submit the assignment within 2 months after the training, partially phase by phase. The submission was made via Learning Management System (LMS) given by MDEC. To be certified with CT skills, participants must not only attend all the workshop sessions, but also need to submit the assignment within the given time frame.

## 4. Survey results

### 4.1. Survey results

Table 2: Perceived competencies of the teachers (n=54)

	Mean	Std. Deviation
CS and Programming Skills 4 questions	1.5972	.47438
Mathematical Reasoning 5 questions	1.6698	.62821
Teaching Assessments 2 questions	1.5093	.57042

Scale: 1 = poor, 2 = fair, 3 = good

For the RQ1, the three sets of self-assessment questionnaire consisted of 3 Likert scales from 1 to 3 (“poor”, “fair”, and “good”). The first set was accustomed from Computer Science (CS) and Programming Skills, which examines teachers’ knowledge and skills in CS and programming in general, Scratch and Python programming languages. The other set examined the teachers’ perceived capability in Mathematical Reasoning related concepts such as statements, quantifiers, operations, implications, argument, deduction and induction. The last set asked about teachers’ perception of using and designing their teaching assessments. The means and standard deviations for each of the constructs, are summarized in Table 2.

As seen in Table 1, 24 teachers had more than ten years working experience and only four teachers had less than 1 year of teaching experience. Majority (n=37) had a Bachelor degree as their highest qualification, 13 teachers had Master degree and only 4 teachers had Diploma. The teachers’ majoring area and their teaching subjects seemed to have not much of a difference, however, only 19 teachers had qualifications majoring in computer science related (IT, CS, Multimedia, and Engineering), while 35 teachers came from non-computer science backgrounds.



The teachers perceived that their competency as “poor” in all aspects that had been asked (mean < 1.68). Mathematical reasoning skills scored almost fair as the mean was closed to 1.68 which was in range “fair” (1.68 – 2.35). In the programming competent questions, almost all (n=54) teachers answered that they were poor at Scratch and Python programming language. On the other hand, majority teachers who were majors in Technology (n=19) had a broad concept of CS in general, but not in programming languages.

The open ended question asked how teachers defined CT before they came to the workshop. Majority of the teachers gave a very simple sentences for example 20 teachers defined CT as “a new problem solving technique”, 5 teachers said CT was “logical thinking”, 3 teachers defined CT as “the way to think like a computer”, 2 teachers described it as “a new skill”, 2 teachers called it “creative thinking” and 2 teachers suggested CT as “coding”. There were 20 teachers who left the questions unanswered.

For the RQ2, the self-assessment questionnaire asked the teachers’ perceptions of the workshop, with an answering module consisting of a 5 Likert scale from 1 to 5 (“strongly disagree” to “strongly agree”). The questions were divided into 5 parts. The first part was general questions about the training such as the organization of the contents, course materials, allocation of time and the workshop control. The second part examined the teachers’ perceived capability of the Master Trainers who had conducted the training which consisted of questions about how the trainer demonstrated expertise in explaining the CT concept, verbal and non-verbal teaching methods, professionalism in answering questions, time allocation for the Q&A and how MTs stimulated the learning process. The third part was on their views of CT after joining the training, followed by the last part, the BIC model. The last part was about the facilities provided during the training. The means and standard deviations for each of the constructs, are summarized in Table 3.

Table 3: Perceived of the workshop

	Mean	Std. Deviation
About the training 9 questions	4.4609	.66331
About the Master Trainer (MT) 8 questions	4.5787	.48764
About the CT 5 questions	4.4556	.52903
About the BIC model 8 questions	4.4861	.62696
Facilities 2 questions	4.5741	.74230

## 4.2. Post-course teachers' feedback

For the RQ3, teachers were asked “what they had learnt from the training” to see their awareness of the training contents. Table 4 summarizes the feedback result.

Table 4: What teachers have learned from the training (n=54)

	Frequency	Percentage
CT concepts	51	94%
Scratch Programming	51	94%
Integrating CT in the classrooms	43	80%
Python Programming	12	22%
Micro teaching	5	9%
Classroom Management	2	4%
No feedback	3	6%

An open question asking the teachers, “How do you hope to change your practice as a result of this training,” gives the results as shown in Table 5.

Table 5: how do you hope to change your practice as a result of this training (n=54)

	Frequency	Percentage
Pupils can gain a lot of benefit	1	2%
I need to practice more	7	13%
I will use CT in my class	28	52%
I will plan lessons based on CT and CS skills	6	11%
I need more time to learn	2	4%
I will use more Inquiry-based and control	2	4%
I will ensure more student centred activity in class	3	6%
No feedback	5	9%

## 4.3. Certification results

Out of 54 participants, only 26 (48%) were able to complete the assignments. Even though some of the participants had submitted a partial of the assignment such as the Scratch project, they were not certified as CT Trainers as all tasks should be completed, as per the requirements stated earlier.

## 5. Discussion

In summary, the workshop was successfully well received and the objectives of the workshop were achieved based on the survey questions and feedbacks we have obtained. Our findings show that the teachers perceived they were incompetent in CS in general, mathematical reasoning and Programming language before attending the workshop. As majority (n=35) of the participants came from non-computer science major, the result is predicted. The teachers also had lack of understanding of the CT concepts based on their own definitions of CT. However, this research did not measure the teachers' technology competencies when the training ended. Even though they were aware that they have learned many new skills (such as the CT concepts, Scratch language, how can CT be integrated in the classroom and etc.), throughout the workshop, it cannot be said that they were competent as no knowledge and skills test has been done after the training. Certification process is one of the ideas initiated by MDEC to measure teachers' competencies as an initiative for continuing the assessment, however, many of the teachers failed to submit the assignment as requested. This may be due to the workload they have when the teachers return to their schools. To see whether the workshop that has been conducted gives real benefits to teachers, a continuing assessment is essential. However, it is beyond our current resources to explore the continuing assessment in further details. The findings also show that teachers were highly motivated to use the skills that they have obtained in their class, however, how far they can integrate CT in their classroom is also beyond our research area. There were three teachers who simultaneously did not give any feedback to the post-course teachers' questions. They were also identified as given low options scale for every constructs on how they perceived of the workshop resulted in quite high standard deviations as shown in Table 3. As the participants attended the workshop involuntarily, it may contribute to this result. Questions that focused on teachers' readiness in attending the workshop as well as readiness in integrating CT in the classroom should have been included in the questionnaires as attitudes toward technology is a key success for technology acceptance and integration in classrooms (Scherer, Tondeur, Siddiq, & Baran, 2018).

## 6. Conclusion

We identify the following shortcomings in our study: Measuring teachers' competencies is essential to see in what level they are at before and after enrolling in the workshop. CT test such as proposed by Román-González, Pérez-González, Moreno-León, and Robles (2018) or the Beaver International Contest on informatics and computer fluency (haberman, Cohen, & Dagiene, 2011) can be used to evaluate the CT skills. Pre-survey and post-survey for teachers' self-assessment should be done using the same constructs to see whether it shows any differences. We also have doubt whether two months given period to all teachers to submit their assignment is a good period or not as teachers usually have lots of commitments at school. Evaluating scratch projects should also be carried out using a free and open source web application, such as Dr. Scratch (Moreno-León, & Robles, 2015), was designed to analyse projects programmed with Scratch. This may be used to avoid any bias while judging the scratch project. The teachers that have been chosen by MOE to attend the workshop ready or not to embed or teach CT without prior experiences or any compulsory education in CT before. As the workshop continues to evolve, revising and refining the content is very important to ensure quality of the teachers'

professional development. It is our hope to continue to have a broad impact throughout Malaysia that can help increase understanding of CT among the school teachers. As future work, we intend to develop an online module that can be used by teachers earlier in the workshop to expose them with CT beforehand.

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### **Conflict of interest**

The authors declare that there is no conflict of interest in this paper.

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***Hall Life Education: A Reflection on Cultivating Independence in Hong Kong University Students***

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**Abstract**

In a densely populated city such as Hong Kong, one of the most remarkable experiences young university students may have is staying at the student residence and becoming “independent” in terms of taking care of themselves. Resident places in the university are highly competitive, not only because of its location on campus but also because of its relatively economy compared to renting a place in the commercial market. Young university students who would like to experience a relatively independent and private life may find this option most attractive, as the residence halls are run by the university, and thus are well-supported, safe, convenient, and generally designed to facilitate personal and intellectual growth. The author is an academic, concurrently a new Resident Master of a student residence hall in Hong Kong. The paper is a reflection on the “other” aspect of university education that is different from what takes place in the lecture theaters. From this first-hand experience of being Resident Master, the author would like to review an example of Hall Life Education, and reflect on its effectiveness in nurturing personal and intellectual growth in Hong Kong young people. Among the various factors in personal development, independence in self-care, intercultural competence, adaptation of a healthy lifestyle, and critical thinking would be the main factors discussed.

Keywords: hall life education, academic learning, leadership training, intercultural competence

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## Introduction

Hall life has been regarded as an important part of university education, not necessarily academically, but in all other respects such as the opportunity for sharpening one's social skills, problem solving skills, interpersonal communication, self-care abilities, and a place of gathering of different backgrounds, which is a feature true of the original intention of a university.

I have been an academic for more than 15 years, and am recently being involved in the hall environment. Being a Resident Master, I have the chance finally to witness this other side of the university education of our Hong Kong students. This paper is a reflection of such learning opportunities and their effectiveness, based on my personal experience as a Resident Master in a local Hong Kong university. The student residence halls I am part of consist of four Halls accommodating about 1700+ students of both genders, and include both local and non-local students of all years, accommodated in closely packed twin rooms with a small number of 3-bed rooms. The Resident Master (RM) is the official director of the Hall, nominated and appointed by the Student Affairs Office, to oversee the management of student life, including disciplinary matters. A full-time Resident Community Officer (RCO), who also stays on campus, conducts the actual day-to-day interaction with students on matters of daily operation. Each residential hall has a student elected Hall Council, which represents the residents in welfare and serves as the bridge between the student body and the university administration. They have their own constitution and have a budget from the university administration to organize activities for hall residents throughout the year. Besides that, the university administration also nominates a team of Hall Tutors (HT) to station at each floor to help manage each floor. The team of HT is the official representatives of the floors and directly accountable to the RM and RCO. These HT also enjoy free lodging and a more spacious room, so that residents of the floor can gather in the HT's room for social and cultural activities.

In this paper, I would like to review a number of incidents from my experience at the Hall, as examples of educational opportunities specifically offered at the student residence, against the generally perceived benefits of staying at a student residence. These incidents involve interactions among the ordinary residents, the student leaders (HC and HT), as well as the university administration, including the RCO and the RM. As this is a reflection based on my personal experience in just one example of a student residence among the nine universities in Hong Kong, this by no means represents the overall situation in Hong Kong higher education. It is hoped that the sharing can contribute something to our knowledge about hall life as an important component of university education, and hopefully provide information for further improvement in this area. Particular attention will be paid to the following aspects of student learning: academic performance, leadership training, and intercultural competence.

Although by no means the longest standing university student residence in Hong Kong,<sup>1</sup> the Hall I am serving now has an 18-year history. This means that although the 1700+ beds can only accommodate a fraction of the actual needs, a system of

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<sup>1</sup> The University of Hong Kong (HKU) is the oldest university in the city, and the residence halls are also the longest-standing. All other local universities supported by UGC has student residence.



administration and programming has already been established through the slow evolution of these 18 years. With this body of knowledge, as well as growing demand of student residence, a new complex of student accommodation is planned and is expected to be completed in 2023.<sup>2</sup> This new complex is designed and organized to accommodate not only dormitories for students, but also to house numerous venues for out-of-classroom learning, such as high-tech auditoriums, conferencing facilities, sports facilities, and laboratories for creative works. I think that this point of looking forward to the new complex is a good point in time to reflect on the system established so far, and possibly to plan for enhancement and improvement in view of the added resources for student learning.

At this historical moment for my liberal arts oriented university, it is interesting to refer to an earlier time when the student residence was first developed as an essential part of the liberal arts education in America. Mary Ashby Cheek in her 1936 article in *The Journal of Higher Education* referred to the growth of college life in the 1920s and 1930s as the mark of liberal arts education. “Traditionally, one characteristic of the American liberal-arts college has been the growth among its students of an aura of group activities and characteristic ways of living, popularly known as college life” (Cheek, 1936, p. 371). The development of “college life” included not only a wide range of “extra-curricular activities” but an overall stricter selection of qualified students to be admitted to the college, which produced at the end of the Great Depression “a group of students of wider interests, better training, and keener intellectual appetite” (Cheek, 1936, p. 372). With this group of capable students, “[s]tudent government began to take on the positive function of training for citizenship instead of satisfying itself with the older negative responsibility for the enforcement of regulations” (Cheek, 1936, p. 372).

In this model that Cheek described, in order to enhance the intellectual training for students, faculties were also brought into the residence either as guests, or mentors for the residents, to enable close interaction between the students and the faculties to facilitate learning. This move had the effect of blurring the academic and the non-academic curriculums, the resulting learning experience becoming what is now known as general education/common core programme. While Cheek’s interest in the development lay in tracing the blurring of curriculum between academic and non-academic as a trend in higher education, I am more interested in the emergence of this model of education, and how the foreseen benefits of such a model can materialize today. In the following I am going to refer to a few incidents in my experience to review the original ethos of the college/residential halls as part of the university education, to evaluate how much the original aims of this education model have been achieved in today’s design and operation.

### **Academic learning**

In a study about the effectiveness of learning community for university students, it was found that “[r]esidential learning communities can be especially influential as

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<sup>2</sup> The new residential-cum-learning complex is named Care Village, holding student residences, relevant administrative offices, a gymnasium, lots of multi-purpose rooms for students to organise their activities, and a concert hall and film theatre of performance standard. This new complex will double the residence capacity, but still far from fully satisfying all the needs of local as well as non-local students.

they tend to be associated with greater social interaction with peers and extracurricular involvement, higher persistence and graduation rates, and greater gain in critical thinking and reading comprehension” (Zho & Kuh, 2004, p.118). As it was shown that students who join several classes together learn better because of the continuous interaction established in the shared learning experience; the residential halls prove to be an effective space for learning. In this situation, students are housed in an environment when they have a lot of close interaction with one another throughout the semester. It was concluded that “membership in resident learning communities enhances overall involvement in educationally purposeful activities, which in turn directly and positively affects indicators of student success (e.g., persistence)” (Zho & Kuh, 2004, p. 118). Besides seeing the residential halls as a learning community, other studies focusing on students’ academic performance also suggest that on-campus living resulted in students feeling “more engaged with the academic environment” (Li, Shelley & Whalen, 2005, p. 28), and in general achieving better success in terms of academic performance.

My experience of academic learning in the student residence offers a different picture. Although there is no lack of individual students achieving very good GPAs, it is generally admitted in my university that staying on campus for many students has a detrimental effect on their academic performance. In fact, one of the first tasks I did as a new RM was to write a letter of appeal for one of the student leaders in my hall, as the student was academically at-risk for two consecutive semesters (meaning the GPA is below 1.67/4 for two consecutive semesters). I supported the student’s appeal by explaining that her role as a student leader had taken up much of her time, and that after her stepping down from such leadership role, she would have the time and energy to catch up with her studies. The student finally was saved from dismissal, was put on academic probation for one semester, in order to assess her ability to continue her study. This was not an exceptional case, as other RMs shared similar experiences with me. For ordinary student residents, even without the responsibilities of the leadership role, juggling between academic work and full engagement with what is regarded as “hall life” has constantly impacted negatively on academic performance.

While I do not have access to all the students’ GPA records, I understand the study environment of the halls from the number of complaints about noise and other types of disturbance by both local and non-local students. The student residence observes quiet hours between 11 pm and 7 am, but there are frequent complaints about noise well into early morning. I myself witness such disturbance during night-time student activities (which are very frequent) and everyday at a certain hour in the morning when there was screaming from amidst the residents. The RM’s flat is on the top floor of the 20-storey building, and if the noise is clearly heard at this level, the disturbance to student residents who are living in the lower floors can be imagined. Another “evidence” of such negative impact on academic performance can be seen in the suggestion by Senior Management of the University to add GPA requirement as one of the factors to consider admission to the halls. On-campus residence is highly competitive in Hong Kong, and for now our university can only guarantee local students one year of residence in their 4-year degree. The Senior Management’s suggestion shows indirectly that the current general academic performance of student residents is not favourable, making it hard to justify resources put into this costly facility.

## Leadership training

Another perceived benefit from living on campus, in terms of learning, is the opportunity for “social interaction and positive involvement with peers, faculty, and communities” (Li, Shelley & Whalen, 2005, p. 28). In numerous studies about student satisfaction with college/university life, it was shown that students living on-campus were “more satisfied with college experience than those who live off campus” (Li, Shelley & Whalen, 2005, p. 28). This satisfaction came from a number of key factors, and one of the top factors is leadership opportunities. “The characteristics of leadership, teamwork, cohesiveness, and sense of identity are qualities associated with a strong residence hall community” (Li, Shelley & Whalen, 2005, p. 35). Leadership opportunities occur in a community. Other studies about student satisfaction also refer to the existence of this community: “residential students were more likely to express overall satisfaction with their undergraduate experiences, and were particularly satisfied with student friendships, faculty-student relations, institutional reputation, and social life” (Foubert, Tepper & Morrison, 1998, p. 41).

This kind of study results reveal to us the benefits perceived by the community of students residing in a structured environment: companionship and leadership. For the average student residents, “a sense of emotional support and expression has been found to be the most significant contributing factor in students’ decision to remain on campus” (Foubert, Tepper & Morrison, 1998, p. 42). The top four sources of student satisfaction in university residence, from a study conducted at the College of William and Mary, were: quality of physical facilities, quality of relationship with residents’ roommates, whether unit members care about them, and whether quiet study is possible (Foubert, Tepper & Morrison, 1998, p. 43). It can be seen that among the top four reasons, two reasons are about the relationship with fellow residents, even more so than a favourable environment for study. The quality of interpersonal relationship is definitely a strong benefit of hall life as perceived from students’ position.

As described earlier, there are opportunities for students to assume leadership positions in my university student residence. The HC is a committee of 10 students elected by the residents, the HT is a team nominated and selected by the university office to help manage the floors, and there are also Non-local Mentors (NLM) on every floor specifically to help non-local students to adapt to local life. These student leaders are present in the various committees related to different aspects of hall life, and have an opportunity to convey the opinions of residents to the university management. At the same time, their cooperation is required in the management of hall life, in terms of bringing messages from university administration to the residents, and in other matters requiring student compliance. In my university, one of the major events of the year is the calculation of “hall contribution” marks of the individual residents, for this have a most direct impact on whether the student can “return” to the residence in the coming year. The HT of each floor will give a mark to all the residents of the floor, to indicate the value of their contribution to the Hall. This mark, together with marks of other factors, such as travel time, special awards, will become a “returning” mark of the students should they want to live in the Hall for another year.

The mechanism of having the HT to give a mark to the residents is built on certain beliefs and expectations. It is believed that the HT is the best person to know the

engagement of fellow residents, as it is the HT's duty to take care of them. Their responsibilities also grant them the power to (indirectly) determine whether students can return to the Hall for another year. But this also allows abuse because no one can argue with the HT whether the marks are fair or not. Besides the HT, the HC also has the right to make a list of recommendations about fellow residents they hope can return to the hall. Each year the RM has a discretion list which allows the RM to support residents to return if they cannot meet the returning marks. This list is the RM's responsibility, after considering students with needs, and suggestions by HC. HC and HT groups are both aware of this mechanism, and they can therefore strategically plan their mark-giving, and recommendations for RM discretion list. My short experience with cooperating with HC and HT has led me to discover a very distinct variation in our understanding of our roles and relationship. While I perceive our relationship as a cooperation to provide a good living and learning environment for the students, it is quite clear to me that the student leaders see me and the university administration as an opponent to their asserting their independence and authority.

### **Intercultural competence**

In our university (and in most other universities), the hall community is a good place to acquire and practice intercultural competence for both the local and non-local residents. With students from different cultures and parts of the world living in close proximity, this internationalised space is good opportunity to embrace differences and practice inclusiveness. In a study about international students staying at university accommodation in Australia, it was found that they "were able to easily establish new social networks, had many opportunities to interact with non-co-culturals and were assisted in learning about Australian culture" (Paltridge, Mayson & Schapper, 2010, p. 362). Although this is an example about international students and their integration into the Australian society, from my own previous experience as an international student, as well as our university's engagement with international students through organising a variety of cultural and social events, I can see that this benefit is generally accepted to be the case.

In my Hall, the top few complaints in the student residence include noise, and differences in lifestyle causing arguments, and subsequently applications for change of rooms and halls. Noise is also a lifestyle difference, as most of the non-local students fail to understand why local students start their activities way after quiet hours start. In fact, one of the reasons for having a NLM on each floor despite having the HT already, is to facilitate the harmonious co-existence of these "two groups" of students. Despite the system in place for so many years, at the beginning of this academic year, I still received recommendations from HC/student leaders that the non-local students should be put in a different building simply because their lifestyle is very different, and they do not participate very much in the activities organised by the HC anyway. When we talk to non-local students about their participation in Hall activities, we have feedback about language barrier in these activities – most of the posters publicising these events are in Chinese, and the official language of these activities Cantonese.

Over the months of June to December (the time of this paper's revision), when Hong Kong society was experiencing a split in political orientation, the campus was also

submerged in a similar split. Students of different cultural backgrounds had voiced their concerns and anxiety about their personal safety simply because of the language they speak. University administration was also very aware of the potential risk should these differences become enhanced in the rather packed accommodation environment. In the middle of November, when some local students pro-actively took measures to “protect” the campus, university administration encouraged all student residents (both local and non-local students) to leave campus and go home for safety considerations. Although there was no serious confrontations between local and non-local students, the differences in political views were quite clear, and clearly manifested in the residential hall area.

## **Conclusion**

With new conditions of life and a fast-changing global environment, there are different challenges to upholding the residential halls both as a space of student accommodation and an environment for whole person education. Besides the shrinking budget which is an individual challenge for some student residences, other conditions in the global community results in habits and ways of behaviour in young people that are counteracting the rationale of gathering students in a community to live and learn together. The expanded use of online education, (Blimling, 2015, p. 291) for example, may mean that there is no need to physically attend classes anymore, thus lessening the learning community effect. Young people’s “continuing use of social networking sites” (Blimling, 2015, p. 296) leads to a tendency of multitasking, which not only changes the mode and quality of learning, but has a knock on effect on students’ GPA achievement, or having too much private information online, etc. These changes in the way of life means that young people learn and interact with others very differently from the days when the student residence was designed to be a place for community interaction and learning. These create other problems besides academic and co-curricular learning, problems that the residence education office has to tackle in order to maintain student residence’s role of being the location of whole person education.

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***Thriving Interdependence and Independence:  
Teamwork and Self-Directed Learning as Nurtured by Team-Based Learning  
(TBL)?***

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**Abstract**

Team-based learning (TBL) has been in prevalent use by higher education, and particularly professional education, with its proven success in student learning in content and application, as well as nurturing teamwork and attitudinal development. I initiated a pilot to introduce TBL sessions into part of a course on research methods for my part-time MBA students in the Mainland China. The pilot had been conducted consecutively with cohorts of students for two academic years, with measurements of students' attitudes towards teamwork and self-directed learning before and after the TBL sessions, among others. Students of the pilot cohorts, comparing with the non-pilot cohorts in the past, revealed more positive course evaluation (+4.0%), and exhibited higher participation (+10.8%), and better academic performance (+3.8%). The paired-samples of the pilot cohorts (n = 44) showed general improvements on attitudes toward teamwork (+1.6%–+1.8%) and self-directed learning (+.2%) after the TBL sessions, with statistical significance identified on particular attitudinal attributes, including *confidence in group vs. individuals to arrive at better decisions*, *confidence in resolving conflicts effectively among team members*, and *liking of learning*. The extent of attitudinal changes toward teamwork was also found in association with students' evaluation of the TBL experiences in general, and the teamwork experiences involved in the sessions in particular. In sum, the pilot found that the TBL approach not only enhanced students' engagement in learning and academic performance, but also nurtured attitudinal changes, especially in teamwork by the teamwork experiences involved in the TBL sessions, in favor of the 21<sup>st</sup> century competence.

Keywords: team-based learning, teamwork, self-directed learning, 21<sup>st</sup> century skills, business education, MBA, teaching research methods, scholarship of teaching and learning

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## Introduction

This paper features the insights of a two-year pilot adopting the instructional strategy of team-based learning (TBL) (Michaelsen, Knight & Fink, 2002) in a graduate course on research methods. The course is a core course offered for part-time MBA students in the Mainland China by a local university in Hong Kong. The TBL approach was found, among others, conducive to positive attitudinal changes of students in teamwork and self-directed learning. These qualities have been sought after, as among the 21<sup>st</sup> century competency (or skills), by the higher education institutions and business schools in particular, and yet remaining a shortfall in the workforce.

## The talent gap to be filled

The 21<sup>st</sup> century is characterized as intense transformation as allowed and driven by new technologies, and the face pace in which those changes take place in pervasive human life domains (Salas-Pilco, 2013). Education (and any institution alike) is challenged for what is to prepare their students (people) for, as well as what is to prepare for their students (people). This is how the 21<sup>st</sup> century competency framework came about, probably taken up firstly by UNESCO as early as 1996 with the attempt to define the kind of competencies that would be needed in the coming century. Among major frameworks, the Assessment of and Teaching of the 21st Century Skills (ATCS) as developed by Binkely and colleagues (Binkely, Erstad, Herman, Raizen, Ripley & Rumble, 2012) with the sponsorship of Cisco, Intel, and Microsoft, set out ten competences in four categories (see Figure 1).

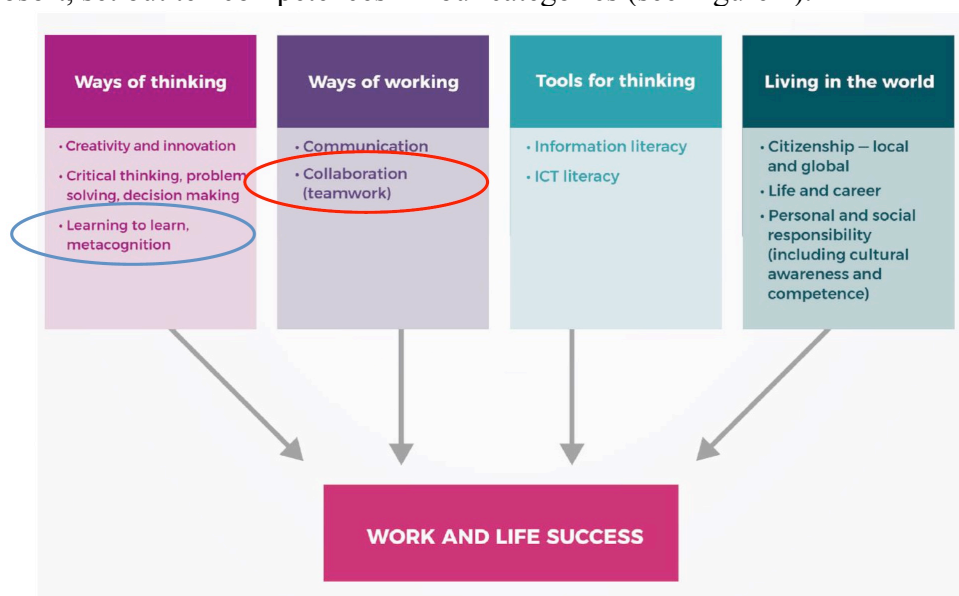


Figure 1: The 21<sup>st</sup> Century skills adapted from Binkely et al. (2012)

In particular, *collaboration (teamwork)* come under the category of “ways of working”, and *learning to learn (metacognition)* under the category of “ways of thinking” are pertinent to the focus of this research. These two competencies are also among the graduate attributes set out, namely *teamwork* and *learning*, by a local university in Hong Kong - one that I used to teach and where the pilot was conducted - since 2008. Obviously, the 21<sup>st</sup> century competences are not of something new, but expected to grow in importance as the century goes (Salas-Pilco, 2013).



In Association of American Colleges and Universities' latest survey (Hart Research Associates, 2018), both business executives and hiring managers rated employee attributes such as *being able to work in teams*, *able to work (and learn) independently*, and *self-motivated* as very important skills (or competencies), and yet found significant gaps in college graduates' preparedness (as wide as a range of 35-46 points in importance vs. preparedness). This presents ample challenges, as well as opportunities, for higher education institutions to evolve and innovate from what they may have done justice (and injustice) to fulfil the needs so far. As far as business schools are concerned, critiques for over a decade have called for instructional innovation over the dominantly used approaches such as lecture and case study, to better promote the transfer of knowledge and skills to the managerial practice (Dierdorff, Nayden, Jain & Jain, 2013). Competencies such as teamwork and self-direction in learning are right appealing for one's skills and attitudes (and even dispositions) vis-à-vis knowledge, to come to play.

### Team-Based Learning (TBL) and its promises

The pilot reported in this paper refers to the adoption of TBL as an instruction strategy, used in combination with case method. What is TBL? How does it work to improve student learning, and in teamwork and self-direction in learning in particular? TBL is an instructional approach that “uses small groups extensively but sets up a particular sequence of activities that transforms groups into teams and then use the extraordinary capabilities of teams to accomplish a high level of content and application learning” (Fink, 2003, p. 132). The typical learning activities include in order: (1) pre-class reading around given content knowledge to be completed by individual students, (2) in-class readiness assurance exercises on the content knowledge (usually in the form of multiple-choice questions) conducted firstly for individuals (i.e., iRAT) and then teams of 4-7 concurrently (i.e., tRAT), followed by feedback or clarifications (e.g., mini-lecture) on questions arisen from the exercises, and (3) most importantly, in-class application activities relevant to the content knowledge. In-class activities may span from two to five hours in total, depending on the scope of the content knowledge and its application, with the application activities taking up the largest portion of time (see Figure 2). Apart from activities of a typical cycle, it is also advisable to have peer assessment system in place to incentivize individual contributions and effective teamwork along, and address the concern of equity as common in group work (Michaelsen, Peterson & Sweet, 2009).

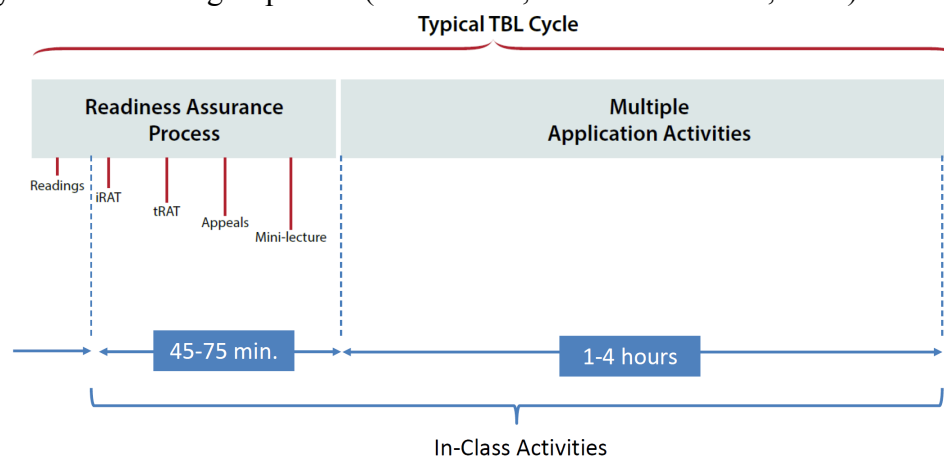


Figure 2: Typical learning activities in TBL (Sibley, 2019; Michaelsen & Sweet, 2008)

TBL strategy is considered particularly effective for learning involving a substantial body of knowledge and problem solving that calls for application of the knowledge (Swanson, McCulley, Osman, Lewis & Solis, 2017). Courses where factual materials are essential and definite answers (e.g., right or wrong) cannot be easily determined are believed to be most benefited by TBL (Michaselsen et al., 2002). It is no wonder why TBL strategy is so prevailing in professional training (e.g., for nurses and medical practitioners). Like problem-based learning (PBL), TBL is characterized as constructivist where learner-centered, problem-solving orientated, learning with dialogue and from each other (c.f. peer instruction), and reflective practices are emphasized (Hrynychak & Batty, 2012). The learning activities involved in TBL sessions are also expected to hit at the depth of Dale's cone of learning that brings about the strongest degree of retention (Herreid, Buskist & Groccia, 2011). TBL is also considered advantageous over *pure* PBL approach (incl. case method), for its lowered risk of cognitive overload on learners, and relatively more economic and scalable use of teaching resources, in general (Dolmans, Michaelsen, Merrienboer & Vleuten, 2015; Vogeltanz-Holm, Olson, Borg & Hill, 2014).

Considerable evidences for the impact of TBL have been received and accumulated along with its practice over the past decades. It has brought about benefits to learners, not limited to knowledge acquisition and academic performance, but also their participation, self-efficacy and interests, and team performance, as well as transfer of learning to the workplace (Haidet, Kubitz & McCormack, 2014; Swanson et al., 2017). For its proven success, TBL is prevalently used in higher education, and professional schools in particular (e.g., medical schools), by over a hundred schools all over the world as at early 2013 (Haidet et al., 2014).

### **The pilot case in point**

For both the promises of TBL as mentioned above, and my personal connection with Prof. Michaelsen – who used to be my teacher in Organization Behavior – and hence my first-hand experience of TBL with him, I had attempted to try out TBL in a course on research methods for my students. This is a 3-credit core course of the MBA programme, used to run in three parts, with the first (about 3 sessions) and the last (about 3 sessions) parts on problem diagnosis and research proposal respectively using interrupted long cases for instruction, whereas the second part (about 3 sessions) on research methodologies using a few short cases for discussion. I started the pilot with TBL for the second part of the course, since the academic year of 2017. Specifically, two cycles of TBL were run for the content on research methodologies for each cohort, from pre-class readings through in-class readiness assurance exercises with clarification to in-class multiple application activities with short cases. Peer assessment however was not put in place in the pilot, after solicited and considered the students' views and concerns. The post-TBL stage is defined up to the end of the academic year of 2019, involving 4 cohorts and a total of 187 students who had completed the course (i.e.,  $N_{post} = 187$ ). For comparison, the pre-TBL stage is taken from the beginning of the academic year of 2016, involving 3 cohorts and a total of 96 students who had completed the course (i.e.,  $N_{pre} = 96$ ). All those students were studying part-time in the Mainland China, working in role of middle management and above in varied industries, with work experience of 10-12 years on average.

It was hypothesized in this research that students' attitudes toward teamwork and self-direction in learning would be improved, along with their academic performance, as a result of the course adopting the TBL strategy. Students' attitudes toward teamwork were measured by the instruments of Value of Teams Survey (Espey, 2010; 9 items;  $\alpha = .830$ ) and Self-Efficacy for Teamwork adapted from De la Torre-Ruiz, Ferron-Vilchez and Ortiz-de-Mandojana (2014; 4 items;  $\alpha = .872$ ), whereas students' self-direction in learning measured by the Scale for Self-Directed Learning (Cheng, Kuo, Lin & Lee-Hsieh, 2010; 20 items;  $\alpha = .938$ ). Students of the pre- and post-TBL stages were compared in terms of their course evaluation and academic performance, as independent samples. On the other hand, students of the post-TBL stage were compared in terms of their attitudes toward teamwork and self-direction in learning as revealed at the beginning of the course (i.e., pre-test) and after the second part of the course where TBL was used was completed (i.e., post-test), as paired samples ( $n_{\text{paired}} = 44$ ). Student feedback to the TBL experiences was also collected with the scale adapted from Vasani, DeFouw and Compton's (2009) (15 items;  $\alpha = .951$ ) in two dimensions – teamwork (7 items;  $\alpha = .901$ ) and process (8 items;  $\alpha = .950$ ) – as part of the post-test measurement.

## Conclusion

Students showed a more positive course evaluation in general (+ 4.0%) upon the use of TBL since the academic year of 2017. By comparing the pre and post-TBL cohorts, academic performance of the course showed improvement in overall terms (+ 3.8% ;  $F(1, 281) = 8.058, p = .005$ ), as well as by assignments – individual (+ 3.1%) and group (+ .9%) – and most pronouncedly in participation (+ 10.8%) (see Figure 3).

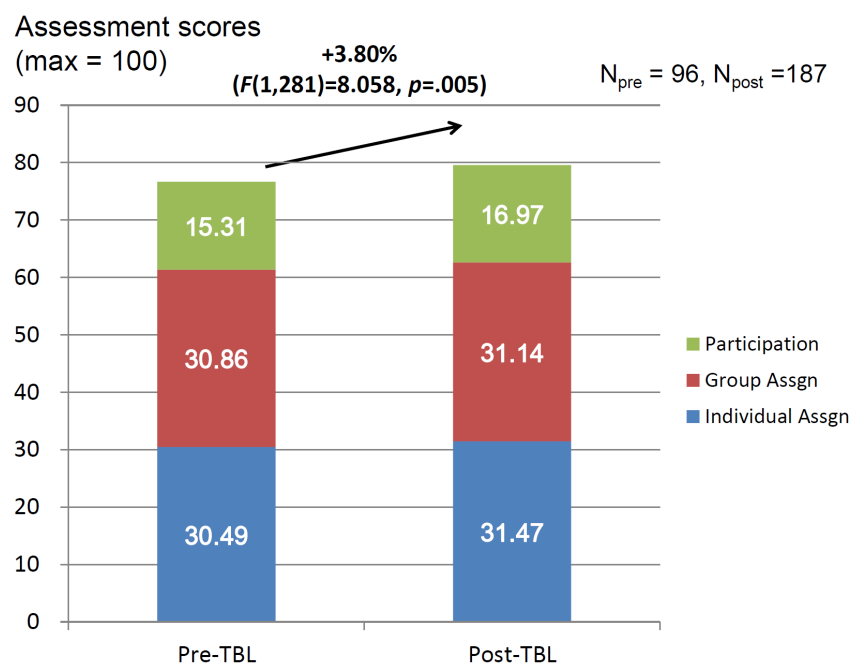


Figure 3: Comparison of academic performances of pre- and post-TBL cohorts

The post-TBL students also found the approach beneficial to their learning, along with other instructional strategies (e.g., instructor teaching and case method). They highly appreciated the learning experiences that TBL brought about with the

teamwork as well as its process, as evidenced by an average rating of above 4.4 (out of 5) received on all items of the TBL experiences (Vasan et al., 2009) (see Figure 4).

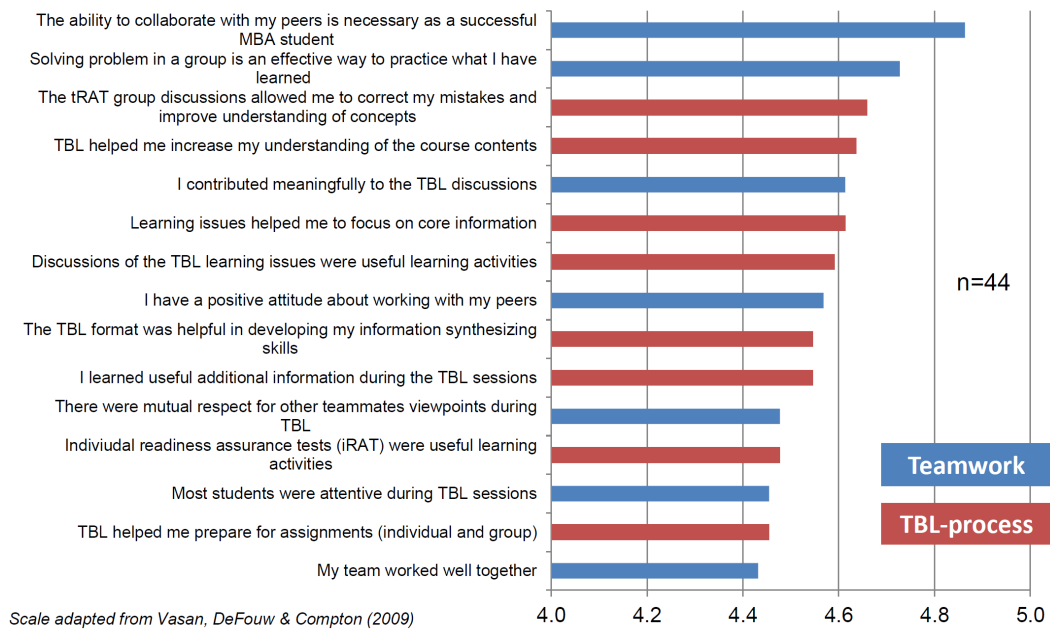
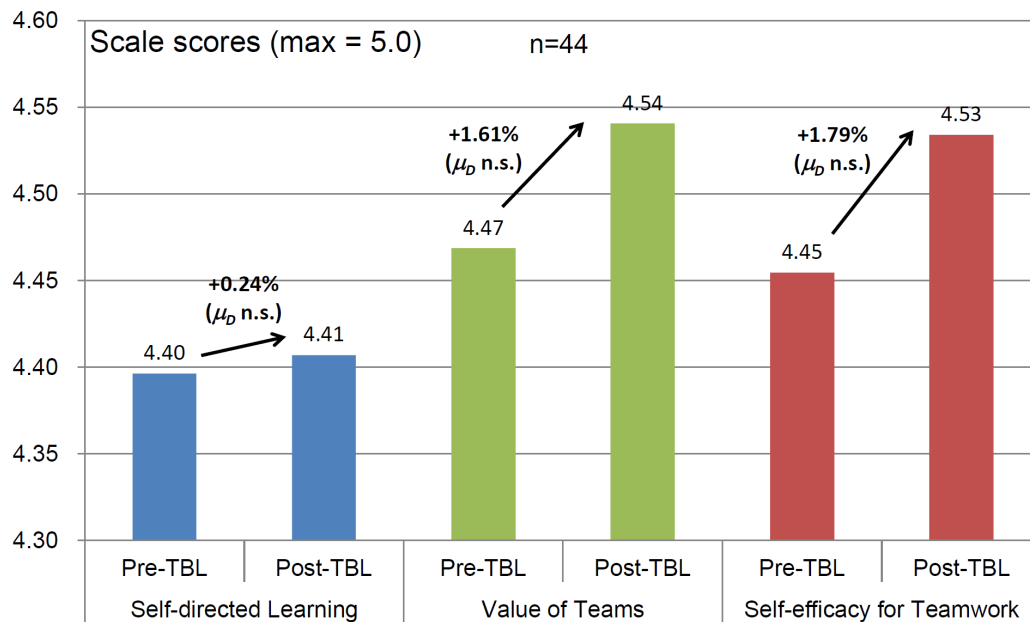


Figure 4: Students' evaluation of TBL experiences

Students' attitude towards teamwork showed some signs of improvement after the TBL sessions, as measured by Value of Teams Survey (+1.61%) and the scale of Self-Efficacy for Teamwork (+1.79%), and so did their self-direction in learning as informed by the Self-directed Learning scale (+.24%) (see Figure 5).



Scales for Self-directed Learning (SDL), Value of Teams, and Self-efficacy for Team adapted from Cheng, Kuo, Lin & Lee-Hsieh (2010), Espey (2010), and de la Torre-Ruiz, Ferron-Vilchez & Ortiz-de-Mandojana (2014) respectively

Figure 5: Comparison of students' self-direction in learning and teamwork-related attitudes before and after TBL sessions

Though improvements at the scale level did not reach the desired level of statistical significance (i.e.,  $p \leq .1$ ), significant (statistically) improvements were detected on individual items that worth attention. These include: -

- Students after the TBL sessions had grown in belief about group over individual decisions. By comparing students' post-test and pre-test responses to Value of Teams Survey, they showed higher level of agreement to the statement that "group decisions are often better than individual decision" (Paired  $t(43) = 1.673$ ;  $p = .05073$ , one tailed);
- Students had become more confident in resolving conflicts among team members. Their responses to the Self-Efficacy for Teamwork scale indicated that, after the TBL sessions, they felt more strongly being "able to resolve conflicts between individuals effectively" (Paired  $t(43) = 1.666$ ;  $p = .05149$ , one tailed);
- Students after the TBL sessions had increase in motivation to learn. They asserted agreement more strongly to the statement that "regardless of the results or effectiveness of my learning, I still like learning" (Paired  $t(42) = 2.496$ ;  $p = .0083$ , one tailed), as revealed by their responses to the Self-Directed Learning scale after the TBL sessions.

Furthermore, positive TBL experiences, particularly teamwork experiences, were found conducive to greater improvement on students' Value of Teams. This was informed by the significant (statistically) correlations detected between evaluation of TBL experiences and changes in Value of Teams – as a whole and on its constituent items – as shown below: -

- Better (or worse) TBL teamwork experiences were found in association with greater (or reduced) improvement on Value of Teams ( $r = .344$ ,  $p = .022$ ). The strength of association was particularly strong for the assertion that "I have a positive attitude about working with my peers" ( $r = .396$ ,  $p = .008$ ), among TBL teamwork experiences.
- Better (or worse) overall TBL experiences - teamwork and process – is likely to reinforce (or weaken) the fostered belief about group learning where "solving problem in a group is an effective way to practice what I have learned" ( $r = .365$ ,  $p = .015$ ) as captured in Value of Teams Survey. Significant correlations were identified with the entire teamwork dimension ( $r = .395$ ,  $p = .008$ ), and most of its constituent items including *holding positive attitude about working with peers* ( $r = .441$ ,  $p = .003$ ), *other students' attentiveness* ( $r = .384$ ,  $p = .010$ ), *being able to contribute personally* ( $r = .369$ ,  $p = .014$ ), and *mutual respect* ( $r = .299$ ,  $p = .049$ ), as well as *being helpful for assignment preparation* ( $r = .340$ ,  $p = .024$ ) and *group discussions being useful learning activities* ( $r = .334$ ,  $p = .027$ ) of the process dimension.

In sum, the pilot showed that adoption of TBL in the course brought about significant learning experiences to students, which not only enhanced their participation in learning and academic performance, but also resulted in attitudinal changes especially in teamwork that are conducive to the 21<sup>st</sup> Century competence. The result offered evidences for early success of the pilot of using TBL in the course, supporting further application of the approach in the course as well as possible extension to other courses.

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***Investigating Relationship Among Learning Self-efficacy, MOOC-satisfaction and MOOC- Loyalty of MOOC Learner Using Bagozzi's Self-regulation Model***

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**Abstract**

This research aims to examine the relationship among Learners' self-efficacy, MOOC-satisfaction and MOOC-Loyalty of the credit-bearing MOOCs at Taylor's University using Bagozzi's self-regulation Model. Online questionnaire included 10-item of learning self-efficacy, 6-item of MOOC-satisfaction, and 5-item of MOOC-Loyalty. It also included another two factors which affected the learning self-efficacy and MOOC-satisfaction: 9-item on Ease of learning and 5-item on Quality of MOOC content. Pearson correlation coefficient between pair of variables among all the variables were obtained. The results of zero order correlation analysis showed a strong positive correlation between the predictors and outcome variables. The research findings provided positive impact to lecturers who plan to convert from traditional teaching pedagogy to MOOC mode as Malaysian students have higher degree of MOOC-loyalty and they were in favor of continuing to take up the credit bearing MOOC throughout their study at Taylor's university. Besides, it also alarmed the university administrator to provide the best infrastructure for the MOOC platform and best quality of MOOC content so as to raise the MOOC-satisfaction which enhance the MOOC-loyalty.

Keywords: Massive Open Online Course (MOOC), MOOC-satisfaction, MOOC-loyalty, Learning self-efficacy

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## Introduction

Massive Open Online Course (MOOC) has become one of the common phenomenon in higher educational Institutions (HEI) globally. MOOCs have drawn attention of educators and educational providers since 2008 with the inception of cMOOC by the young researchers George Siemens and Steven Downes. In 2011, another version known as xMOOCs which emphasized on individual learning was introduced. The educational landscape particularly in the higher education has changed drastically since the inceptions of xMOOCs. According to Class Central's MOOC report (2018), more than 900 Universities in the world had announced or launched 11400 MOOCs, with around 2000 new courses added to the list in 2018. It also reported that there are 20 million new learners signed up for at least one MOOC in 2018, which make the number of learners to a total of 101 million since 2012.

It is undeniable fact that the educational landscape has been changed dramatically due to the mushrooming of xMOOCs in the HEIs globally. According to Balaii,(2013), MOOC is increasingly gaining its popularity in many developing countries which has well developed digital infrastructure, particularly in area of metropolitan and universities. The waves of MOOCs have started to propagate into Malaysia since the inception of cMOOCs in 2008. A study done by Norazah, Mohamed Amin, and Zaidan (2011) found that 11 HEIs in Malaysia offered more than 50% of their courses online, 13.8% of lecturers provided more than 80% online learning materials and that 44.6% of students preferred to read materials uploaded by their lecturers. Their findings have shown that students' preference for online courses was very encouraging. In fact, lecturers also agreed that the integration of e-learning into their courses has benefited students. In general, it clearly shows that MOOCs are accepted by lecturers and students of HEIs as an effective means of communication and teaching and learning.

Malaysia has become the first country in the world to implement credit-bearing MOOCs for university students to enroll to the compulsory courses in its Public Universities since 2014 and develop a national policy on credit recognition for the MOOCs in 2016. Since then, many public and private universities in Malaysia have started the MOOC initiatives in general studies modules on a partial implementation basis. Many public universities have claimed to start the piloted MOOC initiatives for the general studies modules which include Hubungan Etnik (Ethnic Relation) and Tamadun Islam dan Tamadun Asia, TITAS (Islamic Civilization and Asian Civilization). However, the initiative to offer MOOC delivery of the two modules in the public universities were conducted as a blended learning course with 30% of the course conducted in MOOCs while the remaining percentage was carried out according to course instructors (Norazah Nordin, et. al., 2015).

Taylor's University in Malaysia had begun to develop modules in MOOC since 2013. It appeared as the first University in Malaysia to offer MOOCs with 100% online delivery to replace the traditional face to face approach to its two general study modules in 2016. The two compulsory general studies modules are Hubungan Etnik (Ethnic Relations) and Tamadun Islam dan Tamadun Asia, TITAS (Islamic Civilization and Asia Civilization). These two modules have large enrolment, each module has more than 1200 students for each semester and all Malaysian students need to undertake and pass these two modules before they receive their degree.

## Problem Statement

Taylor's University has implemented its new curriculum in 2018, known as Taylor's Curriculum Framework (TCF), which aims to future-proof graduates to be ready for the Fourth Industrial Revolution (IR 4.0). TCF helps to prepare graduates to be ready in different jobs in the future by training them to be able to learn for themselves in a life-long learning manner after they graduate from university. To achieve this goal, the TCF adopts a 'teach less, learn more' philosophy where face-to-face lectures will be gradually reduced from the first to third year to build students' independent self-learning and peer learning abilities. More and more modules are turning into credit-bearing MOOCs. This effort will train graduates to go online and take a MOOC course in preparation to move from one job to another job in future. However, despite the fact that today's kids are born digital—born into a media rich, networked world of infinite possibilities, their formal education and learning environment prior to enrolling into university are still “passive and in teaching paradigm” and conducted in the traditional face to face approach. University students may face problems with such a drastic change from a conventional face to face education environment into the new learning paradigm, such as losing confidence and not satisfied in learning, which may lead to the anxiety or denial to learn MOOCs in future. It is important to note that MOOC-loyalty and MOOC-satisfaction play an important role in the successful future adoption of learning via MOOCs platform. In response to these problems, this research proposes to investigate relationship among learning self-efficacy, MOOC-satisfaction and MOOC-Loyalty of MOOC learners at Taylor's University.

## Literature review

A paradigm shift of social networking relying heavily on information communication technology and ubiquitous computing are beginning to set a profound impact on teaching and learning strategy, and most prominently, on the evolution of new educational landscape offer to our Millennial learners. With this new paradigm of open and online education, learning and knowledge acquisition is no longer restricted and confined within walls and classrooms. Learning can now take place anytime, anywhere one's own pace and convenience whenever there is penetration of radio waves and coverage of WiFi with the aid of online learning. With this development, MOOCs have drawn attention of researchers and stakeholders in higher education sector. Mawaddah (2018) suggested a conceptual model to identify the factors that determine users to continue to select modules offer in MOOC for their learning platform. The model demonstrates the relationship between usefulness, enjoyment, interactivity and openness with MOOCs continuance intention. The research model focused on post adoption usage by examining the continuance intention of Malaysia MOOCs system. Continuance intention is somehow related to MOOC-loyalty as Lee & Kwon (2011) stated that continuance intention describes about user's decision to continue to use a specific technology that users have already been using it. By far, the model has yet to be tested with concrete data. Anderson (2003) investigated the impact of satisfaction on loyalty in the context of electronic commerce. The research indicates that e-satisfaction has impacted e-loyalty, and the relationship is moderated by some other business factors such as trust and perceived value. Even though the research is not directed to MOOC adoption, however its research constructs such as e-satisfaction and e-loyalty can be replicated in MOOC-satisfaction and MOOC-loyalty with academic factor such as learning self-efficacy, ease of learning and quality of

MOOC contents. Polites (2012) proposed a research model on the relationship between e-satisfaction and websites stickiness (another term related to e-loyalty) grounded on Bagozzi's 1992 framework of the self-regulation of attitudes, intentions, and behavior. His research focused on consumer perceptions of satisfaction with, and loyalty toward the information technology (IT) artifact (website) itself. The results obtained generally support the proposed model, indicating a statistical weak relationship between the e-satisfaction and e-loyalty (Site stickiness). Cui (2018) explored the relation between multidimensional self-efficacy and MOOCs continuous learning willingness by building his research model based on Expectation Confirmation Model-Information Technology proposed by Bhattacherjeethe (2001) who stated that success of IS not merely depended on initial use, the key was the continuous use (which is similar to e-loyalty). The questionnaires in his study consists of items related to sense of competence, sense of identification, sense of performance and sense of control, together with items related to self-efficacy, satisfaction degree and MOOCs continuous learning willingness in the form of 5-point Likert scale. This empirical research concluded that self-efficacy and satisfaction degree of MOOCs learners have a significant positive impact on their continuous learning willingness. Bear in mind that MOOC-loyalty and MOOC-satisfaction play an important role in the successful future adoption of learning via MOOCs application.

### **Purpose of study**

In view of the literature based on various study on factors affecting loyalty, it seems a research gap exists in the research on the relationship among the three constructs in the education landscape with the adoption of MOOCs, which are learners' learning self-efficacy, MOOC-satisfaction and MOOC-loyalty. Moreover, the problem statement stated in the earlier section has prompted an urgency to study the relationship among these constructs.

This research sought to address the research gaps in the literature and enhance the future adoption of learning via MOOCs platform by exploring the relationship among the Learners' self-efficacy, MOOC-satisfaction and MOOC- Loyalty of the credit-bearing MOOCs at Taylor's University.

### **Theoretical framework**

This research adapts and adopts Bagozzi's (1992) "self-regulatory process" framework which stimulate intentions, cause enactment of behavior and lead to goal attainment. The process acts in monitoring appraisal and coping activities that translate attitudes into intention (appraisal process), intentions into actions (emotional reaction) and leading to goal attainment (coping responses). The emotional self-regulation of the attitude intention relationship Model (include "self-regulatory process" framework) is represented as shown in figure 1. This framework conceptualize attitude as an evaluative appraisal of the consequences of action. The appraisal is either favorable or unfavorable. Following the appraisal, intentions are expected to emerge with the evaluations results. To form an intention to act requires a desire to perform the act, together with the presence of self-efficacy. Positive or negative reaction are expected to occur depending on the appraisal outcomes. The emotional reaction in turn, induce coping activities. These coping activities again

includes motivation to avoid, relieve, change in the negative aspect or maintain the satisfaction, share positive outcomes with others or savor the experience in the positive aspects.

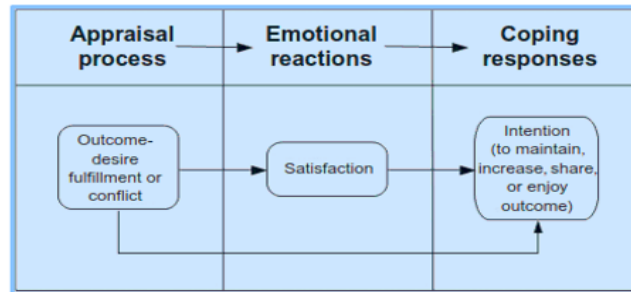


Figure 1: Emotional self-regulation Model (Bagozzi, 1992).

Figure 2 shows the proposed research model of this study adapted and modified from Bagozzi’s (1992) emotional self-regulation of the attitude intention relationship Model. The appraisal process in this model involves the learning self-efficacy which addresses the evaluation of resources in MOOC with regards to quality of MOOC content and Ease of learning. Consider a MOOC learner achieves a goal or experiences a pleasant event, with high level of learning self-efficacy, an outcome-desire fulfillment is said to occur. This experience will lead to MOOC-satisfaction. Specific intentions probably will emerge to take step to maintain or increase MOOC-satisfaction by sharing experience with others. Thus, the specific coping responses will depend on the particular emotion, and the degree of learning self-efficacy characteristic of the outcome-desire unit. As a results, MOOC learner will choose to take up another credit-bearing MOOC modules in the university or after graduation while changing a new job. This is translated as MOOC-Loyalty.

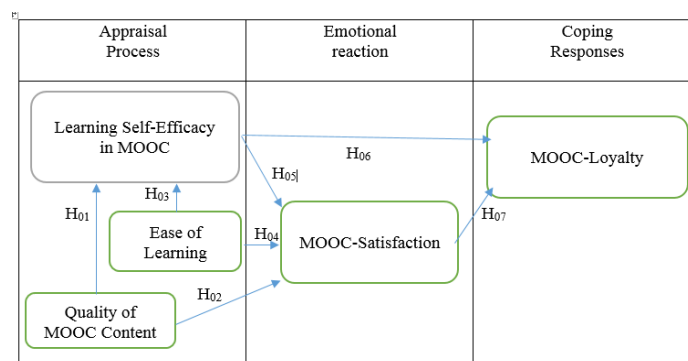


Figure 2: Proposed research model to Exploring relationship among Learners’ self-efficacy, MOOC-satisfaction and MOOC-Loyalty

**Learning self-efficacy in MOOC**

Bandura (1994) defines Self-efficacy as people’s beliefs about their capabilities to produce expected outcomes. Learning self-efficacy in MOOC refers to learners’ confidence in learning a module in the MOOC environment, with regards to the ease of learning and quality of the content presented in MOOC.

## **MOOC-satisfaction**

Satisfaction is essential to any form of service provider. Oliver (1997) defined satisfaction as “the summary of psychological state resulting when the emotion surrounding disconfirmed expectations is coupled with a consumer’s prior feelings about the consumer experience”. MOOC-Satisfaction in this study refers to learner’s satisfaction with regards to ensuring his effective learning and increases his competence which would guarantee his proper function in an online or MOOC learning environment (Muylle, et.al, 2004).

## **MOOC-Loyalty**

Brand loyalty is defined as “the preferential, attitudinal and behavioral response toward one or more brands in a product category expressed over a period of time by a consumer” (Engel, Kollat, and Blackwell, 1982). In e-business, e-loyalty is defined as the customer’s favorable attitude toward an electronic business resulting in repeat buying behavior (Anderson, 2003). MOOC-loyalty is defined as MOOC learner’s favorable attitude toward learning a module in a MOOCs environment resulting in MOOC learner to repeatedly enroll to another credit-bearing MOOC in the university or after graduation while changing for a new job.

## **Method**

### **Study Design**

The present study adopted the quantitative approach and correlational design to explore the relationship among students’ Learning self-efficacy in MOOC, MOOC-satisfaction and MOOC-Loyalty

### **Sample**

A convenient sample of students was used to investigate the relationship among the variables. 952 Taylor’s University students are expected to respond to the online survey, 195 students from the March 2018 semester (pilot study sample) have responded while 757 students from August 2019 Semester have identified and promised to respond by end of December 2019. These students were studying in various faculties. There were 458 students enrolled to the Tamadun Islam and Tamadun Asia or TITAS and 493 students enrolled to Hubungan Etnik or HE. The sample comprised of 502 female students and 450 male students. The age of the students ranges from 19 year old to 22 years old.

### **Procedure**

This study was carried out from March 2018 Semester (pilot sample) to August 2019 Semester for a period of 2 semesters at Taylor’s University. Duration of each semester were 14 weeks. The TITAS and HE modules were conducted via MOOC mode with 100% online and only offered to Malaysian students. They have completed 12 years of formal education and one to two years of Pre tertiary education prior to their enrolment into the degree program at Taylor’s University.

## **TITAS and HE via MOOC at Taylor's University**

The two modules, TITAS and HE fall under the category of general studies modules and are mandatory for all Malaysian students pursuing Bachelor's degree.

TITAS module recognizes the benefits of the ancient civilization, the advantages and disadvantages of the past and present to devise future strategy while HE module focuses on the study of the basic concepts of ethics relations.

These two modules were conducted with an initial two hours of face to face briefing session in Week 1 where the lecturer concern provided a thorough explanation of the modules. Students were guided to register and use the Open Learning platform and Taylor's Moodle Platforms during this face-to-face session. Students were required to participate in online learning via MOOC platform in a weekly basis. They were responsible to complete the exercises, watched the videos and conducted self-study. The online learning via MOOC replaced the face-to-face lessons throughout the semester. The weekly activities (checkpoints) were treated as the attendance for this virtual classes. It was mandatory for students to complete 100% of attendance. Two times of YouTube Live sessions were also conducted by the lecturer in 6<sup>th</sup> and 12<sup>th</sup> week of the semester to have live discussion with the students regarding their assignments and projects. These live discussion sessions were recorded and uploaded to the MOOC platform for students to review.

### **Data Collection**

The link to online survey questionnaire in Google form was posted on the Taylor's MOOC platform for students to response to the survey questions at the end of the semester. The online questionnaire includes 10-item of learning self-efficacy in MOOC, 6-item of MOOC-satisfaction, and 5-item of MOOC-Loyalty. It also includes another two factors which affect the self-efficacy and MOOC-satisfaction, that is: 9-item on Ease of learning in MOOC and 5-item on Quality of MOOC content. Reliability test was performed for the pilot study sample and the Cronbach's alphas for the three variables, students' Learning self-efficacy in MOOC, MOOC-satisfaction and MOOC-Loyalty for the pilot study sample are 0.979, 0.959, 0.964 respectively while Cronbach alpha for Ease of learning in MOOC and Quality of MOOC content are 0.962 and 0.964 respectively.

### **Data Analysis**

Until the end of Nov 2019, some of the data were not complete as students from August 2019 semester were busy in preparing for their final exam but promised to return the online questionnaire by end of December. After the complete set of data collected from the online questionnaire tabulated in the google sheets, it can be converted into SPSS worksheet IBM SPSS, version 20. All the null hypotheses can then be tested using the statistical analysis.

## Findings

This research is expected to use Pearson's Product Moment Correlation Coefficient to test the relationship among all the variables in the study after the complete set of data is obtained. Table 1 displays all the null hypotheses and alternative hypotheses. The results from the computation of Pearson's Product Moment Correlation Coefficient play the important role to determine if the null hypothesis is rejected in favor of alternative hypothesis or fail to reject the null hypothesis:

That is,

- if  $R(952) = 0.xxx$ ,  $p < 0.01$ , Two-tailed, then reject null hypothesis in favor of alternative hypothesis,
- if  $R(952) = 0.xxx$ ,  $p > 0.01$ , Two-tailed, then fail to reject null hypothesis.



Table 1: Results Of Testing Hypotheses with Pearson's Correlation Coefficient

Null Hypotheses	Pearson R and p-value	Alternative Hypotheses	Results: Reject/ Fail to reject
H <sub>01</sub> : There is no statistical significant positive correlation between Quality of MOOC content and learners' Learning Self-efficacy in MOOC.		H <sub>1</sub> : There is a statistically significant strong positive correlation between Quality of MOOC content and learners' Learning Self-efficacy in MOOC.	
H <sub>02</sub> : There is no statistical significant positive correlation between Quality of MOOC content and learners' MOOC-satisfaction.		H <sub>2</sub> : There is a statistically significant strong positive correlation between Quality of MOOC content and learners' MOOC-satisfaction.	
H <sub>03</sub> : There is no statistical significant positive correlation between Ease of learning in MOOC and learners' Learning Self-efficacy in MOOC.		H <sub>3</sub> : There is a statistically significant strong positive correlation between Ease of learning in MOOC and learners' Learning Self-efficacy in MOOC.	
H <sub>04</sub> : There is no statistical significant positive correlation between Ease of learning in MOOC and learners' MOOC-satisfaction.		H <sub>4</sub> : There is a statistically significant strong positive correlation between Ease of learning in MOOC and learners' MOOC-satisfaction.	
H <sub>05</sub> : There is no statistical significant positive correlation between learners' Learning Self-efficacy in MOOC and learners' MOOC-satisfaction.		H <sub>5</sub> : There is a statistically significant strong positive correlation between learners' Learning Self-efficacy in MOOC and learners' MOOC-satisfaction.	
H <sub>06</sub> : There is no statistical significant positive correlation between learners' Learning Self-efficacy in MOOC and learners' MOOC-Loyalty.		H <sub>6</sub> : There is a statistically significant strong positive correlation between learners' Learning Self-efficacy in MOOC and learners' MOOC- Loyalty.	
H <sub>07</sub> : There is no statistical significant positive correlation between learners' MOOC-satisfaction and learners' MOOC-Loyalty.		H <sub>1</sub> : There is a statistically significant strong positive correlation between Students' MOOC- satisfaction and students' MOOC-Loyalty.	

## **Discussion**

A pilot study for the March 2018 semester showed a strong positive correlation between the predictor and outcome variables.

However, the researcher suspected that the learning self-efficacy has direct impact on the MOOC-loyalty. Thus, a higher order partial correlation need to perform to determine if the Learning self-efficacy is correlated with the MOOC-Loyalty not because it exerts some direct effect upon the MOOC-Loyalty, but because it causes changes in MOOC-satisfaction, and then the MOOC-satisfaction causes changes in MOOC-Loyalty. It is essential to determine if MOOC-satisfaction is an intervening variable known as mediator which mediate the relationship between Learning self-efficacy and MOOC-Loyalty.

## **Conclusion**

The strength of association among the variables in the pilot study sample of 195 participants, namely, students' Learning self-efficacy in MOOC, MOOC-satisfaction, and MOOC-Loyalty at Taylor's University were determined using Pearson's Correlation coefficient in SPSS. Besides, the relationship between the other two factors affecting the learning self-efficacy and MOOC-satisfaction, i.e Ease of learning in MOOC and Quality of MOOC content were also determined. The results from Pearson's zero order correlation for the pilot study sample suggested that all the null hypotheses were rejected in favour of their respective alternative hypotheses. A comprehensive set of data is currently under study to verify this results.

## **Recommendations**

To improve the rigorous and robustness of this type of study, further research can be conducted to look into several issues such as the relationship among learners' acceptance of MOOC and usability, usefulness, loyalty, satisfaction and ease of use based on Technology Acceptance Model (TAM).

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*Designing Experiential Learning Activities for Primary Schoolers*

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**Abstract**

Experiential learning is now deemed a crucial part in primary education in almost all learning contexts because it helps develop and cultivate children's cognitive and life skills. It functions as a bridge linking the knowledge that children acquire in regular classroom and their experiences built up by participating in real life activities, especially beyond classroom. With this in mind, the present study made an attempt to design an experiential learning model with coherent steps for primary schoolers by referencing Kold's theoretical framework (2015). And thereby, this study empirically made a concrete plan and administered a one-day field trip for the primary schoolers in Cao Lanh City, Dong Thap Province, Vietnam. The results obtained are overallly positive, but there is room for improvement. Thus, the study makes recommendations to primary school teachers for effectively designing and operating experiential learning activities.

Keywords: Experiential learning, primary schooler, designing procedure

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## 1. Statement of the problem

In Vietnam, K-12 education program after 2018 (MOET, 2018), experiential activity is included in the program as a compulsory element throughout grades 1-12. It aims to educate students' qualities and personality. Currently, experiential activities have been done in most classes subject to the required duration in the program. However, experiential activities are still open, i.e. not under any strict regulations by the Ministry of Education and Training. This article suggests the process of designing experiential sightseeing activities for primary students.

## 2. What is experiential learning?

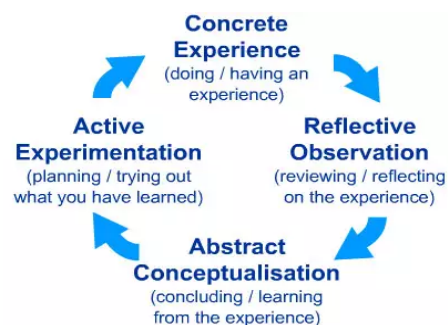
### 2.1. Experiential activity

Experiential activity is one of the educational activities at school. Under the organization and guidance of teachers, students take part in practical activities inside or outside school campus. Thereby, students restructure and refine their old experiences as such to develop their qualities, personalities, abilities and creativities. This activity in nature is a learning method, enabling students to connect theoretical knowledge learnt in class with realities, recognizing connections across different subjects, thus to help them develop comprehensively.

### 2.2. Kolb's experiential learning cycle

According to Kolb (2015), the experiential learning cycle consists of 4 steps as follows:

- **Step 1. Concrete Experience** – a new experience or situation is encountered, or a reinterpretation of existing experience.
- **Step 2. Reflective Observation of the New Experience** – of particular importance are any inconsistencies between experience and understanding.
- **Step 3. Abstract Conceptualization** – reflection gives rise to a new idea, or a modification of an existing abstract concept (the person has learned from their experience).
- **Step 4. Active Experimentation** – the learners applies their idea(s) to the world around them to see what happens.



**Model 1:** Kolb's experiential learning cycle

Experiential activities make students detect and resolve possible conflicts in their minds to create a new harmony in knowledge acquisition. This occurs in two continual processes of action and cognition. These steps can be repeated many times; the cycle can continue in a spiral that expands and elevates.

The nature of experiential activities is organizing activities for students to perform (individually or in groups). Thereby, students interact with realities in certain circumstances to construct current experiences. At the same time, within students' minds there are interactions between the existing experience and the currently gained experience. Thus, by processing information and systematizing knowledge, students gain new experiences (new competencies) and use new experiences as a means to solve a new situation or activity in real life.

### **2.3. Principles of organizing experiential activities**

- Learning environments are real-life situations.
- Instruction: student-centered approach.
- Learning tasks are based on students' existing knowledge.
- Experiential activities are organized subject to Kolb's experiential learning cycle.
- The outcomes are to evolve student's personalities and life skills.

## **3. Process of designing an experiential sightseeing activity**

### **3.1. Suggested process of designing an experiential sightseeing activity**

#### **3.1.1. Determining requirements, sites/places and participants**

To ensure the feasibility of the activity, Teacher needs to consider (1) objectives, contents, the academic year's plans made by school, (2) student participants, (3) sites/places for field trips, (4) financial resources from outside school if any.

#### **3.1.2. Name the activity**

The activity name should reflect the core content of the activity; also sound interesting and suit students' needs.

#### **3.1.3. Determining the targets, contents, and evaluation criteria**

- **Targets:** for feasibility, Teacher should base the targets on contents and students' existing knowledge levels.

- **Contents:** they should include (1) experiential contents, i.e. features of the site to visit (geography, history of development, infrastructure, facility, etc.), which suit primary education program and students' needs and cognitions; (2) the contents which link different subjects in the program. Teacher should select contents from those subjects related to the experiential content; (3) Educational contents: basing on (1) and (2) above, Teacher determines the values of personality and behaviors to be embedded in the experiential activity.

- **Evaluation criteria:** Basing on targets and students' acquisitions, Teacher selects contents to be evaluated and evaluation formats which are suitable to the targets and accurately assess students' competences. The evaluation criteria should include 2 parts: (1) products/results of learning content awareness and (2) learning attitude.

### 3.1.4. Making plans

It identifies tasks and responsibilities of each and all stakeholders to create close relations between them. This involves several authority levels, and it should be done in paper work such as organizing plan, the decision of organizing committee (list of participants), task assignments, etc.

### 3.1.5. Designing operational plan for experiential activities

This step plays a very important role in the quality of experiential activities. Teacher should pay close attention to:

- **Contents:** Educational values embedded in the experiential activity and taught to students: basing on the content of specific activities, Teacher identifies appropriate formats, methods and means of operation. In order for students to pay attention to the content of the experiential sightseeing activity, Teacher uses learning worksheets for students to focus on the contents and also as an immediate tool for monitoring and assessment.
- **Performer issues:** Basing on the characteristics of tasks and their professional training, Teacher identifies appropriate performers;
- **Temporal issues:** Teacher identifies enough periods of time for the whole project, including preparation, performance and reports of the activity results.
- **Outcome issues:** Teacher identifies adequate evaluation criteria for specific activities. For accurate evaluation, Teachers need design evaluation sheets of specific criteria for each activity to motivate students.

### 3.1.6. Checking, revising and refining

This step is to check up the contents, procedures and time plans for operation concerning the issues of appropriateness, feasibility and target results. If there is any something in appropriate, it should be fixed timely. Finally, Teacher completes the activity design and makes it in official papers.

**Note:** These steps of designing are possibly integrated or expanded, based on the characteristics and volume of each project under operation.

## 4. Experiment

### 4.1. Designing a sightseeing visit to Nguyen Sinh Sac Mausoleum

**Stopic:** “Grateful to and follow the example of Nguyen Sinh Sac”

**Participants:** 5<sup>th</sup>-Graders



**4.1.1. Learning outcomes:** By the end of this activity, students will be able to:

- Present the process of founding this mausoleum site, biography and career of Nguyen Sinh Sac;
- Participate in some activities to express gratitude to Nguyen Sinh Sac;
- Actively join group or class activities;
- Proactively present ideas and take responsibilities on their own.

#### **4.1.2. Contents**

(1) Experiential dimension

- Biography and career of Nguyen Sinh Sac;
- The process of founding this mausoleum.

(2) Linking several content subjects and students' life experiences

- History subject of 5<sup>th</sup>-grade: Patriots such as Truong Dinh, Nguyen Truong To, etc.
- Ethics subject of 5<sup>th</sup>-grade: Grateful to martyrs and the wounded for the country's cause, "I love my country";
- Vietnamese literacy subject of 4<sup>th</sup>-grade: Write promotional paragraphs;

(3) Educative dimension

- To educate students how to express gratitude by actions such as burning grateful incense, cleaning the tomb area, writing reflections on the visit to the mausoleum.

#### **4.1.3. Preparations**

(1) Scheduling and funding

Teachers need plan sightseeing schedules so that the visit tour is proactive at work and parents can easily follow. Teachers need determine specific times for activities involved. Expenses for transport, food, drink, gifts, guides, etc. should be counted in advance.

## (2) Needed materials

## a. Teachers' materials

<b>LEARNING WORKSHEET FOR EACH STUDENT</b>		
Activity's name:.....		
Student's name:.....; Class:.....		
#	QUESTIONS	ANSWER OPTIONS
1	Another name of Nguyen Sinh Sac is ....	A. Nguyen Sinh Khiem B. Nguyen Sinh Thuyet C. Nguyen Sinh Cung <b>D. Nguyen Sinh Huy<sup>(1)</sup></b>
2	When did Nguyen Sinh Sac gain the second ranking title?	<b>A. 1901</b> C. 1903 B. 1902                      D. 1904
3	Where did Nguyen Sinh Sac stay while in Dong Thap?	<b>A. Hoa An village</b> C. Tre Viet village B. Hoa Sadec village              D. Sen village
4	What did Nguyen Sinh Sac do while in Dong Thap?	A. Teacher <b>C. Both A &amp; B</b> B. Doctor                      D. Neither A nor B
5	When was Nguyen Sinh Sac born and died?	A. 1862 - 1928 <b>C. 1862 - 1929</b> B. 1861 - 1929                      D. 1861 - 1928
6	What acreage is Nguyen Sinh Sac Mausoleum?	<b>A. 9 ha</b> C. 5 ha B. 4.6 ha                      D. 10 ha
7	Which ward is Nguyen Sinh Sac Mausoleum located in Cao Lanh city?	A. Ward 1                      C. Ward 3 B. Ward 2 <b>D. Ward 4</b>
8	How many sections does Nguyen Sinh Sac Mausoleum have?	A. Tomb section of Nguyen Sinh Sac B. Exhibition house C. Uncle Ho's stilt house and the earlier Hoa An village <b>D. All are correct</b>
9	How many parts does the tomb section of Nguyen Sinh Sac have?	A. The main tomb and the statue <b>B. The main tomb, lotus pond and tower</b> C. The main tomb and Uncle Ho's stilt house D. The main tomb and Hoa An village
10	When was Nguyen Sinh Sac Mausoleum recognized as a national historical relic?	A. 1991                      C. 1993 <b>B. 1992</b> D. 1994
Write your own feelings while visiting Nguyen Sinh Sac Mausoleum? .....		
What qualities will you learn from Nguyen Sinh Sac? .....		

<sup>1</sup>Those bold are the keys.

<b>INDIVIDUALS' LEARNING OUTCOME EVALUATION</b>				
Activity's name:.....				
Student's name:.....Class: .....				
<b>Competency evaluation criteria</b>		<b>Development levels</b>		
		Level 1	Level 2	Level 3
<b>Learning</b>	Answer the learning worksheet			
	Tell stories about patriots			
	Clean the mausoleum sections			
	Write a script to advertise the Mausoleum			
<b>Attitude</b>	Write about feelings and lessons learnt			
	Join the activities			
	Group working attitude			
<b>Teacher's comments:</b> .....				
<b>Evaluation criteria</b>				
- <b>Multiple choice section:</b> <b>Level 1:</b> 1-3 sentences correctly; <b>Level 2:</b> 4-7 sentences correctly; <b>Level 3:</b> 8-10 sentences correctly;				
- <b>Tell stories about patriots, clean the mausoleum sections, write a script to advertise the Mausoleum:</b> calculated by the team's performance: <b>Level 1:</b> The team won the third and the fourth prizes; <b>Level 2:</b> The team won the second prize; <b>Level 3:</b> The team won the first prize.				
- <b>Attitudes:</b> <b>Level 1:</b> partial participation of activities, passive and uncooperative; <b>Level 2:</b> partial participation of activities, positive and cooperative; <b>Level 3:</b> Total participation of activities, positive and cooperative.				
<b>Teacher's comments:</b> (1) Not pass level 1; (2) Pass level 2; (3) Pass level 3 (Very good grade)				

GROUP'S LEARNING OUTCOME EVALUATION				
Activity's name:.....				
Group's name:.....Class:.....				
Competency evaluation criteria		Development levels		
		Level 1	Level 2	Level 3
Achievements	Tell stories about patriots			
	Clean the mausoleum sections			
	Write a script to advertise the Mausoleum			
Attitudes	Organizing and managing groups			
	Group working attitude			
Teacher's comments: .....				
<b>Evaluation criteria</b> - Tell stories about patriots, clean the mausoleum sections, write a paragraph to advertise Mausoleumsection: <b>Level 1:</b> The team won the third and the fourth prizes; <b>Level 2:</b> The team won the second prize; <b>Level 3:</b> The team won the first prize. - <b>Attitudes:</b> <b>Level 1:</b> Poor team organization and management,uncooperative; <b>Level 2:</b> Group organization and management are not very good, some members are not cooperating; <b>Level 3:</b> Well organized and managed team, active members, cooperation, solidarity. - <b>Teacher's comments:</b> (1) Not pass level 1; (2) Pass level 2; (3) Pass level 3 (Very good grade)				

**b. Students' preparations:** Backpacks, coats, hats, paper, pens, etc.

**c. Organizing group and assignments**

- Divide class into 4 groups (subject to the group's composition).
- Assigning tasks to groups for preparations.

#### 4.1.4. Organizing activities

**(1) Activity 1:** Learning about the process of founding the Mausoleum, biography and career of Nguyen Sinh Sac

**a. Learning outcomes:** Students are able to present the process of founding the Mausoleum, biography and career of Nguyen Sinh Sac

**b. Administration:** Teachers perform the following procedure:

❖ **Step 1: Burn the grateful incense:** The teacher guides students in line and to perform the flower-offering ceremony, burn the grateful incense to Nguyen Sinh Sac.

❖ **Step 2: Learning about the process of founding the Mausoleum, biography and career of Nguyen Sinh Sac:** Teachers perform the following procedure:

- Distribute and guide students how to perform learning sheets;

Organize students to follow the guide's addressing the process of founding the Mausoleum, biography and career of Nguyen Sinh Sac; and then complete the multiple-choice section of the learning sheet;

- Gather students in the reasonable place to complete the writing of feelings section;
- Duration: 10 minutes
- Collect and mark students' learning sheets.

**c. Conclusion:** Nguyen Sinh Sac is a teacher, a doctor, a patriot, President Ho Chi Minh's father. He led a simple, sacrificing life in love of his people. So, he is a shining example for us to follow.

## **(2) Activity 2: Telling stories about patriots**

**a. Learning outcomes:** Student consolidates their knowledge about History of 5<sup>th</sup>-Grader

**b. Administration:** Teachers perform the following procedure:

- Tasks: Each group chooses a patriot and tell a biographical summary, operational process, patriotic contributions.

- Duration: 5 - 7 minutes (each group)

- Organize groups to tell stories and discuss about the stories

- Give comments on the achievements of the groups, cooperation spirit, attitude, etc.

**c. Conclusion:** The patriots have a living heart for everyone and ready to sacrifice their private interests for the country.

## **(3) Activity 3: Clean the mausoleum sections**

**a. Learning outcomes:** Student will do some works to express their gratitude to Nguyen Sinh Sac

**b. Administration:** Teachers perform the following procedure:

- Tasks: Group 1: clean the grave; Group 2: scavenge around the grave; Group 3: cut the grass around the grave; Group 4: water the flower pots.

- Duration: 20 - 25 minutes

- Comments and evaluations.

**c. Conclusion:** It is necessary to show the gratitude to Nguyen Sinh Sac. By doing good things, each one should be grateful to those noble hearts and living for the people's sakes.

## **(4) Activity 4: Playing a tour guide role**

**a. Learning outcomes:** Students will design the script to promote the tomb of Nguyen Sinh Sac mausoleum

**b. Administration:** Teachers perform the following procedure:

- Task: Each group designs a script to promote Nguyen Sinh Sac mausoleum;

- Duration: 5 - 7 minutes (each group);

- Each group presents their script and discussions follow;

- Comments and evaluations.

**c. Conclusion:** The promotion of the Nguyen Sinh Sac Mausoleum helps spread his example to everyone.

**4.1.5. Comments and evaluations:** Teachers perform the following procedure:

- Distribute evaluation and learning sheets to students.

- Guide students to synthesize and complete the evaluation form.

- Collect evaluation sheets to summarize and write general comments for each student.

- Organize arts/games for students to play while teachers complete evaluation paper works.

- General comment, assessment on activities and results announcement.

## 4.2. Experiment results

For experimenting the process of designing and operating one experiential activity, first we had a contact with the managerial staff of Nguyen Sinh Sac Mausoleum and asked for permission to organize an experiential activity for primary school students at this mausoleum (in the 2018 – 2019 academic year). Upon their permission, we went on to see and present our activity plan to the Principals of 3 primary schools, namely Chu Van An, Le Van Tam (both in Cao Lanh city center), and Phan Chu Trinh (urban school of Cao Lanh city), which were scheduled to take part in the activity. Following the Principals' agreements, we then went to meet 3 group leaders and 5 in-charge teachers of 5-grader classes who were supposed to take part in the experiential activity (total number: 214 students from the 3 schools mentioned above). Also, we presented our activity plan in details to the speaker at the mausoleum, group leaders and teachers of the 3 schools involved. The obtained results were gratifying with 72.38% of the student participants gaining good grades and higher, showing their motivations, positive attitudes and active oral presentations.

However, during the experiment we met a number of difficulties, for example: (1) the schools appeared to worry about the lengthy duration for the activity and the hard task of monitoring the student participants during the entire activity; (2) the group leaders and in-charge teachers found it very new to the activity and had not got the ample skills to monitor students outside classroom; (3) student participants had not got used to learning worksheets and working in groups outdoors. Furthermore, group leaders and teachers complained about spending too much of their time in advance, instructing students about the field trip, collecting necessary materials and other stuffs. Previously, a field trip like this was not integrated with learning assignments.

The lessons we have learnt from organizing the above activity are (1) the designed plan should be particularly specified so that teacher and students participants can do their jobs correctly and effectively subject to the allotted duration; (2) Learning worksheets should be used to integrate learning tasks with sightseeing, which attract students attention and survey their attitudes; (3) The better preparations, the more effective interactions between teachers and students involved; (4) Evaluation sheets, both of individuals and groups, should be used to motivate students' learning; (5) Teachers and students should learn how to work together outside classroom.

## 5. Conclusion

For better monitoring experiential activities and learning outcome evaluation, it is essential to ensure the principles and feasibility of designing plans and organizing sightseeing visits. For plan-designing, teachers should fully understand the basics of experiential activity framework, objectives of primary education program, implement appropriate methods of planning procedures with sequential steps, and identify compatible formats of learning outcome evaluation ensuring accuracy and objectivity.

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[www.simplypsychology.org/learning-kolb.html](http://www.simplypsychology.org/learning-kolb.html)

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## ***Boost Sight Reading Skills of Students Using Melodic Ostinato***

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The Asian Conference on Education 2019  
Official Conference Proceedings

### **Abstract**

The purpose of the study was to boost the sight-reading skills of the grade six students through the use of melodic ostinato patterns as a strategy. Prior to the demonstration teaching, information about the current status of music education in the provincial setting was gathered and generated through field observations and interviews with selected students and music teachers. It was noted that teachers who handled music classes were not really music major graduates. This served as one factor why the application of musical concepts particularly in sight-reading was not given emphasis in the classroom teaching. Guided by Orff, Campbell and Scott-Kassner's philosophy of sequential learning, a strategic framework that uses the *melodic ostinato* patterns with three phases: (1) rhythm patterns (2) melodic patterns (3) part-singing, was created as a guide in teaching sight-reading. The study was implemented to twenty-three (23) students in Marinduque province. There were individual and group skills tests and performance-based tests given to assess the strength of the student's sight-reading ability. Findings indicated that sight-reading plays a significant role in the development of student's music literacy. Since *melodic ostinato* patterns were executed repeatedly, it increases retention on the pitch, rhythm, and duration of notes and rests. The summary of scores showed that through simple *melodic ostinato* patterns, students' sight-reading skills can be developed upon following the step by step procedure outlined in this study. The students were able to read musical score through individualized and group interpretations. And having been able to sight-read, it allowed the students to perform larger piece of music like part singing.

Keywords: melodic ostinato, sight-reading, part-singing, music education, music literacy

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## Introduction

One of the most important goals that a music educator should strive for is to assist their students in becoming self-sufficient learners. Fast, accurate sight-reading is one of the skills that will help a teacher and student reach this goal. Sight-reading ability directly affects the speed and quality of the student's music literacy, especially for those at the elementary levels. (Kuo, 2012) In the Philippines, music instruction in sight-reading for some schools is typically challenging. In spite of the utilization of the new K-12 music curriculum, the reality in meeting the objectives and standards may be less than adequate. Furthermore, the difficulty in teaching sight-reading in the classroom increases due to different factors such as teacher quality and development; readiness in coping with the new curriculum; dearth of relevant materials and funding; and implementation of music literacy and assessment in the classroom. (NCCA, 2017)

With these in mind, an interview and diagnostic test in chosen schools in the province of Marinduque, Philippines were conducted to find out the current situation of music literacy and instructions in sight-reading. According to Mrs. Aracelli M. Rolluqui, the school directress of Escuela de Gratia Plena, teaching sight-reading has always been an ongoing problem in their school because they don't have a trained music teacher. Therefore, the school's music curriculum focused mainly on the theoretical aspects with less emphasis given to the application of musical concepts. It was evident from the result of the diagnostic tests that more than half of the total number of grade six students can identify basic musical concepts and can visually recognize musical symbols. However, students have difficulties in interpreting the musical notations.

The researcher thus initiated to do a thorough study that aimed to apply effective strategies using *melodic ostinato* patterns in sight-reading. It aimed to promote the development of music literacy that will reduce the percentage of elementary students who cannot read music at sight.

Based on the purpose stated above, the following questions were explored: (a) Is the strategy of using *melodic ostinato* patterns effective in sight reading? (b) Did the students develop music literacy through this strategic design? (c) What is the effect of *melodic ostinato* patterns on student's sight-singing achievement?

The researcher believed that students should not be taught using the rote method alone. They were expected to learn how to interpret musical notations independently. It is through *melodic ostinato* patterns that students can better create and understand character of simultaneously sounding pitches, their meaning, relationships, and usage in the musical piece. In this strategy, students who develop better sight-reading skills will learn new music faster, improve accuracy and increase their level of self-confidence, while singing in harmony will add an exciting dimension and appreciation to their musical experiences.

## Review of Related Literature

The development of sight-reading abilities requires some set of skills such as pitch and rhythm reading; it relies upon preformed internal auditory representation of pitches or pitch relations (Gudmundsdottir, 2010). There are several philosophies about pedagogical tools and the appropriate age to introduce reading music from a

staff. Amongst music educators, better sight-readers tend to be better performers. This philosophy is parallel to Holmes (2009) instruction on the development of sight-singing skills which states that the ability to read and notate music is considered to be an essential ingredient of musical understanding and is vital to independent musical performance. According to Dr. Michelle L. Louer (2016), singing is the fundamental basis of students' music education; and it therefore is placed at the center of all their musical activities. Singing, in particular, is an ideal tool for developing listening, speaking, reading, and writing skills in a holistic way. Similarly, it develops personal meaning for the child by relating specific vocabulary to his or her schema. (Huffman, 2017)

Studies on "Elemental Music Making" by Watson (2017), which uses the Orff approach, showed that rhythm is the most important part of music-making. All learning is through active participation, and children had difficulty learning how to read or write music until they have a basic sense of rhythm and melody. The inner intonation was used by Yang (2014) in his classroom teaching, which was initially formed by practicing intervals in sight-singing and through familiarization of relationships among basic pitches and sounds. Irish and O'Reilly (1999) affirmed this study in their Music Arts Education Teacher Guidelines which showed that the most vital departure in the performing strand is the inclusion of music literacy as an integral element of song singing.

The study by Huffman (2017), stated that *ostinati* enhanced repetitive stories that were based on cumulative language. He stressed that any rhythmic, rhyming verse that fits a steady beat works well with this strategy. *Ostinati* can include speech, song, body percussion, instruments, and movement. Findings showed that from keeping a steady beat, the child progresses to an awareness of the rhythm pattern and later to an *ostinato*. Moreover, in the study of musical skill development done by Tucker (2007), it emphasized that students are required to master automaticity, the ability to perform a task through repetition and drill without thinking consciously about it.

The study of Noyes (2010), showed that singing in harmony is an interesting, motivating, and rewarding skill for children. It is a skill which should be sequentially developed by utilizing appropriate activities and materials. Two part-singing, as used by Chris Moore (2013), showed that the voices adjust and balance with each other, and the advantages of singing in two parts can hardly be overestimated. Furthermore, Casarow (2016) explained that the path to harmony must first be paved with a clear unison sound. Beginning with a simple rhythmic *ostinato* and moving towards *melodic ostinati*.

### **Framework and Methodology**

The concepts presented in this study were guided by the principles of Orff, Campbell, and Scott-Kassner. They believed in the sequential methods of teaching wherein students were expected to master a specific skill before proceeding to the next. Combining Orff's approach of allowing the learners to use various activities while learning rhythm patterns, applying imitation strategies during part-singing was believed to be an effective strategy which leads to better sight-reading skills.

Carl Orff specified that rhythm is considered the foundation of music-making, with acknowledgment of the rhythm of spoken language as its source. Beginning experiences are designed to awaken the natural human rhythmic sense and to reinforce and use it as a primary component in expanding musical ability. Orff's starting point is rhythm. He believes it to be the basis of all music, even stronger than melody. (Walter, 1958) Rhythm was first introduced as growing out of speech patterns by using rhythmic accents of the spoken language. He treats language as being inseparable from music and movement. All of this was learned through experience rather than explanation because Orff believes insight into first-hand experience of life "develops, unaided, its first principles." (Pleasants, 1956)

After the speech patterns were enhanced, come after were bodily movements. Here, rhythmical formulas were interpreted by clapping, stamping, and dancing. These exercises were used to accompany single instrumental melodies, speech patterns, and songs. Walter (1959) states that melody was made to grow out of rhythm. It begins by using a range of only two notes.

Then, the researcher referred to Patricia Shehan Campbell and Carol Scott-Kassner (1995) who discussed part-singing. When children have developed the perceptual and productive skills that come with singing in tune, the next natural stage is to sing in harmony. In testing children's ability to sing in independent groups, songs with active melodies were sung simultaneously with a sustained pitch. Among the first attempts of singing in parts is the use of a repeated melodic pattern or *ostinato* to accompany the melody. *Ostinato* parts were created by examining the melody for its harmonic possibilities, and sampling on a pitched instrument one or two measure segments that go well harmonically with each measure of the song.

This research was guided by the strategic framework shown in Figure no. 1. The framework exhibits how melodic ostinato patterns were used as a strategy in teaching sight-reading to the elementary grade students. There were three strategies executed consecutively. As a preparatory activity, observations and interviews were conducted to determine the students' musical literacy specifically in reading and singing notes. Moreover, a diagnostic test was given as an initial assessment to identify student's weaknesses and strengths regarding the interpretation of musical concepts. Execution of the detailed learning-activities follow. At the end of every meeting, the researcher evaluated the skills of students to prove the effectiveness of the given strategies.

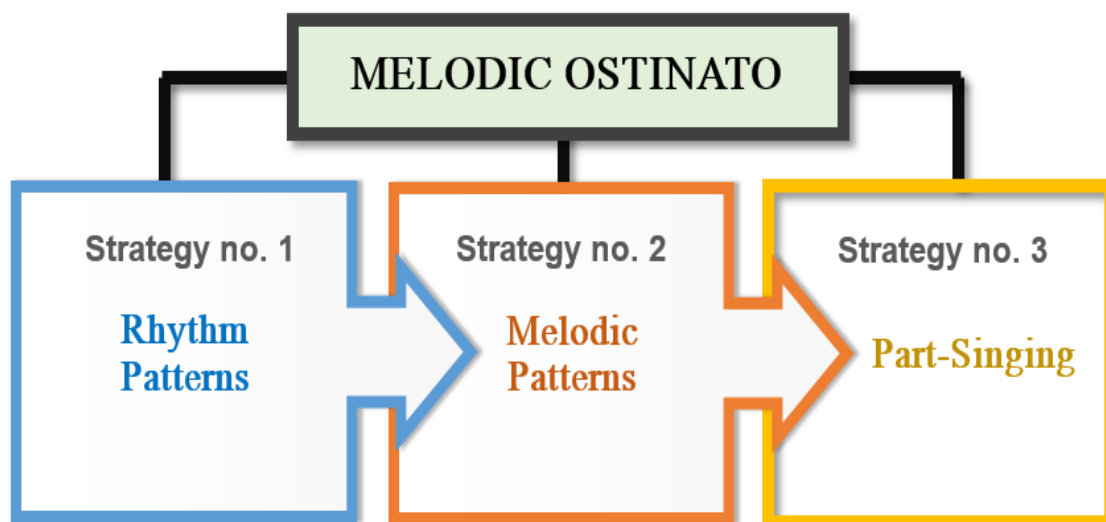


Figure No. 1: Strategy Framework in Teaching Sight Reading

In the first part of the process, the researcher builds up a sense of rhythm by introducing the four kinds of notes and rests. The second step was to learn how to read and clap the rhythm patterns with correct durations in 2/2 and 4/4-time signature. These rhythm patterns were repetitively studied until the students obtained mastery. It was a concept that will help develop students' sight-reading skills. In the next step, the short rhythm patterns formulated from the learned songs *Magtanim ay Di Biro* and *Magsayaw Magsaya* were introduced and executed through reading, chanting, clapping, and eventually involve body movements. By executing the rhythmic patterns repeatedly, the students get fast retention in the beats and accurate duration of each note and rest. This technique was significant for the grade six students who don't have a background in sight-reading.

The most efficient way to build up a sense of pitch accuracy is through singing. In the second part of the process, the students sang the notes of the C major scale and determined the intervals of one note to another using tonal movements. The tonal movements used were stepwise, skips and repetition. Then, the rhythm patterns from the previous strategy was notated melodically using the notes of the C Major scale. It was repeatedly sang using the sol-fa syllables. Motivating the students to learn was a vital part in learning. Therefore, to be proficient in singing the melodic patterns, games like the question and answer game, and guessing the tune by pairs were incorporated. The goal of this strategy was to create a fun environment while learning.

After pitch retention was acquired, the notated patterns sang with sol-fa syllables were incorporated with words and lyrics. Words used in the exercises were composed of the lyrics of the learned songs *Magtanim ay Di Biro* and *Magsayaw Magsaya*. The rhythm patterns and melodic patterns learned in strategy 1 and 2 were used as materials in part singing. These *melodic ostinato* patterns were in key of C major and consist of 8 measures for each set. Notes moved stepwise, skip wise and in repetitive manner. The intervals were ranging from unison, minor second (m2) up to perfect fifth (P5). From these patterns, the students were encouraged to create harmony through part-singing. While singing the melodic ostinato patterns concurrently with the main melody of the songs, harmonic lines were produced. And for a better

dynamics in the harmonization, it was reiterated to sing the *melodic ostinato* softer than the main melody of the song.

The study was implemented to twenty-three (23) sixth-grade students of Escuela de Gratia Plena, in the third quarter of the school year 2016-2017. It is a private educational institution located at Sta. Cruz Marinduque, Philippines. It covered nine (9) meetings during the third grading period of the school year 2016-2017. New materials, nine (9) learning plans for forty-five (45) minutes class, and assessment tools were incorporated. At the end of each strategy, the teacher evaluated each of the students' performance in class. It was in the form of individual and small group assessment. For individual tests, students sight-read the given *melodic ostinato* patterns using sol-fa syllables and with words/lyrics. In group test, they were evaluated according to their performance in part singing. The teacher based the assessments in the given rubrics (see Figure no. 2) which contain specific criteria to evaluate the skills of students in sight-reading new sets of rhythmic and melodic patterns.

Skills Test in Music Escuela de Gratia Plena Inc. School Year 2016-2017					
Skills Tests No. 3: Melodic Ostinato					Date: _____
CRITERIA	Sing the melodic patterns with accurate pitch	Sing the melodic patterns with accurate rhythm	Keep a steady beat while singing the melodic ostinato patterns	Pronounce fluently the words of the melodic ostinato patterns	TOTAL
1. Student A					
2.					
3.					
4.					
5.					
6.					

Manner of Grading  
5 : Excellent 4 : Very Good 3 : Good 2 : Fair

Figure No. 2: Rubrics of Skills Test no. 3

### Assessment Results and Findings

#### Skills Tests

The researcher's reflection during the study offered some interesting findings. In Skills Test no. 1 the student's ability in reading and clapping sets of rhythmic patterns were measured. First, it was observed that few students can hardly identify the names, symbols, and values of notes and rests. Second, the student's efficiency in recognizing individual notes was observed, subsequently repetitive drills of the patterns. They began to interpret the rhythm patterns independently towards the end of the lesson. Results of the skills test show that students who hardly identified the value and symbols of notes and rests, spent more time in interpreting the rhythmic patterns than

those students who can recognize the symbols by first sight. Students who interpreted rhythmic notations independently became enthusiastic about the new way of learning, and so they were eager to learn more pieces of music.

There were some technical issues observed as the singing of melodic patterns began. The initial observation during this strategy showed that singing with a starting tone given by a human voice was more effective than referring to a musical instrument. At the beginning of the process, some students had difficulty in singing the correct pitch of the notes. Moreover, the researcher also noticed that most of the students tend to be out of tune while singing intervals of P4 (C to F) and M6 (C to A). These patterns were repeated in a slow and fast tempo until the retention of a single pitch appeared to be independent. Notes F and A were also stressed to articulate the correct musical phrase. As a result of Skills Test no.2, 75% of the total number of students sang confidently the given melodic notations. Students performed the patterns without relying on their teacher and the keyboard. To reinforce learning specifically the correct pitch of each note, students were advised to exercise singing at home since mastery of these skills require time and continuous practice. It was a good starting point for the students to strive more as it was their first time to do this kind of activity. It is hoped that later on they will be able to sight-read a larger piece of music.

In the next strategy, it was observed that few students took time to process the correct execution of the melodic ostinato patterns. Along with recognizing the musical symbols and the correct rhythmic patterns, students also needed to execute them at a given pace. At the beginning of the process, they thought singing notes was easy, but considering all the elements to be followed, they realized that it was challenging. The contextual and expressional aspects created in the process of learning further challenges the students to perform independently. The repetitive interpretation of the rhythmic and melodic patterns in the first two strategies were essential in learning how to execute the melodic ostinato patterns by sight. During their skills tests, they were able to sing repeated melodic patterns with correct pitch, rhythm and proper voice projection using sol-fa syllables even if it wasn't free of errors. It was noted that the key to retention of a skill in sight-reading is the relentless correct repetition of it.

In Skills Test no. 4 (see Figure no. 3), it was observed that the student's ability in sight-reading the *melodic ostinato* patterns with words/lyrics became faster and more precise. Although there was a tendency for an overly projected voices, students were reminded to modulate it into soft singing. Part of the process was to understand the production of a good quality of voices. Another important thing to emphasize on was their improved pronunciation of words. Through these simple patterns, the students appreciated singing and gained interest in reading more musical notations.

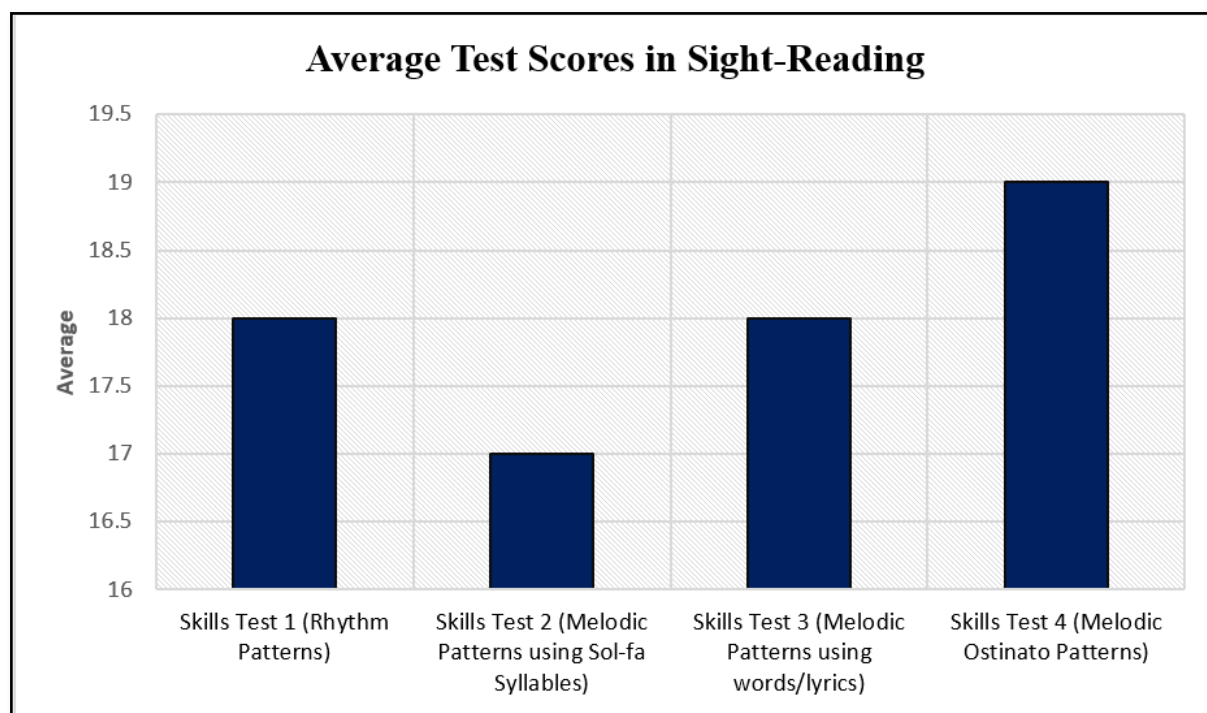


Figure No. 3: Average Test Scores in Sight-reading

#### Performance Based Test

Through the step by step process using the *melodic ostinato* patterns in boosting the students' sight-reading skills, it necessarily connects their reading ability with their performance ability. During their performance-based tests, students were challenged to perform the songs in two part-singing. They were assigned into two groups to sing the main melody of the song simultaneously with the *melodic ostinato* patterns. Creating harmony through part singing became easy for the students since they went through the sequential process of learning. Their dynamics were well-balanced for everyone to hear the harmony of the piece.

The results of the skills tests and performance-based tests are detailed in Figure No. 4. The average of the combined tests (see Figure no. 5) were measured based on the performance indicator as shown in figure no. 6. Findings showed that six (6) students or 26% of the total class population obtained an excellent performance. Eleven (11) out of 23 students, which is 48% of the total class population, achieved a very good performance. Four (4) students or 17% got a good performance while only two (2) or 9% obtained a fair performance. In general, the results of performance-based tests reflect the time and effort of the students in learning how to read notes accurately by sight.



NAME OF STUDENTS	SKILLS TEST				TOTAL 40%	CULMINATING ACTIVITY		TOTAL 60%	GRAND TOTAL 100%
	ST 1.0	ST 2.0	ST 3.0	ST 4.0		CA 1.0	CA 2.0		
Student No. 1	17	16	14	15	31	23	22	54	85
Student No. 2	20	19	18	19	38	25	24	58.8	96.8
Student No. 3	18	16	19	19	36	23	22	54	90
Student No. 4	19	18	18	18	36.5	25	24	58.8	95.3
Student No. 5	18	19	18	19	37	23	22	54	91
Student No. 6	20	19	19	19	38.5	25	24	58.8	97.3
Student No. 7	18	19	19	18	37	23	22	54	91
Student No. 8	17	16	14	14	30.5	23	22	54	84.5
Student No. 9	18	18	19	18	36.5	23	22	54	90.5
Student No. 10	18	18	19	18	36.5	23	22	54	90.5
Student No. 11	19	18	19	18	37	25	24	58.8	95.8
Student No. 12	17	16	18	18	34.5	23	22	54	88.5
Student No. 13	17	19	18	18	36	23	22	54	90
Student No. 14	18	16	18	18	35	23	22	54	89
Student No. 15	17	19	18	19	36.5	23	22	54	90.5
Student No. 16	20	18	19	19	38	25	24	58.8	96.8
Student No. 17	19	16	18	18	35.5	25	24	58.8	94.3
Student No. 18	20	18	19	20	38.5	25	24	58.8	97.3
Student No. 19	20	18	19	19	38	25	24	58.8	96.8
Student No. 21	19	18	18	18	36.5	25	24	58.8	95.3
Student No. 21	20	18	17	18	36.5	25	24	58.8	95.3
Student No. 22	19	18	18	18	36.5	25	24	58.8	95.3
Student No. 23	19	18	18	18	36.5	25	24	58.8	95.3

**Legend:** CA- Culminating Activity  
 ST- Skills Test  
 ST 1.0 & ST 2.0 - Group Test  
 ST 3.0 & ST 4.0 - Individual Test

Figure no. 4: Results of the Skills Tests and Performance-Based Tests

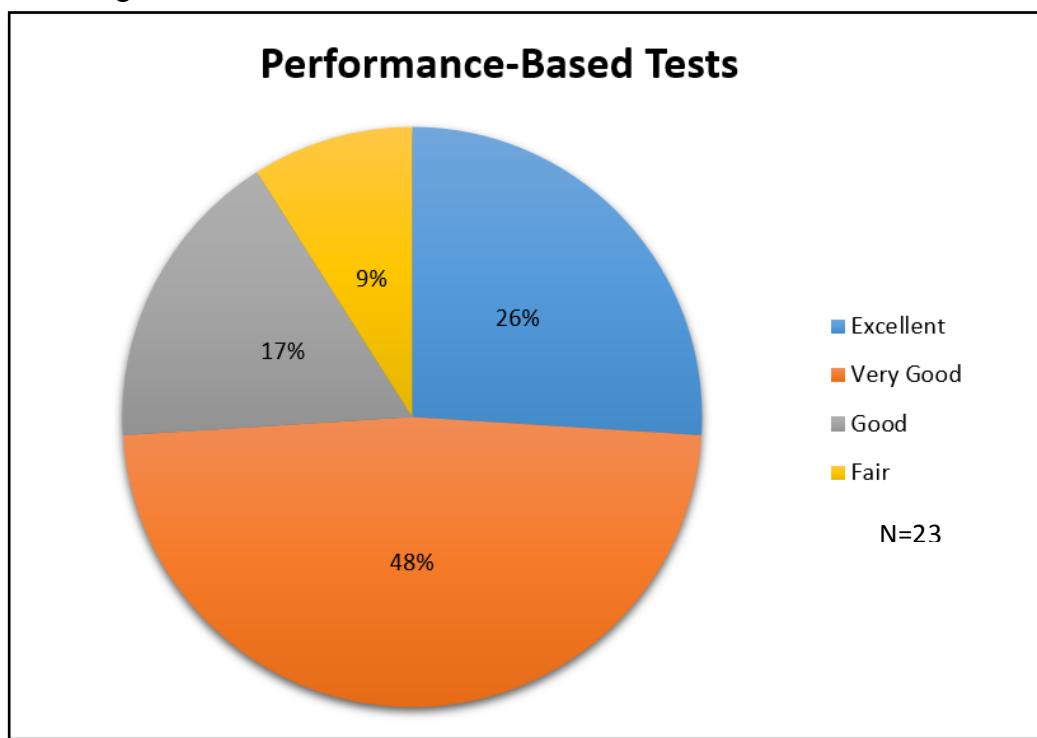


Figure No. 5: Results of the Performance-Based Tests

RATING	EQUIVALENT
96- 100 %	EXCELLENT
91-95 %	VERY GOOD
86-90 %	GOOD
80-85%	FAIR
75-79 %	NEEDS IMPROVEMENT
70-74%	FAILED

Figure No. 6: Performance Indicator

### Students' Reflection

Students showed their appreciation as they answered a short reflection paper. They recognized that the process of learning was engaging and fun. According to them, *melodic ostinato* helped them to recall the pitch and rhythm of the notes. One student mentioned that at first, it was hard for her to hit the right notes, but upon the repetitive practice using *melodic ostinato patterns*, she became skillful in singing notes with correct pitch. Another student regarded part-singing as a challenge but the sequential process of using melodic ostinato patterns improved their way of learning. Most students also expressed their desire to have more similar activities in the remaining quarter.

### Music Teacher's Remarks

As a remark from the school music teacher, he found *melodic ostinato* as an effective strategy to improve further his teaching skills in note-reading. According to him, the demonstration teaching was an eye-opener to teachers who are hesitant to teach music because they lack the skills needed to interpret musical notations. Upon using the same strategy in his music classes in the succeeding quarter, results showed a more meaningful process of learning. His music classes became more engaging and interactive. He started to maximize the utilization of the anchor charts posted in the classroom. The listening materials he used became more suitable for the students' age and level.

### Conclusion

There are three main strengths of the study. First, it has allowed the interactions of the students in the process of learning how to sight-read. To sight-read music successfully, students learned how to read and clap rhythm patterns, sing the correct pitch the notes with different tonal movements, and execute simultaneously sets of rhythmic and melodic patterns using sol-fa syllables and words. Students also paid attention to the other musical symbols written in the score. These are elements that comprised the overall structure of the music like time signature, tempo, dynamic marks, and phrasing. Being able to sight-read, students became open to explore new things like part-singing. Students had the opportunity to express themselves and appreciate singing while creating two-part voices. The results of the study coincide

with Orff's description that students further develop their music literacy with continuous note reading and singing.

Secondly, this study is socially valuable that it aids the problem of Escuela de Gratia Plena in the interpretation of musical concepts, particularly in sight-reading. To better understand a concept, it should pass through our senses first. This study allowed the students to develop their ability to sing at their own speed—it takes time, experience, and progression. The students who have less experience in this skill application proved that *melodic ostinato* is an effective strategy in developing their musical literacy.

Lastly, this research served as a helpful strategy for the school who doesn't have a trained music teacher. It helped Escuela de Gratia Plena to implement the application and interpretation of musical concepts in their curriculum. This study motivated Mr. Pineda to improve his teaching practices using a more interactive classroom strategy learned in this demonstration teaching.

In general, this research proved that the use of *melodic ostinato patterns* is effective in boosting the sight reading skills of students. The key to retention of correct pitch and note duration is the relentless correct repetition of the patterns. Through *melodic ostinato* patterns, the students acquired a deep understanding of the musical concepts and notations that they are singing. Now, students can better create and understand the character of simultaneously sounding pitches, its meaning, relationships, and usage in the musical piece.

### **Acknowledgment**

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***PS2CLH: A Learning Factor Model for Enhancing Students' Ability to Control Their Achievement***

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**Abstract**

Numerous factors that influence students' academic performance involve issues beyond the individuals' control, such as national policies, government initiatives and university resources among many others. Even if students are aware of these factors, addressing them may be unfeasible. Identifying causes within students' control could both improve students' understanding of these factors as well as enabling students to independently deal with related issues. This paper proposes a student-controllable learning factor model that combines the perspectives of Psychology, Self-responsibility, Sociology, Communication, Learning and Health & wellbeing (PS2CLH). The proposed model used qualitative methods to identify underlying aspects affecting academic achievement and selected controllable factors. This research reports on the outcomes of the employment of the PS2CLH model to predict student performance. Initially, data is collected through a self-evaluative web-based questionnaire. Each student's past performance and factors affecting this are then quantified. This study reveals the impact of students' controllable factors on student achievement. The model test results indicated 94% accuracy of successful prediction of the student performance based on the proposed PS2CLH model. The importance of "establishing and achieving personal goals" was higher than "stress", "learning room" and "grammar and vocabulary" among other factors. This research raised participant students' awareness of PS2CLH perspectives, which helped them manage factors affecting academic performance more effectively. Consequently, most of the students have enhanced their academic performance by addressing these critical factors. However, due to the limitations of the current sample data, the PS2CLH model will be further monitored for various applications.

Keywords: Students performance, learning factors, grade prediction

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## Introduction

Studying the factors influencing a student's academic performance has been a matter of research for decades. Consequently, there is an overwhelming number of studies in this field. Among them, four researchers have presented the most influential work. Firstly, Professor John Hattie, one of the world's leading education researchers in this field. His ongoing research work Visible Learning focuses on the evaluation of learning and teaching techniques, models of measurement and performance indicators (Hattie, 2009). In 2018, Hattie's Visible Learning research synthesised findings from 1500 meta-analyses of 90,000 studies (Hattie, 2018). Secondly, Rossi and Montgomery's model focuses mainly on societal student's context, which points to two distinct scenarios. Firstly, the community environment and home quality, secondly the quality of the school such as the classroom conditions, curriculum and student's incentives (Akama, 2017). Thirdly, a research group led by Dunlosky from Kent State University in 2013 presented ten years of literature indicating the possible enhancement of student accomplishment in different conditions (Ericsson & Pool, 2016). Lastly, the "Chemers, Hu, and Garcia's model" is a longitudinal study developed by Martin M. Chemers, Li-tze Hu, and Ben F. Garcia at the University of California. They inspected the effects of optimism and academic self-efficacy on students' achievement, commitment to continuing in school, health and stress. Chemers et al. (2001)

These studies show that there is a broad range of research highlighting numerous learning factors affecting students' achievement. Among them, there are many factors outside of students' control, even though they are aware of those factors, they may not be able to address issues associated with factors on their own. For instance, students cannot choose the place where they are born, and they may not be able to change other people's decisions. However, students can control learning factors such as their attitude, psychology, behaviour, self-responsibility skills and most of the cases their physical health. Furthermore, students have the responsibility for their communication and how they want to study and learn. There is a gap in the literature exploring and associating these different perspectives from students' controllable factors (Akama, 2017).

This paper proposes a student-controllable learning factor model that combines the perspectives of Psychology, Self-responsibility, Sociology, Communication, Learning and Health & wellbeing (PS2CLH). The proposed model used qualitative methods to identify underlying aspects affecting academic achievement and selected controllable factors.

Then, data is collected through a self-evaluative web-based questionnaire. Each student's past performance and factors affecting this are then quantified. This study reveals the impact of students' controllable factors on student achievement. The focus of the hypothesised PS2CLH model is on factors which students can control so that students could be aware of how such factors influence their achievements and then take actions to address these issues independently or being taught via mentorship programs.



## Proposed PS2CLH'S model

PS2CLH's model is a student-controllable learning factor model for enhancing students' ability to control their performance, which combines the perspectives of Psychology, Self-responsibility, Sociology, Communication, Learning and Health & wellbeing. This research acknowledges the existence of other perspectives, however, the proposed model excludes them for the absence of a scientific study showing the correlation between those perspectives with student's academic performance, such as the religion, spirituality, positive thinking, law of attraction and so on.

The proposed PS2CLH' model, is the big umbrella abstract concept of the PS2CLH's perspectives. Knowing that each perspective has a large spectrum of learning factors affecting students' performance, the application of the model will be adapted to each Country or University's reality. Selecting for each perspective only the most influence learning factors, since each University has their own challenges.

The proposed PS2CLH model was inspired by the area of child development and early learning (Landry, 2014). This field develops children's critical skills through interactive play in a safe and engaging environment. The domains of child development and early learning are categorical organized by: cognitive development; general learning competencies; socioemotional development; and physical development and health [8] (Allen et al., 2015). The categorisation of child development and early learning stems from a variety of sources.

Therefore, there is not a single best categorical organisation. Indeed, it is essential to recognise that the perspectives shown in PS2CLH Fig. 1 are not easily separable. For instance, general cognitive processes also relate to learning competencies, such as persistence and engagement (Allen et al., 2015). Nevertheless, PS2CLH identify the main factors affecting students' achievement, which are on students' daily life control, and recognise that they are interactive and mutually reinforcing rather than hierarchical (Allen et al., 2015). For future students' representation, the diagram merges six perspectives into three pairs.

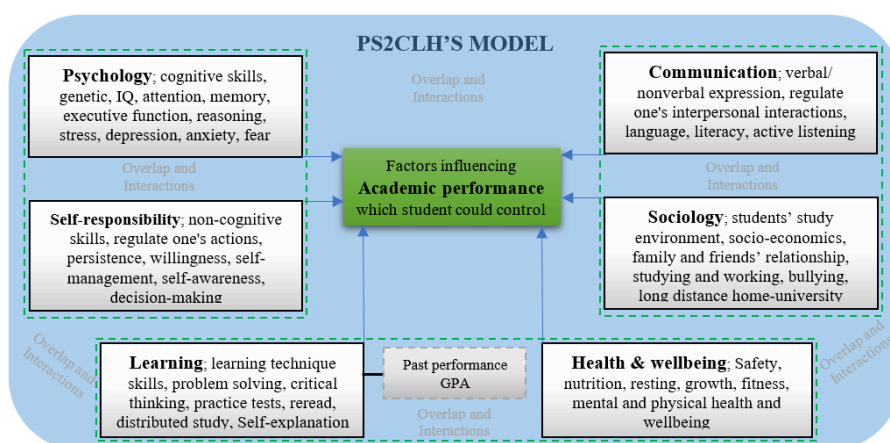


Figure 1: Diagram PS2CLH's perspectives

The "P" on PS2CLH stands for Psychology and "S" for Self-responsibility. These two perspectives relate in terms of internal skills where Psychology represents cognitive skills and Self-responsibility non-cognitive skills. Both perspectives deal with

students' internal state where one's mind and the other perspective is related to willingness. Therefore, they are selected because it is directly related to student performance, and most of the factors affecting students' performance are in the students' control.

Likewise, the diagram presents Sociology "S" and Communication "C", where Social perspective covers the following elements social-interaction, family and friends' relationship and study environment. Communication is essential for human interaction, allowing to express their thoughts and understand others. Excellent communication is vital during the learning process and seems that it could be in the students' control.

The "L" means learning and "H" Health & wellbeing, to a large extent the mental and physical health and wellbeing elements, is reflected in the diagram, and it is the students' control to apply better learning technics and take care of their health & wellbeing. These perspectives direct affect students' performances. There is below, scientific literature to support the proposed PS2CLH's perspectives on the hypothesised model.

### **A. Psychology and Self-responsibility**

According to Cambridge dictionary, Psychology can be defined as logical investigation in which the human behaviour is drifted due to the way the human mind works (Cambridge University Press, 2019). This perspective is important since, students' psychology has a direct impact on their performance. Hattie's list of factors that affect students' academic performance, presents a wide range of studies supporting the idea that psychological learning disabilities, such as autism, dyslexia, ADHD and so on, negatively affect learners' academic performance. On the other hand, considerable research proves that psychological interventions for students with learning needs have a high impact on their achievement.

Self-Responsibility – it can be defined as being capable to acknowledge your own emotional clashes without blaming or projecting upon someone else. The lack or not of this characteristic determines behaviours (Ascensionglossary, 2019). Self-responsibility skills specify behaviours, strategies and attitudes which are thought to underpin victory in life, such as resilience, beliefs, and self-control. The term self-responsibility is associated with non-cognitive skills since it is related to "personal choice and learners' willingness", contrary to genetic or cognitive skill. The concept of 'non-cognitive skill was coined by Bowles and Gintis (Bowles & Gintis, 1976) to emphasise the factors instead of those measured by cognitive test scores. Bowles and Gintis bring to light the role of perseverance, motivation and attitudes instead of academic skills and IQ, as factors contributing to accomplishment. Some studies reinforced their results, confirming the vital role of non-cognitive skills such as student's attitudes, determination and commitment over and above cognitive skill in influencing social behaviour, and students' results and health (Bowles & Gintis, 1976).

The well-known scientist, Michio Kaku, describes the importance of non-cognitive skill. He said that when they look at all the different theories about what makes a successful person. They realise that almost all the theories are wrong because it has

been verified, for instance, that high IQ does not determine the outcome or a person's success (Kaku, 2018). He asked what the one psychological test that correlates with success in life is, and he found out that the marshmallows test predicts people's success. The marshmallow experiment created by Walter Mischel, who studied delay gratification in young children, emphasises self-control in human growth. The experience consisted of asking a child if he/she wanted a marshmallow at that moment or two marshmallows an hour from then, and the children that wanted a marshmallow immediately tended to be those who wanted shortcuts, those who did not want to put in the hard work (Mischel, 2015).

Resisting the marshmallow and the success of self-control generated studies such as "Grit" the power of passion and self-control developed by Angela Duckworth (Duckworth, 2017).

'Grit' and Self-control are some of the non-cognitive skills which have a strong correlation with students' performance. However, these skills seem to be more correlated with steady personality rather than soft skill (Lesli & Ingrid, 2013). On the other hand, interventions developed by Wilson in his book title "REDIRECT" (changing the stories we live), his interventions show long term positive outcomes for students (Wilson, 2013).

To summarise psychological and self-responsibility perspectives, the psychology perspective represents the students' internal state of the mind and behaviour and the self-responsibility is related to the student's decision. As presented below changing both perspectives will positively impact on the students' mind, behaviour and decisions, leading to a better performance. It is moving to the next views, an examination of sociology and communication perspectives.

## **B. Sociology and Communication**

Sociology is usually defined as a social science that studies the human interactions in societies and acknowledge the processes used to change or preserve their way of living (Faris, E.L, 2019). There is a strong correlation of students' academic results in secondary school with their academic activities, awareness of their adapting study's strategies, parent's guidance, family pay, parent's level of education, and so on. Students' social facet and their homes plays an important role on students' performance. The environment at school or the university, for instance, Laiqa et al. (2011, pp.16-707) support the notion that the school facilities affect the education process. Rossi and Montgomery's model also reinforces this idea where it focuses mainly on social student's context, which leads to two distinct scenarios. Firstly, the quality of the school climate and curriculum. Second, the quality of home & community environment Chemers et al. (2001, pp.55-64). Laiqa et al. (2011, pp.16-706) introduce an essential factor, which is the fact that the environment directly affects students' academic performance. Therefore, a home architecture is essential, the shape, colour, texture, scale, proportion and quality of illumination links to the quality of the environment. Those conditions impact on human and cultural behaviour. Although most of the researches focus is at the schools' level rather than the residence, they bring light to the fact that building conditions associated with personal comfort, which affects students' performance.

Lawson and Bacolod (Lawson, 2001) support this argument, declaring that the supply of essential services for instance, “the electricity in learning environment improves the concentration of teachers and students” Laiqa et al. (2011, pp. 16-709). Bearing in mind that people’s environment is dynamic and constructed out of family and social relations. Family structure has a direct impact on students’ achievement. Bankston and Caldas (1998, pp.715-723) research states that non-single-headed families are six times more likely to be wealthy than single-headed families. Consequently, students in the single-headed family’s environments will not only have to live without a father or mother figure but also with financial difficulties. Referencing Mulkey et al. (Mulkey et al, 1992, pp.48-65), family structure influences their school performance. Furthermore, Bankston and Caldas (1998, pp. 18-716), reinforce the idea that students’ family structure has its impact on educational success not only socioeconomic status.

Social relationships and Communication play an important role on students’ performance. Communication is a process by which messages or specific information is led from a precise spot or individual to another, or the message itself. Likewise, communication can be a trade of information and the manifestation of feeling that culminate in understanding (Cambridge University Press, 2019). According to Noble (Noble et al, 2006), Social communication skills also play an essential role in students’ achievement. Therefore, it creates significant upheaval for some students, due to inconsistency between the languages at home and on campus. It created a double-awareness on the process of adapting to a different language environment. On the other hand, according to Abdullah (Abdullah, 2005, pp.1-26) students with efficiency in English and excellent communication skills expand their achievement. Furthermore, William & Burden’s (1997) discovery that language in the classroom gives confidence among students to discuss, to use the new terminology to communicate and experiment different forms of conveying meanings as well as to deal with failures and successes.

In brief, the social perspective is related to the student’s external environment, and communication is the student’s perception of the bridge between external and internal dialogue. Improving students’ social relationships and their communication gives to students’ a sense of belonging, confidence to express thoughts and facilitate the learning process. Finally, moving on to learning and health & wellbeing perspectives.

### **C. Learning and Health & wellbeing**

Learning could be described as the transformative process of assimilate information after internalizing and blended with we have experienced before, bringing the need to assimilate the new content and expands our experience overall. This process of learning depends on three phases: input, process and reflection (Malamed, C, 2019). There is an outstanding monograph “Improving students’ learning with effective learning techniques”. Developed at Kent State University in 2013 a study, which presents ten years of literature indicating that they could enhance student accomplishment across a wide range of environments. That study focuses on practical learning techniques a research group led by Dunlosky (2013, pp. 4 –58).

Active learning strategies have been presenting positive results in students’ academic performance. Ericsson is considerate to be the research leader of what makes people

great in what they do. He coined the term “expertise”, inspired the 10.000 hours rule and created the deliberate practice. For 30 years deliberate practice is a powerful method to help children to develop expertise on practical learning. On his recent book, “PEAK” Ericsson calls attention to purposeful practice, divided into four components of purposeful practice. 1. Having a clear goal, 2. Intense Focus, 3. Immediate feedback and 4. Get out of their comfort zone (Ericsson & Pool, 2016).

Wellbeing is characterized as a decent or agreeable state of existence, as well as a state portrayed by happiness, satisfaction, safety and success. (Dictionary.com, 2019). Health & wellbeing is the other perspective that has a significant impact on students’ performance. According to academic Singh, there is a correlation between physical activity and scores on various subjects. Ms. Singh argues “There are, first, physiological explanations, like more blood flow, and so more oxygen to the brain. Being physically active means that there are more hormones produced like endorphins. Also, endorphins make the stress level lower and improve the mood, which means better performance” (Singh, 2012). Likewise, students involved in organised sports are more focused on the classroom. However, differences among the observational studies lead Ms. Singh to declare that it is not possible to establish the correlation between the amount or kind of activity and the level of academic enhancement (Singh, 2012).

In a nutshell, improving learning and health & wellbeing perspective are crucial to rise students’ performances, these areas represent the student’s strategy and action toward education.

### **Testing the proposed PS2CLH’s perspectives: Angolan context**

Angola is a developing Southern African country, which obtained independence in 1975, then lived in a state of civil war until 2002. The war left many psychological and social traumas which affected the Education System directly; as a result, in Angola, the level of students’ academic performance is at a considerably low level (UNICEF, 2011, pp 22). In the Country, no scientific studies are pointing on the relationship between factors affecting students’ achievement. Therefore, the variable’s selection reflects the common belief of what should be the factors that affect the most students’ performance. In addition, was taken into consideration the current Angolan reality. Also, the variables selected are self-evaluated variables, that do not need external test.

Data collection was carried out in Luanda capital of Angola, at ICT laboratory of “Universidade Católica de Angola”. Data is collected through a self-evaluative web-based questionnaire. Each student’s PS2CLH’s factors affecting their performance are then quantified using a 5 point Likert scale labelled as ‘strongly disagree’, ‘tend to disagree’, ‘Do not know’ ‘tend to agree’, ‘strongly agree’. Initially, the population sample number was around 500 students from different courses and years, after the clean-up process had around 432 students. The balanced partition split found between results and percentage for the available data was: 60% training, 20% testing and 20% validation. The test model uses the past performance grade point average GPA as the target variable where it is correlated with all other variables selected on the implementation of the PS2CLH model in Angola.

The students range ages was between 18 to 30 years old, both male and female, with a nationality of 98% Angolan, on degree program where the majority of the students was between their second and third years.

#### Perspectives of Angolan Context PS2CLH's variables

Perspectives	Angolan Context PS2CLH's variables
Psychology	Stress; Feel depressed; anxiety or fear; Disturbance of the mode of being; believe in witchery; low self-esteem; some unspecified psychological problems
Self-responsibility	Set priorities; Establish and achieve personal goals; Time management; Aim for excellence; Procrastination; Immediacy; Accept the change; hours study per day
Sociology	Studying and working; Bullying; Family income; Sensual images; Discouragement and negativity; Long distance; certain negative beliefs and habits; bad conditions of habitability; Lack of electricity; water or sanitation, Lack of public transport; hours play/distraction per day
Communication	Fluency in language; Understand the lecturer in the classroom; Understanding and interpretation of reading; Expressing yourself; Grammar and vocabulary; Stuttering or typology of disfluencies; learning prob which impact my communication
Learning	Preparation of a questionnaire; Highlighting and underlining; Practice tests; Reread; Distributed study; Self-explanation; Prepare summaries; Problem with calculus and mathematic; ADHD
Health & wellbeing	Regular physical activity and exercise; feel mentally healthy; plenty of energy during the study time; eating healthily; rest body and mind; sleep problems.

Table 1. Variables used in Angolan context

### Findings and discussion

Among numerous machine learning's models tested, the "RandomForest model", shown at the Appendix session 'Table 2', produced the best result. The prediction result presented by the model, based on proposed PS2CLH's perspectives was 94% of accuracy. Showing that the selected variables from proposed PS2CLH's model directly correlates with the target variable or the student's academic performance. The target variable was the students' past performance, grade point average (GPA). For more detail, find attached the predictor Importance variables at the Appendix session 'Figure 3'. Having "studying and working", one of the most significant predictor importance. Followed by the variables "the average hour students play/distractions per day", "Aim for excellence in everything you do", "Establish and achieve personal goals" and "Practice Tests" and so on. It explains the correlation on time students spend on distractions such as social network, spending hours with friends, and so on. The "Aim for excellence in everything you do" and "Establishing and achieving personal goals" variables also had a significant impact on the model. Dealing well with these last variables has proven to be game-changing for top students, what seems to be in harmony with the previous literature reviewed, such as the marshmallow factor or delay instant gratification and apply deliberate practice.

Students were divided into three groups, the first group 'No Participants' was approximately 50 students that did not fill the questionnaire, the second group was

‘Participants, No Interventions’, where these students filled the forms but did not receive any interventions, and the third group of students was about 50 students, they filled the questionnaire and had experts’ interventions (such as Piagetian programs) on their learning factors. The average score in standard deviations effect size, are shown below.

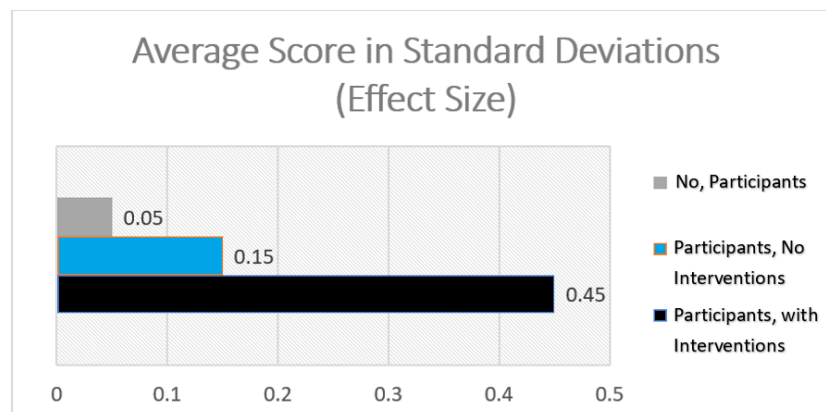


Figure 2: Shows the average score or GPA in standard deviations effect size

Due to lack of human resource, was selected 50 students from the initial 500 students, to work on their major problems presented in the model. At the end of the semester was found that it raised students’ awareness of PS2CLH perspectives, helped them manage factors affecting academic performance more effectively.

Consequently, most of the students have enhanced their academic performance by addressing these critical factors. Nevertheless, due to the limitations of the current sample data, the PS2CLH model will be further monitored for various applications.

### Conclusion and Future work

The proposed PS2CLH’s model presents the psychological perspective, which correlates with the student’s internal state of mind. Thus, the self-responsibility standpoint is related to a student’s daily decisions. Besides, the social perspective links with students’ lifestyle environment. Additionally, a communication standpoint associated with students’ perception and how they express themselves; communication could be seen as the bridge between external and internal dialogue. Finally, health & wellbeing and learning perspectives are related to the student’s studying strategy and action.

Accordingly, to the results, students raised awareness about PS2CLH’s perspectives from factors influencing students’ achievement and which are in their control, this helped them to control how much influence the factors have on them. It empowered the students, for instance, students start using a daily task to build new habits.

For future work, a representation of a student’s controllable factors can be built, starting by developing a student’s web-based questionnaire. Each question would have a weight and the sum of the questions’ value in specific coordinate value. Having, psychology & self-responsibility (coordinate/axes X), social & communication (axes Y), learning and health & wellbeing (axes Z). It results in

student representation on a point in three-dimensional space 3D. From a mentor's or university manager's point of view, it is essential to measure and to keep track of the student's performance alongside factors which affect their academic achievement, it will be possible to accomplish this intend using 3D student representation.

The PS2CLH's model scalability can be further improved by the development of a Social Network, where each student will have all the problems that most affect them on a personal profile with their own individual learning factors. Thus, each student will be able to independently and proactively work on those issues that affect their results the most.



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## Appendix

*We have applied the SMOTE function to balance the lack of positive values “1 = 65”, “0 = 367”. Then applied the “Random Forest” function to build the model*

*Having Created the model, we tested and validated, the accuracy was  $\approx 0.943\%$*

```

0    1
367  65
> TrainSet <- SMOTE(Astudent ~ ., TrainSet, perc.over = 500, perc.under=120)
> table(TrainSet$Astudent)
0    1
390  390
Call:
randomForest(formula = Astudent ~ ., data = TrainSet, importance = TRUE)
  Type of random forest: classification
    Number of trees: 500
No. of variables tried at each split: 8

  OOB estimate of error rate: 4.54%
Confusion matrix:
  0 1 class.error
0 370 20 0.05128205
1 31 359 0.07948718
Call:
randomForest(formula = Astudent ~ ., data = TrainSet, ntree = 500, mtry = 8, importance = TRUE)
  Type of random forest: classification
    Number of trees: 500
  No. of variables tried at each split: 8

OOB estimate of error rate: 4.92%
Confusion matrix:
  0 1 class.error
0 368 22 0.05641026
1 32 358 0.08205128
> table(predTrain, TrainSet$Astudent)

predTrain 0 1
          0 390 0
          1 0 390
> # Predicting on Validation set
> predValid <- predict(model1, ValidSet, type = "class")
> # Checking classification accuracy
> mean(predValid == ValidSet$Astudent)
[1] 0.9425926
> table(predValid, ValidSet$Astudent)

predValid 0 1
          0 94 2
          1 2 12

predict_unseen
          0 1
0 130 7

```

Table 2. Application of the Random Forest function

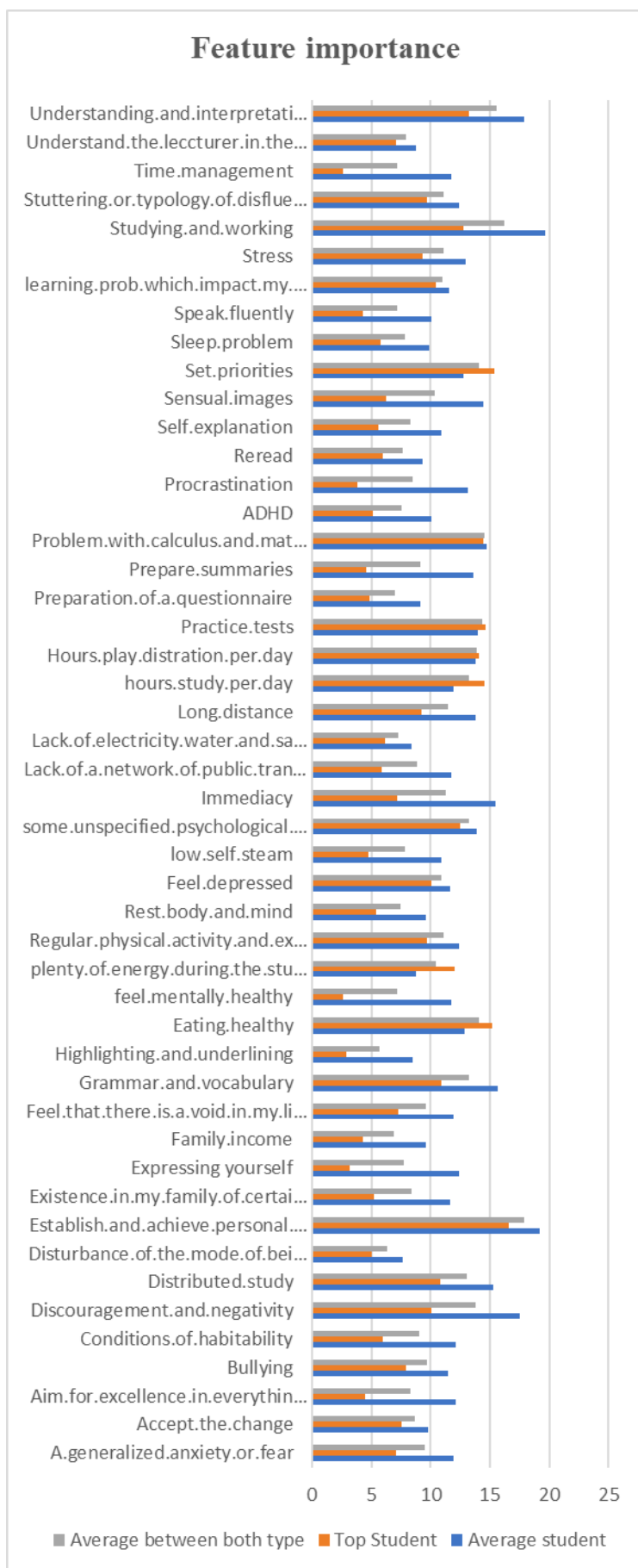


Figure 3: Feature importance Angolan context



***Give Swirl a Whirl: A Mixed-method Analysis on Swirl Approach to Teach Applied Statistics in a Biology Student Cohort***

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**Abstract**

To equip biology students with data literacy skills, this study investigates the utility of retooling the electronic programming tutorial system, Swirl, for teaching applied statistics in a cohort of biology students in a 2-phased study: Phase 1 involved administration of tutorial-based course, pretest-posttest assessment and preliminary survey, while Phase 2 involved post-hoc survey and learning style analysis. The base teaching material, in both Swirl and paper-based forms received positive content evaluation amongst students and improved students' learning outcomes with significant learning gains and large effect sizes. While there is no evidence of greater learning gains in Swirl against the paper version, it does offer better palatability through its interactive and integrated programmatic components. We see Swirl's key value in early immersion of students in a formal programmatic environment while learning applied statistical theory simultaneously, and believe that this is essential for efficiently bridging theory-practice gaps for aspiring bio-data scientists.

Keywords: biological science; data literacy; education; statistics; Swirl; technology-enhanced learning

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## Introduction

The 21st century marks the era of technological revolution in an increasingly knowledge-driven society. In biology, Big Data is responsible for fuelling the rise in high-throughput “-omics” studies (involving the large-scale analyses of all biological molecules found within a cell or tissue). Biological research has since become data-heavy and computationally-complex. There is a pressing need for biologists to acquire strong statistical thinking and computational literacy (Carey & Papin, 2018) – two skillsets undoubtedly critical for 21<sup>st</sup> century work-readiness (Makarevitch, Frechette, & Wiatros, 2015). Biologists often could not apply their theoretical statistical knowledge to real research problems (Gore, Kadam, Chavan, & Dhumale, 2012), a situation we term as “theory-practice” gap. The superficial, touch-and-go statistical and computational training that prevailed in most biology undergraduate curriculum creates an ever-widening gulf between what is learnt by students versus the practical demands required from research activities.

### 1.1. Overview of The Swirl Platform

To fulfil the twin criteria of delivering statistics and programming, we selected Swirl (Statistics with Interactive R Learning) as the study platform. Swirl is a free, open-source R package developed to teach R programming (Carchedi, 2014). R is a statistical computing language that is widely adopted by non-developer users. It is a powerful platform that offers wide range of data analysis and visualisation packages for customisation and application in different fields (Becker RA, 1988). These qualities provide R with a strong advantage over commercial statistical software such as SAS and SPSS (Muenchen, 2014).

Swirl is unique from other Massive Open Online Courses (MOOCs) such as DataCamp, Khan Academy, and Coursera in that it provides students direct user interaction within the native R programmatic environment and gives them freedom for further exploration. Swirl also acts as a virtual tutor that offers guided learning at one’s own pace. The interactive component comes as student responds to a series of instructional questions in Swirl and immediate feedback is given to either stimulate students’ response or correct students’ misconceptions.

Since the inception of Swirl in 2014 to till date, there were very few advanced statistics courses (Swirl, 2014). Moreover, despite being commended by online community as a great learning tool for data science and R, there was virtually no formal study to evaluate the effectiveness of Swirl as an educational instrument. This work served to provide empirical evidence on the use of Swirl as teaching platform for applied statistics in the context of adopting it as part of large scale, formal institutional teaching.

However, effective statistical education goes beyond just selecting a suitable instructional method. Subject matter difficulty such as the relatively abstract statistical concepts could present significant barriers in teaching and learning. For the instrument to be effective, it should also be designed with appropriate pedagogy that integrate both statistics and students’ academic discipline (Feser, Vasaly, & Herrera, 2013). The lack of personalised applied statistics within the biological science field



thereof calls for technical development of the course content based on a selected applied statistics theme.

## **1.2. Research Objectives**

The overall aim of the study was to evaluate the suitability of using Swirl as an educational platform to teach applied statistics for biology students. Given that the effectiveness of an educational platform is preconditioned on the content validity, our research objectives were framed in two parts:

- (1) *Content*: to design an effective introductory course to teach a selected theme of applied statistics for biology students, incorporating pedagogical elements as recommended in the literature
- (2) *Platform*: to evaluate the potential of Swirl as an instructional platform for teaching the same educational content developed in the first objective by comparing it to a Control medium (paper-based/PDF format).

## **2. Methodology**

The materials and methods were selected based on its feasibility to deliver the study's objectives within the time span of 17 weeks.

### **2.1. Preparation**

#### **Course Development**

Content analysis was first done to identify relevant themes in statistics for senior biology students. Out of the three themes shortlisted, the concept of False Discovery Rate (FDR) was chosen as the final teaching topic based on several considerations as exemplified in Figure 1.

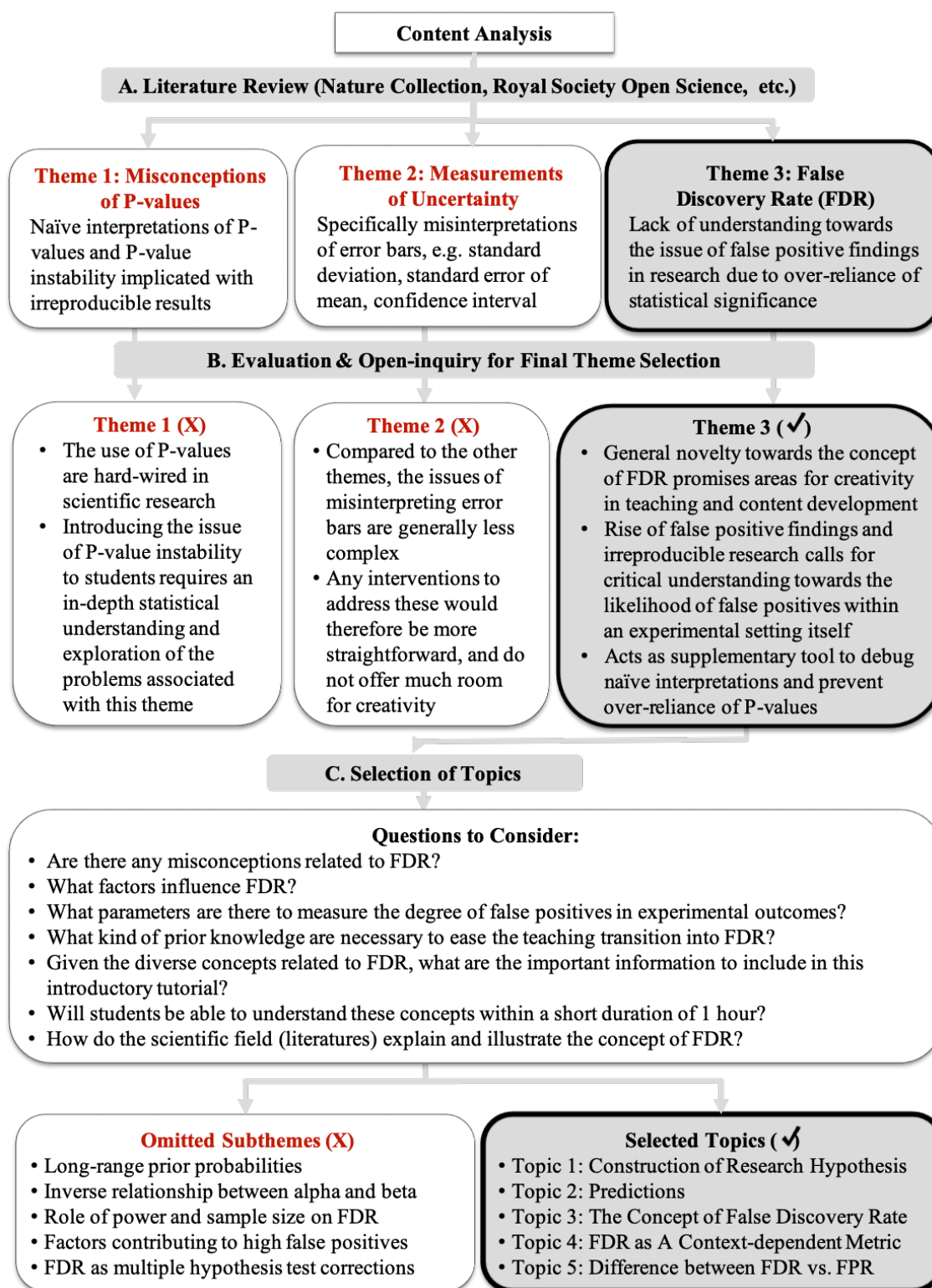


Figure 1: Content analysis performed over three major themes lasted a time span of three weeks, consisting of: (A) Literature review, (B) Evaluation of statistical themes, (C) Topics selection of the final theme

The course was developed by adopting blended mix of content-pedagogy-technology teaching strategies (D. S. Moore, 1997) and integrating statistics with biological field (Feser *et al.*, 2013). The pedagogical design of the educational instrument was guided following four content evaluation criteria (Figure 2A) and quality process frameworks (Figure 2B).

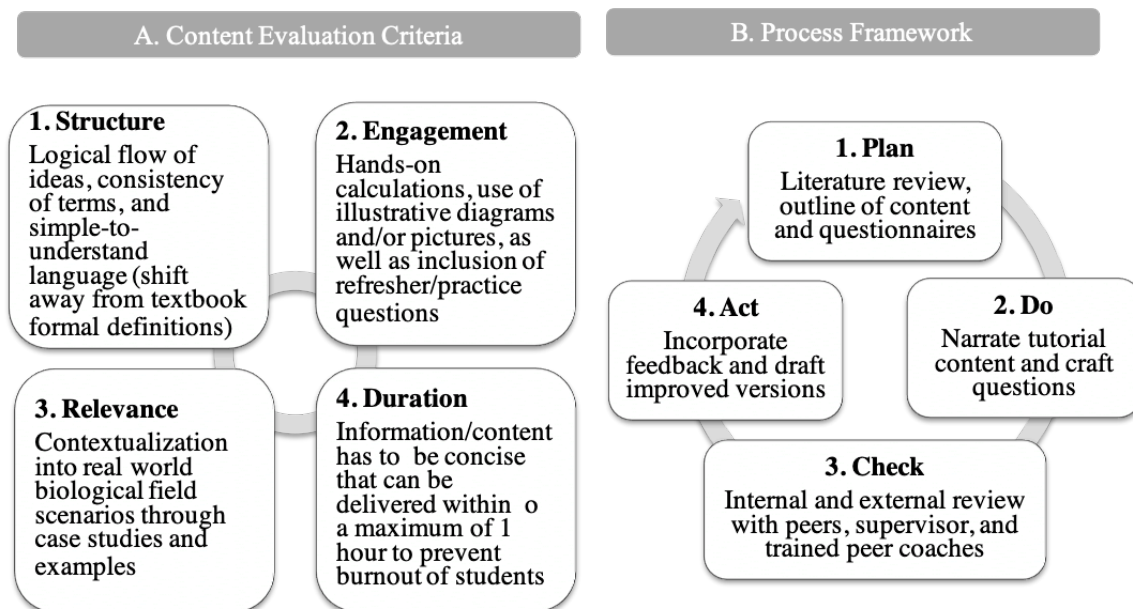


Figure 2: (A) Content evaluation criteria, (B) Process framework

The short course materialised in the form of a tutorial format, covering a total of five topics (Table 1).

Table 1. List of topics introduced in the tutorial

Topics	Content
Topic 1	Construction of Research Hypothesis
Topic 2	Predictions 2.1 Positive and Negative Predictions 2.2 False Predictions 2.3 True Predictions 2.4 Contingency Table
Topic 3	<b>The Concept of False Discovery Rate</b> 3.1 Mini-exercises
Topic 4	<b>FDR as A Context-dependent Metric</b> 4.1 Ratio of Positive to Negative Events 4.2 Summary of FDR Calculations
Topic 5	<b>Difference between FDR vs. FPR</b> 5.1 Practice Case Calculations 5.2 Summary of Key Concepts

For the Control tutorial, the content was organised into 10 sections and totalled to 13-page editable PDF document which enabled inputs of answers by students (Appendix A). The teaching material was designed by following the four evaluation criteria of the content (Figure 2A):

- (1) *Structure*: standard use of terminologies and simple-to-understand, stepwise explanations
- (2) *Engagement*: adoption of visual aids (e.g. pictorial diagrams, graph simulation) to foster conceptual understanding, as well as occasional summary pointers, practice questions and a guided case study to validate students' understanding
- (3) *Relevance*: the entire course was narrated based on an allergy screening scenario where students were simulated into the role of researcher investigating the screening results with the aim of identifying the false positive outcomes through the use of the false discovery rate metric
- (4) *Duration*: the entire course was trialled with the help of several student volunteers from the science discipline (not the study participants) and timed for completion within 1 hour

For the Swirl tutorial, the same teaching material was adapted into Swirl using the “swirlify” R package, (Swirl, 2014b), following the workflow as shown in Figure 3. This standardisation helped to minimise confounding factors such as user attitudes and behaviour towards the use of computer-assisted learning such that any observable differences could be more directly associated with the platform differences.

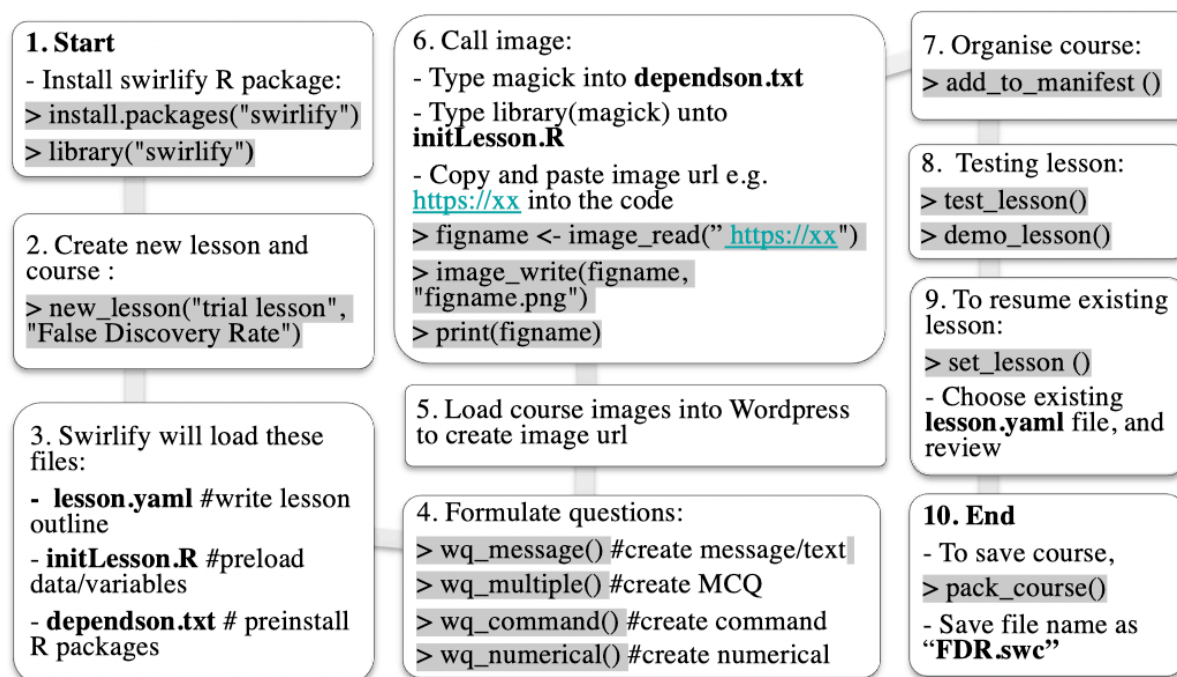


Figure 3: Process outline to develop the Swirl course on False Discovery Rate (FDR). Authoring of Swirl course was done through “swirlify” R package loaded into the R-studio (step 1). Swirlify would generate a series of files with each new course (step 2-3). The content from the control reference could be adapted into swirl course through the use of multiple question types, specifically message (for purely text description), multiple (for MCQ question), command and numerical questions were utilised for instrumentation. The course would then be organised into order (step 7) prior to trial and demo (step 8). Author of the course could exit and resume the development of course (step 9). Upon completion, the course was saved in “.swc” format which would then be ready for loading by user (step 10).

A sample of the Swirl tutorial along with its 10 characteristic elements is featured in Figures 4A and 4B below.

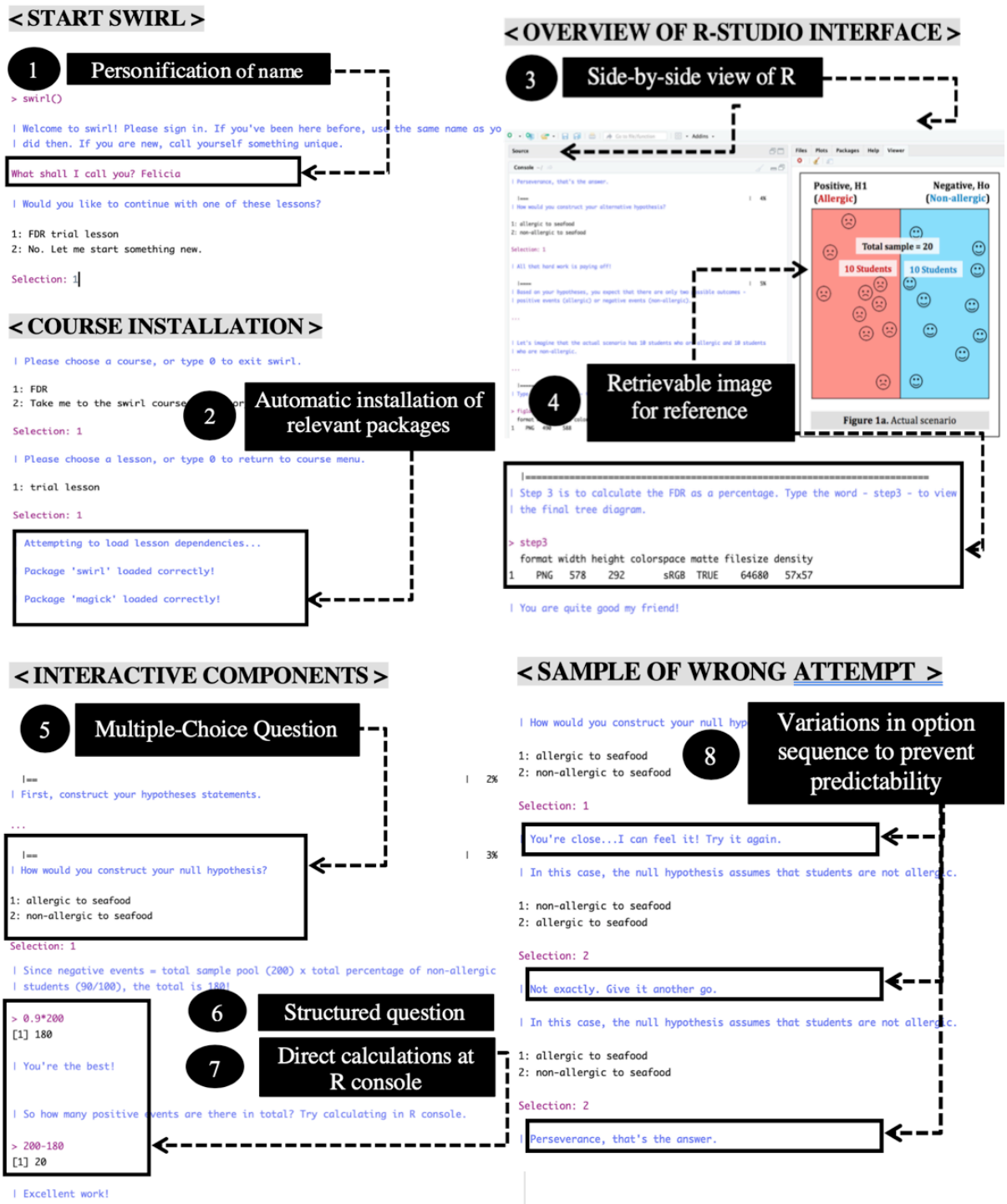


Figure 4A: Sample Swirl tutorial featuring starting interface, course installation, visual interface, interactive components and incorrect trial attempts

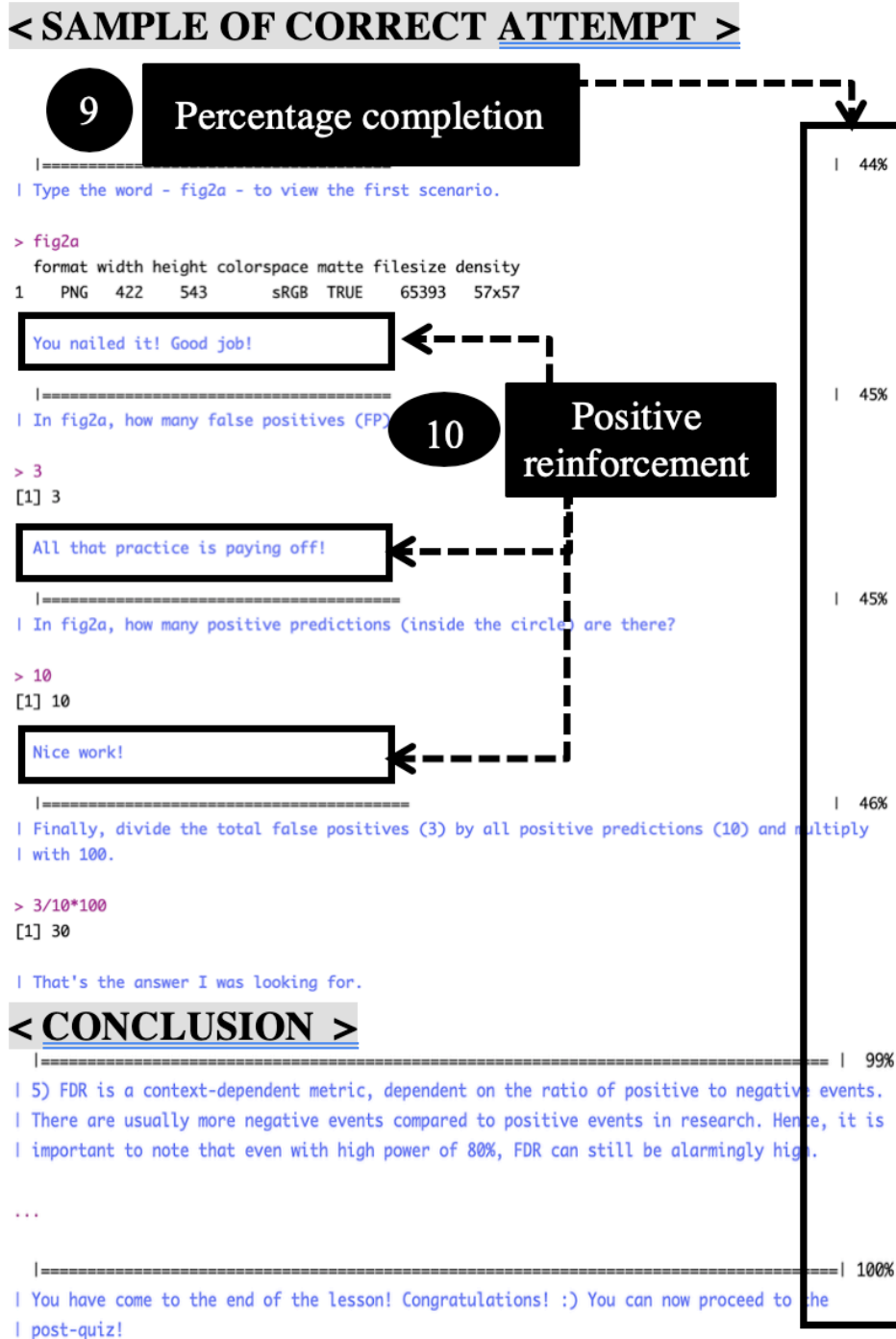


Figure 4B: Sample Swirl tutorial featuring correct trial attempts

## Test Questionnaires

Each pretest and posttest (Appendix B) consisted of five closed-ended, multiple-choice questions (MCQ). The tests were administered in Google Forms with pre-specified answer keys to facilitate quick scoring and data collection. Pretest questionnaires and MCQ options were designed in parallel with the posttest for evaluation of each learning objective (Appendix D, Table 2). The validity of questions and answers were reviewed against the learning objectives and by teaching faculty. The first topic relating to the construction of hypothesis test was not tested as students were assumed to have known this introductory concept.

## Survey Questionnaires

Preliminary survey items was administered immediately after the tutorial to gather students' first-hand responses towards the course quality. The post-hoc survey questionnaires were constructed to follow up on the preliminary survey responses, and consisted of 13 open-ended questions and a series of Likert-type questions which included three ranking questions and 26 short statements. The survey metrics (Appendix D, Table 3) were inspired from standardised frameworks used in evaluating technological-based instrument (Bowyer & Chambers, 2017). Both surveys (Appendix C) were adapted into Google Forms.

Index of Learning Style (Felder & Soloman, 1997) was used to evaluate students' learning styles (Felder & Silverman, 1988). There were four categories of learning dimensions: (1) active-reflective, (2) sensing-intuitive, (3) visual-verbal and (4) sequential-global.

## 2.2. Implementation

12 biology students enrolled in Nanyang Technological University's "BS3033 Data Science for Biologists" were recruited and assigned non-randomly into experimental and control groups based on common timeslot. Swirl group and Control group referred to students enrolled in Swirl tutorial and paper-based (PDF) tutorials respectively. This cohort made up of senior students who were trusted to have statistical foundations needed for proper assessment of the applied statistics course and had prior familiarity with Swirl courses to provide more holistic perspectives on the use of Swirl platform.

The project was administered in two phases (Figure 5) of one hour each: Phase 1 was conducted during the mid-semester break since most students would be free from classes, whereas Phase 2 was resumed two weeks after to allow time for data analysis of first phase results and preparation of the post-hoc survey. Students' attitudes and behaviours were observed to provide supplementary qualitative data. Researcher was available to answer respondents' queries, ensured full survey completion, and obtain informed consent from participants.



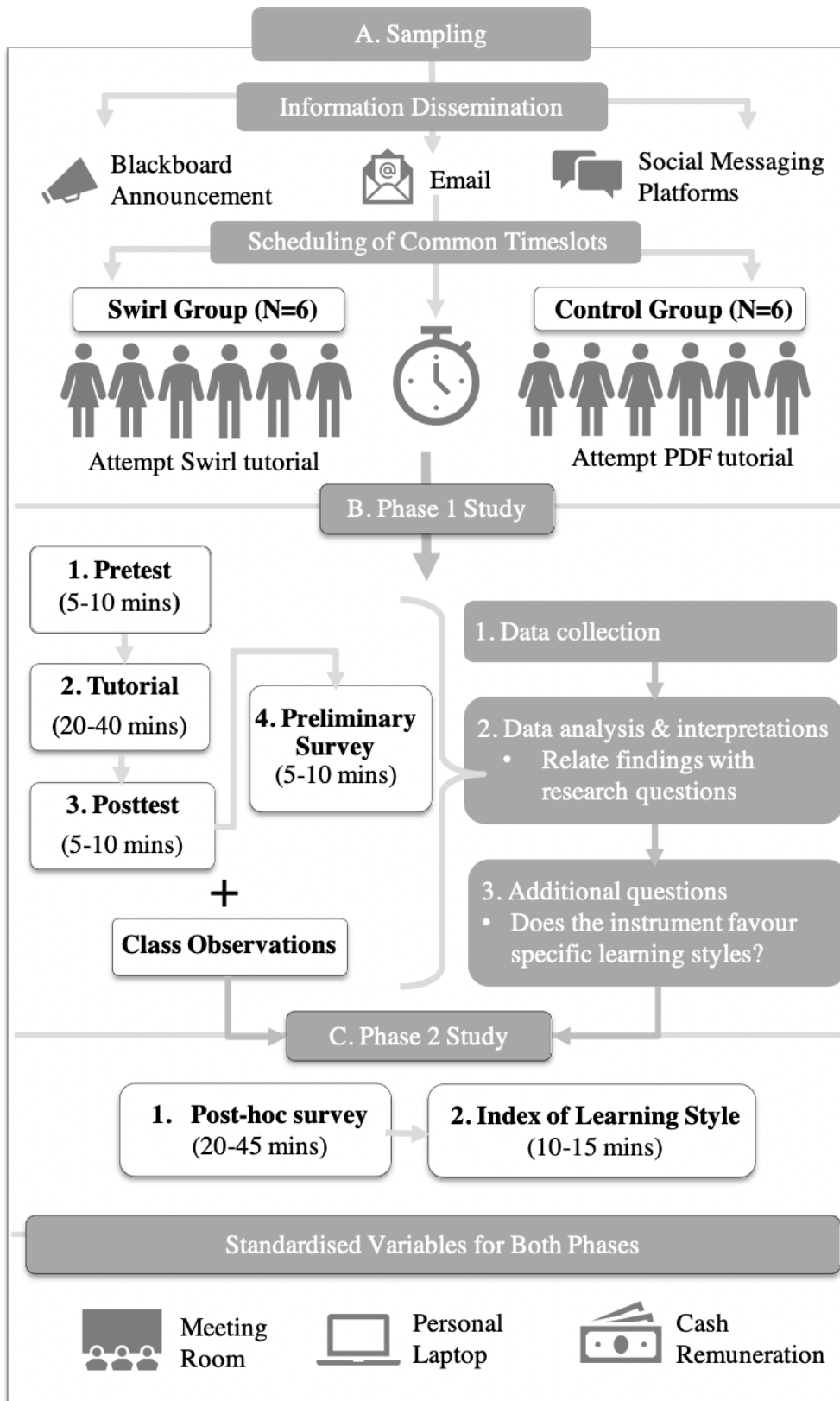


Figure 5: Process outline for the implementation stage of the study involves: (A) Sampling where information about recruitment was disseminated via three modes of communication channels, (B) Phase 1 of the study involved several tasks with approximal duration listed above; the findings were followed up in (C) Phase 2 of the study via the post-hoc and learning style surveys. External variables were controlled whenever possible

Students in Swirl group followed the instructions below to load the Swirl tutorial (Figure 6).

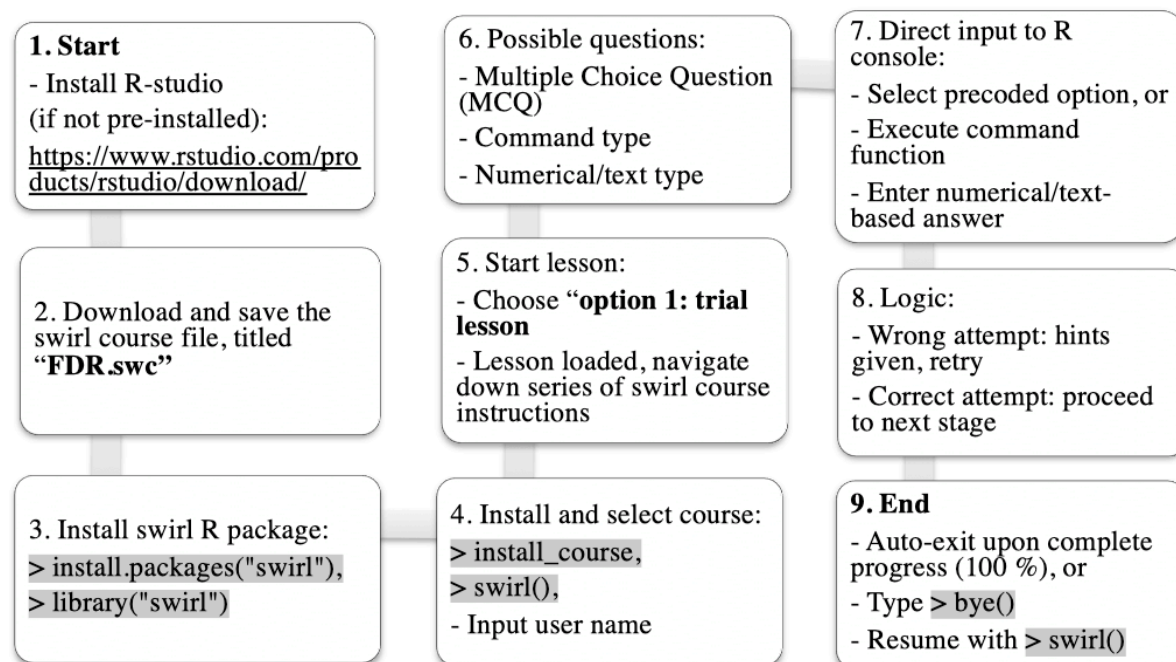


Figure 6: Process outline to install and navigate the instrument (swirl course on FDR) from a user (learner) perspective. Prerequisites for the Swirl course included installation of R-studio and swirl R package (step 1-3). The selected swirl course file (e.g. "FDR.swc") could then be loaded (step 4-5). Swirl course would direct users through a series of alternating instructional text and prompts students to answer each question. Throughout the course, users encountered different types of questions where they were required to either choose a pre-specified MCQ options, enter text command, or numerical value as answer all within the native R console (step 6-7). With each input of incorrect answer, feedback was given immediately in the form of precoded hint to prompt user to retry. With each input of correct answer, user would receive positive encouragement words which were pre-programmed in every swirl course (step 8). User could see the percentage completion with every progress made. Entire swirl course would require around 10-20 minutes, subject to individual's progress. User could choose to exit the course and resume later (step 9)

### 2.3. Evaluation

Mixed-method evaluation was adopted due to its holistic approach in providing insights by triangulation of both quantitative and qualitative data (Greene, Caracelli, & Graham, 1989), common in educational research.

Normalised learning gains (*nlg*) adapted from Hake's normalised gain (Hake, 1988) and Cohen's *d* effect size (Cohen, 1988) were used concurrently to evaluate the extent of learning gained from the intervention. Average *nlg* was computed by taking the mean of all *nlg* scores of students.

All scores were calculated in percentages and equations used were as follow:

$$\text{Learning gains } (lg) = \text{Posttest scores} - \text{Pretest scores} \quad (1)$$

$$\text{Normalised learning gains } (nlg) = \frac{\text{Learning gains in Equation 1}}{\text{Maximum scores} - \text{Pretest scores}} \quad (2)$$

$$\text{Effect size } (d) = \frac{(\text{Average of X}) - (\text{Average of Y})}{\text{Pooled Standard Deviation (SD)}} \quad (3)^{\#}$$

$$\text{Pooled SD} = \frac{\sqrt{(\text{SD of X} + \text{SD of Y})}}{2} \quad (4)^{\#}$$

<sup>#</sup>For equations (3) and (4), ‘X’ denotes posttest scores and ‘Y’ denotes pretest scores in the calculation of within-group differences in terms of pretest-posttest scores. For calculation of between-group differences in terms of *nlg* (Table 4C), ‘X’ denotes mean *nlg* of Control group and ‘Y’ denotes mean *nlg* of Swirl group.

For analysis of survey responses with 5-point Likert, the median of respondents’ ratings in each sample was first computed, followed by taking the mean of substituent survey items to give a composite mean score for each survey metric. Negatively-expressed survey items were reverse-coded for easier mean score computations of each metric. Higher scores suggested higher attributes for the metric of interest. The preliminary and post-hoc survey were used to evaluate one and six survey metrics respectively.

Statistical analyses and graph computations were performed using GraphPad Prism (version 6.0e). For all statistical tests, a standard significance cutoff at  $P = 0.05$  is used. Independent t-tests with assumptions of unequal variances (Welch’s correction) were the primary mode of statistical analysis. Within-group *lg* differences were analysed with one-sample t-test, whereas between-groups *nlg* were analysed with two-sample t-test. One-tailed, two-sample t-tests were done to identify if one variable was significant over the other for gender and learning styles preferences. The Fisher’s Exact Test was performed to evaluate any significant relationships between each pair of learning style dimensions.

### 3. Results

#### 3.1. Quantitative Analysis

Pretest-posttest assessment was done to evaluate the effectiveness of each platform in promoting students' conceptual understanding. Both groups showed significant pretest to posttest scores improvement in terms of learning gains ( $p < 0.05$ ), with Swirl group achieving twice as much effect size (1.85) compared to the Control group (0.89) (Table 4, Figures 7A-7B).

Table 4. Summary statistics showing students' performance: (A) Swirl group, (B) Control group and (C) Normalised learning gains (*nlg*) of both groups

Variable	Mean $\pm$ Standard Deviation	Min	Max	<i>P</i> -value (Cohen's <i>d</i> )
<b>(A) Swirl</b>				
Pretest scores (%)	23.33 $\pm$ 15.06	0.00	40.00	$P = 0.042^*$
Posttest scores (%)	63.33 $\pm$ 26.58	20.00	100.00	( $d = 1.85$ )
Learning gains (%)	40.00 $\pm$ 28.28	0.00	80.00	
<b>(B) Control</b>				
Pretest scores (%)	60.00 $\pm$ 17.89	40.00	80.00	$P = 0.018^*$
Posttest scores (%)	76.67 $\pm$ 19.66	40.00	100.00	( $d = 0.89$ )
Learning gains (%)	16.67 $\pm$ 15.06	0.00	40.00	
<b>(C) Average normalised learning gains (<i>nlg</i>)</b>				
Swirl <i>nlg</i>	0.52 $\pm$ 0.14	0.00	1.00	$P = 0.36$
Control <i>nlg</i>	0.44 $\pm$ 0.16	0.00	1.00	( $d = 0.21$ )
Difference in <i>nlg</i> (%)	0.077 $\pm$ 0.21			

\* denotes statistically significant with sig level of 0.05 (two-tailed, two-sample t-test).

Pretest and posttest scores between groups were compared to determine differences in terms of prior knowledge and post-intervention understanding. Table 4, Figures 7C-7B showed both groups differed significantly in terms of pretest scores ( $p < 0.01$ ), with Swirl group performing lower (0-40%) compared to Control group (40-80%). No significant difference was observed in the posttest scores (Figure 7D).

Because of non-comparable pretest scores, comparison based on posttest scores alone would not fairly associate students' understanding to the sole merits of the platform. Both groups' performance were further compared using *nlg*, a widely used metric in educational research to account for disparities of learning abilities and backgrounds (Hake, 1988). Comparison of both groups' *nlg* showed non-significant differences with small effect size of 0.21 (Figure 7E).

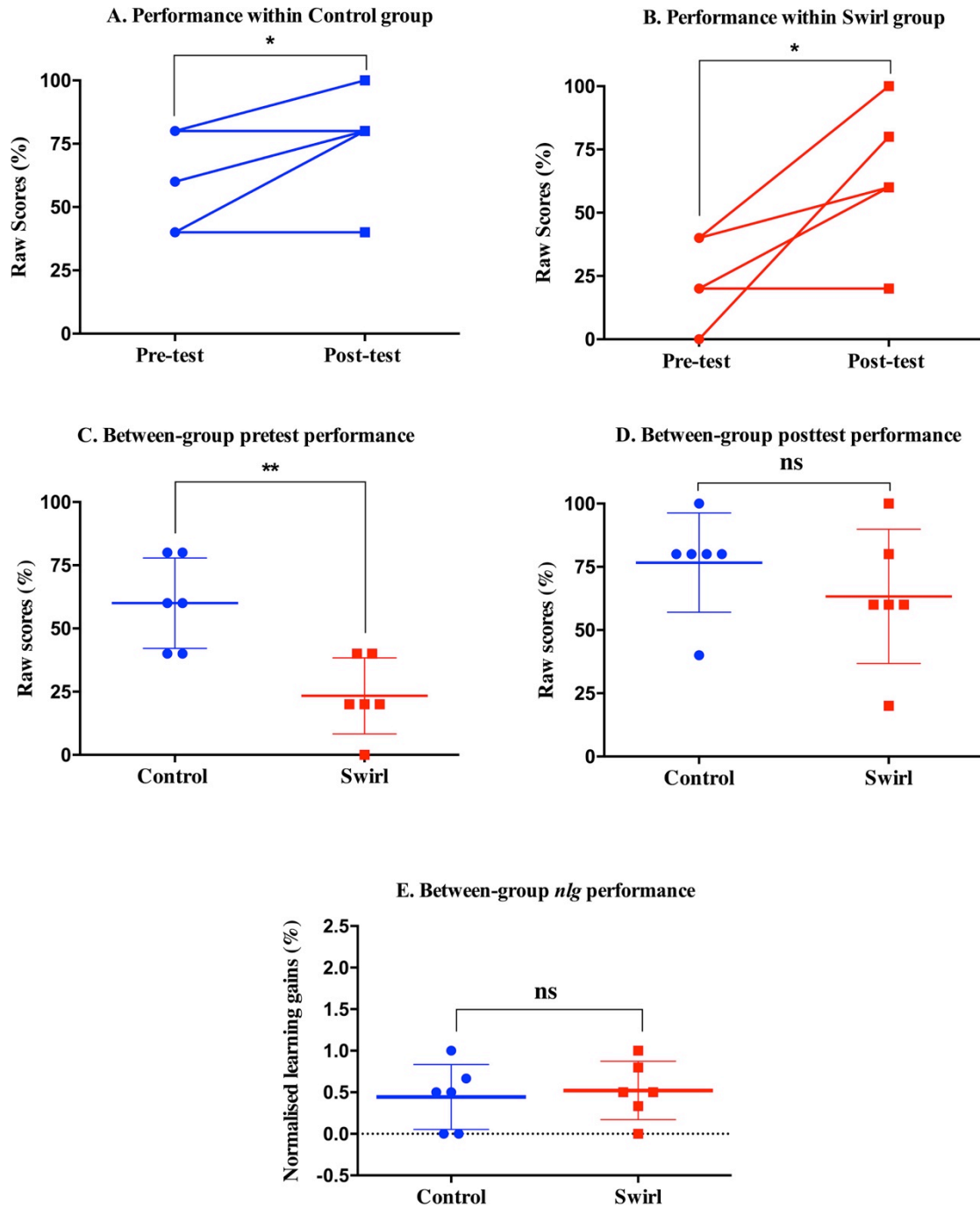


Figure 7: Comparison of students’ performance with regards to: (A) Control group, (B) Swirl group, (C) pretest scores, (D) posttest scores, (E) *nlg*. For (A) and (B), there were two data points bearing the same pretest and posttest scores pairing of 60%- 80% and 20%-60% respectively. Statistical analyses for all figures were done using two-tailed, two-sample t-test with Welch’s correction (sig level = 0.05). Legends: ‘\*’ and ‘\*\*’ denotes statistical significance at  $p < 0.05$  and  $p < 0.01$  respectively, and ‘ns’ denotes not statistically significant

Given no significant differences in *nlg* (Figure 7E), we analysed students’ performance on each pair of pretest and posttest questions to determine whether the choice of platform helped to facilitate better conceptual understanding for certain

topics than the others. Both groups of students however yielded similar sequence of ranking in terms of question-based performance (Appendix D, Table 5A, 5B).

After analysing the preliminary results of students' performance, we investigated the effect of gender and learning style preferences on average *nlg*. We found no significant difference in any of the four learning style dimensions between both samples based on the Fisher's Exact Test. Interestingly, female gender and students with sensing learning style performed significantly better ( $p < 0.05$ ) than male and intuitive learners respectively (Table 6). Demographics analysis on the sensing-intuitive learning style showed that gender was similarly represented on both scales. However, there were two females in the sensing category who scored the maximum *nlg* of 1.00.

Table 6. Gender and learning style preferences of students against the average *nlg*

Variables	Swirl (N=6)	Control (N=6)	Average <i>nlg</i> (%)	Standard Deviation	P-value
<b>Gender (Total)</b>					
Female (5)	2	3	0.70	0.27	0.0316*
Male (7)	4	3	0.33	0.34	
<b>Learning Profiles and Associated Learning-Teaching Dimensions</b>					
<b>Processing-Participation Dimension</b>					
Active (5)	3	2	0.43	0.43	0.3598
Reflective (7)	3	4	0.52	0.32	
<b>Perception-Content Dimension</b>					
Sensing (6)	3	3	0.67	0.28	0.0362*
Intuitive (6)	3	3	0.30	0.35	
<b>Input-Presentation Dimension</b>					
Visual (11)	5	6	0.45	0.36	-
Verbal (1)	1	0	0.80	-	
<b>Understanding-Perspective Dimension</b>					
Sequential (3)	3	0	0.67	0.29	0.1487
Global (9)	3	6	0.42	0.37	

\* denotes statistically significant with sig level of 0.05

### 3.2. Qualitative Analysis

#### Classroom observations

The student participants who showed good learner attitudes (e.g. notes-taking and careful review of content before taking the posttest) were seen to perform well. These behaviours were common in Control group, but less so for Swirl group (only one student took notes during the tutorial). In solving test questions, most students in Control session wrote their workings and used calculator, while those in Swirl session performed calculations directly on the R console. Duration for completion of entire Phase 1 was approximately 45 and 60 minutes for Swirl and Control group respectively. Investigation into time stamp records showed that Swirl group started

the post-test comparatively earlier than Control group. In Phase 2, no stark differences were observed between both groups.

### Similar Survey Ratings on Perceived Difficulty Level (M2) and Perceived Ability (M3)

Table 7A showed that both groups demonstrated similar perceptions where they were moderately neutral (Mean = 2.50) and positive (Mean = 3.58) towards perceived difficulty level of course and perceived ability towards performance respectively. Results of survey items M2a-b on ranking of topics based on difficulty and abstraction level were omitted from the study due to poor construct validity. Both groups found the tutorial explanations and exercises comparatively easy compared to the assessments (pretest and posttest). For item M3c, majority of Swirl group responded with “Agree” while Control group gave “Neutral” stance. Swirl group appeared less confident for posttest performance and expressed the need for more time to review the tutorial and attempt the quizzes.

Table 7A. Breakdown of survey metrics (M2, M3) with similar ratings<sup>#</sup> from both groups

ID	Components	Mean ± S.D. (Control)	Mean ± S.D. (Swirl)	Comparison
M2	<b>Perceived difficulty of course content</b>	<b>2.50±0.31</b> “Agree”	<b>2.50±0.50</b> “Agree”	<b>0.00±0.19</b> (Control ≈ Swirl)
c	The explanations in the course content were easy for me to understand ( <b>reverse-coded</b> )	2.00	2.00	NA
d	The exercises were too easy for me with or without the hints and answer keys ( <b>reverse-coded</b> )	3.00	3.00	NA
e	The questions asked in the quizzes were relatively difficult to do	2.50	2.50	NA
M3	<b>Perceived ability</b>	<b>3.58±0.15</b> “Agree”	<b>3.58±1.02</b> “Agree”	<b>0.00±0.87</b> (Control ≈ Swirl)
a	I would think my performance in the pre-test quiz was generally good (Scored at least 3 out of 5 points)	3.00	3.00	NA
b	I would think my performance in the post-test quiz was generally good (Scored at least 3 out of 5 points)	4.00 “Agree”	3.50 “Agree”	Control > Swirl
c	I would need more time to review the course and remember the concepts ( <b>reverse-coded</b> )	3.00 “Neutral”	2.00 “Agree”	Control >> Swirl
d	I would need more time to complete the quizzes ( <b>reverse-</b>	3.50 “Disagree”	4.00 “Disagree”	Control < Swirl

<b>coded)</b>			
e	My general performance for the course was not affected by how fast other participants complete the study	4.00	4.00 NA
f	My general performance for the course was not affected by the amount of monetary rewards I receive from participating in the study	4.00 “Agree”	5.00 “Strongly Agree” Control < Swirl

# Items which did not involve mean ratings or show any group differences were indicated as “NA”. The approximately equal sign ( $\approx$ ), single comparison sign (“<” or “>”), and double signs (“<<” or “>>”) denotes negligible difference, difference of less than 1-Likert point, and difference of at least 1-Likert point respectively. Reference code for mean Likert scores: “1.00-1.49” (Strongly Disagree), “1.50-2.49” (Disagree), “2.50-3.49” (Neutral), “3.50-4.49” (Agree), “4.50-5.00” (Strongly Agree). Reverse-coded: “1.00-1.49” (Strongly Agree), “1.50-2.49” (Agree), “2.50-3.49” (Neutral), “3.50-4.49” (Disagree), “4.50-5.00” (Strongly Disagree).

Open-ended questions further investigated students’ opinions on tutorial design, course and quiz duration, and impact of distraction on performance.

Table 7B. Open-ended post-hoc survey responses following survey metrics (M2 and M3)

Key Points	Key Evidence
<b>Most Control group students were supportive of the use of guided hints</b>	“The guided approach does help me in my learning”
<b>Most students enrolled in Swirl tutorial were less receptive to guided hints</b>	“...Direct hints is not good for my learning, as I will tend to think less and answer straight away...”
<b>Both groups were not confident of their posttest performance</b>	“...discomfort with the subjects”, “tend to feel uneasiness when faced with a mathematically-related concept”
<b>Some students were pressurised to complete posttest earlier due to peer pressure</b>	“...started to guess my answers when others finished earlier”, “I was pressured to complete the questions a bit faster...even though not sure”
<b>The Control students were generally focused during the study</b>	“...tend to 'get into the zone' and...block off external distractions”

Although most students expressed they were slow learners, they recorded similar range of duration as the given trial duration to review new concept and attempt assessments.



### Higher Survey Ratings by Swirl Group on Perceived Course Quality (M1), Ease of Use of Self-guided Tutorials (M5) and Learner Engagement (M8)

Table 7C showed that although both groups were positive on the course quality, Swirl students had better impression than their Control counterparts specifically on course layout and structure (item M1d). While both groups were positive towards provision of hints in self-guided tutorials, they were neutral towards learning a new concept using this format alone. Swirl group showed better impression on effort to understand new concept in self-guided tutorials (item M5b) compared to Control group. While both groups preferred the bite-sized delivery of information, higher level of learner engagement (M8) was found amongst Swirl group (Mean = 4.00) than Control group (Mean = 3.13).

Both groups agreed that course duration was “just right” in the preliminary survey (Table 7C, M1d). Interestingly, this contradicted the single respondent in the Swirl group indicating preference of needing more time to review the course during post-hoc survey (Table 7A, M3c).

Table 7C. Breakdown of survey metrics (M1, M5, M8) with higher ratings<sup>#</sup> from Swirl group

ID	Components	Mean ± S.D. (Control)	Mean ± S.D. (Swirl)	Comparison
M1	<b>Perceived course quality (preliminary survey)</b>	<b>4.13±0.25</b> “Agree”	<b>4.25±0.29</b> “Agree”	<b>-0.13±0.04</b> (Control < Swirl)
a	The course was well-organised and structured	4.00 “Agree”	4.50 “Strongly Agree”	Control < Swirl
b	The course was easy to follow and engaging	4.00	4.00	NA
c	The course was relevant and beneficial to my learning	4.50	4.50	NA
d	Time given to complete the course was just right	4.00	4.00	NA
M5	<b>Perceived ease of learning from self-guided tutorials</b>	<b>3.13±0.52</b> “Neutral”	<b>3.25±0.96</b> “Neutral”	<b>-0.13±0.44</b> (Control < Swirl)
a	Self-guided tutorials are an easy way for students to learn independently since hints and answer keys would be provided	4.00	4.00	NA
b	It takes a lot of effort to fully understand a new concept from a self-guided tutorial ( <b>reverse-coded</b> )	2.50 “Neutral”	3.00 “Neutral”	Control < Swirl
c	I would find it easier to learn when the information is delivered in a small, bite-sized manner	4.00	4.00	NA

d	I would find it easier to learn when the information is delivered in a detailed and comprehensive manner <b>(reverse-coded)</b>	2.00	2.00	NA
M8	<b>Learner engagement</b>	<b>3.13±0.25</b> “Neutral”	<b>4.00±0.00</b> “Agree”	<b>-0.88±0.25</b> (Control < Swirl)
a	I was fully engaged throughout the study	3.50 “Agree”	4.00 “Agree”	Control < Swirl
b	I found it difficult to stay focused during the study (e.g. my mind sometimes wander off) <b>(reverse-coded)</b>	2.75 “Neutral”	4.00 “Disagree”	Control << Swirl

# Items which did not involve mean ratings or show any group differences were indicated as “NA”. The approximately equal sign ( $\approx$ ), single comparison sign (“<” or “>”), and double signs (“<<” or “>>”) denotes negligible difference, difference of less than 1-Likert point, and difference of at least 1-Likert point respectively. Reference code for mean Likert scores: “1.00-1.49” (Strongly Disagree), “1.50-2.49” (Disagree), “2.50-3.49” (Neutral), “3.50-4.49” (Agree), “4.50-5.00” (Strongly Agree). Reverse-coded: “1.00-1.49” (Strongly Agree), “1.50-2.49” (Agree), “2.50-3.49” (Neutral), “3.50-4.49” (Disagree), “4.50-5.00” (Strongly Disagree).

Table 7D. Open-ended post-hoc survey responses following survey metrics (M1, M5 and M8)

Key Points	Key Evidence
<b>Both groups agreed visual aids, logical structure, practice questions and summary sections were most useful</b>	“diagrams were informative, intuitive, and aesthetically pleasing”, “logic and structure is really good and helpful for understanding”, “simple exercises to confirm understanding also help...summary sections are very helpful in cementing concepts”
<b>Most students favoured bite-sized delivery of information in learning new concept</b>	“detailed and comprehensive in terms of overall content quality but delivery to be small and well-paced would be the ideal combination”
<b>Students were concerned on the depth of teaching and learning within Swirl platform as self-guided tutorial</b>	“elementary”, “self-limiting”, “structured for success”, “may have limited avenues to clarify doubts beyond what was already programmed within the course”
<b>Both groups generally agreed that Swirl is an engaging learning platform</b>	“cultivate personal interest”, “real-life example”, “pictorial illustrations”, “hands-on calculations”
<b>Swirl group showed that learning hands-on with Swirl helps to familiarise with coding</b>	“my prior familiarity with swirl tutorials made me comfortable”, “interaction with R console gives the illusion that I can code...this build confidence in students that coding may be manageable”

Some factors that led to students' disengagement were mainly attributed to the content rather than the platform: "*questions were repetitive and a bit predictable.*" Other reasons raised by students for losing their focus included fatigue from trying to consolidate the newly-learnt concepts in one sitting.

### Higher Survey Ratings by Control Group on Perceived Usefulness of Integrating statistics and R (M4), Learner Attitude and Motivation towards Instrument (M6) and towards Swirl (M7)

Table 7E showed that Control group preferred integrated learning of statistics and R (item M4a), while Swirl group preferred separate courses for these subjects (item M4b). Despite their preference, both groups strongly agreed on the usefulness of integrating statistics and R (Control Mean = 4.50, Swirl Mean = 5.00) to prepare them for biological science (item M4c), and to improve their performance and competency in both subjects (item M4d). Interestingly, students who took the Control tutorial felt more motivated learning with guided hints than those in Swirl tutorial. Generally, strong support were given towards formal development of Swirl tutorials (item M7b).

Table 7E. Breakdown of survey metrics (M4, M6, M7) with higher ratings<sup>#</sup> from Control

ID	Components	Mean ± S.D. (Control)	Mean ± S.D. (Swirl)	Comparison
M4	<b>Perceived usefulness on integrating statistics and R as single course</b>	<b>3.75±0.28</b> "Agree"	<b>3.50±1.29</b> "Agree"	<b>0.25±1.01</b> (Control > Swirl)
a	I would find it more effective to learn both statistics and R as part of a single, integrated course	3.50 "Agree"	3.00 "Neutral"	Control > Swirl
b	I would find it more effective to learn statistics and R as two separate, independent courses ( <b>reverse-coded</b> )	3.00 "Neutral"	2.00 "Agree"	Control >> Swirl
c	I would find enrolling in an integrated course of statistics and R useful to prepare me for Biological Science field	4.50 "Strongly Agree"	5.00 "Strongly Agree"	Control < Swirl
d	I would think learning an integrated course of statistics and R can help to improve my competency and performance in both fields	4.00	4.00	NA
M6	<b>Learner attitude and motivation towards instrument</b>	<b>3.75±0.50</b> "Agree"	<b>3.25±0.96</b> "Neutral"	<b>0.50±0.46</b> (Control > Swirl)
a	Overall, I am satisfied with the learning outcomes that I gained from the short course on False Discovery Rate	4.00	4.00	NA
b	Overall, I consider participating in the study a well-spent investment of my free time	4.00	4.00	NA

c	I found myself becoming complacent in attempting the exercises since there were guided hints and answers provided ( <b>reverse-coded</b> )	3.00 “Neutral”	2.00 “Agree”	Control >> Swirl
d	I found myself more motivated in attempting the exercises since there were helpful hints and answers to correct my understanding of the concepts	4.00 “Agree”	3.00 “Neutral”	Control >> Swirl
e	If you could turn back time and do the study all over again, would you choose to do it differently to improve your understanding towards the course?	2 "Yes" 2 "No"	3 "Yes" 3 "No"	NA
M7	<b>Learner attitude and motivation towards Swirl in general</b>	<b>3.75±0.35</b> “Agree”	<b>3.67±0.76</b> “Agree”	<b>0.08±0.41</b> (Control > wirl)
a	I would be more motivated to complete a tutorial via swirl compared to conventional tutorial in the form of worksheet	4.00 “Agree”	3.00 “Neutral”	Control >> Swirl
b	I would support the school to build more of swirl tutorials to teach modules such as statistics and R programming	4.00 “Agree”	4.50 “Strongly Agree”	Control < Swirl
c	I would be interested in getting committed myself in developing Swirl tutorials to help others develop stronger foundations in applied statistics and R programming	3.50	3.50	NA

# Items which did not involve mean ratings or show any group differences were indicated as “NA”. The approximately equal sign ( $\approx$ ), single comparison sign (“<” or “>”), and double signs (“<<” or “>>”) denotes negligible difference, difference of less than 1-Likert point, and difference of at least 1-Likert point respectively. Reference code for mean Likert scores: “1.00-1.49” (Strongly Disagree), “1.50-2.49” (Disagree), “2.50-3.49” (Neutral), “3.50-4.49” (Agree), “4.50-5.00” (Strongly Agree). Reverse-coded: “1.00-1.49” (Strongly Agree), “1.50-2.49” (Agree), “2.50-3.49” (Neutral), “3.50-4.49” (Disagree), “4.50-5.00” (Strongly Disagree).

A polling was also done to investigate the most important reasons for participating in the study (Figure 8).

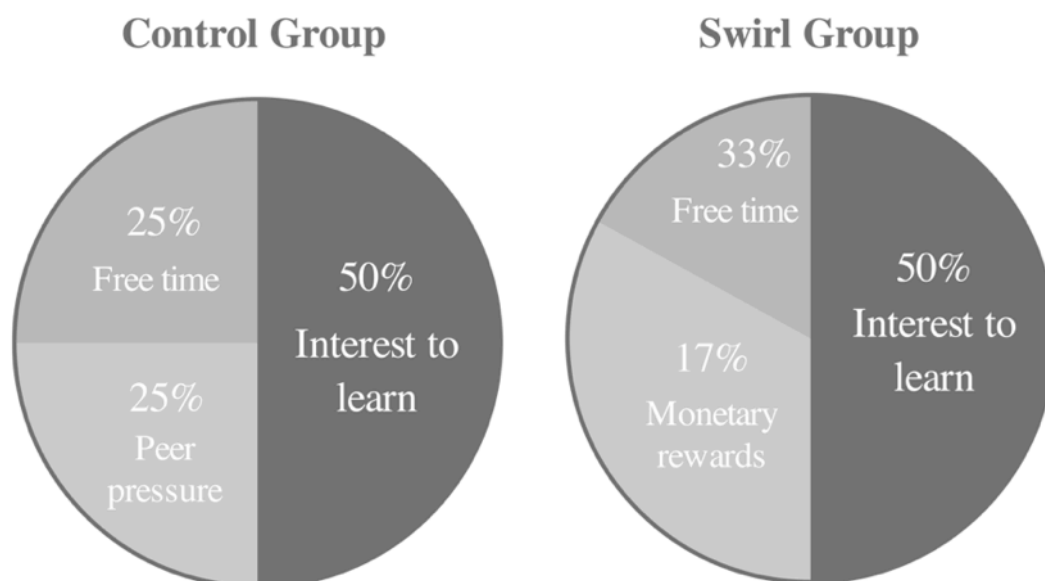


Figure 8: Both student groups shared the same top and second motivating factors (interest to learn and free time), differing only in the third factor (Peer pressure/monetary awards).

Table 7F. Open-ended post-hoc survey responses following survey metrics (M4, M6, M7)

Key Points	Key Evidence
<b>Students were generally supportive on integration of statistics and R, placing a special emphasis on importance of learning R</b>	“can enhance the practical application of statistical knowledge and R functions and facilitate better learning”, “R is an amazing platform for statistical computation...being able to run simulations (and freely changing variables)...can visualise certain concepts better than just hearing from lecturer...”
<b>Students felt the suitability of the course delivery was dependent on the purpose of learning, motivation and confidence in the subject matter of statistics and R, e.g. students who were not confident of either statistics and R knowledge preferred learning them separately</b>	“Integrated course would be more suitable for those who have a strong background in either statistics or R programming”, “learning statistics on its own allows more in-depth understanding of statistics”, “learning 2 unfamiliar things at the same time can be daunting at the start.”

## 4. Discussion

To answer the two-part objectives of this study, we first evaluated the course quality in delivering applied statistics concepts of FDR, followed by comprehensive analysis on Swirl platform.

### 4.1. Content Evaluation

The consistent positive survey impressions and improved performance of students showed that the educational content was effective in promoting learning outcomes regardless of the mode of platforms. It was likely that the incorporation of pedagogical elements (conceptual and contextual illustrations, practice-and-drill questions, guided case study) into the more abstract concepts of the course helped to enhance the conceptual understanding of students. However, inclusion of practice questions with similar level difficulty and long texts contributed to some degree of repetitions and fatigue which may compromise students' learning. More varied questions featuring different scenarios of biology-related research problems and increasing the difficulty of questions could be done to minimise predictability and promote higher cognitive engagement. Such findings further reinforced the need for more pedagogical efforts in statistics education.

### 4.2. Evaluation of Swirl Platform

Having attained high satisfaction in content quality as a precondition to evaluating the effectiveness of the instructional method (Kirkpatrick, 1998), we move on to investigate any differential performance and qualitative benefits attributed by the specific platforms.

#### Course Outcomes

We found that there was no evidence of greater learning conferred by the interactive delivery of Swirl tutorial as opposed to the conventional, passive paper-based platform. This was similar to observations wherein automated tutoring did little effect in improving students' achievement (Palocsay & Stevens, 2008). In many ways, Swirl can be likened to computer-assisted instruction (CAI). The sole use of CAI in teaching statistics (to diverse subject disciplines, including biology) had shown mixed results on several reports (Capper, 1985; Cotton, 1991).

While this showed that promoting interactive learning may not guarantee better performance, it is pertinent to recognise limitations in the metrics used. Even with normalisation to offset pretest scores, interpretations based on *nlg* (Figures 7A, 7B) and average *nlg* may not accurately portray students' achievement as it disregards the issue of losses (correct attempt in pretest, but incorrect attempt in the corresponding posttest) (Miller et al., 2010), which was clearly evident from the question-based performance (Appendix D, Tables 5A-5B). It was not possible to determine whether losses were attributed to students randomly guessing during the pretest or simply a reflection of the theory-practice gap. For more reliable comparison between disparate groups, other studies recommended the use of regression-based ANCOVA (Analysis of Covariance) which utilised pretest score as covariate to the corresponding posttest or learning gain (Weber, 2009), but this was not explored in this study due to inability

to satisfy the assumptions needed. In the case of a future study with larger sample size, further stratification based on students' pretest scores for comparison to their posttest achievement may yield interesting insights such as differential performance of low and high achievers with CAI (Owusu, Monney, Y. Appiah, & Wilmot, 2010).

### **Learning Effectiveness and Engagement Level**

The multimedia modality of Swirl granted students the convenience of visualising the course concepts and tutorial questions while working at the solutions first-hand at the R console. This helps to enhance students' learning experiences and also promotes constructive thinking process (Nickerson, 1995), critical to fostering effective statistical learning. Swirl's bite-sized delivery of information and fast calculations enabled by R is also useful in offsetting students' negative experiences related to performing manual complex, long calculations. This reportedly help to reduce learning barriers towards statistics (D. S. Moore, 1997). By shifting the focus of the course to teaching (and learning) the principles behind why certain methodology is adopted in tackling real world biology research problems, it makes statistics learning more palatable to biology students.

The immediate, virtual feedback that students received with every incorrect attempt promoted stress-free learning upon performing trial-and-error. This continuous positive reinforcement system (Tsai, 1992) helped to facilitate positive emotional engagement amongst students. When designed effectively, Swirl's guided but stepwise session has potentially greater value over conventional tutorials that condone complacent behaviours such as decision to not attempt the questions at all and "peek" into the provided answer straightaway. Future adoption of Swirl as part of formal teaching may include graded assessment to encourage higher participation of independent learning.

Notably, we found strong concern towards missing functionality to document previous attempts in current version of Swirl course. The design of Swirl course could be further optimised by grouping into shorter courses of 10-15 minutes to prevent cognitive overload (Swirl Development Team, 2014a/b) and allow students to backtrack and review previous information. While exact matching of user input to Swirl's built-in answer may serve as stringent checks towards instilling good coding habits from the start, many felt that it could impede progress for them who were untrained in programming. Such issues could have been addressed by explicitly introducing students to the Swirl's in-built "play()" command that enable users to pause course progress such that they could perform trial-and-error calculations or even retrieve images which were embedded in the earlier parts of the course for review (N. A. Carchedi, 2014).

Swirl as a form of CAI was found to enhance learning experience of both low and high achievers group (Owusu et al., 2010): Self-paced learning allowed for drilling of fundamental knowledge at the convenience of time, privacy and feedback for the former group (Cotton, 1991) while enabling faster learning for the latter group (Capper, 1985). Although in our trials, the Swirl group completed their studies about 10-15 minutes earlier than Control group, we do not think this accurately reflect students' learning pace: Both supposedly fast and slow learners were required to complete all session tasks within the allotted 1-hour period. Awareness of a timed

study may induce artefactual effects that influenced students' attitudes to progress more quickly than proceed at their own comfortable pace.

### **Attitude and Motivation**

Beyond the functional benefits, Swirl's potential in becoming an effective self-teaching tool was ultimately (and unsurprisingly) dependent on the attitude and motivation of each individual. A student who did not find value in the educational platform may not actually invest their cognitive efforts to learn as much as another student who believed in the effectiveness of the method (J. Moore, 2018). The high positive perception on the use of guided hints amongst Control students actually led to higher motivation in attempting the self-guided tutorial exercises, which in turn translated to higher motivation in doing interactive Swirl tutorial compared to the conventional format, and the exact opposite patterns applied for Swirl group. The Control tutorial incorporated guided hints in similar fashion but most students did not respond negatively against it, suggesting poorer learner attitudes or learning incompatibility amongst Swirl participants.

### **Categorical variables**

Studies on the role of gender on performance in statistics or in general academic performance (Zogheib, Zogheib, & Saheli, 2015) suggest that the observation of females outperforming males in this study could simply be attributed to females exhibiting positive learner attitudes (i.e., taking notes and attentive to details). Likewise, sensing learners could have outperformed intuitive learners due to comfort with details, repetition and fact memorisation (Felder & Silverman, 1988), all of which were critical factors to perform in the timed study of the given content.

### **Research Limitations**

While the case study approach allowed in-depth exploration of both qualitative and quantitative data on individual level, the data obtained here may not be representative to extended biology student populations. However, there may be (uncontrollable) confounding factors such as guessing of answers, misreading of questions or possibly not putting in efforts to recall previously-learnt concepts which contributed to measurement errors of the results. The 1-week time lapse between Phase 1 and 2 may also compromise the qualitative analysis of the metrics since insights gathered from post-hoc survey typically involved retrospective thinking rather than immediate reactions of students. Mismatch between self-perception and reality sometimes occur as well.

### **4.3. Research Implications**

This study reaffirms the commonly-held notion that biology students generally lack statistical skills. Although negative perceptions such as fear of learning applied statistics should be alleviated by selecting students who have also read data science-related courses in this study, such aversion still present nonetheless. The lack of confidence in statistics coupled with unfamiliarity with the computational language R may lead to the false impression of steep learning curve due to learning of both statistics and R simultaneously. Hence, not all respondents were favourable towards



learning an integrated course combining both of these subjects despite acknowledging its usefulness. The inconsistent positioning of preference versus usefulness for integrating both subjects stemmed from the fact that students viewed appropriateness of the delivery format was subjective on the purpose of teaching. Most importantly, since there is a demand for Swirl tutorials and that supplementation of R was perceived useful for teaching applied statistics, it reinforces the need for schools to incorporate integrated learning platform of statistics and R such as Swirl.

Swirl makes an appealing learning platform for students who wish to acquire both statistical and computational proficiency for those who recognise the benefits that Swirl can deliver for their learning. The sceptical reactions pertaining to Swirl interface could be attributed more to unfamiliarity rather than total aversion to such technology. With enough exposure and practice to Swirl tutorials, students expressed that they gained comfort and confidence working with Swirl. It could also be because students had preconceived notions of what teaching resources “should” be like in biology: Many courses were delivered using traditional lecture slides and that students were accustomed to comprehensive study of textbooks for understanding concepts not taught in details during classroom (J. Moore, 2018).

This work reviews the adoption of digital technology in facilitating higher education learning in Singapore, with an eye towards contributing to the local educational research efforts (Luke, Freebody, Shun, & Gopinathan, 2005). Adoption of Swirl is hoped to offer the value of allowing the faculty to make more strategic use of class hours to address challenging aspects of the course, beyond what was programmed within the Swirl tutorial. This would in turn enhance the teaching effectiveness of applied statistics to biology students. Collectively, Swirl seems to have greater potential in serving as a practice-and-drill instrument rather than primary mode of instruction for teaching applied statistics for students. This was supported by effectiveness of CAI as supplementary teaching tool to complement statistics teaching in tertiary education (Basturk, 2005). A longitudinal cohort study could be explored to evaluate the effectiveness of Swirl in improving statistical and computational R proficiency amongst biology students.

## **5. Conclusion**

Proper education and training to develop statistical and computational literacy amongst biology students is crucial to prepare them for the data-heavy research settings in the near future. This study serves as empirical work for evaluating the suitability of Swirl as an instructional platform for teaching standardised applied statistics content customized for biologists. Triangulating quantitative performance of students with qualitative opinions interfacing with Swirl, the study showed that learning in Swirl did not yield superior results compared to conventional medium, which suppressed its potential as stand-alone teaching instrument and raised the question of whether adaptation of courses into Swirl was a worthwhile effort. This study provides preliminary evidence on the use of Swirl platform as particularly useful for teaching applied form of statistics while immersing learners in the native R programmatic environment, by tapping on data analysis functions of R and by facilitating an interactive, multimedia learning environment that encouraged active engagement amongst students. The study also identified some limitations and suggestions that may guide future development of Swirl courses. The low cost of

development involved due to the open-source nature of Swirl makes it an attractive alternative instrument for delivering lessons over commercial statistical platforms in the context of university teaching. The long-term adoption of Swirl as a supplementary teaching tool could possibly help to develop independent learning, enhance statistical thinking and improve data processing skills in biology students living in the 21st century. Last but not least, successful adoption of Swirl in statistics education is preconditioned on student buy-in to Swirl approach in helping them learn both applied statistics and R.

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## **Appendix A**

### **Control Tutorial**

## **Appendix B**

### **Pretest Questionnaires**

Correct answers highlighted in grey

*School of Biological Sciences  
Pretest (Phase 1)*

**Question 1**

**Which of the following statement is true?**

- A. beta is the probability of getting a true positive, that is rejecting the null hypothesis w not true
- B. power is the probability of identifying a true negative, that is not rejecting the null hyp when it is true
- C. (1-alpha) is the probability of getting a false negative, that is not rejecting the null hyp when it is not true
- D. alpha is the probability of getting a false positive, that is rejecting the null hypothesis is true**
- E. I do not know this concept

**Question 2**

**Which of the following formula represents false discovery rate?**

- A.  $\frac{\text{False Positives}}{\text{All Predictions}} \times 100\%$
- B.  $\frac{\text{False Positives}}{\text{All Positive Predictions}} \times 100\%$**
- C.  $\frac{\text{False Positives}}{\text{All Negative Predictions}} \times 100\%$
- D.  $\frac{\text{False Positives}}{\text{All Positive Events}} \times 100\%$
- E.  $\frac{\text{False Positives}}{\text{All Negative Events}} \times 100\%$
- F. I do not know this concept

**Question 3**

You are the Game Master for a gene discovery game in SBS Camp.  
For Round 1, you allocate an equal number of positive and negative gene signals.  
For Round 2, you decide to increase the number of positive signals available.

So how will you compare the false discovery rate (FDR) in Round 1 and Round 2?

- A. Both rounds have the same FDR
- B. Round 1 has a lower FDR than in Round 2.
- C. Round 1 has a higher FDR than in Round 2.**
- D. Not enough information to decide
- E. I do not know this concept

**Question 5**

Out of the 10 false negative positive outc

- A. 22%**
- B. 26%
- C. 77%
- D. 83%
- E. I do no

**Question 4**

The results of a court trial are as such:

- There is an equal chance that the suspects present are likely to be guilty as they are innocent
- For suspects who are really guilty, Judge declares "Guilty" 80% of the time ("True Positive")
- For suspects who are actually innocent, Judge declares "Guilty" 5% of the time ("False Positive")

So what is the chance of wrongly accusing a suspect given all the judgements declared as "Guilty"?  
Round off your answer to nearest whole number.

- A. 2.5% (FP only)
- B. 5.0% (FPR)
- C. 6.0% (FDR)**
- D. 20.0% (FP/False Pred (FP+FN))
- E. I do not know this concept

**Posttest Questionnaires**

Correct answers highlighted in grey



*School of Biological Sciences*  
*Posttest (Phase 1)*

**Question 1**

A recent personalised genomics test has an alpha of 5% and power of 70%. How do you interpret these specifications?

- A. The chance of getting a false positive, a false negative and true positive is 5%, 30%, and 70%**
- B. The chance of getting a false positive, a false negative and true positive is 5%, 70%, and 30%
- C. The chance of getting a false positive, a false negative and true positive is 30%, 5%, and 70%
- D. The chance of getting a false positive, a false negative and true positive is 30%, 70%, and 5%
- E. I do not know this concept

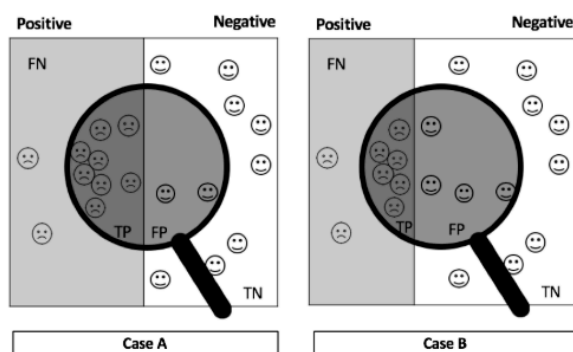
**Question 2**

Which of the following components are NOT required to determine the false discovery rate of a study?

- A. The number of true positives
- B. The total number of positive predictions
- C. The ratio between positive and negative events
- D. The ratio between positive and negative predictions**
- E. I do not know this concept

**Question 3**

Case A and Case B represent the outcomes for two different experimental settings.



Which of the following statement is most likely to be true?

- A. Case A has a higher false discovery rate than case B (should be lower)
- B. Case A has a lower false discovery rate than case B**
- C. Case A has a higher false positive rate than case B (should be lower)
- D. Case A has a lower ratio of positive to negative events than case B (should be higher)
- E. I do not know this concept

**Question 4**

Typically, a drug candidate will have 50% chance of failure and 50% chance of success during the intermediate stage of clinical trial. Given this clinical trial has an alpha of 10% and power of 70%, what is the false discovery rate? Round off your answer to the nearest whole number.

- A. 5%
- B. 10%
- C. 13%
- D. 25%
- E. I do not know this concept

**Question 5**

The following table summarises the epidemiology results for 200 residents on HIV prevalence:

Possible Test Outcomes	State of truth	
	HIV-free Residents	HIV-positive Residents
Outcomes declared "Positive"	5	40
Outcomes declared "Negative"	95	60

What is the false positive rate for this study? Round off to nearest whole number.

- A. 3%
- B. 5%
- C. 8%
- D. 11%
- E. I do not know this concept

## Appendix C Preliminary Survey

### 1) Course content \*

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
The course was well-organised and structured	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The course was easy to follow and engaging	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The course was relevant and beneficial to my learning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Time given to complete the course was just right	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### 2) What aspects of this course were most useful or valuable or interesting for you? E.g. specific theme/exercises/concepts \*

Your answer

### 3) How would you improve the course? Feel free to feedback about anything \*

Your answer

---

### 4) Why did you choose to sign up for this study? \*

- Free time
- Interest to learn
- Peer pressure
- Monetary rewards
- Other: \_\_\_\_\_

## Post-hoc Survey

*School of Biological Sciences  
Post Hoc Survey (Phase 2)*

### **M2: Perceived difficulty of the course (omitted from results due to confusion)**

- **Rank the concepts based on:**
  - **Increasing level of difficulty:** 1 (being least difficult) to 5 (most difficult)
  - **Increasing level of abstractness:** 1 (being least abstract) to 5 (most abstract)
  
- **5 Main Topics Covered:**
  - **Construction of Research Hypotheses**
  - **Predictions**
    - Positive and Negative Predictions
    - False Predictions
    - True Predictions
    - Summary of Test Outcomes
  - **The Concept of False Discovery Rate**
    - Mini-exercises
  - **FDR as a context-dependent metric**
    - Ratio of positive to negative events
    - Summary of FDR Calculations
  - **Difference between FDR vs. FPR**
    - Practice case calculations
    - Summary of all important points

*Open-ended Questions for Posthoc Survey*

**(Q1) To further improve your learning, how do you think the exercises should be designed in terms of the format or delivery, the level of difficulty and the quantity of questions? Do you think having a guided approach (e.g. direct hints) help you in your learning or do you feel otherwise? Please outline your thought processes and justify your preference.**

**(Q2) With reference to your answers in (2a) and (2b), what are the factors that go through your mind when you have to estimate your expected performance for the trial quizzes? Elaborate these in details. You may want to consider factors such as but not limited to the motivations to participate in the study, discomfort with numbers/calculation cases, optimal study time, level of difficulty of the quiz, the degree of understanding towards the content, etc.**

**(Q3) How long do you think is a comfortable duration for you to review the content in order to fully understand the concepts pertaining to the “False Discovery Rate” (as covered in the trial)? Please specify the time duration in minutes/hours and justify why.** In deciding what is a comfortable duration, you may consider your usual study habits and the amount of time you spent to learn a new concept related to statistics/mathematics.

**(Q4) How long do you think is a comfortable duration for you to complete pre-test and post-test quizzes respectively? Please specify the time duration in minutes/hours and justify why.** There were a total of 5 questions in pre-test and post-test quiz respectively.

**(Q5) Were you able to complete the session earlier ahead of other participants? If not, did you get distracted or affected when others actually completed the study earlier? How did they affect you? Please specify your reactions and elaborate on the things which went through your mind during the incident.** Could you have skipped reading certain texts, misread the questions in the quizzes or probably guessed the answers? Or, did you stay focused and were not bothered at all since you really wanted to understand the concepts and questions

**(Q6) Elaborate on your thought processes on why a particular format of course delivery (integrated vs independent) would help you gain a better understanding of the two fields of interest (Statistics and R).** You may want to consider factors such as but not limited to the breadth and width of the content, the presentation, the speed of learning, the ease or difficulty of learning, the relevance to real life applications, your personal study habits, etc.

**(Q7) Explain the reasons that motivate your opinions on the relative ease of learning from self-guided tutorial.** You may want to consider factors such as but not limited to the scale of use, the quality of explanations and facilitation, the flexibility of learning beyond classroom, the general reaction of SBS students to this idea, the interactivity, and etc.

(In Swirl Group)

**(Q8) Were there any difficulties, challenges or discomfort that you face (technical or otherwise) while loading any of the study materials such as the swirl course and questionnaires? Please specify a few examples or instances (if any) and explain how it has affected your learning.**

(In Control grp)

**(Q8) Were there any difficulties, challenges or discomfort that you face (technical or otherwise) while reviewing/learning the study materials such as the course in PDF format and questionnaires? Please specify a few examples or instances (if any) and explain how it has affected your learning.**

**(Q9) What aspects of swirl made you more motivated or less motivated to complete a tutorial using swirl compared to a conventional worksheet? Please justify your answer.**

**Motivation for Reattempt**

If you could turn back time and do the study all over again, would you choose to do it differently to improve your understanding towards the course?

- a. Yes
- b. No

**(Q10-Yes) If you have chosen “Yes”, explain why you may decide to attempt it differently and also what would you have done differently?** You may want to consider certain strategies or practices that you usually adopt to help you study for your lessons in school, such as but not limited to reviewing the content again, redo the exercises, write out/make notes, talking about the learning points, etc.

**(Q10-No) If you have chosen “No”, explain why you may decide not to. Is it because you have prepared or performed sufficiently well for the lesson?** You may want to consider factors such as but not limited to the lack of motivation to perform, disinterest to learn the concept, eager desire to quickly rush through the content and leave, discomfort with statistics, etc.

**(Q11) Besides having pictorial illustrations and summary pointers in the course, were there any other factors which kept you engaged on the course throughout?** You can want to consider factors such as but not limited to your typical attention span, real case examples, hands-on calculation practices, personal interest in the lesson itself, motivation to do well, and etc.

**(Q12) If you found yourself losing focus, when did you actually start to switch off or feel bored along the way?** Please indicate specific period of time when you started to get distracted, and also the sections of the lesson which you find boring/confusing. If this does not apply to you, simply state “NA”

**(Q13) Could you think of any factors that made you switch off mentally along the way?** Does it concern your typical attention span, the format of the delivery, the length of information, the timing of the study, the level of difficulty of the content, and etc.

**Appendix D: Supplementary Data**

**Table 2.** Rationales for learning objectives (LO) associated with each pair of pretest and posttest questions

ID	Learning objectives	Rationale for each question pair
LO1	<b>Evaluates understanding of Topic 2:</b> Able to interpret the meanings of different probability outcomes such as alpha, beta, and power	<b>Question 1</b> The aim of the pretest was to assess students' theoretical knowledge on the definitions of parameters associated with hypothesis testing. To refresh students' memory, explanations on the four parameters (alpha, beta, power, and 1-alpha) were included under Topic 2 of the tutorial. The posttest version served as a slight variation of pre-test, where an understanding towards all three definitions (alpha, beta, power) were tested by matching the right numerical value onto each parameter.
LO2	<b>Evaluates understanding of Topic 2, 3, 4:</b> Recall the parameters used in calculating False Discovery Rate (FDR)	<b>Question 2</b> The pretest was designed to identify students with prior exposure to the mathematical formula associated with FDR. The posttest served as an indirect version to assess students' understanding towards the three key parameters (alpha, power, ratio of positive to negative events) introduced in the tutorial. The notion of "events" and "predictions" were only introduced explicitly in the tutorial. Being able to differentiate these two terminologies showed that students paid attention to the details in the tutorial. Getting correct answers for both pretest and posttest implied good understanding towards the calculations involved to solve FDR.
LO3	<b>Evaluates understanding of Topic 3, 4:</b> Understand that FDR is a context-dependent metric, dependent on the ratio of positive to negative events	<b>Question 3</b> In the pretest version, students were evaluated on the ability to recognise that varying the amount of positive and negative signals or data had an impact on increasing FDR of an experiment. The same objective was tested on posttest, but framed using an illustrative diagram which was introduced in the tutorial. Being able to interpret the diagram demonstrated students' understanding of the context-dependency nature of FDR from the tutorial itself.
LO4	<b>Evaluates understanding of Topic 3, 4, 5:</b> Know how to apply and solve for False Discovery Rate and False Positive Rate given a problem statement/case study	<b>Question 4</b> In order not to penalise students who did not have prior knowledge of FDR and yet investigate those who have prior understanding, the pretest was expressed in terms of simple probability question. The posttest meanwhile was framed in a manner similar to tutorial's case study to assess students' ability to solve for FDR. This required students to understand the concept of FDR and apply the formula.
		<b>Question 5</b> The main objective was to test students' ability to differentiate the concept of FDR from False Positive Rate (FPR).



**Table 3.** List of qualitative survey metrics (M1-M8) analysed through a series of survey items introduced as part of preliminary and posthoc study

ID	Qualitative Survey Metrics
<b>Preliminary survey</b>	
M1	<b>Perceived course quality:</b>
a.	Structure (relates to M2, M5)
b.	Engagement (relates to M8)
c.	Relevance (relates to M4, M6, M7)
d.	Duration (relates to M3)
<b>Post-hoc survey</b>	
M2	<b>Perceived difficulty of course content:</b>
a.	Topics introduced
b.	Explanations
c.	Exercises/practice questions
d.	Assessment (pretest and posttest)
M3	<b>Perceived ability:</b>
a.	Pretest
b.	Posttest
c.	Course duration
d.	Quiz duration
e.	Distraction
f.	Monetary rewards
M4	<b>Perceived usefulness of integrating statistics and R as a single course:</b>
a-b.	Learning preference for integrated course vs independent course
c.	Usefulness of integrated course for biological field
d.	Usefulness of integrated course for improvement in statistics and R
M5	<b>Perceived ease of use of self-guided tutorials:</b>
a.	Provision of hints and solutions
b.	Effort to learn new concept
c-d.	Learning preference for bite-sized vs comprehensive release
M6	<b>Learner attitude and motivation towards specific study of the intervention:</b>
a.	Learning satisfaction
b.	Learning satisfaction
c-d.	Participation satisfaction
e.	Provision of hints and solutions
	Reattempt of study
M7	<b>Learner attitude and motivation towards Swirl in general:</b>
a.	Completion of Control vs Swirl tutorial
b.	Support for formal development of Swirl
c.	Support for informal development of Swirl
M8	<b>Learner engagement:</b>
a-b.	Engagement vs disengagement



*An Investigation into the Efficacy of Students-as-partner Pedagogy in a Singapore University Education Learning Context*

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**Abstract**

In Students-as-partner (SAP), students work in partnership with staff members in higher learning institutions to facilitate deeper learning in students by promoting student engagement. While SAP's impact on student consultants and staff members directly involved in partnership is generally well and widely researched, relatively little is reported about its application on student learning in an Asian university context. This case study reports the efficacy of SAP-produced teaching resource on a cohort of biology major students in Nanyang Technological University, Singapore (NTU). Participants were either exposed to the student-centric (collaborative work between faculty and student) or tutor-centric (produced by the faculty) teaching resource and their test performance and perception of the respective materials compared. Our data shows that students generally prefer tutor-centric material with consistent and higher improvement in test scores when they knew material as tutor-centric compared to the learner-centric alternative. Although SAP is a high-impact pedagogical practice, this study suggests cultural context can confound outcome, and that at least in NTU's predominantly conservative Asian setting, and where collaboration in content creation is concerned between faculty and student, stronger buy-in and gradual introduction is necessary.

Keywords: Outcome-based teaching and learning (OBTL), Students-as-partner (SAP) Technology enhanced learning (TEL)

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## **Introduction**

### **Motivation for study**

In Students-as-partner (SAP), students adopt an active producer role alongside teaching faculty in the process of teaching and learning as opposed to the consumerist role typically expected of them (Bovill et al., 2015). SAP involves engaging students as collaborators, specifically acting as co-inquirers or co-producers, which has the effect of levelling the power imbalance between faculty and students such that students have more of a say in what they are learning (Cook-Sather, 2013).

There had been much research on the benefits and efficacy of SAP in promoting deeper learning in students (Healey et al., 2016). However, these mainly revolved around qualitative aspects of SAP intervention with heavy focus on the perception and reflections of student partners themselves and the staff involved in the SAP projects. This study aimed to fill the gap in knowledge regarding the efficacy of SAP to enhance learning in higher education students in an Asian University setting by evaluating the impact of SAP-generated teaching material in a cohort of biology students through the use of mixed method analysis.

### **Literature review**

In this section, we first discuss the concept of student-as-partner and summarize the benefits of SAP in practice. We then discuss one relevant case study done on the effectiveness of resources created by students as partners as perceived by the general student population, followed by an overview of the differences between learners from Western and Asian societies.

### **Student-as-partner conceptual models and benefits**

While partnership falls under the umbrella of student engagement, it is important to note that there are qualitatively different kinds of student engagement and not all involve partnership (Healey et al., 2016). For example passive collection of end-term student feedback is not in itself a true form of partnership.

The four-stage model of student engagement from the NUS/HEA student engagement toolkit (Healey et al., 2014) is useful for describing the different forms of engagement and highlighting the differences among them - mainly consultation, involvement, participation and partnership (Figure 1). Partnership is defined as a “reciprocal process through which all participants have the opportunity to contribute equally, although not necessarily in the same ways, to curricular or pedagogical conceptualization, decision-making, implementation, investigation, or analysis” (Cook-Sather et al., 2014, p. 6-7). Benefits of student-faculty partnerships in teaching and learning have been well documented mainly in three clusters: engagement, awareness and enhancement (Lubricz-Nawrocka, 2018). While students are not disciplinary or pedagogical experts, they do come with the knowledge and experience of being a student, a position faculty members have not occupied for a long time, and possibly disconnected from (Healey et al., 2016). Consequently, collaborative intervention may bridge the gap and disconnect between faculty and students, and precipitate in a better and more meaningful learning experience for everyone involved

(Healey et al, 2016). Furthermore, partnership can transform the student-faculty relationship into one where both parties become colleagues, challenging the constraints of traditionally hierarchical student-teacher relationships.

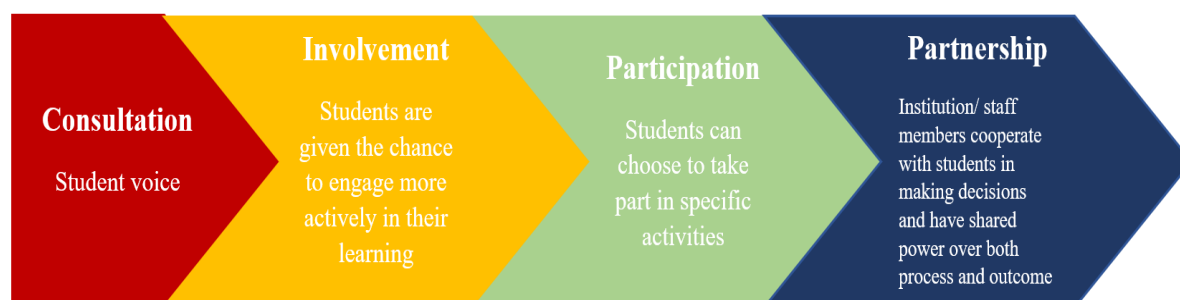


Figure 1. Ladder model showing the four stages of student engagement (Inspired from Healey et al., 2014).

### Case study on the effectiveness of student-produced resources perceived by the general student population

Dunn et al., (2018) investigated the effectiveness of student-produced resources as perceived by the general student population in an Australian university. Student responses were split equally into ‘yes’ or ‘no’ when asked if it affected them to know that student consultants were involved in producing their material. Of respondents who replied “no”, most expressed a preference for more authority in the material produced. Moreover, a small percentage indicated ‘no’ even when they acknowledged the benefits of student-produced material such as relevance to other students. Interestingly however, the majority of respondents liked the idea of students and faculty co-producing material the most, over other provided options of ‘students only’ and ‘teachers only’, an indication that students were open to the concept of collaboration between staff and students in research. Additionally, quantitative analysis of the results after the intervention of the student-produced informative animated videos showed that they were useful in increasing feelings of relevance towards mathematics in first-year engineering students, which was the intended goal of the project.

### Differences between the Western and Asian learning environment

The ingrained cultures of the East and West do determine behaviour and thought-process amongst individuals raised in these respective societies. As such, we anticipate culture-related differences in educational values that should be considered while implementing educational reform (Ee and Tan, 2008).

Asian societies such as that of Singapore remain tightly organised by strict social rules and acceptable behaviours that constitute norms. Status, age and even gender are typical factors which influence social interaction between two individuals (Fang and Gopinathan, 2009). Additionally, a high level of importance is placed on hierarchy between superior and subordinate. For example, local teachers assume authoritarian roles while students are relegated to the role of the submissive/passive learner in the classroom. The Confucian heritage that permeates across the Asian-Chinese culture

also places a strong emphasis on learning, instruction and the status of teachers (Ee and Tan, 2008).

In contrast, social interaction within the Western society is relatively less structured, with less importance attributed to rank and social status (Fang and Gopinathan, 2009). Westerners are generally more individualistic and less concerned with winning approval from their in-groups compared to their Asian counterparts (Ee and Tan, 2008) (Figure 2). We expect that differences in social norms to also act as a strong confounder when it comes to the application of high-impact practices such as SAP, which relies on a certain degree of extraversion.

VARIABLES	EASTERN SOCIETY	WESTERN SOCIETY
<b>CULTURE</b>	<ul style="list-style-type: none"> <li>• Tightly organised</li> <li>• Hierarchical</li> <li>• Greater emphasis on social order and harmony</li> <li>• More concerned with “saving face” or reputation</li> </ul>	<ul style="list-style-type: none"> <li>• Loosely organised</li> <li>• Egalitarian</li> <li>• Individualistic</li> <li>• Greater emphasis in open and democratic exchange of ideas</li> <li>• More concerned with realising one’s creative potential in life</li> </ul>
<b>SCHOOL</b>	<ul style="list-style-type: none"> <li>• Classes highly structured</li> <li>• More teacher directed</li> </ul>	<ul style="list-style-type: none"> <li>• Classes less structured</li> <li>• Less teacher directed</li> </ul>
<b>FAMILY</b>	<ul style="list-style-type: none"> <li>• Family pressure serves as a catalyst</li> <li>• Socialise child to be dependent on ingroup</li> </ul>	<ul style="list-style-type: none"> <li>• Expects individual to be a catalyst</li> <li>• Socialise child to be independent</li> </ul>

Figure 2. Influence of culture on creative styles and motivational orientation (Modified from Ee and Tan, 2008).

### Introduction to the study

We were interested to find out how SAP may impact our local student population and whether the learning benefits extended beyond the student partners directly involved in the partnership. Student consultants were first recruited and tasked to produce their version of a teaching resource on a topic irrelevant to their major of study (data science) after consultation and mentoring with a faculty member. Both learner-centric (developed by both faculty and students) and tutor-centric (developed by the mentoring faculty only) resources were then fielded to discrete cohorts of student participants (who were all from the same biology major as the student consultants themselves). Quantitative and qualitative results from the trials were then analysed.

## Materials and Methods

### Recruitment and Selection of Student Consultants

A recruitment email was sent to the student body in the School of Biological Sciences (SBS), NTU. Interview and trial sessions were then conducted for respondents. Of the 8 respondents, 5 were selected based on 2 criteria- availability for the duration of the research and their performance on the trials. 3 were disqualified based on their unsatisfactory performance on the trials which did not meet the standards expected of a student consultant. Of the 5 whom offers were made to, only 3 accepted while the other 2 declined, citing the job scope as being a poor fit with their personal interests as the main reason.

### Interview and Trial Process

The trial session stimulated what was expected of a practicing student consultant. Interviewees worked in small groups (of 2s and 3s) to design a set of teaching material in the form of PowerPoint slides based on a bio-related topic (Concept of emulsion) with the added twist that it must be suitable for educating a non-bioscience audience. Their work was evaluated for its creativity, originality and palatability as teaching material for a non-bioscience audience. Additionally, several strategic questions were posed to them to assess their suitability and motivation for joining the project (Table 1).

- |   |
|---|
| <ol style="list-style-type: none"><li>1. How did you approach the problem?</li><li>2. How did you distribute the work?</li><li>3. What are your intentions and thought processes while doing the task?</li><li>4. Did you feel comfortable doing this task?</li><li>5. Was it difficult to put yourself into the roles of both learner and teacher?</li><li>6. If you had more time, what else would you have tried to incorporate?</li></ol> |
|---|

Table 1. List of interview questions asked to applicants for the Student Consultant position

Lastly, the basic rules-of-engagement and expectations were established during the interview. In this study, student consultants were paid for their work due to the high time commitment required and high expectations. To protect the rights of both student consultants and the faculty, a clear list of payable and non-payable items was established (Table 2). Such strict delineation on payable items reduced the likelihood of recruiting someone mainly motivated by monetary incentives. The student consultants were paid per hour, with a pre-agreed cap on the time required to complete each task, established and discussed with the faculty prior to execution.

Payable items	Non-payable items
<ol style="list-style-type: none"> <li>1. Appropriate number of hours on a payable task to be agreed upon before starting it</li> <li>2. Extensions given where justified</li> <li>3. Tasks included               <ul style="list-style-type: none"> <li>- Preparation of teaching material</li> <li>- Team discussions (minutes must be recorded and submitted)</li> <li>- Field work or conducting simulation</li> <li>- Writing paper/poster/report (cap of 15 payable hours each)</li> <li>- Reading and presentation of relevant research material (hours agreed upon by PI and student consultants)</li> <li>- Carrying out experiments</li> <li>- Creating software/hardware</li> </ul> </li> </ol>	<ol style="list-style-type: none"> <li>1. Training sessions and generic meetings with the Principal Investigator (PI)</li> <li>2. Training sessions for e-learning software</li> <li>3. Transport reimbursement</li> <li>4. Time spent self-studying or researching generic materials not previously approved by the PI</li> </ol>

*Table 2. List of payable and non-payable items as agreed upon by the student consultants and faculty.*

### **Training of Student Consultants and Production of Student-centric Teaching Material**

Student consultants had to create their own set of Data Science-related teaching material based on the topic “Machine Learning”. They were given a comprehensive lecture on the topic itself by the faculty first before crafting their own as they had little to no prior exposure to ‘Data Science’ (the students have no precognition bias, and their knowledge of the field comes due to interact with the faculty involved in this project). Additionally, they were expected to keep journal logs of their thought processes and ideas during the process, which were submitted to the PI for review and to keep the PI updated on their progress.

The student-centric teaching material was then presented as a team to the faculty by the student consultants and any changes discussed were implemented before the final product was produced. Throughout the entire process, the faculty adopted a collaborative mentoring role as opposed to an authoritative one to ensure minimal personal influence on the consultants’ work while also making sure no technical mistakes were made in the learner-centric material.

### **Recruitment of Participants for Paid Trial Sessions and Exclusion Criteria**

24 students were recruited from the School of Biological Sciences, NTU across different years of study from year 2 onward. This study deliberately excluded freshmen and seniors who have completed the module BS211S: Equations of Life. This is because freshmen would not have completed the core module BS1008: Biostatistics, which was required of participants as necessary basic statistical knowledge for the trial and for those seniors who have taken BS211S, they would already be more aware and likely more knowledgeable in the content covered by the trial teaching material. Since we were looking for learning gains, it was important that test participants had limited knowledge of the chosen test topic such that any



improvement made on the trial post-test would have been attributed to the intervention of the test material, and not the participant's prior knowledge on the subject matter.

A recruitment notice was disseminated informally through WhatsApp and word-of-mouth and participants signed up by indicating their availability and their particulars on GoogleForms. The sign-up closed after the quota for each session had been reached.

### **Trial Procedure**

To ensure controllability of the trial, participants were split into groups of 4 according to their availability as indicated during sign-up. Each group was enrolled into a trial session covering a unique scenario. Altogether six trials were conducted (Table 3).

During the study, participants were first briefed on what to expect. They were shown instructions on-screen reminding them not to use their phones to minimize distraction and encouraged to do their best on the pre- and post-tests. The pre-test was then fielded, followed by a 15-minute recorded lecture covering the learning material, and finally, administration of the post-test. Additionally, a Likert-scale type survey was included at the end of the post-test to evaluate students' reception towards the lecture material. The participants were then remunerated for their time. The design principles and reasoning for the instruments (pre/post-tests and learning materials) are described in Table 4 (The actual pre- and post-test questions are listed in Appendix A and B respectively). The questions for the Likert-scale palatability evaluation are listed in Table 5.

Both pre- and post-tests were conducted using TurningPoint self-paced polling, a Technology-enhanced learning (TEL) device. Participants were reminded (and encouraged) to choose the "I do not know this concept" option in both tests should they not know the answer. The test material fielded was either designed by the faculty (tutor-centric), or in collaboration with the student consultants (learner-centric).

Session	Scenario
1.	Tutor-centric teaching material fielded with participants unaware about it being tutor-centric
2.	Student-centric teaching material fielded with participants unaware about it being student-centric
3.	Tutor-centric teaching material fielded with it deliberately made known to participants that the teaching material was designed by a professor
4.	Student-centric teaching material fielded with it deliberately made known to participants that the teaching material was designed by student t consultants who underwent training before producing the teaching slides
5.	Tutor-centric teaching material fielded but participants deliberately misinformed that it was produced by trained student consultants
6.	Student-centric teaching material fielded but participants deliberately misinformed that it was produced by a professor

*Table 3. Description of scenarios for the six separate trials conducted.*

### Materials list and rationale behind instrument design

Instrument	Details of instrument design	Rationale behind instrument design
Pre-test questionnaire (Appendix A)	<ol style="list-style-type: none"> <li>1. Number of questions: 6</li> <li>2. Test type: Single answer MCQ with 'I do not know this concept' answer option available for all the questions</li> <li>3. Nature of questions: To assess conceptual knowledge</li> </ol>	<ol style="list-style-type: none"> <li>1. Each question was designed to test participant's knowledge of the subject matter covered by each learning objective of the learning material.</li> <li>2. MCQ format was most familiar to students and reduced performance anxiety that may hinder their performance. 'I do not know this concept' option eliminated the possibility of participants' guessing the answer when they truly did not know.</li> <li>3. Students' prior knowledge of the concepts covered in the learning material was evaluated and compared against their ability to apply their knowledge (application skills) in the post-test after the learning material was fielded to them.</li> </ol>
Post-test questionnaire (Appendix B)	<ol style="list-style-type: none"> <li>1. Number of questions: 8</li> <li>2. Test type: Same as for pre-test</li> <li>3. Nature of questions: To assess participants' ability to apply their knowledge of the subject matter after watching the learning material in the form of video lecture</li> </ol>	<ol style="list-style-type: none"> <li>1. All learning objectives from the learning material were covered</li> <li>2. Same as for pre-test</li> <li>3. The ability of participants to apply what they have learned is indicative of effective learning. Furthermore, even if their answers were wrong, analysis of their pre and post-tests could reveal the gap in knowledge that prevented them from getting it right.</li> </ol>
Evaluation for palatability – Likert-scale type questionnaire survey	<ol style="list-style-type: none"> <li>1. Scale of 1 to 5- Strongly agree, Agree, Neutral, Disagree, Strongly disagree. Each option is given a number of points: from 5 for Strongly Agree to 1 for Strongly disagree</li> </ol>	<ol style="list-style-type: none"> <li>1. Scale of 5 was sufficient to evaluate the depth of feeling participants had towards the entire study while a scale of 10 would be excessive and redundant.</li> </ol>

	<ol style="list-style-type: none"> <li>2. Number of questions: 4</li> <li>3. Nature of questions: To gauge participants' reception of the learning material in regard to its content, organisation, pace of delivery and usefulness in teaching the learning objectives</li> </ol>	
Teaching material- "Introduction to Machine Learning"	<ol style="list-style-type: none"> <li>1. 2 versions: Tutor-centric and Student-centric; both were PowerPoint presentations</li> <li>2. Lecture content adhered strictly to the learning objectives which were also included in the first slide of the presentation for both versions</li> <li>3. Mode of delivery: Video of lecture material with voiceover done by the same person for both versions</li> <li>4. The narrator of the lecture videos was also responsible for writing the transcripts for both of them</li> </ol>	<ol style="list-style-type: none"> <li>2. Done in accordance with NTU's pedagogy of Objective-based Teaching and Learning (OBTL)</li> <li>3. Presenting it as a voiceover instead of a conventional recorded lecture video with the presenter seen on-screen minimizes distraction to the test participants that may affect their concentration on the lecture material.</li> <li>4. Transcripts were written strictly based on what was presented in the PowerPoint slides and no additional information was included. The narrator was a third party- neither the PI nor a Student Consultant. Any bias associated with difference in tone of voice or additional information delivered orally was eliminated.</li> </ol>

*Table 4. List of instruments used in the trial sessions and the rationale behind the instrument design.*

On a scale from 1-5 from “Strongly agree” to “Strongly disagree”, rate the following statements that agree best with your sentiments.

1. The concepts explained in the video lecture were clear and easy to follow
2. The pace of the presentation was just right.
3. The presentation slides were well organized and comprehensive
4. If the lecture was presented live and no recordings were made available, the presentation slides contain sufficient material to allow me to understand the concepts based on the learning objectives

Table 5. Questions for the evaluation of palatability on the Likert Survey. The order of questions corresponded to that used in the trials.

## Results

### Analysis of general performance across trials on the pre- and post-tests

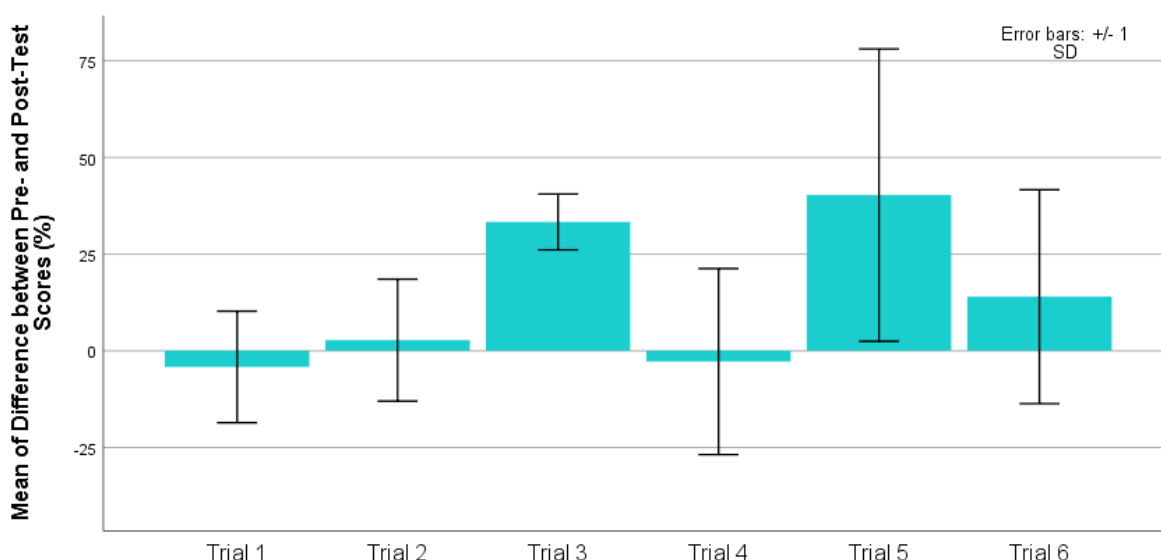


Figure 3. Comparison of the mean of (Post-test – pre-test) scores across all trials with error bars for 1 standard deviation included. Trial 1- Normal, tutor-centric, Trial 2- Normal, learner-centric, Trial 3- Told tutor-centric, Trial 4- Told learner-centric, Trial 5- Told learner-centric, but material is tutor-centric, Trial 6- Told tutor-centric, but material is learner-centric.

The mean of the difference between post- and pre-test scores were calculated for all members in each trial, with the exception of trial 1 where one test participant scored full marks in the pre-test (Figure 3). In this situation, there is no possible learning gain. While only trials 1 and 4 showed mean negative difference scores, the mean difference for trial 1 is more negative than trial 4 (negative learning gain). It is possible to do worse in the post-test as the pre-test questions test only knowledge on theory, while the post-test questions evaluate the ability to apply the knowledge (if it has been successfully learnt). This ensured that learners do not pass by simply regurgitating facts from memory (which is already a skill finely honed in the Asian academic setting).

Trials 2, 3, 5 and 6 showed positive mean differences (positive learning gain), with the highest positive mean difference observed in trial 5 at approximately 37.5%, followed closely by trial 3 at approximately 30%. Trial 2 experienced the lowest positive mean difference close to 0.

In this study, we looked at learning gains solely as the distribution of absolute difference between post-test and pre-test (delta) amongst individuals. No normalisation of the results was done since most participants performed similarly on the pre-test anyway and there was little variance in basal capability among individuals within and across trials.

**Analysis of performance on one specific learning objective across trials**

The net improvement score for each trial as a whole and the performance for individual participants on the pre- and post-tests matched to learning objective 5: ‘Interpreting the Receiver Operator Curve (ROC) curve’ are presented in Figure 4. Performance on this learning objective was chosen for analysis as it had the highest percentage of people choosing ‘I do not know this concept’ out of all the pre-test questions at 50% of the entire cohort across all trials.

Tutor-centric: Not told (trial 1) and Perceived as (Trials 3 and 5)					Student-centric: Not told (trial 2) and Perceived as (Trials 4 and 6)				
Trial 1 (not told, tutor-centric)				Net improvement	Trial 2 (not told, student-centric)				Net improvement
				+/- 0%					+50%
Student	A	B	C	D	Student	A	B	C	D
Pre-test (qn 6)	X	✓	N/A	X	Pre-test (qn 6)	N/A	N/A	N/A	N/A
Post-test (qn 8)	X	✓	X	X	Post-test (qn 8)	X	X	✓	✓
Trial 3 (told tutor-centric)				Net improvement	Trial 4 (told student-centric)				Net improvement
				+25%					+/- 0%
Student	A	B	C	D	Student	A	B	C	D
Pre-test (qn 6)	N/A	N/A	N/A	✓	Pre-test (qn 6)	✓	X	N/A	✓
Post-test (qn 8)	X	X	✓	✓	Post-test (qn 8)	X	X	✓	✓
Trial 5 (student-centric, but told tutor-centric)				Net improvement	Trial 6 (tutor-centric, but told student-centric)				Net improvement
				-25%					-25%
Student	A	B	C	D	Student	A	B	C	D
Pre-test (qn 6)	N/A	✓	N/A	✓	Pre-test (qn 6)	N/A	✓	✓	✓
Post-test (qn 8)	X	X	✓	X	Post-test (qn 8)	X	X	✓	✓

Figure 4. Comparison of individual test participants’ pre- and post- test results matched to learning objective 5: Purpose of ROC curve across trials. Results are separated into two columns: tutor-centric (perceived and not told)- left, student/learner-centric (perceived and not told)-right. The grey boxes represent wrong answers that are marked with ‘X’ or when students chose ‘I do not know this concept’, marked as ‘N/A’ and the green boxes represent correct answers, marked with ‘✓’.

The net improvement score was derived by summing up the positive improvement and negative improvement scores of all members in each group. Trial 2’s net improvement score of 50% was the highest while trials 5 and 6 had the lowest score at -25%. The learner/student-centric category had a higher total net improvement score of 25% combined compared to tutor-centric at 0%. Additionally, the percentage of people who improved from an ‘N/A’ score (which represented ‘I do not know this concept’) for trials 2 and 4 combined was higher at 60% compared to the combined percentage of 25% for trials 1 and 2.

However, there was an increase in net improvement from 0% when test participants were unaware material was tutor-centric (trial 1) to when they were aware (trial 3) at 25% with no negative improvement observed in both trials. In contrast, net improvement decreased from 50% to 0% between when they were unaware material was learner-centric (trial 2) and when they were told (trial 4). Although there was a positive improvement of 25% by student C of trial 4, it was cancelled out by student A’s negative improvement in the calculation of net improvement.

**Qualitative comparison of palatability towards both teaching materials**

Figures 5 and 6 showed the proportion of test participants per group who chose from the 5 options available on the palatability questionnaire (Table 5) for each question. All participants’ responses were included in this qualitative analysis. None of them chose ‘Strongly disagree’ for any of the questions. The total score on the Likert scale for each group was calculated by summing up the scores of the group members corresponding to the option they chose.

In situations where participants were unaware of who produced the teaching material, the responses were slightly more positive for the tutor-centric group (trial 1) than the learner-centric group (trial 2) across all questions. For questions 1 to 3, trial 1 scored

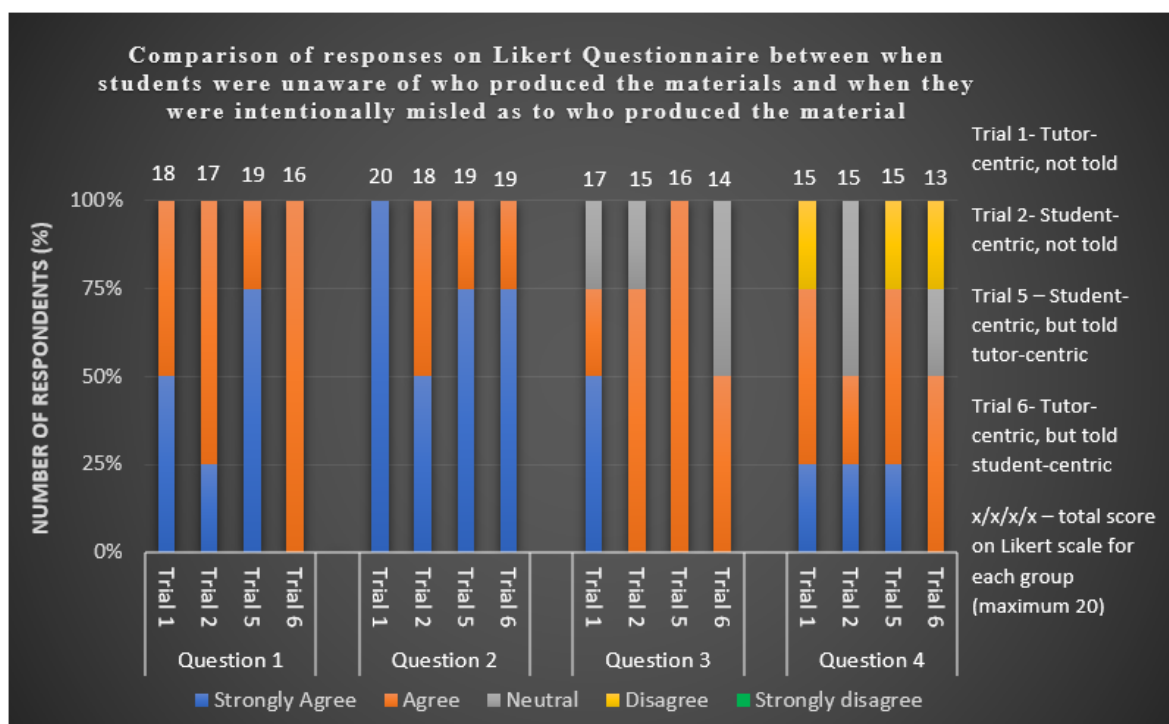
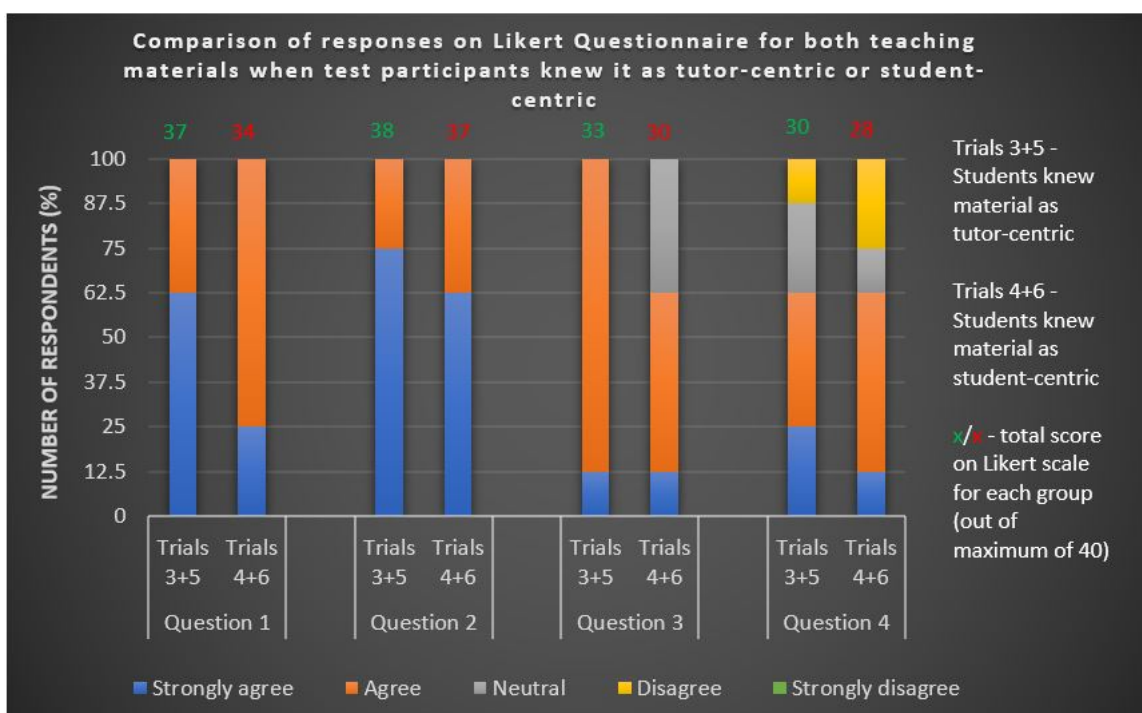


Figure 5. Palatability scores across trials in which students were unaware of who produced the material and when they were intentionally misled. Tutor-centric material-perceived or otherwise- scored higher than learner-centric material in all questions except question 4, in which trials 1,2 and 5 got the same score.

higher on the Likert scale than trial 2. Additionally, a higher proportion of respondents in trial 1 chose 'Strongly agree' than 'Agree' whereas in trial 2, 'Agree' made up the bulk of their responses. In question 3 where both trials had the same proportion of people choosing 'Neutral' at 25%, trial 1 was still comparatively more positive as 50% of the participants chose 'Strongly agree' while none chose that option in trial 2. For question 4 however, although the score on the Likert scale was the same for both groups at 15, trial 1 still showed a more positive response with a median score of '4' as opposed to '3.5' in trial 2.

The comparison between when participants were not told who produced the teaching material (Trials 1 and 2) and when they were intentionally misled as to who produced the teaching material (Trials 5 and 6) shows 2 obvious results. Firstly, responses were more positive when test participants were told the teaching material was tutor-centric even when it was really learner-centric (trial 5) as compared to when the opposite is true (trial 6) for all questions except question 2.

Secondly, barring question 2, trial 5 was more similar to trial 1 than trial 2 and trial 6 was more similar to trial 2 than trial 1 when comparing across the two categories. For question 4, trial 5's median score of 4 was identical to trial 1 even though trials 1, 2 and 5 had the same score of 15. In contrast, trial 6 scored lower at 13 yet its median score was the same as trial 2's at 3.5.



34                          38      37                          33      30                          30      28

Figure 6. Palatability scores between combined trials of when students knew material as tutor-centric or learner/student-centric, irrespective of whether that was true. Perceived tutor-centric scored higher than learner-centric in all questions.

Similarly, responses were also more positive across all questions when test participants were told teaching material was tutor-centric as opposed to when they were told it was learner-centric, regardless of whether they were truly tutor-centric or learner-centric respectively. For questions 1 and 2 where participants only chose either 'Strongly agree' or 'Agree' for both clusters, more respondents chose "Strongly agree" in the cluster which knew material as tutor-centric (trials 3 and 5) than those who knew material as learner-centric (trials 4 and 6).

## **Discussion**

### **Students showed a much higher improvement on post-test when told teaching material was tutor-centric as opposed to when told learner-centric**

In the first two trials conducted, little difference in improvement was observed when test participants were unaware of who produced what between when tutor-centric material was fielded (trial 1) and when learner-centric material was fielded (trial 2) (Figure 6).

However, students benefitted from knowing that their teaching material was tutor-centric, with an approximate five-fold increase in improvement when they knew material as tutor-centric, irrespective of whether that was indeed and truly the case (trials 3 and 5), compared to when they were not told.

A better performance on their tests after knowing the teaching material they were going to be exposed to was tutor-centric could be attributed to the high regard for teachers that most students have in a predominantly Chinese Confucian-based society such as Singapore (Ee and Tan, 2008). Making participants conscious about the fact that the material was tutor-centric right before the start of the trial could have emphasized the credibility of said teaching material to them or made them aware that the material had the possibility of not being tutor-centric, thus making them more appreciative that it was actually tutor-centric.

In contrast, no observable difference in improvement was made between when students were told teaching material was student-centric (trial 4) and when they were not told (trial 2). Although a larger improvement was seen in trial 6 when students were fielded tutor-centric material but told it was student-centric compared to trials 2 and 4, it was still notably lower than that in either trials when students were told material was tutor-centric. The results of trial 4 were surprising given that SAP was reportedly successful in not just increasing deeper learning in student consultants involved in the co-creation process (Carey, 2013), but some cases also demonstrated how student contribution to work fielded to fellow students was well-received (Dunn et al., 2018). We expected a deeper engagement with the lecture material in the test participants after knowing it was student-centric that may be reflected by a higher improvement in scores compared to when they were not told, which was not the case in this study. One reason could be that because the Asian culture emphasises hierarchy in relationships and respect towards authority, people who are seen as equal in standing may not be afforded the same level of regard compared to those in higher



positions. Consequently and unfortunately, they might not be receptive towards learning from a material prepared by “SBS students like them but trained by a Computer Science professor”.

However, as trial 6’s results conflicted with trial 4, it cannot be inferred that telling students material was student-centric was ineffective. At the same time, because two confounding variables were possibly introduced in trial 6, the increase in improvement as compared to trial 2 cannot be related clearly to either being told learner-centric or if it was due to the material being tutor-centric.

All trials, with the exception of trials 1 and 4, followed the expected notion that any intervention in learning which serves to educate (be it in the form of a lecture, video presentation or reading for example) will lead to positive learning that may be different for each individual (Conn, 2017). In both groups, most of them actually did worse in the post-test after exposure to the teaching material as compared to the pre-test.

Key reasons for such a disparity in both trials could be due to disengagement from the lecture material or a larger practice-theory gap in the students of these trials compared to the other trials.

### **Students found tutor-centric material to be more palatable than student-centric, be it perceived or real**

Palatability refers to the general perception of agreeability the test participants have towards the teaching materials that reveals the magnitude of their feelings regarding a certain aspect of the material.

When students were unaware of who produced what, they rated the tutor-centric material slightly more positively than the learner-centric one in various ways (Figure 5). However, this does not mean that the tutor-centric material was truly superior to the learner-centric version in all these categories. The palatability survey only revealed the test participants’ subjective perception of the teaching material, which did not account for the effectiveness of the material. Furthermore, the test participants rated the tutor-centric material less favorably when told it was student-centric (trial 6), suggesting that general notions of palatability are easily manipulated.

Similarly, students found teaching material to be more palatable when told it was tutor-centric than learner-centric, regardless of whether that was truly the case (Figure 6). This indicated that students generally preferred tutor-centric teaching material over learner-centric and this bias may be one reason accounting for their better improvement on post-test scores when told tutor-centric compared to when told student-centric.

### **Learner-centric material was more effective than tutor-centric material in educating students on learning objective 5, more so when students were unaware of it being student-centric**

Question 6 on the pre-test relating to the concept of ROC curve was the most unfamiliar to test participants based on results analysis and feedback to the facilitator about the questions after the trials (Figure 4).

Interestingly, more people improved on the corresponding post-test question from an N/A score in the pre-test in the student-centric trials combined (2 and 4) compared to those in the tutor-centric trials (1 and 3) at a ratio of 2.4:1. However, while telling students the material was tutor-centric increased the net improvement rate by 25% compared to when not told with only positive improvement made, telling students material was learner-centric actually decreased the net improvement with a negative improvement accounting for the decrease.

Although learner-centric material was more effective than tutor-centric material in bridging the gap in knowledge regarding ROC curve in test participants, the effectiveness was diminished by telling them it was learner-centric. On the other hand, students did better when told tutor-centric compared to not told, which agreed with the findings on the overall improvement.

While the content of both teaching materials regarding the ROC curve was similar, there were some differences in the presentation of information. For example, the learner-centric material had a larger picture of the curve, and equations were separate from the curve itself. Such presentation could have appealed more to the participants and facilitated learning of the concept better. This thus demonstrated the usefulness of using student input in co-designing teaching material on the basis that students understand better how other students would like to learn on account of them being in the same position themselves compared to professors (Healey et al., 2016).

### **Limitations and recommendations for future study**

The test design did not account for the theory-practice gap which varied uncontrollably amongst individuals (i.e., the post-test does not reward superficial learners). Thus, people with a wider theory-practice gap would naturally be at a disadvantage. However, weak application skills do not necessarily translate to a failure to learn as successful learning may also manifest in other forms (aside from test performance). Therefore, the post-test results could be limited in the interpretation of deeper learning since they only captured one form of successful learning. Future studies may include surveys to determine participants' learning styles and tailoring the evaluation of successful learning accordingly.

Additionally, while the study revealed students perceived tutor-centric material more favourably than learner-centric, that their perception of a material may change when told who produced it and that their performance can be affected by whether they knew the teaching material as tutor-centric or learner-centric, it was limited in showing the extent of influence of perception over the individual's performance or how it affects it. Future studies may be done to investigate the extent of correlation between both factors by including a post-hoc analysis of the students' feelings and thought processes

during the trial in future studies (a list of potential questions are shown in Appendix C).

## **Conclusion**

Students generally found tutor-centric material more appealing than learner-centric and telling them it was tutor-centric clearly improves their test performance. However, learner-centric material did have merit and was even more useful than tutor-centric material in teaching test participants something which they previously knew nothing about (e.g. the section on ROC curves), provided they were not told it was in fact, learner-centric.

The placebo effect of telling students a teaching resource was tutor-centric was consistent and much stronger than that of telling them it was learner-centric. While students found learner-centric material generally palatable, there was an inherent disconnect in them when faced with material perceived to be learner-centric which may be responsible for the poorer test performance observed.

While it seems intuitive to suggest incorporating SAP in terms of co-creation between student consultants and professors, but not to tell the general student population that students contributed to the production of material to get the best of both worlds, doing so violates the ethos of SAP itself. A partnership refers to equal contribution from both parties (though not necessarily in the same ways) and equal amount of respect (and recognition) should be accorded to both of them. Additionally, it is unethical to deceive the student population and it may become counter-productive when the student consultants feel resentful and discouraged.

Though SAP is gaining traction as a viable pedagogical method to enhance learning among higher education students in Western societies, there is limited information available about it applied in the Asian context. The differences between learners from the Western and Asian societies should be considered during the implementation of SAP and customised for these respective contexts. It may be prudent to introduce SAP slowly and in ways which students can visualise how it is done. We believe that SAP can work, but it needs to be introduced gradually and purposefully.

## **Acknowledgements**

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## Appendix A

### List of questions in Pre-test for the topic ‘Machine Learning’

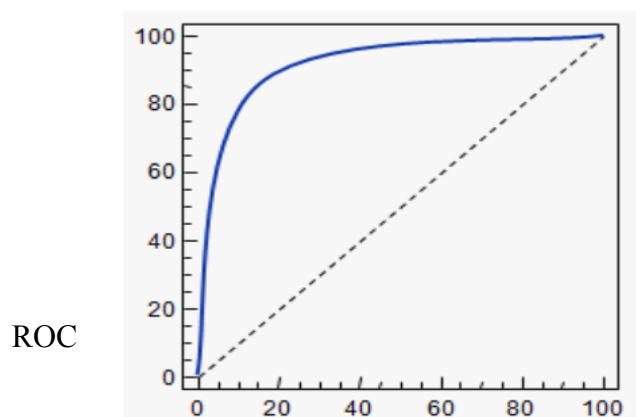
#### Instructions to test participants

Thank you for taking part in our study, your responses are important to us. There are 5 single-answer MCQ questions in this pre-test. Please answer to your best abilities and where a concept is unfamiliar to you, please fill in “I do not know this concept”.

1. In statistical testing and machine learning, what does a “true negative” mean to you?
  - a. Happens with a positive prediction, when in fact it is negative
  - b. Happens with a negative prediction, when in fact it is positive
  - c. Happens with a positive prediction and it is in fact, positive
  - d. Happens with a negative prediction, and it is in fact, negative
  - e. I do not know this concept.
  
2. In statistical testing and machine learning, what does a “False negative” mean to you?
  - a. Happens with a positive prediction, when in fact it is negative
  - b. Happens with a negative prediction, when in fact it is positive
  - c. Happens with a positive prediction and it is in fact, positive
  - d. Happens with a negative prediction, and it is in fact, negative
  - e. I do not know this concept.
  
3. Knowledge Discovery is the process of extracting useful information from data. Using your own intuition, list the order of the steps which you find to be most reasonable.
  - a. Data gathering> Variable selection> Variable generation> Variable integration
  - b. Data gathering> Variable integration> Variable selection> Variable generation
  - c. Variable selection> Variable generation> Data gathering> Variable integration
  - d. Data gathering> Variable generation> Variable selection> Variable integration
  - e. I do not know this concept.

Glossary\*: **Variable integration** is to use selected information to make a conclusion about something, **variable selection** is to determine the correct variable, **variable generation** is to classify information into specific categories, **data gathering** is to obtain all available information  
\*arranged in a random order
  
4. Which of the following best describes the relationship among variables, attributes and traits?
  - a. An attribute is a variable

- b. A trait is a variable that distinguishes one thing from another
  - c. An example of a variable is “Shape” while an example of an attribute is “circle”
  - d. B and C only
  - e. I do not know this concept
5. Statistical prediction is a form of statistical inference. Which of the following are conditions of a good prediction?
- I. High sensitivity
  - II. High specificity
  - III. High false positive rate
  - IV. Low true positive rate
- a. I and II only
  - b. I, II, III only
  - c. III and IV only
  - d. II only
  - e. I do not know this concept
6. The Receiver Operator Curve (ROC) is shown as below with its X and Y axes removed.



What information does the curve present?

- a. Degree of specificity of the test
- b. Degree of sensitivity of the test
- c. The relationship between sensitivity and specificity of the test for every possible cut-off
- d. None of the above
- e. I do not know this concept

## Appendix B

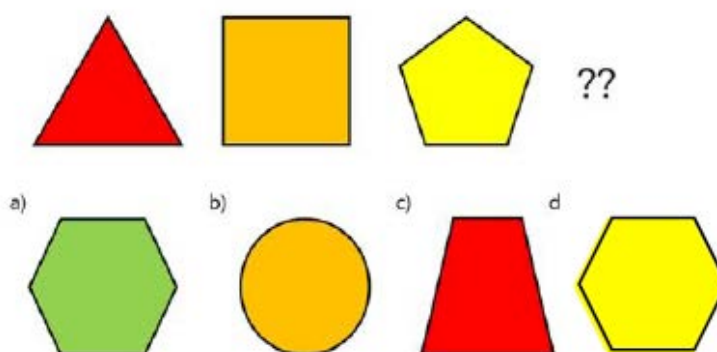
### List of questions in Post-test for the topic ‘Machine Learning’

Read the scenarios given carefully and tick the box that you think correctly describes the situation. You may tick ‘X’ if you do not know the answer. **Each box may be ticked once, more than once, or not at all.**

Scenario	Outcome				
	TP	TN	FP	FN	X
1. A pregnancy test is positive when you are not pregnant					
2. Detective Jake Peralta arrested a criminal suspect who was indeed the ringleader in a diamond heist					
3. The surveillance system of the jewellery store where the diamond heist took place did not detect malicious activities during the heist					
4. The saleswoman told the rude customer that there were no more new pieces of the blouse displayed on the mannequin when there were actually a lot of it stored in the storeroom.					

TP- true positive  
 TN- true negative  
 FP- false positive  
 FN- false negative  
 X- I do not know the concept

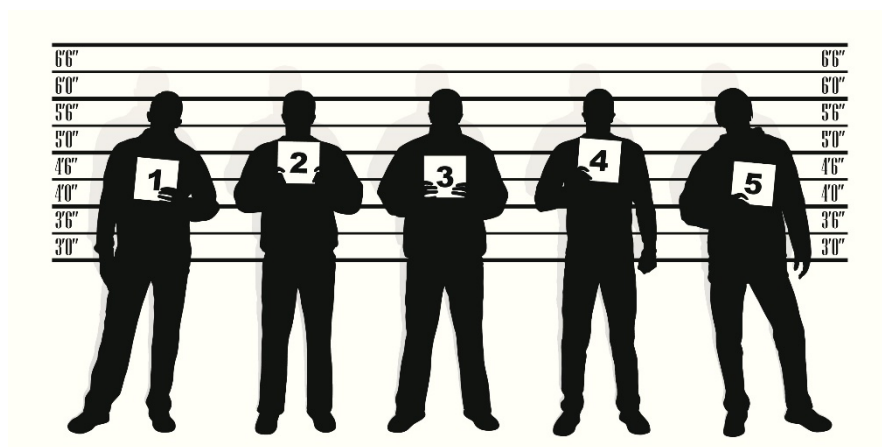
Question 5 is based on the diagram shown below.



5. Which of the following is **true** about this pattern recognition?
- 2 traits are used to determine which comes next in the pattern
  - ‘Shape’ is an example of an attribute while ‘Hexagon’ is an example of a variable
  - Both a and b
  - None of the above
  - I do not know this concept



6. You were an eye-witness in the diamond heist case and was called in to identify the culprit from a line-up as shown below:

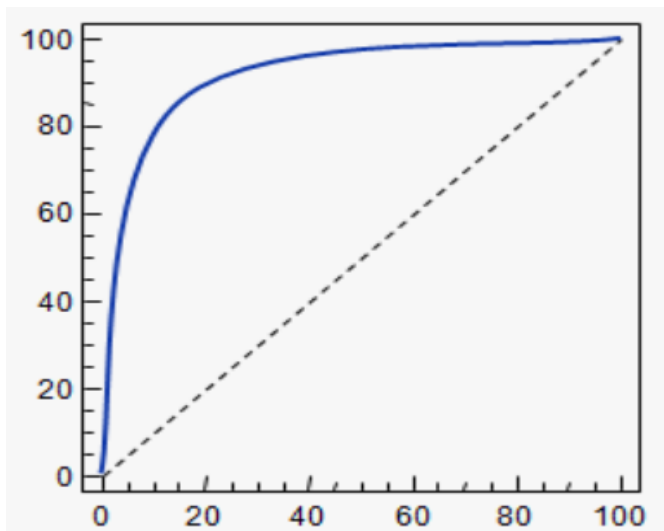


Using what you have learnt about the process of knowledge discovery, identify the appropriate heading for each classification in the table below.

I	II	III	IV
Suspect 3 seems to fit the profile of the culprit you saw that day	From memory, the culprit was a very tall, white male, bald, had a nose ring and a rose tattoo on his left forearm	You looked specifically at the men' height (about 185cm tall), hairstyle (bald), race (Caucasian),	Height, race, facial accessories, body modifications

- a. I-Variable integration, II- Variable selection, III- Data gathering, IV- Variable generation
  - b. I- Variable integration, II-Variable selection, III-Variable generation, IV- Data gathering
  - c. I- Variable integration, II-Data gathering, III-Variable selection, IV- Variable generation
  - d. I- Variable selection, II-Data gathering, III-Variable integration, IV- Variable generation
  - e. I do not know this concept
7. Which of the following is true about 'Sensitivity' in statistics?
- a. Sensitivity is otherwise known as the accuracy of the test
  - b. It measures how well the prediction captures relevant results
  - c. 'False negatives' are not considered in the calculation of Sensitivity
  - d. I do not know this concept

8. The picture below shows a ROC curve with its X and Y axes removed.



Which of the following statements is/are **false** about the ROC curve?

- I. The Y axis is labelled 'Sensitivity' and the X axis is labelled 'Specificity'
  - II. The top left corner of the ROC curve is the point where the results are most sensitive and specific
  - III. The diagonal line represents results that were obtained by chance
  - IV. Sensitivity and specificity have a directly proportional relationship i.e. as sensitivity increases, so does specificity
- a. I only
  - b. I, III and IV
  - c. I and IV
  - d. I, II and III
  - e. I do not know this concept

## Appendix C

### Potential List of questions for palatability survey

**On a scale from 1 to 5 (1 being “Strongly Disagree” to 5 being “Strongly Agree”), please choose the option that corresponds most closely to how you feel about the following statements:**

- 1i) The questions on the pre-test were challenging to answer
- ii) Describe one or more particularly memorable question to you from the pre-test and elaborate more on why you say so.
- iii) I feel confident that I did well on the post-test compared to the pre-test

- 2i) I was fully engaged during the entirety of the lecture
- ii) Think back on the lecture. Which part of it did you think was confusing for you or failed to engage you enough? Please elaborate and give as many details as possible.
- iii) The lecture prepared me well enough for the questions on the post-test

- 3i) Rank in order of importance to you the factors (**1 being least important, to 5 being most important**) that optimize your learning in SBS.

Interest in the subject, having ample time to learn the content, quality of the teaching material, having trained teaching assistants available for assistance, technology-enabled learning (use of clickers, smartboard etc)

- 3ii) Describe the ideal teaching material you would appreciate to be made available to you.

- 4) If NTU professors were to collaborate with students that have already taken the module in designing learning material, which type of material would you want to learn from the most?

- a) Student consultants produced material only
- b) Student and professors produced material
- c) Professor produced material only
- d) Please explain your choice in terms of why your chosen option appealed to you most and not the other two.

Question 5 and its subparts are tailored to the different trials (T1, T2, T3 etc) according to the unique scenario involved in each one.

#### **(T1,2)**

- 5a) How surprised are you to know that the lecture material was produced by a professor/ student consultants?

- **Extremely surprised, quite surprised, moderately surprised, slightly surprised, not at all surprised**

- 5b) Please elaborate on your answer in terms of what you experienced vs what you expected from a professor-produced/student-produced material (content, usefulness of analogies etc).

#### **(T3,4)**

- 5a) Knowing my material was student-produced/professor-produced made me look forward to it.

5b) Please elaborate on your answer, giving as many details about how you perceived the material as you can.

5c) How much more excited will you be if the material presented to you was student-produced/professor-produced instead?

- **Very excited, quite excited, moderately excited, a little excited, not at all excited**

**(T5,6)**

5a) How surprised are you to know that the lecture material was produced by a professor/ student consultants instead of by a professor/ student consultant as mentioned to you during the trial itself?

- **Extremely surprised, quite surprised, moderately surprised, slightly surprised, not at all surprised**

5b) What are your expectations of a professor-produced material (for those fielded faculty but told student). Did the material live up to your expectations? Please elaborate in terms of content, relatability, analogies used for etc.

***Internal Migration and Educational Attainment: Are Rural Migrant Workers Uniquely Socially Vulnerable in China?***

Jason Hung, London School of Economics, United Kingdom

The Asian Conference on Education 2019  
Official Conference Proceedings

**Abstract**

*Background.* Since 1980, China has been experiencing the largest migration in human history. Rural migrant workers are barred from enjoying fair treatment, when compared with their local urban counterparts, in both occupational and social settings. *Research aims.* The aim was to understand whether internal migration *per se* is associated with unique social vulnerability among rural migrant workers. *Research hypotheses.* (1) Less educated rural migrant workers were particularly disadvantaged in their access to social welfare, relative to their better educated counterparts. (2) Less educated rural migrant workers were particularly disadvantaged in securing social networks, relative to their better educated counterparts. (3) Rural migrant workers were more socially vulnerable, relative to their local rural counterparts. *Data.* Wave 1 (in 2008) of the Rural Household Survey (RHS) and Migrant Household Survey (MHS) were used for binary logistic regression analysis via the software package STATA 14.2. *Findings and discussion.* In response to Hypothesis 1, the lower the educational background of rural migrant workers, the more disadvantaged they were in terms of the access to social welfare. Supporting Hypothesis 2, less educated rural migrant workers were especially disadvantaged in securing social networks. As noted in Hypothesis 3, rural migrant workers were uniquely socially vulnerable, when compared with local rural dwellers. *Conclusions.* Rural migrant workers encountered a greater degree of social exclusion than local rural dwellers. Internal migration *per se* was associated with unique social vulnerability.

Keywords: Internal Migration, Educational Attainment, Social Welfare, Social Network

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## Introduction

### Rural-Urban Migration in China

Since 1980, China has been experiencing the largest migration in human history as hundreds of millions of rural dwellers relocate to urban areas (Gong, Liang, Carlton, Jiang, Wu, Wang, & Remais, 2012, p. 843; Editorial 2014, p. 1902). According to the China Population Census, the rural migrant worker - also known as rural-urban migrant worker or *nonmingong* (农民工) - population increased from 30 million in 1980, to 132 million in 2006, and 262 million in 2010 (National Bureau of Statistics, 2007; Fong & Tong, 2015, p. 1087). Urban populations increased from 21 percent of the total in 1982, to 45 percent in 2007, and rural-urban migration accounted for 70 percent of the rapid growth (Zheng, Long, Fan, & Gu, 2009, p. 425). Although rural migrant workers primarily engage in geographical mobility to improve their financial condition, migration has the potential to impose negative impacts on individual social wellbeing, reducing its net benefits (Stillman, McKenzie, & Gibson, 2006, p. 2).

### Rural-Urban *Hukou* System

In China, each citizen is assigned either a rural or urban *hukou* status (户籍), based on their maternal *hukou* status (Fu & Ren, 2010, p. 593; Song & Sun, 2016; Tani, 2017, p. 48). The *hukou* system, also known as the household registration system, was initiated in 1958 to control the movement of the Chinese population (Gallagher, Hasan, Canning, Newby, Yiu, & Whitman, 2009, p. 30; Fan, 2008, p. 66). Those in possession of a rural *hukou* can only gain access to state benefits and opportunities designated for rural Chinese communities (Young, 2013, p. 28; Davin, 1999, p. 7; Gaetano, 2015, p. 30; Chan & Zhang, 1999, p. 819). When individuals migrate to urban spaces, they remain ineligible for any social welfare - including healthcare, unemployment insurance, pensions, subsidised education and housing - allocated to urban Chinese communities (Wang, 2005; Zhong, Liu, Chan, Jin, Hu, Dai, & Chiu, 2015, p. 2; Akay, Bargain, & Zimmermann, 2012; Chen, Wang, & Wang, 2009, p. 1501; Wang, Liu, Zheng, & Liu, 2017, p. 1386).

The possession of a rural *hukou* status often prevents rural migrant workers from enjoying fair treatment, when compared with their local urban counterparts, in educational, occupational and social settings (Fong & Tong, 2015, p. 1087; Chan & Zhang, 1999; Cai, 2007). Rural migrant workers tolerate overcrowded and insalubrious living conditions (Lau, Cheng, Gu, Zhou, Yu, Holroyd, & Yeung, 2012, p. 526; Li, Wang, Ye, Jiang, Lou, & Hesketh, 2007, p. 718). For example, migrant cohorts are usually residentially segregated and concentrated in poorly facilitated “urban villages” (Lu, Lin, Vikse, & Huang, 2016, p. 59; Xiao, 2011). In Beijing’s “urban villages”, rural migrant workers often live in one-room residential units, with a mean living space per dwelling of 13.2 m<sup>2</sup>. The mean per capita living space in these “urban villages” was 8.2 m<sup>2</sup>, less than one-third of that in houses built on state-owned land parcels (27.4 m<sup>2</sup>) in 2007 (Zheng *et al.* 2009 pp. 433-4).

### Migrant Workers in China

Migrant workers can, in most circumstances, be categorised as rural migrant workers. For local rural residents, the decision to move between rural regions is easily

approved by local governments. Rural-to-rural migrants are not required to obtain expensive temporary residential and work permits, a necessity for rural-to-urban migration (Chan, 1998, p. 890; Chan, 2003, p. 7). Those who make this move lose none of their access to socioeconomic benefits designated for rural residents. However, rural residents moving from rural to urban spaces for a period of six months or longer are regarded as rural migrants and become ineligible for any benefits or opportunities (Chan, forthcoming).

### **Educational Attainment and Social Wellbeing**

Without an urban identity, migrant cohorts educated in cities are required to pay expensive entrance fees to enter local public schools – academic institutions where significantly greater educational resources are concentrated (Xiao, 2011; Lu *et al.*, 2016, p. 60; Pan, 2018, p. 363). Annual entrance fees ranged from RMB3,000 to RMB30,000 per child (Wong, Chang, & He, 2009, p. 816; Lu *et al.*, 2016, p. 60). Due to substantial financial constraints, the migrant population themselves illegally establish unlicensed, poorly-facilitated schools to educate their children. Here migrant children are subject to unsatisfactory teaching quality and facilities (Xiao, 2011; Qian, 2017, p. 212; Song, 2014; Fleisher & Yang, 2003). Poor educational environments adversely impact migrant children's academic outcomes as children receive little academic support at school (He *et al.*, 2014, p. 474; Song, 2014). Here academic support includes teachers' academic expectations and supervision (Golley & Kong, 2013, p. 35). Migrant children also face a certain degree of alienation and misunderstanding by teaching staff, in addition to a need to enter the labour market at an early age to financially support their families. These prompt their decisions to leave school prematurely (Wong, Chang, & He, 2009, p. 821; Xiao, 2011). For example, Jane Golley and Sherry Tao Kong (2013, p. 20) found that the average years of schooling of local urban dwellers and rural migrant cohorts were 12.27 and 9.44 respectively.

Aside from receiving education at *ad hoc* schools, other rural migrant cohorts had received the majority of their education at rural school before migrating to cities for work or otherwise. Based on data from 1993, 1997 and 2000 at provincial and county-level, published in the *Chinese Education Finance Yearbook*, nationwide primary schools indicated increasing rural-urban gaps in budgetary spending on operating expenses, including salary expenses (Wang & Gao, 2013, pp. 30, 33, 35). The relatively low salary levels and poor working conditions faced by rural teachers, relative to their urban counterparts, are significant impediments to attracting better-quality teachers in rural regions (*ibid.*, p. 66). As a consequence, schools located in poor, rural regions are often staffed by graduates from lower-tier academic institutions, rendering unsatisfactory teaching quality and hampering the academic development of rural students (Wang & Guo, 2013, p. 71; Peng, 2015). For example, in West China, the pass rate for Chinese Language in urban public schools was 100%, relative to 66.9% in rural village schools. (Wang & Li, 2009, p. 77). The dropout rate of lower secondary school was 2% in urban public schools, but 36.8% in rural village schools (*ibid.*, p. 80).

The relatively low educational attainment of migrant cohorts limits their opportunities to develop metropolitan networks (Knight, Sicular, & Yue, 2013, p. 184). They are

therefore particularly vulnerable when claiming job security or social welfare (Shi, Luo, & Sicular, 2013, p. 28; Yue, 2015, pp. 15-6; Murphy, 2002, p. 69).

Bao Liang Zhong, Tie Bang Liu, Sandra Chan, Dong Jin, Chi Hu, Jing Dai, & Helen Chiu (2015, p. 2), and Yang Cao and Zhenhui Liu (2015, p. 464), measured the levels of social wellbeing of poorly educated rural migrant workers. They found that rural migrant workers with an education of junior high school level or below suffered from lower earnings, worse working conditions and greater social strain, when compared to their better educated counterparts (Zhong *et al.*, 2015, p. 5; Cao & Liu, 2015, p. 465). Findings corresponded with results obtained from alternative studies (e.g. Zhu, Wang, Fu, Zhou, Zhao, & Wang, 2012, pp. 497, 501; Frenkel & Chongxin, 2015, pp. 262, 266, 268).

Some existing Chinese literature addresses how lower educational attainment impacts on rural migrant workers' social wellbeing. However, relevant literature fails to take social connections into consideration when measuring such wellbeing. This dissertation will, in part, focus on understanding the links between academic qualification and rural migrant workers' opportunities to secure social resources.

### **Research Aims and Questions**

Existing literature rarely explores how internal migration, and its implications of poor educational attainment, affect social wellbeing among rural migrant workers, particularly in the Pearl River Delta (珠江三角洲) and the Yangtze River Delta (长江三角洲). Regions along both deltas include Guangdong, Shanghai, Jiangsu, Zhejiang and Anhui – areas where significant numbers of rural migrant workers are situated (e.g. Fong & Tong, 2015; Zhang, 2015). This dissertation adopts a holistic, comparative approach and studied both rural migrant workers and local rural dwellers within the above two delta regions, alongside other areas which were either home or hosting cities of most rural migrant workers. A total of 15 provinces/cities with the greatest concentration of rural migrant workers - including Guangzhou, Shenzhen, Nanjing and Shanghai - were examined. The aim was to understand whether internal migration *per se* is associated with unique social vulnerability among rural migrant workers. To achieve this aim, this dissertation compared the extent of social exclusion faced by rural migrant workers and local rural dwellers, both holding rural *hukou* status, in most circumstances. The research question under investigation was whether rural migrant workers encountered social exclusion to a greater extent than local rural dwellers.

### **Research Hypotheses**

Chinese studies are inclined to rely on contemporary Western sociological theories, rather than developing their own frameworks of analysis (Huang, 2005, p. 94). This dissertation therefore adopts Pierre Bourdieu's interpretation of social capital (Savage, 2015, p. 46; Savage, Devine, Cunningham, Taylor, Li, Hjellbrekke, Roux, Friedman, & Miles, 2013, p. 223; Atkinson, 2015, pp. 62-3; Atkinson, 2010, p. 11). Pierre Bourdieu's pioneering interpretation of class focused within and beyond economic contexts. He, in part, incorporated social and cultural capital into the understanding of class (Savage, 2015, p. 46). Scholars, including Bourdieu, argue social capital refers to resources as per the exhibition of social networks and associations with certain



parties, families and names, that is in favour of creating life chances, enhancing wellbeing and realising upward mobility (Bourdieu, 1998; Shapovalova, 2013, p. 156; Savage, 2015, p. 62; Savage *et al.*, 2013, p. 223; Atkinson, 2015, p. 63). Such a definition applies in Chinese contexts, as social networks are a major determinant of social mobility (Jackson, Luijckx, Pollak, Vallet, & Werfhorst, 2008, p. 370)

Circumstances which inflict social challenges on rural migrant workers reduce their workplace efficiency and capacity for work, potentially compromising national economic growth (Wang, Liu, Zheng, Liu, & You, 2017, p. 1386; Liu, Ma, He, Xie, Xu, Tang, Li, Hao, Wang, Zhang, Ng, Goding, Fraser, Herrman, Chiu, Chan, Chiu, & Yu, 2011, p. 210). In the late 2000s, rural migrant workers contributed approximately 16% - 24% of GDP, in addition to around 33% - 40% of net income in rural China (Wang, 2010, p. 218). It is therefore crucial to ensure rural migrant workers can maximise their social wellbeing in order to enhance the economic contribution. Furthermore, discrimination and alternative forms of social exclusion are human rights abuses, prompting the need for early identification and intervention (World Health Organisation, 2013).

This dissertation outlines five hypotheses accordingly:

**Hypothesis 1:** Less educated rural migrant workers were particularly disadvantaged in their access to social welfare, relative to their better educated counterparts.

**Hypothesis 2:** Less educated rural migrant workers were particularly disadvantaged in securing social networks, relative to their better educated counterparts.

**Hypothesis 3:** Rural migrant workers were more socially vulnerable, relative to their local rural counterparts.

## **Ethics**

This study received approval from the Rural Urban Migration in China (RUMiC) team to conduct secondary data analysis in accordance with an end user license agreement obtained from the Institute of Labour Economics (IZA) to analyse data for this dissertation.

## **Research Design and Data**

### **RUMiC Data**

Data from the RUMiC 2007-8 datasets was used for analysis. The RUMiC is a large-scale longitudinal and representative survey of rural and urban Chinese populations from 2008 to 2012, and Chinese rural migrants from 2008 to 2013 (Zhao, 2015, pp. 88-9; Lee & Zhao, 2015; Zhang, 2017, p. 115; Akgüç, Giuliatti, & Zimmermann, 2014). The RUMiC consists three of independent surveys: The Rural Household Survey (RHS), the Urban Household Survey (UHS), and the Migrant Household Survey (MHS). The RUMiC was a joint venture of researchers at the Australian National University, the University of Queensland and the Beijing Normal University, with support from the Research Data Center of the IZA, a team led by Dr. Nikos Askitas (Fang, Gunderson, & Lin, 2015; Fang, 2017, p. 15). The RHS was carried out

in collaboration with the National Bureau of Statistics of China (NBSC) (Akgüc *et al.*, 2014). The NBSC is a deputy-cabinet level agency directly under the State Council of the People's Republic of China (PRC). Wave 1 (in 2008) of the RHS and MHS included detailed information about personal characteristics, educational attainment and occupational status, as shown in **TABLE 1** (Tani, 2015; Lee & Zhao, 2015). In the RHS, 8,000 households, with a total of some 32,000 respondents, were surveyed (ANU, 2014). The MHS interviewed approximately 5,000 households, with a total of 8,500 respondents (Tani, 2015; Meng, Kong, & Zhang, 2010; Lee and Zhao, 2015; Zhang, 2017, p. 115). Wave 1 data was collected throughout 2008 for the RHS; and between March and May 2008 for the MHS (Giulietti, Ning, & Zimmermann, 2012; IHSN, 2002; Meng *et al.*, 2010). Migrants were defined as individuals who had left their rural households and resided in urban regions for six months or longer (Meng *et al.*, 2010; Connelly & Maurer-Fazio, 2015; Kong 2010, p. 136; Démurger & Wang, p. 2016).

### Statistical Methods

The software package STATA 14.2 was used for secondary data analysis.

### Statistical Model

A total of 6 binary logistic regression models were built. In these models, sociodemographic variables – namely gender, age group, ethnicity and occupation status – were considered as confounding variables. Occupational status was measured by job nature and working hours. Educational level was treated as an independent variable. Each of the social exclusion components – defined as the presence of medical insurance, unemployment insurance and pension, and having financial, psychological and care giving help from people other than respondents' immediate families – was applied to the models as a response variable (Barry, 2002). Here care giving help refers to the ability of respondent to use their social networks to find people to take care of their dependent children, as well as elderly and disabled relatives.

Additionally, medical insurance, unemployment insurance and pension were either paid by employers or respondents themselves, or in combination. Alternatively, receiving help from people was measured based on whether respondents received financial, psychological and care-giving assistance in the past 12 months prior to undertaking surveys.

The formulas of inferential binary logistic regression model were written, as follows:

$$Y_{Medical} = \alpha + \beta_{gender} X_{gender\ i} + \beta_{age} X_{age\ i} + \beta_{ethnicity} X_{ethnicity\ i} + \beta_{education} X_{education\ i} + \beta_{job} X_{job\ i} + \beta_{workinghours} X_{workinghours\ i}$$

$$Y_{Unemployment} = \alpha + \beta_{gender} X_{gender\ i} + \beta_{age} X_{age\ i} + \beta_{ethnicity} X_{ethnicity\ i} + \beta_{education} X_{education\ i} + \beta_{job} X_{job\ i} + \beta_{workinghours} X_{workinghours\ i}$$

$$Y_{Pension} = \alpha + \beta_{gender} X_{gender\ i} + \beta_{age} X_{age\ i} + \beta_{ethnicity} X_{ethnicity\ i} + \beta_{education} X_{education\ i} + \beta_{job} X_{job\ i} + \beta_{workinghours} X_{workinghours\ i}$$

$$Y_{Financial} = \alpha + \beta_{gender} X_{gender\ i} + \beta_{age} X_{age\ i} + \beta_{ethnicity} X_{ethnicity\ i} + \beta_{education} X_{education\ i} + \beta_{job} X_{job\ i} + \beta_{workinghours} X_{workinghours\ i}$$

$$Y_{Psychological} = \alpha + \beta_{gender} X_{gender\ i} + \beta_{age} X_{age\ i} + \beta_{ethnicity} X_{ethnicity\ i} + \beta_{education} X_{education\ i} + \beta_{job} X_{job\ i} + \beta_{workinghours} X_{workinghours\ i}$$

$$Y_{Care-giving} = \alpha + \beta_{gender} X_{gender\ i} + \beta_{age} X_{age\ i} + \beta_{ethnicity} X_{ethnicity\ i} + \beta_{education} X_{education\ i} + \beta_{job} X_{job\ i} + \beta_{workinghours} X_{workinghours\ i}$$

where  $Y_{CMDs} = \log(\text{Odds}_i)$ ;

$\text{Odds}_i = \log[\pi_i / (1 - \pi_i)]$ ;

$$\pi_i = \exp(\alpha + \beta_{gender} X_{gender\ i} + \beta_{age} X_{age\ i} + \beta_{workinghours} X_{workinghours\ i}) / [1 + \exp(\alpha + \beta_{gender} X_{gender\ i} + \beta_{age} X_{age\ i} + \beta_{workinghours} X_{workinghours\ i})]$$

## Measurement

There are limited factors enabling the conversion from rural to urban *hukou*, including entering higher education. As a result, a small percentage of local rural dwellers and rural migrant workers might hold an urban *hukou* (Treiman, 2012, p. 34; Yeung, 2013, p. 55). In the RHS and MHS, 6.19% and 1.88% of all respondents held an urban *hukou* respectively. This dissertation focuses exclusively on social exclusion faced by rural *hukou* holding populations.

Existing literature suggests that Han Chinese individuals enjoy far more educational, occupational and social opportunities than the rest of 55 ethnic minority groups in China. Many of these minority groups face unique, diverse, socioeconomic barriers to education and employment, therefore this dissertation focused entirely on the Han Chinese migrant population (Hannum, 2002, p. 95; Gallagher *et al.*, 2009, p. 24). As shown in **TABLE 5** and **TABLE 6**, over 99% in the RHS and 98% in the MHS of all respondents were Han Chinese. Daniel Fu Keung Wong *et al.* (2005, p. 32) argued rural migrant workers are predominantly male and under the age of 35. According to the 2009 NBSC data, 51.19% of rural population and 65.1% of rural migrant worker population nationwide were male. Furthermore, 45.73% and 61.60% of the rural and rural migrant worker population were 30 years old or younger (NSBC, 2009; Chan, Ngai and Chan, 2010). Correspondingly, approximately 60% and 50% of local rural samples were self-identified as male and under the age of 35. Additionally, around 60% of rural migrant samples each described themselves as male and under the age of 35 (**TABLE 5** and **TABLE 6**). All confounders - namely “gender”, “age” and “ethnicity” - were denoted as  $X_{gender\ i}$ ,  $X_{age\ i}$ ,  $X_{ethnicity\ i}$ . For the variable “age”, both the RHS and MHS contained some underaged samples, as low as the age of 1 in some cases, who could not possibly respond to the set of questionnaires themselves. This indicated underlying flaws during data collection, which jeopardised the validity of the data. However, the number of underaged samples was very small (In the unprocessed MHS dataset, 451 samples aged 6 or below and 770 aged 12 or below; in the unprocessed RHS dataset, 1,332 samples aged 6 or below and 3,091 aged 12 or below) in both surveys, so any errors in data collection should be limited.

The legal retirement age in China is 60, although local rural dwellers and rural migrant workers running small businesses were not bound to the statutory retirement age due to the absence of an employment contract (James, 2007, p. 60). It is

noteworthy that samples might under-report their ages, as a result of their socioeconomic need to continue working rather than retire, therefore this dissertation analysed samples aged below 64 but not 60. Furthermore, according to the *People's Republic of China (PRC) Labour Law*, the minimum age for working was 16 (Library of Congress, 2015). Sample data included in this dissertation restrictively aged between 16 and 64.

According to the Xinhua News Agency (2004) and the State Statistical Bureau (2001), some 16% of migrant populations had, at most, completed elementary school and 52% of migrant populations finished junior secondary school or below. Statistics from these two sources corresponded to the MHS, where approximately 15% had, at most, graduated from elementary school and 54% from junior secondary school (**TABLE 5** and **TABLE 6**). In rural China, approximately 90% of the population completed primary school (Li, 2009, p. 14). Data echoed the RHS demonstrated around 85% of rural samples finished primary education. The variable “education level” was denoted as  $X_{education\ i}$ . Post-secondary education level referred to those who completed their schooling in polytechnic colleges or post-secondary vocational programmes – including TV/correspondence training programmes – and tertiary education.

As rural migrant workers are often undereducated and lower-skilled, occupational mobility is relatively low when compared to their local urban dweller counterparts. Rural migrant workers aiming to occupationally mobilise can, to some extent, compete for a limited range of technical or non-technical jobs (Wong, He, Leung, Lau, & Chang, 2008, p. 483; Yu & Hu, 1998). Data from the RHS and MHS demonstrated that the number of local rural dweller samples and rural migrant samples respectively undertaking manual work were both approximately 60% (**TABLE 5** and **TABLE 6**). The variable “job nature” was denoted as  $X_{job\ i}$ .

As an alternative to working for an hourly wage, Puilam Law and Yinni Peng (2008, p. 60) argued rural migrant workers, in part, preferred starting a business that required low levels of skill - for example, garment production or mobile phone selling. Although NBSC statistics failed to indicate the number of rural migrant workers engaging in individual or family businesses, data analysed as part of this dissertation revealed corresponding rural migrant samples were less than 20%. The percentage of rural migrant samples working for individual or family business almost doubled that of their local rural counterparts.

The majority of rural migrant workers were employed in factories, as well as the construction and services industries (Knight *et al.*, 1999). They engaged in physically demanding positions, jobs that local urban dwellers usually disdained (Roberts, 2000, p. 183). Moreover, they worked long hours, as many as 10 -12 hours per day, 6 -7 days per week (Tan, 2000, pp. 292-3; Park, 2008, p. 45). According to 2009 NBSC statistics, on average, migrants worked for 58.4 hours per week (Xu, 2013, p. 244). This dissertation established the cut-off points of the variable “working hours” (per week) as 60/61 and 120/121 accordingly (**Table 5** and **Table 6**). The variable “working hours” was denoted as  $X_{workinghours\ i}$ . Rural migrant samples on average worked for 64.5 hours per week.<sup>1</sup> Additionally, 87.8% of rural migrant samples

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<sup>1</sup> **Note:** 64.5 hours per week is the midpoint of 60 to 69 hours per week range.

worked for 84.5 hours per week or fewer.<sup>2</sup> Samples' lengths of weekly working time corresponded to aforementioned literature and statistics, revealing that rural migrant workers, on average, worked for approximately 60 hours per week and, in most circumstances, worked no more than 84 hours per week (i.e. 12 hours x 7 days = 84 hours per week). In China, it is noteworthy that the Central Government recommends the standard working-hour system, suggesting all employees nationwide should work for 40 hours per week on average (i.e. 8 hours x 5 days = 40 hours per week) (Shanghai Government, 2008).

As it was unlikely that an employee would work more than 120 hours per week, this dissertation exclusively focused on the comparison between samples working 60 hours or fewer per week, and those working over 60 hours but no more than 120 hours weekly.

All variables mentioned above were categorised as explanatory variables, or independent variables. Alternatively, in all given inferential statistical models, the dependent variables were the presence of medical insurance, unemployment insurance, pension, financial help, psychological help and care giving help. They were denoted as  $Y_{Medical}$ ,  $Y_{Unemployment}$ ,  $Y_{Pension}$ ,  $Y_{Financial}$ ,  $Y_{Psychological}$  and  $Y_{Care-giving}$  respectively. Here these dependent variables were all seen as dummy variables, coded as 0 or 1 (TABLE 7, 8, 9, 10, 11 and 12). Since only the head of a household was asked to fill out the information regarding their access to social welfare and social networks in the RHS and MHS, the vast majority of respondents were not required to report such details. This dissertation removed all samples who failed to disclose their social conditions in both surveys. As a result, 9,565 respondents from the RHS and 7,515 respondents from the MHS were included for data analysis.

As rural migrant workers reside in cities but do not hold an urban *hukou*, they cannot receive social welfare designated for rural or urban residents. A study conducted by Wang Feng *et al.* (2002, p. 521) found that as few as 14% and 10% of rural migrant workers benefited from health insurance and pension plans respectively. In contrast, as many as 79% and 91% of their urban counterparts received health insurance and pension plans respectively. These migrant cohorts also struggled to maintain or create rural and urban social networks. This dissertation therefore examined whether rural migrant cohorts were particularly disadvantaged in claiming social resources.

## Data Analysis

Cross-tabulation was employed in order to assess the relationships between each categorical confounding or explanatory variable, and the response variable. Then, Chi-square tests were performed to examine whether there was statistical evidence to suggest an association between two variables at 0.05 significance level. Next, logistic regression was performed for RHS and MHS data separately, for the purpose of measuring the associations between social resource components and each of the sociodemographic or socioeconomic predictors, keeping all other variables constant.

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<sup>2</sup> **Note:** 84.5 hours per week is the midpoint of 80 to 89 hours per week range.

## Findings

### Cross-tabulations

Data revealed that the higher educational attainment migrant samples achieved, the more likely they were to secure the benefits of social welfare and networks. For example, 4.47%, 7.69%, 29.90% and 61.45% ( $p < 0.05$ ) of samples who only completed elementary school received unemployment insurance, pension, financial help and psychological help respectively. However, 20.30% of samples who finished post-secondary education benefited from unemployment insurance, 32.47% from pension, 30.57% from financial help and 72.05% from psychological help ( $p < 0.05$ ) (**TABLE 7, 8 & 9**).

It is noteworthy that, apart from psychological help, less than 35% ( $p < 0.05$ ) of all migrant sample groups by educational level obtained social welfare or help from their social networks (**TABLE 7, 8 & 9**). In comparison, nearly all local rural samples received medical insurance (**TABLE 10**). Additionally, over 40% ( $p < 0.05$ ) of local rural samples, regardless of educational attainment, enjoyed financial and psychological help if needed (**TABLE 11 & 12**). Slightly over 35% ( $p < 0.05$ ) of local rural samples who finished post-secondary education were able to access to a pension (**TABLE 11**).

### Binary logistic regression

Keeping all confounding variables and other explanatory variables constant, the higher the educational attainment, the higher the odds of receiving unemployment insurance and pensions among rural migrant samples. Specifically, the ratio of benefit from unemployment insurance to those who had completed junior middle school, senior middle school and post-secondary school were 2.04 ( $p < 0.01$ ), 3.08 ( $p < 0.01$ ) and 4.48 ( $p < 0.01$ ) times higher than those who had completed elementary school. Furthermore, the likelihood of providing a pension to those who had completed junior middle school, senior middle school and post-secondary school were 2.06 ( $p < 0.01$ ), 4.17 ( $p < 0.01$ ) and 5.54 ( $p < 0.01$ ) times higher than those who had graduated from elementary school (**TABLE 13 & 14**).

## Discussion

Data revealed less educated rural migrant samples were, to a large extent, exposed to greater social vulnerability than their more educated counterparts. The lower their educational attainment levels, the less likely they were to receive social welfare – measured by unemployment insurance and pensions. This data was supported by existing literature, arguing poorly educated rural migrant workers often experienced worse social wellbeing and working conditions than their better educated counterparts (Zhong *et al.*, 2015, p. 5; Cao & Liu, 2015, p. 465; Zhu *et al.*, 2012, pp. 497, 501; Frenkel & Yu, 2015, pp. 262, 266, 268). As a result, in response to **Hypothesis 1**, the lower the educational background of rural migrant workers, the more disadvantaged they were in terms of the access to social welfare.

Findings in this dissertation demonstrated a positive association between educational attainment and social networks among rural Chinese migrants. Here better educated

rural migrant samples secured more financial help and psychological help, relative to their less educated counterparts. The assistance was of particular importance when compensating for the exposure to social strain and financial constraints faced by rural migrant cohorts (Song & Sun, 2016; Cheung, 2013, p. 122; Bankston & Zhou, 1997; Kulis *et al.*, 2009; Noh & Avison, 1996; Young, 2001; Xiao, 2011; Qian, 2017, p. 212; Song, 2014, p. 359). These findings supported **Hypothesis 2**, where less educated rural migrant workers were especially disadvantaged in securing social networks.

Additional findings demonstrated the disparities in social welfare and networks between rural migrant samples and local rural samples. Rural migrant groups were excluded from the access to social welfare and networks, relative to their local rural counterparts. This data echoed **Hypothesis 3** and presented rural migrant workers as uniquely socially vulnerable, when compared with local rural dwellers.

## Conclusions

In response to the research question, this dissertation stated that rural migrant workers encountered a greater degree of social exclusion than local rural dwellers. Rural migrant workers, on average, gained access to far fewer social resources, in terms of social welfare and networks, relative to local rural counterparts. Therefore, in response to the research aim, this dissertation found internal migration *per se* was associated with unique social vulnerability.

Within rural migrant cohorts, research findings demonstrated educational attainment was an important indicator of social wellbeing. Better educated rural migrant groups enjoyed more social welfare and were able to access to more help from individuals within their social networks. If this dissertation addressed tertiary and post-secondary education separately, findings could further indicate whether rural migrant samples with a tertiary education gained access to substantially more social resources than their less educated counterparts. However, this dissertation cohabited tertiary and post-secondary education due to the limited sample sizes in both educational categories. Combining samples from these two groups facilitated data analysis through running cross-tabulations, building regression models and undertaking significance tests.

Rural migrant cohorts securing tertiary education and post-secondary education were exceptional. As mentioned, rural migrants receiving higher education can convert their rural *hukou* to an urban *hukou*. In doing so, those holding an urban *hukou* can gain benefits from all social welfare designated for local urban dwellers. As a result, social inclusion faced by rural migrant cohorts might significantly increase once they have gained entry to higher education. However, without the separation of tertiary and post-secondary education in data analysis, these potential claims could not be verified.

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Not applicable.

***Students' Problem-Solving and Critical Thinking Skills:  
Bases for the Development of Contextualized  
Learning Module in Geometry***

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**Abstract**

This design research aimed at designing and developing a contextualized learning module on the basis of the level of problem-solving and critical thinking skills of the Grade 7 students particularly in Geometry under the K to 12 Curriculum. This study utilized the researcher-made problem-solving and critical thinking skills test. The results revealed that the students' problem-solving and critical thinking skills were at the beginning stage. The least-learned competencies in problem-solving and critical thinking skills were the bases of developing a contextualized learning module utilizing the ADDIE model. The design and development of the module was done through a seminar-workshop participated in by secondary school mathematics teachers. The implementation of the final draft of the module was done through pilot testing to determine the quality of the module. The results revealed that majority of the students found that the module was easy, exciting, enjoyable, and could enhance their problem-solving ability and critical thinking skills. The teachers also found that the contextualized activities could arouse the interest of the students. Hence, the contextualized learning module developed by the researcher can be used by teachers as support instructional material. Competencies in Mathematics will be learned by more students if the contents are taught in the students' real-world context.

Keywords: Problem-solving skills, critical thinking skills, contextualized learning module

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## Introduction

Mathematics is one of the subjects that pervade life at any age and at any circumstances (K to 12 Mathematics Curriculum Guide, 2016). Students are expected to be equipped with the 21st century skills especially the problem solving skills and the critical thinking skills. However, many students have poor performance in Mathematics. In an international setting, the study of Ogena, Laña, and Sasota (2010) showed that out of 10 countries participated in the Trends in International Mathematics and Science Study (TIMSS), the Philippines is on the 10<sup>th</sup> place with science high schools participating. They also found out that only 1% of the students have reached the advanced level. The problem of low performance in Mathematics is not only apparent in elementary and high school students. In the local setting, the study of Junsay (2016) showed that pre-service Mathematics teachers possess inadequate skills in critical thinking and problem solving. They lacked the ability to analyze, evaluate, interpret, infer, explain, and self-regulated (Junsay, 2016). Thus, they need to enhance their critical thinking and problem solving skills. The study of Saylo (2016) also showed that students had fairly developed critical thinking skills. This is an alarming reality and served as a great challenge for teachers and other educators to exhaust all means in achieving the goal of higher level achievement of students and bring great change to happen in the educational system.

The National Council of Teachers in Mathematics (NCTM, 2000) suggests that critical thinking and problem solving should be the focus of teaching Mathematics. The development of students' critical thinking and problem solving abilities are the primary objectives of Mathematics instruction (K to 12 Mathematics Curriculum Guide, 2016). Critical thinking skills should be developed through teaching and learning process an integral part of student's learning in schools (Firdaus, Ismail Kailani, Md. Nor Bin Bakar, Bakry, 2015). Students will have the characteristics of an independent learner if they internalize the skills and competencies of critical thinking and problem solving. (Elder and Paul, 2010).

In addition, the Philippines is the only country in Southeast Asia which has 10 year basic education (SEAMEO INNOTECH, 2012). There's really a need to enhance our curriculum because when compared with other countries, the Philippines is almost far at the bottom in terms of educational development program. By virtue of RA 10533, the Philippine education system shifted from 10-year to 12-year basic education by implementing the K to 12 curriculum. It started its implementation last school year 2012-2013. One of the problems encountered on its first implementation was the shortage of textbooks or learner's modules. Section 10 paragraph 3 of rule II of the RA 10533 states that production and development of locally produced instructional materials should be encouraged. However, these materials should meet the national policy standard. The learning material or learning module should be contextualized (RA 10533). It should also enhance problem solving and critical thinking skills of the students.

Theory of constructivism emphasizes that the learner construct knowledge when they were able to draw ideas from their own experiences and connect them to new ideas (Bruner, 1977). It contends that learners construct from what they learn through active involvement. That's why in the teaching and learning process, students must be involved actively in their learning and will be provided with experiences that



challenge their thinking. For Bruner, the purpose of education is to facilitate the learner's critical thinking and problem-solving skills which can then be applied to a range of situations.

On the other hand, Situated Learning Theory emphasizes that people's knowledge is constructed within and linked to the activity, context, and culture in which it was learned (Brown, Collins, & Duguid, 1989). For Lave and Wenger(1992), Situated Learning is learning that takes place in the same context in which concepts and theories are applied. Heckman and Weissglass (1994) believe that mathematics will be learned if taught within the context of the learners. In situated learning environments, students are actively involved in learning activities by using problem-solving and critical thinking skills.

An instructional-design theory offers explicit guidance on how to help people learn, develop and require at least two components: methods for facilitating human learning and development, and indications as to when and when not to use those methods (Reigeluth, 2011). Design theories are somehow prescriptive since they provide methodical guidelines to achieve a goal.

## **Methodology**

This design research utilized the ADDIE(Analysis, Design, Develop, Implement, and Evaluate) model in developing a module. Participants in each stage were identified. The results of the problem-solving and critical thinking skills test of the 143 students were analyzed and the basis for developing a contextualized learning module in Geometry. The design and development stages were done through a seminar workshop participated by 25 Mathematics teachers who have at least two years of experience teaching Geometry subject. The implementation stage was done through pilot testing of the final draft of the module to 31 students. The final module was evaluated by 17 teachers who actually teach the subject.

This research also utilized the researcher made problem-solving and critical thinking skills test. The tests were content validated by Mathematics teachers who were considered experts in their field of specialization. The four dimensions of problem solving by Wu and Adams (2006) which includes reading or extracting all information from the question, sense making and common sense approach to solving problems, mathematization and reasoning, and standard and computational skills were utilized for the problem-solving test while the six core skills on Critical Thinking of Facione (2013) which include interpretation, analysis, inference, evaluation, explanation, and self-regulation for critical thinking test. The final instrument has a reliability coefficient of .803 for problem-solving test and a reliability coefficient of .834 for critical thinking test through Kuder-Richardson(KR<sub>20</sub>). A focused-group discussion was conducted to determine the teachers' teaching experiences and the students' learning experiences with the use of the module during implementation. During the evaluation of the module, the teachers rated the module in terms of learning objectives, content, activities, assessment, and design and presentation.

This study used the research design to develop a learning module in Geometry. Design research is the the systematic analysis, design and evaluation of educational interventions with the aims of generating research-based solutions for complex

problems in educational practice, and the advancement of the knowledge about the characteristics of these interventions and the processes of designing and developing them (McKenney and Reeves, 2012)). Furthermore, the students' level of problem-solving and critical thinking skills and the least-learned competencies served as the bases for the development of learning modules in grade 7 Geometry. Specifically, this study utilized the ADDIE model which follows the five stages: analysis, design, develop, implement and evaluate.

## Results

The data in table 1 shows that students level of problem solving skills is at beginning stage ( $M=9.64$ ,  $SD=6.46$ ). This means that students neither identify the problem nor develop a coherent plan to solve the problem. They were not able to collect viable information as well as interpret the findings or reach a conclusion. This result was consistent with the study of Junsay (2016) that even pre-service teachers were short of the ability to apply concepts and mathematical principles to solve problems.

The beginning level of problem-solving can be attributed to the lack of problem-strategies or heuristics of the students. Problem-solving strategies help the students understand and solve the problem (Schoenfeld, 1985; Dolan, 1983). Dolan (1983) added that students' performance at solving problems could be improved if they are aware of the problem-solving strategies.

The data in table 1 further shows that students level of critical thinking skills was also beginning ( $M=11.55$ ,  $SD=6.71$ ). This means that students offered biased interpretations of evidence, statements, graphics, questions, information, or the points of view of others. They failed to identify relevant counter-arguments, and ignored or superficially evaluated obvious alternative points of view. Moreover, they argued using fallacious or irrelevant reasons and unwarranted claims. They neither justified results nor explained reasons, and regardless of the evidence or reasons, maintains or defends views based on self-interest or preconceptions and also exhibited close-mindedness or hostility to reason. A larger variance on students' scores on problem-solving compared to critical thinking was also noted. It indicated that the students' scores in problem-solving had wider spread from the mean.

This result is backed up by the study of Junsay (2016) that prospective teachers did not possess adequate critical thinking skills and were short of the ability to apply concepts, and mathematical principles. They lacked the ability to analyze, evaluate, interpret, infer, explain, and self-regulate. Furthermore, the study of Junsay (2016) and Saylo (2016) shows that even prospective teachers' critical thinking skills were between the beginning and developing levels.

The beginning level of students' critical thinking skills can be meager of students' exposure to classroom situations that could tickle their critical thinking skills. Asking higher order thinking skills (HOTS) questions to stimulate students' critical thinking skills is important. Brown & Kelley (1986) emphasized the importance on integrating questioning techniques into class discussions to support an educational environment where students can demonstrate and practice critical thinking skills. Another fact is that most students find mathematics difficult specifically in problem solving. This was confirmed by TIMMS (Ogena, Laña, & Sasota, 2010) and Junsay (2016). Hence,

there's a need for teachers to revisit their teaching strategies. They must utilize strategies that suit the need of their students.

*Table 1. Level of Students' Problem-Solving and Critical Thinking Skills*

Test(n=143)	SD	M	Description
Problem Solving Skills	6.71	11.55	Beginning
Critical Thinking Skills	6.46	9.64	Beginning

Scale of Means: Problem Solving - accomplished (41.26 –55.00), competent (27.76-41.25), developing (13.76 – 27.50), beginning (0 – 13.75). Critical Thinking - accomplished (37.51 - 50.00), competent (25.01-37.50), developing (12.51 – 25.00), beginning (0 – 12.50)

The top five(5) least-learned competencies for problem-solving skills were: Problems involving points, lines and planes; Conditions for convexity and concavity of polygons; Relationships of sides and angles of a polygon; Perimeter of a Polygon; Relationship of segments formed by bisectors of line segments, Angles formed by parallel lines cut by a transversal using measurement; supplementary pair. For critical thinking skills, the top five(5) least-learned competencies were: Conditions for convexity and concavity of polygons; Relationships of geometric figures using measurements and by inductive reasoning; coplanar, skew and parallel lines, Relationships of geometric figures using measurements and by inductive reasoning; intersecting and perpendicular lines, Relationships of sides and angles of a polygon ;Perimeter of a Polygon, Angles formed by parallel lines cut by a transversal using inductive reasoning; supplementary pair .

In summary, the least-learned competencies for both problem-solving and critical thinking skills were: Problems involving points, lines and planes, Conditions convexity or concavity of a polygon, Perimeters of a polygon, Relationships of geometric figures using measurements and by inductive reasoning; intersecting and perpendicular, coplanar, skew and parallel lines, Relationships of segments formed by bisectors of line segments, Angles formed by parallel lines cut by a transversal using measurement and by inductive reasoning. These were the bases of the module developed by the researcher.

*Table 2. Least-learned Competencies Problem-solving and Critical thinking skills*

Learning Competency/Topics( <i>n</i> = 143)	% of incorrect answers	Rank
<b>Problem Solving Skills</b>		
Problems involving points, lines and planes.	93.71	1
Conditions for convexity and concavity of polygons	88.11	2
Relationships of sides and angles of a polygon ;Perimeter of a Polygon	86.01	3
Relationship of segments formed by bisectors of line segments.	81.12	4
Angles formed by parallel lines cut by a transversal using measurement; supplementary pair	80.42	5
<b>Critical Thinking Skills</b>		
Conditions for convexity and concavity of polygons	86.71	1
Relationships of geometric figures using measurements and by inductive reasoning; coplanar, skew and parallel lines.	83.92	2
Relationships of geometric figures using measurements and by inductive reasoning; intersecting and perpendicular lines,	82.52	3.5
Relationships of sides and angles of a polygon ;Perimeter of a Polygon	82.52	3.5
Angles formed by parallel lines cut by a transversal using inductive reasoning.- supplementary pair	81.12	5

The data in table 3 showed the responses of the students on their experience with the module during the pilot implementation of the module. The results revealed that majority of the students found that the module was easy and enjoyable. The module's simplified activities encouraged everyone maximum participation. The result also revealed that majority of the students found that the module enhanced their problem-solving ability because they thought of a process in finding answers to the problem and by leading them how to solve the problem. In addition, the activities were understandable that it made them easy to find answers to the problem. They added that the activities allowed them to compute and solve. This was confirmed by the study of Wu and Adams (2006) that the domains of problem solving are reading and extracting information from the question and standard computational skills in carrying out computations.

The result further revealed that still majority of the students found that the module allowed the students to think critically. The activities allowed them to think and analyzed the situations that they could understand and answer the problems were given. One student said that they could explain the situation if they understand. This also confirms the cores of critical thinking skills by Facione (2013) and the Delphi Research Team. Through cooperation and collaboration with others, they have a better understanding of the lesson.

*Table 3. Students' Responses on their Experience with the Module during the Pilot Implementation.*

Items ( $n = 31$ )	Yes		No	
	$f$	%	$f$	%
The module is easy to understand and enjoyable.	30	96.77	1	3.23
The module enhances the students' problem-solving ability.	27	87.10	4	12.90
The module allows the students to think critically.	21	67.74	10	32.26
The module is of good quality	30	96.77	1	3.23

Table 4 shows the summary of teachers' evaluation of the module in terms of objectives, content, activities, assessment, and design and presentation. The results revealed that the teachers rated the quality of the module as excellent for objectives ( $M=3.88$ ,  $SD = 0.27$ ), activities ( $M=3.79$ ,  $SD = 0.28$ ), assessment ( $M=3.74$ ,  $SD=0.35$ ), design and presentation ( $M=3.46$ ,  $SD = 0.28$ ) except for content ( $M=3.11$ ,  $SD = 0.16$ ) that is very good. From this result, it can be derived that the module is accompanied by a list of specific objectives, suit a particular topic, clear and simple, fitted to the level and needs of the learners, and it is attainable. The content of the module is easily understood, cleared and well organized. The activities are congruent to the objectives of the lesson, interesting and contextualized, and can enhance the problem solving and critical thinking skill of the students. The module also provides assessments that can enhanced problem-solving skills, congruent to the objective of the lesson, challenge students to think critically, and are adequate to measure student learning. Furthermore, the design and presentation is clear observing with correct grammar and the layout of the module is appealing. Finally, the overall rating of the teachers of the module is excellent as shown by the mean score ( $M = 3.60$ ,  $SD = 0.20$ ). This means that the teachers found the overall components of the module to be of excellent quality.

*Table 4. Teachers' Evaluation of the Module*

Areas ( $n=17$ )	Mean	Std. Deviation	Interpretation
Objectives	3.88	0.27	Excellent
Content	3.11	0.16	Very Good
Activities	3.79	0.28	Excellent
Assessment	3.74	0.35	Excellent
Design and Presentation	3.46	0.28	Excellent
Overall	3.60	0.20	Excellent

Scale of Means: 3.26-4.00 Excellent, 2.51-3.25 Very Good, 1.76-2.50 Fair, 1.00-1.75 Poor

## Conclusions

The students do not have adequate problem-solving and critical thinking skills in grade 7 Geometry since they are in the beginning stage. They lacked the ability to apply mathematical concepts and principles in order to solve mathematical problems. They also don't have adequate knowledge and skills in reading or extracting all information from the questions and careless in carrying out computations since they cannot identify the problem, develop a coherent plan to solve the problem, and did not collect viable information. In addition, the students lack the ability to analyze, evaluate, interpret, infer, explain, and self-regulate. The students offer biased

interpretations of evidence, statements, graphics, questions, information, or the points of view of others. They also fail to identify relevant counter-arguments. They do not justify results or explain reasons, and argue using fallacious or irrelevant reasons and unwarranted claims. Hence, they needed to enhance their problem-solving and critical thinking skills. There's also a need for teachers to revisit their teaching strategies. They must utilize strategies that suit the need of their students. With the introduction of the contextualized learning module, they are required to provide solutions to a given problem. By doing this, students are given opportunity to apply what they understand about the problem and construct mental actions to arrive to a correct solution. They can also apply their previous knowledge and experiences by connecting it with the present situation. Thus, students can formulate solutions to problems if they have a better understanding about the problem situation.

The insufficiency of instructional material provided by DepEd to the teachers may have contributed to the low performance of the students in problem-solving and critical thinking skills in grade 7 Geometry. This may due to the fact that when teachers use reference materials, the concepts and activities may not be suited or appropriate to the specific grade level of the students. That's why in the teaching and learning process, there must be enough learning support of instructional materials that suit the needs of the students.

The contextualized feature of the module contributes mainly to the excellent rating of the learning module developed by the researcher in terms of its quality to enhance the problem-solving and critical thinking skills of the students. The contextualized activities enable students to apply their real life sense-making approach to problem-solving. Competencies in Mathematics will be learned by more students if the contents are taught in the students' real-world context. Likewise, this feature promotes information drive of the local culture of Guimaras.

Aside from this, teaching strategies must be complemented with appropriate learning instructional materials such as learning modules. Surya et.al. (2017) found that students' problem solving ability was improved with the use of the module. With the use of the module, students will be encouraged to work cooperatively in groups. Through active involvement in group activities, students enjoyed and appreciated the input and perspectives from peers(Herrmann, 2013). Herrmann added that cooperative learning groups can offer potentially valuable learning opportunities, but teachers should be aware that this does not guarantee a successful teaching and learning. This should be augmented with strategies that suit the needs of the students.

The result of this current study further showed that until now the modules for grade 7 have not been completed and delivered to schools specifically for Grade 7 Mathematics. The teachers are preoccupied by many responsibilities in the classroom. So, what could be expected from these teachers? Furthermore, looking for additional instructional materials may add to the burden of teachers.

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***The Influence of Student Learning Styles toward Behavioral Intention to Learn via Online Educational Games Platform***

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**Abstract**

The rapid expansion of new technologies has led to a change in the learning and teaching process. With the paradigm shift, the conventional teaching method no longer appeals to the current generation whose lives revolve around social media and technology. It is time educators learn to adopt new teaching methods to cater to the learners' needs. Fun learning evokes enthusiasm among learners. Hence, this study attempts to investigate how different learning styles among students influence their perception towards the intention to learn using online educational games instead of the conventional learning. Technology Acceptance Model (TAM) is employed in this study. Perceived usefulness and perceived ease of use from the model serve as the mediating variables in strengthening the analysis. This quantitative study employs a questionnaire adopted from the Selmes Learning Style Inventory targeting 240 undergraduate students in a private higher institution in the northern region of Malaysia. The inventory consists of five learning styles which are deep learning, surface learning, well organised learning, diligent learning and motivational learning. Data obtained was analysed using Partial Least Square- Structural Equation Modelling (PLS-SEM) version 3.0. The expected outcome aims to enhance the student's behavioral intention to learn via online educational games during lecture based on their learning styles. This study further provides insights to the educators who adopt 21<sup>st</sup> century learning methods, to take into account their student's learning behavior before preparing the teaching materials so as to produce talented and high potential learners.

Keywords: Selmes Learning Style Inventory, Technology Acceptance Model (TAM), perceived usefulness, perceived ease of use, behavioral intention

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## 1.0 Introduction

The rapid expansion of new technologies has led to a change in the learning and teaching process. With the paradigm shift, the conventional teaching method is no longer applicable to the current generation whose lives revolve around social media and technology. It is time educators learn to adopt new teaching methods to cater to the learners' needs. Fun learning evokes enthusiasm among learners. Educators who adopt 21<sup>st</sup> century learning methods can produce talented and high potential learners. According to Kamsin (2005), the infusion of technology in learning gives a positive effect to the learners.

Selangor Education Department Director, Zainuren Mohd Nor in The Star Online, April 24 2016 said that the traditional chalk and talk method is no longer applicable with this generation. He added that 21<sup>st</sup> century learning can help produce a generation of 'high quality students'. Technology is evolving and online learning has become easily accessible globally. This technology established a new platform for language learning which is known as gamification, a term coined by Nick Pelling in 2002 (Pelling, 2011). The term gamification is commonly defined as the use of game design elements in non-game contexts (Deterding et al., 2011).

Online educational games platform is often utilized by educators to attract learners to participate in a certain task by infusing game like elements into it. Game based learning is a popular method whereby most research focuses on its positive effects on students (Liu & Chen, 2013, Wang & Lieberoth, 2016, Bakan & Bakan, 2018). The effects are usually seen in student performance, motivation and engagement. There is limited research which investigates the relation between different learning styles and the varied perception to the use of online educational games during lecture.

Hence, this study attempts to investigate how different learning styles among students influence their perception towards the intention to learn using online educational games. On the other hand, this study aims to address the research objectives as below:

- i. To identify student learning style based on Selmes Learning Inventory
- ii. To examine the influence between student learning style and perceived usefulness on the online educational games platform
- iii. To examine the influence between student learning style and perceived ease of use on the online educational games platform
- iv. To examine the influence between student learning style and behavioral intention to learn via online educational games platform mediated by perceived usefulness and perceived ease of use

Section 2.0 presents the related studies pertaining to the learning styles and online educational platform. Section 3.0 presents methodology including the sample size size and research instrument. Selmes Learning Style Inventory is used in this study. This inventory consists of five learning styles which are deep learning, surface learning, well organised learning, diligent learning and motivational learning. Section 4.0 presents the results generated from the PLS-SEM 3.0 software consist of descriptive analysis, model measurement, convergent validity, discriminant validity, path coefficient and mediating effect tests. Section 5.0 discusses the results and concludes the study.

## 2.0 Related Studies

Learning style refers to the approach that best suits a student in learning. According to Isyak and Awang (2017), learning style is the method used by individuals to retain and absorb new information. There are students who learn something according to their own approach and they do not realize the approach used is different compared to other students (Chik & Abdullah, 2018). Learners may be inclined to use more than one learning style depending on the content they are learning. Some learners have a combination of learning styles but often have a certain preference they are most comfortable with. Each individual process new information differently. It is of utmost importance that educators understand which approach suits the learners to maximize the retention of new information. The term 'learning style' can be defined as unique and different ways to learn among individuals (Dunn et al, 2010 as cited in Samarakoon et al, 2013).

### *Learning Styles Frameworks*

In general, there are many different learning styles. This can be seen in the availability of a variety of learning styles frameworks. The models that are often used by educators to understand learning styles are Kolb's (1981,1984) inventory and VARK model by Fleming (2001).

Kolb's model (1981) listed four learning styles which are known as the converger, diverger, assimilator, and accommodator. The convergers are unemotional and good with applying ideas in practical, divergers are creative and good in brainstorming ideas, assimilators are great in inductive reasoning and creating theoretical models and accommodators are willing to take risks to try new experiences.

Fleming's VARK model (2001) categorises learners into four types which are visual, auditory, read/write and kinesthetic. Visual learners favor charts, colors and diagrams, auditory learners like discussing topics and ideas with their friends and teachers, read/write learners prefer textbooks, manuals and taking notes and kinesthetic learners enjoy hands-on approaches and finding solutions to problems. According to Selmes (1987), there are five learning styles which are deep learning, surface learning, well organised learning, diligent learning and motivational learning.

### *Learners Acceptance Models*

There are many models that investigate learners' acceptance to technology such as Technology Acceptance Model (TAM), Theory of Planned Behavior (TPB) and Theory of Reasoned Action (TRA). Davis (1989) has developed TAM and it has been widely used to explain users' acceptance to technology. The perceived ease of use and perceived usefulness based on the Technology Acceptance Model are key factors in computer use behaviors. Perceived usefulness and perceived ease of use are defined as "the degree to which a person believes that using a particular system would enhance his or her job performance" and "the degree to which a person believes that using a particular system would be free from effort" (Davis,1989). Marangunic and Granic (2015) believe the two key factors which are perceived usefulness (PU) and perceived ease of use (PEU) can directly or indirectly describe the outcomes.

### *Online Educational Games Learning*

With the 21st century learning comprising communication, collaboration, critical thinking, and creativity, advocates believe that educationist need to teach these skills to help students thrive in today's world. Interactive and fun learning using social media and technology that can evoke enthusiasm among students in the 21st century classroom, needs to be incorporated into new methods so that every learner's deepest potential is unlocked. By making learning fun and engaging through online educational games, and taking into account student's learning behavior, online educational games learning platform is able to produce talented and high potential learners.

Online educational games using technology such as Kahoot and Zuvio are two of the many game-based learning platforms that form powerful classroom assistance for educationist. These game-based learning platforms can be used as educational technology in schools and other educational institutions in the process of making education fun and engaging for the 21st century learners.

Educational researchers have pointed out several features of online educational games that allow them to be used as learning tools. For example, games are engaging (Dickey, 2005) and motivating (Prensky, 2003). They also provide a lot of experiences (Arena and Schwartz, 2013) and an excellent feedback on performances (Shute, 2011). Finally, games support very well the learner centred education (Gee, 2005). The advantage of a broad range of online educational games platforms is that they foster their learners learning through fun learning.

### *Research Framework*

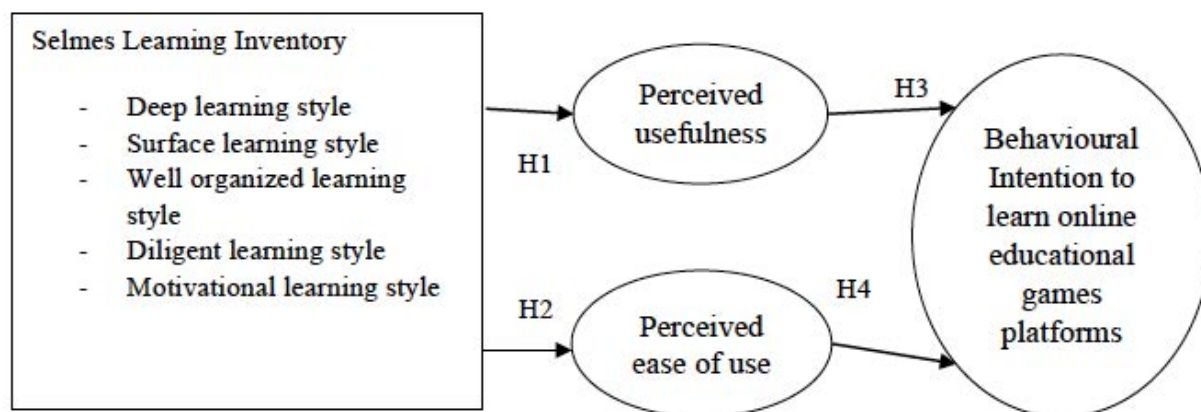


Figure 1: Research Framework

Based on the Figure 1, the research framework was developed to examine the behavioral intention among tertiary level student to learn via online educational games platforms. Different students have their own learning style to obtain knowledge. Thus, student learning styles served as the external attribute in this study. The mediating variables include perceived usefulness and perceived ease of use. Research questions and hypothesizes have been developed to address the study's need in order to achieve the research objectives.

### *Research Questions*

- i. What are the student learning styles based on Selmes Learning Inventory?
- ii. Is there any significant influence between student learning style and perceived usefulness on the educational games platform?
- iii. Is there any significant influence between student learning style and perceived ease of use on the educational games platform?
- iv. Is there any significant influence between student learning style and behavioral intention to learn via online educational games platform mediated by perceived usefulness and perceived ease of use?

### *Hypotheses*

- H1: Student learning style will influence the perceived usefulness  
H2: Student learning style will influence the perceived ease of use  
H3: Student learning style will influence the behavioral intentional to learn via online educational games platform mediated by perceived usefulness  
H4: Student learning style will influence the behavioral intentional to learn via online educational games platform mediated by perceived ease of use

## **3.0 Methodology**

This quantitative study employed Technology Acceptance Model (TAM) and Selmes Learning Inventory to develop the questionnaire. Questionnaire has been distributed to the undergraduate students across field of study in a private higher institution in a state of Perak, Malaysia. This institution have been selected as the research location due to the large number of undergraduate student among private institution in Malaysia.

There were 240 undergraduates from science and social sciences stream involved as the respondents. Data obtained from the completed questionnaire will be inputted into the excel sheet. Thereafter exported to the PLS-SEM software version 3.0 to generate descriptive and inferential analysis.

## **4.0 Results and Discussions**

### *Analysis of empirical results*

As shown in Table 1, out of 240 respondents, 70% of them are female students. Majority of them are first-year undergraduates obtained foundation qualification.

Table 1. Respondent's Profile

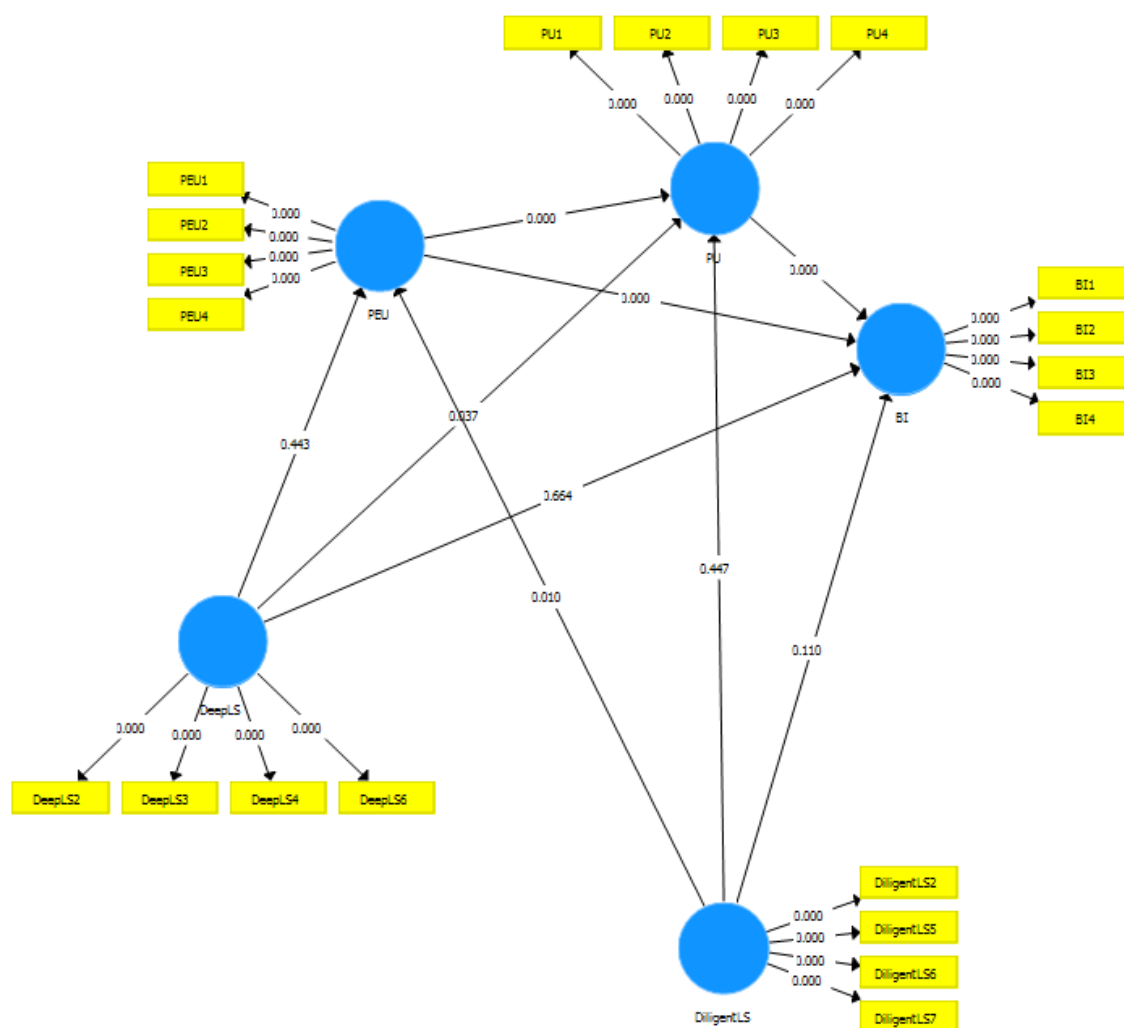
Demographic profiles		%
Gender	Male	30.4
	Female	69.6
Latest Educational Level	UEC	5.8
	STPM	10
	Diploma	5.4
	Foundation	54.6
	Others	24.2
Years of Study	1	57.5
	2	36.7
	3	5.4
	4	0.4

*Results of the model's assessment*

The proposed model as described in Figure 2 has a good fit by the sample data set as the Standardized Root Mean Square (SRMR) the estimated model is  $0.066 > 0.008$  (Henseler et al., 2016).



Figure 2. Proposed model



As shown in Table 2, the indicators' loadings for all the latent constructs of the model are significant at 99.99% confidence level via bootstrapping procedure with 5000 subsamples of the original sample data set In all constructs of the model. Besides, Cronback's  $\alpha$  , Dijkstra-Henseler's rho, composite reliability and Average Variance Extracted (AVE) for all the latent constructs of the proposed model are 0.7 or more. It shows that the scales used in all the model constructs have a good convergent validity. Based on variance inflation factor (VIF) computed among indicators in each model construct, there is no critical collinearity problems in the proposed model as all VIF values  $< 5$  (Hair et al., 2018).

Table 2. Convergent Validity

Latent Variable	Indicators	Standard Loading	t-statistics	p value	Cronbach's $\alpha$	Rho_A	Composite Reliability	AVE	VIF
Deep Learning Style					0.700	0.701	0.807	0.513	
	DeepLS2	0.652	3.795	0.00					1.332
	DeepLS3	0.725	4.214	0.00					1.556
	DeepLS4	0.783	5.469	0.00					1.349
	DeepLS6	0.698	3.887	0.00					1.202
Diligent Learning Style					0.716	0.746	0.820	0.536	
	DiligentLS2	0.632	3.671	0.00					1.222
	DiligentLS5	0.678	4.179	0.00					1.406
	DiligentLS6	0.787	7.267	0.00					1.385
	DiligentLS7	0.815	7.525	0.00					1.498
Perceived Usefulness					0,911	0,917	0,937	0,790	
	PU1	0.847	24.735	0.00					2,468
	PU2	0.915	60.426	0.00					3,524
	PU3	0.927	74.526	0.00					3,833
	PU4	0.864	36.165	0.00					2,378
Perceived Ease of Use					0.925	0.755	0.892	0.896	
	PEU1	0.879	47.323	0.00					2.450
	PEU2	0.842	24.896	0.00					2.271
	PEU3	0.884	42.838	0.00					2.743
	PEU4	0.868	44.179	0.00					2.266
Behavioral Intention					0.935	0.783	0.908	0.909	
	BI1	0.875	37.142	0.00					2.468
	BI2	0.856	27.089	0.00					2.382
	BI3	0.906	64.458	0.00					4.060
	BI4	0.903	61.540	0.00					3.969

In Table 3, as diagonal elements are larger than off-diagonal elements in Fornell-Larcker criterion analysis and Heterotrait-monotrait ratios (HTMT) between two constructs are  $<0.9$ , all constructs in the proposed model have satisfactory discriminant validity (Hair et al., 2016)

Table 3. Discriminant Validity

Construct	Fornell-Larcker criterion analysis					Heterotrait-Monotrait (HTMT)				
	BI	Deep LS	Diligent LS	PEU	PU	BI	Deep LS	Diligent LS	PEU	PU
BI	0.885									
DeepLS	0.127	0.716				0.155				
Diligent LS	0.068	0.354	0.732			0.082	0.528			
PEU	0.696	0.131	0.214	0.869		0.767	0.167	0.248		
PU	0.695	0.211	0.173	0.775	0.889	0.759	0.258	0.207	0.850	

In relation to the influence of students' learning style on the perceived usefulness of the online educational game platform, from the path coefficients and their corresponding p values generated by bootstrapping with 5000 resamples in Table 4, only deep learning style has significant effect on the perceived usefulness of online educational game platform at 0.05 significance level. Besides, only diligent learning style has significant effect on the perceived ease of use on online education game platform.

Table 4. Path coefficients between latent variables

Path	Standardized Estimate	t statistics	p value
Deep Learning Style -> Behavioral Intention	0.026	0.434	0.664
Deep Learning Style -> Perceived Ease of Use	0.063	0.767	0.443
Deep Learning Style -> Perceived Usefulness	0.123	2.086	0.037
DiligentLS -> Behavioral Intention	-0.096	1.598	0.110
DiligentLS -> Perceived Ease of Use	0.192	2.568	0.010
DiligentLS -> Perceived Usefulness	-0.035	0.760	0.447
Perceived Ease of Use -> Behavioral Intention	0.415	4.426	0.000*
Perceived Ease of Use -> Perceived Usefulness	0.766	21.520	0.000*
Perceived Usefulness -> Behavioral Intention	0.385	4.200	0.000*

Table 5. Mediating effects test

<b>Path</b>	<b>Standardized Estimate</b>	<b>t statistics</b>	<b>p value</b>
Deep Learning Style -> Perceived Ease of Use -> Behavioral Intention	0.026	0.704	0.481
DiligentLS -> Perceived Ease of Use -> Behavioral Intention	0.080	2.122	0.034
Deep Learning Style -> Perceived Usefulness -> Behavioral Intention	0.047	1.667	0.095
DiligentLS -> Perceived Usefulness -> Behavioral Intention	-0.013	0.738	0.461
Deep Learning Style -> Perceived Ease of Use -> Perceived Usefulness -> Behavioral Intention	0.019	0.766	0.444
Perceived Ease of Use -> Perceived Usefulness -> Behavioral Intention	0.295	4.315	0.000
DiligentLS -> Perceived Ease of Use -> Perceived Usefulness -> Behavioral Intention	0.057	2.087	0.037
Deep Learning Style -> Perceived Ease of Use -> Perceived Usefulness	0.048	0.769	0.442
DiligentLS -> Perceived Ease of Use -> Perceived Usefulness	0.147	2.529	0.011

As shown in Table 5, there are significant indirect effects between diligent learning style on perceived ease of use on online educational game platform and perceived ease of use on the students' behavioral intention to learn via online educational game platforms. Thus, the influence of diligent learning style on the students' behavioral intention to learn via online educational game platform is mediated by perceived ease of use.

## **5.0 Conclusion**

Based on the results, it can be concluded that students have deep and diligent learning styles. It is also cleared that perceived usefulness and perceived ease of use do influence the students' perception with deep and diligent learning styles on their behavioral intention to learn via online educational game platforms. Implications of this study indicates that students with deep and diligent learning style are interested and motivated to learn via online educational game platforms such as Kahoot, Blendspace. Thus, this will make teaching and learning process run smoothly and effectively. Educators could plan for more online educational games based learning in the lecture or tutorial class to encourage students to participate actively in their studies.

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## *Socio-cultural Aspects in the Japanese Language Teaching Methodologies*

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The Asian Conference on Education 2019  
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### **Abstract**

In the age of globalization learning a foreign language can be used as an important mean of cross-cultural understanding. Nowadays, there have been a lot of changes in the social life of people in different countries. Therefore, the language teaching and learning requires a comprehensive approach. That is especially true for the Japanese language, because, being a native language of one of the most closed nations in the world, its proficiency may be useful not only for communication, but also for better understanding the culture and mentality of the Japanese people. In the case of Japanese the teaching process can be divided into several subjects, such as grammar, writing, spoken language, the Japanese media, translation of Japanese fiction, historical text etc. Each of these subjects has its own specifics of learning and aims at developing translation or interpreting skills, as well as skills of writing a research paper or working with documents etc. However, learning just the language is not enough for building an intercultural dialogue. It is the task of lecturers to encourage learners to study geography, history, including the current political and economic situation, culture and ethnography, as well as customs and specifics of daily life of the Japanese people. The proper knowledge of the Japanese realities helps to make an adequate translation, what is especially important for state-to-state relations issue. Consequently, working out the appropriate Japanese teaching methodologies, taking into account socio-cultural factors, is finally aimed at building up the constructive dialogue with the Japanese nation.

Keywords: the Japanese language, teaching methodologies, comprehensive learning, socio-cultural realities, translation skills

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## Introduction

In the age of globalization learning a foreign language can be used as an important mean of cross-cultural understanding. Taking into account the importance of the international collaboration for further development of political, economic, cultural relations between different countries, one should pay more attention to the problem of working out the appropriate methodology of teaching a foreign language at University. Historically, the foreign language skills have been used not only as a mean of making a conversation, but also as a “key” for better understanding the way of thinking and the specifics of mentality of other people.

Nowadays, there have been a lot of changes in the social life of people in different countries. Therefore, the language teaching and learning requires a comprehensive approach. That is especially true for the Japanese language, because, being a native language of one of the most closed nations in the world, its proficiency may be useful not only for communication, but also for better understanding the culture and mentality of the Japanese people.

This paper aims to point out some features of the teaching methodologies of Japanese taking into account the necessity of learning the language alongside with the studying the historical and modern realities of Japan.

## Methodology and Findings

Traditionally the course on the Japanese language at the Department of Japanese studies at Saint Petersburg University is divided into several aspects such as: “Japanese writing”, “Japanese Grammar”, “Spoken language”, “The Japanese media”, “Translation of Japanese Fiction”, “Historical and Modern Historical Text” etc. Each of these subjects has its own specifics of learning and aims at developing translation or interpreting skills, as well as skills of writing a research paper or working with documents etc. However, learning just the language is not enough for building an intercultural dialogue. It is the task of lecturers to encourage learners to study geography, history, including the current political and economic situation, culture and ethnography, as well as customs and specifics of daily life of the Japanese people. Learning the language in the form of different aspects is finally aimed for the students can acquire the skills that can be applied in various fields of professional activity: research, education, diplomacy, translation, business, art and cultural activities etc. (Lelenkova, 2016).

Firstly, it’s worth focusing on two subjects, the main purpose of which is to study the texts on the socio-political and economic issues, that is "the Japanese media" and "Modern historical text". When studying these subjects, it is almost impossible to rely on certain teaching materials completely, since they quickly become out-of-date. In this regard, one should teach students how to work properly with texts of electronic and printed media and original historical research, while using auxiliary sources, including the Internet resources, to analyze information and work with lexical and phraseological material both in Japanese and in their own language.

The printed media is one of the most important means of information dissemination, and consequently, the formation of reality in the mind of common people. The media



has a difficult task of prioritizing certain words or events. Thus, the press can be considered as a kind of mirror of political, economic, cultural, scientific and technical life of the society (Ibrahim, 2016).

In Japan there has been a long tradition of determination of the character of the year and making the lists of the most frequently used popular words (jp. 流行語 *ryu:ko:go*) and neologisms or “newly created words” (jp. 新造語 *shinzo:go*). It is the media, where such words can be used for the first time and then widely spread in using among the people in ordinary life. The study of the popular or new words lists makes it possible to figure out the changes in the social, economic, political and cultural life of Japan over a period of time. In order to provide a better explanation of what exactly the tradition of neologism creation has been meant for the Japanese society in different historical periods, it's worth providing the following examples:

1940s – タケノコ生活 (jp. *takenoko seikatsu*). The word *takenoko* means “bamboo shoot”. This expression reflects the postwar realities in Japan and means “to exchange clothes for food”. In the postwar time people sometimes had nothing but to take off and give their clothes in order to get some food, as if one needs to peel a bamboo shoot before cooking.

1950s – 一億総白痴 (jp. *ichioku so:hakuchi*) means the process of dullness of the population caused by the mass use of TV and media.

1970s – オイルショック (jp. *oirushokku*) - “the oil shock”.

1980s – フリーター (jp. *furi:ta:*) – an abbreviation of the German *frei arbiter*, “free worker”, which means taking on work for a short duration. Such word had been practically used for young gradulators, who couldn't find a proper job and had to be held while waiting for other possibilities to open up. However, this term reflects not only the realities of social life in 1980s, but is also topical up to nowadays. Moreover, its meaning has also transformed a little in terms of emerging a new attitudes toward work among the younger generation in 1990s and 2000s.

1990s – リストラ (jp. *risutora*) means “restructuring”. The emerging of this term was caused by the realities of the prolonged economic recession in Japan since the late of 1980s, when some workers were forced to retire and left unemployed. It's also worth mentioning, that the word 首切り (jp. *kubikiri*), used previously, has gradually become out of use.

2000s – 妊活 (妊娠生活) (jp. *ninkatsu* or *ninshinseikatsu*) means literally “the pregnant life”. This word is used to express the way of life of a pregnant woman. The problem of child birth became one of the main problems of the Japanese society when such social problems as “fewer children and more careers” or “graying of the population” occurred in the beginning of 2000s. (Ibrahim, 2018).

The study of such phenomena as "popular words" and neologisms in Japanese plays a significant role in the work on translating texts of various subjects, as well as in acquiring the skills of verbal communication with native speakers.

Such subject as the “Modern Historical Text” provides reading and working with the texts on historical issues written in modern Japanese. The content of the research texts covers, mainly, a wide range of problems in the history of Japan, and world history, as well.

When learning the language in the form of reading and translating thematically specific texts, as those mentioned above, the problem of making inaccuracies in translating definite terms and concepts may arise. To that reason it is very important to develop the skills of conceptual translation. However, this aim cannot be achieved without further study of historical realities and the modern society situation. This is the goal of comparative study and analysis of materials in both native and foreign languages (Borisova, Lelenkova, 2017).

However, for the development of a more complete understanding of the language, having just lectures and practical exercises is not enough. In addition one can use the news reports, documentaries or movies, etc. This type of training develops not only listening and comprehensive skills, but also contributes much in getting familiar with the realities of the Japanese people’s life.

Reading and translating a fiction is another aspect, which is worth to be mentioned. It takes an important place not only in the teaching of a foreign language, but also in daily life as one of the means of getting to know other cultures. It is quite natural, when the plot of the fiction is put in the context of the everyday life realities that is customs, people’s behavior in various situations, the use of specific words and expressions. One of the problems of teaching the translation of fiction is that the bare knowledge of a foreign language is not enough for an adequate translation. It’s also necessary to understand the cultural, historical and other contexts (Lelenkova, 2018).

Working on a translation of fiction text means philological comprehension of the text, understanding of stylistic factors of linguistic expression etc. It is almost impossible to translate correctly the idea of a foreign author without knowing the linguistic features (phraseological units, fixed expressions, idioms, speech styles (official, courtesy, familiarity, vulgarism), special features of male and female way of speaking, proper and geographical names etc.).

### **Examples:**

1. 頂きます (jp. *itadakimasu*). This is the honorific form of the verbs “eat”, “drink” and “get”. So the literal (word-for-word) translation may be as “I get this food or drink with a pleasure”. However for some European languages the expression like “bon appétit” is more common.
2. The place name written in characters 十八女 in a word-for-word translation means “eighteen women” (jp. *ju:hachi onna*), but in fact the place name sounds as “*Sakari*”.

As for the translation of phraseological units, a problem of “non-identifying” an idiom may arise:

3. 朝飯前 (*jp. asameshimae*), which may literally means as “before the breakfast”. In fact, it has the same meaning as “a piece of cake” in English, in other words it means “it is very simple to do something”.
4. 体を張る (*jp. karada wo haru*) literally means ”stretch the body”. In fact it means “to sacrifice one's health for; to risk one's life”.
5. 自腹を切る (*jp. jibara wo kiru*) means in a literal translation “to cut one’s stomach”, while in fact it means “to pay for something out of one’s own pocket; to pay more than it needs”.

A problem can also arise in the translation of words or expressions that denote the realities of daily routine or social life – the so called “a problem of untranslatability”. In this case one should find the ways to translate words or phrases that denote specific realities.

### **Example:**

天下り (*jp. amakudari*) . This idiom is very hard to express in other foreign languages, as it refers to a very common practice, existing in Japan only, when bureaucrats are often able to find high-ranking jobs in private firms after retirement. Moreover it is so common that it has its own idiomatic name. As this reality reflects the unique feature of the Japanese social life, one should translate it descriptively, making some comments.

Thus, while working on the translation of a fiction text one can obtain a comprehensive understanding of the cultural phenomena of other nations, based not only on the description of the phenomenon itself, but also on the daily life context. In consequence, the so-called “couleur locale” will not be lost during the translation and the features of the original related to the historical period of its creation will be kept.

It is assumed that a professional translator should not only be proficient in a foreign language, but also be sufficiently erudite in the field of history, ethnography, culture, geography, as well as in specifics of daily routine or social life of the Japanese people etc. In case a translator has a lack of knowledge in any field, it is easy to make a slip when translating.

For example, when the Izumo province is mentioned in a Japanese text, one can often find a mention of clouds at the same time. Someone who is not familiar with the history of the Japanese culture and literature might think that this is due to the specifics of the weather in this region. Thus one may miss an important reference to the myth of the *Kojiki*, in which the god named Susano, exiled to the earth, after entering the province of Izumo, admired the heap of clouds and composed the following poem:

<i>Yakumo tatsu</i>	Many	clouds	arise,
<i>Izumo yaegaki</i>	The clouds which come forth (are) a manifold fence.		
<i>tsuma-gomi ni</i>	For the husband and wife to retire within		
<i>yaegaki tsukuru</i>	They have formed a manifold fence:		
<i>sono yaegaki o</i>	Oh! that manifold fence!		

There is also quite a common practice when one can make a slip, translating some everyday life realities.

### **Examples:**

1. まごの手 (*jp. mago no te*), what literally means “the hand of grandson”. In fact it means “a back scratcher”.
2. 親知らず (*jp. oya shirazu*), which word-for-word translation is “not knowing one’s parents”. However in fact it is a “wisdom tooth”.

It is the task of a teacher to explain the meaning of such words and encourage the students to study also some of the cultural and historical features of the relevant country. As a result, students can obtain a comprehensive understanding of the cultural phenomena of other nations, based not only on bare description, but also on the daily life context.

Thus, working with texts in Japanese on various issues can be used not only as a mean of learning the language, but also as an important tool for understanding the culture and mentality of other peoples.

### **Conclusion**

To conclude, in the current realities of globalization and building up multilateral relations, studying the foreign language is of high importance in order to get familiar with and understand the socio-cultural characteristics of the people of other countries. It’s also true for the studying of the Japanese language. Working out the appropriate Japanese teaching methodologies, taking into account socio-cultural, political and economic factors, is finally aimed at building up the constructive dialogue with the Japanese nation.

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***Job Satisfaction and Employee Creativity and Innovation for  
Student Affairs Practitioners***

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**Abstract**

Student affairs and services play an important role in the success of educational institutions most especially in carrying out students' holistic development and as a support to academics in order to facilitate learning. The student affairs administrators and practitioners contribute a lot in ensuring the delivery of dynamic programs and services that are responsive to the needs of the students. Because of this, the student affairs practitioners are expected to be creative and innovative in the field in order to provide and assure the quality of programs and services that addresses the ever-changing needs of their clientele. This paper examined the relationship of job satisfaction and employee innovation and creativity among student affairs practitioners. The descriptive-correlational design was employed to describe the relationship between the variables. The data were collected using validated pre-existing survey instruments. The data gathered was analyzed using Chi-Square test of independence and Pearson product moment correlation. The methods confirmed that there is a strong relationship between the variables job satisfaction and employee innovation and creativity as perceived by the respondent student affairs practitioners.

Keywords: Employee Creativity, Employee Innovation, Job Satisfaction, Student Affairs, Student Services

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## **Introduction**

Student Affairs and Services plays a significant role in ensuring student development in various areas: from academic to personal, socio-cultural, and in some instances, even in areas of political participation and citizenship (UNESCO, 2002). In the Philippines, the Commission on Higher Education describes student affairs and services as the unit tasked to ensure that meaningful non-academic experiences and efficient services are abundantly available, to provide every student various opportunity for total development (CHED, 2013). Because of this, the student affairs practitioners are expected to be creative and innovative in the field in order to provide and assure the quality of programs and services that addresses the ever-changing needs of their clientele. The relationship between job satisfaction and employee creativity/innovation of the administrators and employees working in the field of student affairs has been somewhat neglected or not given much attention. Student affairs administrators and practitioners are, most often than not, expected to have the ideal leadership and management skills in order to run the office. Their job satisfaction is a concern that is often times set aside and not considered in the field. The opportunity to innovate is also a not so popular topic. The leaders in the field are expected to understand the factors that have an impact on the adoption of innovation as they manage their institutions (Thomas, 1989). Many studies have already determined job satisfaction as a significant predictor that result to organizational innovation but there are very few researches that explored the relationship between employee job satisfaction, and organizational innovation (Palmer, 2016) most especially in the student affairs work.

## **The Student Affairs and Services Practitioner**

Taking into account the background of the administrators and their educational preparations, which is mostly in education and psychology, many are not familiar with the management process more so management innovations. Many of the practitioners and administrators would just research and study on their own just to strengthen their background on managing the student affairs office that is assigned to them. Because of this, the administrators utilize different leadership styles and the employees have different views and appreciation of these styles that could also be related to their job satisfaction and determination to be innovative in the field. According to De Poel, Stoker, and Van der Zee (2014), an empowering or transformational leadership style supports the creation of innovation among its members by facilitating idea creation. The demonstrated effect of leadership style on innovativeness purportedly is the cultivation and the enhancement of performance outcomes. Student affairs administrators and practitioners often find themselves focusing on what is wrong with their organization rather than what is right. Most are guilty of criticizing their organization and their leadership about what needs to be done differently. Many are coming from the experience where they felt that the student affairs work is not that important for the educational institution and they only receive little or no attention and support. De Jong and Hartog (2007) found out that studies that examine the definite link between leadership style and innovation have been limited and researchers disagree on the importance of leadership styles in prompting employee innovation. Previous studies have concentrated on the relative importance of determinants of job satisfaction (Ashraf, Joarder, & Al Masum, 2008).



The student affairs practitioners are carrying out the big responsibility of holistic development. There is always the pressure to be ideal, a model, and exemplary in all their dealings. Despite all these expectations, student affairs practitioners find joy and satisfaction in the work that they do. Bender (1980) examined the job satisfaction of student affairs professionals. The emphasis of her research was on demographic features and their effect in predicting overall job satisfaction. She focused on percentages of her sample satisfied with their work, differences in satisfaction between age groups, and implications of these findings on productivity. Majority of her respondents indicated enjoying their work with students. However, job satisfaction cannot fuel the improvements on student affairs management alone. Innovation in the field is also necessary and that the student affairs administrators and practitioners (employees) should be kept abreast of the latest trends in handling students and their concerns. The best way for this to happen is for the student affairs administrators and practitioners to learn how to be champions of innovation. Recent studies determined management style and job satisfaction is related to creativity and innovation (Voon et al., 2011). Organizationally, centralization findings confirm that, even in an administrative core operation such as student affairs, innovation is linked with decentralization more than with centralization. This supports the organic organization as being one that innovates (Thomas, 1989).

This study examined the relationship between job satisfaction and employee creativity/innovation. Specifically, this study addressed the question: Is there a relationship between job satisfaction and employee creativity/innovation in the field of student affairs?

The hypothesis tested for this study was: There is no significant relationship between job satisfaction and employee creativity/innovation in the field of student affairs. The theoretical framework of this study was grounded in Herzberg's Two Factor Theory and the Idea Generation and Idea Implementation framework of Magdeley & Birdi (2012). Motivational theories and innovation theories were not able to tackle how job satisfaction among employees establishes a relationship with innovation in organization. The strategic literature highlights employee job satisfaction as a markedly relevant influencer of organizational innovation (Palmer, 2016). The variables in this study were based on these referenced theories.

### **Job Satisfaction and Student Affairs and Services**

Job satisfaction has been heavily researched in many fields and has led to a better understanding of the factors that increase worker satisfaction, their productivity, and their retention. Studies on job satisfaction that address student affairs professionals have provided important information but do not comprehensively examine position level of the participants from a nation-wide perspective; available literature presents an incomplete picture of job satisfaction in student affairs. (Davidson, 2009) No single study has attempted to examine job satisfaction and its relationship with employee innovation in the field of student affairs.

Another important factor considered that determine job satisfaction is the kind of supervision given and received by the student affairs administrators and practitioners. It is a known fact that student affairs work values the importance of mentoring because of the direct supervision provided by the administrators and practitioners to

the students. However, it will be very hard for the administrators and practitioners to mentor and positively influence the students if they themselves are not satisfied with the kind of “mentoring” that they get from their supervisors. Researches also indicated that the supervision received was a satisfying construct of this work (Nestor, 1988). One interesting insight to the supervision concern is that of Burns (1982) where he reported that those student affairs officers who valued independence were satisfied with their work and would remain in the field. Supervisors should examine the balance between student interaction and administrative responsibility they are placing on midlevel managers. This balance could be a source of strain for individuals who hold these roles. Is their administrative workload appropriate in conjunction with the expectations placed on them for contact with students? Supervisors should also work to create an environment where student contact is valued, even for mid- and senior-level professionals (Lombardi, 2013).

The logical approach to understanding job satisfaction with student affairs professionals involves application of validated instruments for global and facet satisfaction while exploring differences based on age, ethnicity, gender, job tenure, position level, and institutional type. In addition, it is useful to understand if student affairs satisfaction is similar to the national norms for satisfaction with nonprofit companies. This information will enable the construction of recommendations and implications for practice that enhance the work experiences of student affairs staff and help promote organizational efficiency and effectiveness (Davidson, 2009). Professional development should be considered a part of a total rewards package related to benefits, educational support, etc. This finding also supports the desire for opportunities for promotion, as the two are clearly linked. If employees are provided appropriate monetary support for professional development along with opportunities for promotion and growth within an organization, positive outcomes will likely result for both the employee and organization (Lombardi, 2013).

### **Employee Creativity and Innovation and the Field of Student Affairs**

Shipton et al. (2014) investigated the link between job satisfaction and organizational innovation based on a sample of manufacturing companies in the UK. It was concluded, collective job satisfaction was found to be a significant predictor of organizational innovation. It was further determined in Shipton et al. (2014), the firms who are able to produce sustained innovation will likely increase their chances of long-term survival and growth. Past research on job satisfaction had been focused on investigating the situational factors affecting the job satisfaction of workers and has neglected to regard individual based and age-related factors (Hosseini et al., 2014).

Chen et al. (2012) performed research to explore the mechanism through which conflict management behavior affects job satisfaction and innovation-linked performance. Findings indicated the integration of conciliatory conflict management behaviors were correlated positively to job satisfaction. The integration of conflict management behavior was positively correlated to innovation-linked job performance and conflict management avoidance behavior was inversely related to innovation performance (Chen et al., 2012). Few studies have explored the relationship between employee job satisfaction and organizational innovation (Shipton et al., 2014). Relatively fewer studies have focused on job satisfaction and organizational innovation within the automotive industries. Nonetheless, most of the recent literature

converged on the relationship between organizational performance and job satisfaction.

The employees of every job could be creative (Bhatt, 2001). So the organizational researchers must determine variables that caused to the encouragement of creativity so that the organizations can enjoy the creativity and the managers must know how to support these creativities (Duffy, 2000). According to Kong (2012), high success rate of today organizations is based on creativity, innovation, discovery and invention. According to the existing needs, the organization are encouraged to efficiently change the behavior of individuals and organizations functions so that can survive, it seems the changes lead to the increasing emergence of new and benefit ideas rapidly. Among the organizations that have an important role in human life, are institutional organizations especially education system. In each country, the education system is one of the important social systems. The mission of this system is to transfer the cultural heritage and human experience to the next generation, to make desired changes in knowledge, attitudes and the behavior of children, adolescents and young adults (Taherkhani, 2015).

### **Job Satisfaction and Creativity and Innovation for Student Affairs Practitioners**

The main purpose of this study determined the relationship between job satisfaction and employee creativity/innovation in the field of student affairs. Job satisfaction (intrinsic, extrinsic, and general job satisfaction) served, as the independent variables while employee creativity/innovation (idea generation and idea implementation) was the dependent variable. The descriptive-correlational design was employed to describe the relationship between the variables. These variables were measured and operationalized using a cross-sectional survey design. A cross-sectional study obtains the profile of the respondents allowing conclusions to be drawn on a wider populace. The use of a cross-sectional survey design with applied quantitative procedures can provide greater accuracy in the analysis of the data. Quantitative approach is chosen as the preferred method for analysis for the following reasons: (1) to facilitate comparison and statistical accumulation of data, (2) to allow generalizability of the findings to the extent allowed by the source of participant recruitment, (3) to determine prediction through deductive reasoning, and (4) to test the hypotheses (Agarwal, 2014).

This study utilized the purposive sampling technique. It is the sampling technique where the subjects are selected based on a certain criteria or limitation set by the researcher. This technique gives each member of the population that falls fit in the identified category a chance to be selected as subject or respondent. The target population of this study was the student affairs administrators and practitioners in the Department of Student Life of the De La Salle-College of Saint Benilde. At present, there are about forty-five (45) student affairs practitioners working as regular employees in the Department of Student Life of the De La Salle-College of Saint Benilde. All of these student affairs practitioners were sent email information about the research to be conducted and were invited to partake in the survey process. A link to the online survey will also be included in the content of the email. The target is to gather forty (40) complete survey responses from the identified sample population as determined by the online sample calculator considering a 95% level of confidence and a margin of error of 5.

The data were collected using validated pre-existing survey instruments. The survey instrument was drafted online via Google form in which the online link was shared to the target population as part of the content of the email.

The data gathered was analyzed using Chi-Square test of independence and Pearson product moment correlation. The Chi-Square test of independence was used to determine if there is a significant relationship between two nominal variables. The frequency of one nominal value was compared with the different values of the second nominal variable. The Pearson product-moment correlation coefficient was used to measure the strength and direction of association that exists between two variables measured on at least an interval scale. Pearson product moment correlation was used to explain the relationship between job satisfaction and employee innovation.

In order to constrain issues on validity, a pre-existing survey instruments was used. The independent variable job satisfaction was measured with the use of another pre-existing survey questionnaire, the Minnesota Satisfaction Questionnaire (MSQ). This survey instrument was just previously validated and was originally developed by Weiss et al. (1976). The scores from this questionnaire measure the intrinsic, extrinsic, and general satisfaction. The items were rated on a five-point Likert Scale ranging from (5) very satisfied to (1) very dissatisfied.

The dependent variable employee innovation was measured using the recently validated corporate innovation survey questionnaire developed by Magadley and Birdi (2012). For purposes of this study, the items on organizational support for innovation, idea generation and idea implementation was measured. The respondents rated each question in a five-point Likert Scale ranging from (1) not at all to (5) a great deal.

### **Job Satisfaction and Employee Innovation**

The main purpose of this study is to determine the relationship of the independent variable job satisfaction with the dependent variable employee innovation in the field of student affairs. The data was gathered and analyzed using the chi squared method. The strength of the relationship of the two variable was also tested using the Pearson product moment correlation coefficient.

The average rating of all the respondents (see Table 1) were plotted on a graph in Fig. 8 to examine linearity of the two variables. It can be directly observed from the scatter plot that the two variables, job satisfaction and employee innovation, have strong uphill linear pattern, depicting strong correlation between them. To measure how strong their positive correlation is, the correlation coefficient,  $r$ , was computed using Data Analysis function of Microsoft Excel. Results were shown in Table 2.

*Respondents' Average Rating of Job Satisfaction  
and Employee Innovation*

Respondent number	Job satisfaction	Employee innovation
1	4.50	4.00
2	4.90	4.71
3	4.50	4.71
4	3.80	3.71
5	4.10	3.71
6	4.00	4.00
7	4.60	4.00
8	3.70	3.29
9	4.00	4.43
10	4.70	4.57
11	4.20	4.14
12	3.05	3.43
13	3.95	3.86
14	3.95	3.71
15	4.90	5.00
16	4.80	4.86
17	4.90	5.00
18	4.15	4.29
19	3.05	3.57
20	4.65	5.00
21	4.50	5.00
22	3.50	4.00
23	4.80	4.71
24	3.40	3.14
25	4.65	4.57
26	4.00	4.00
27	4.00	4.00
28	3.70	4.00
29	4.65	4.14
30	3.15	3.00
31	4.80	4.00
32	4.55	4.71
33	4.90	5.00
34	3.90	4.00
35	4.90	3.86
36	4.70	4.00
37	4.75	5.00
38	3.75	3.86
39	4.65	4.29
40	4.15	3.86

Table 1. Average Rating of Job Satisfaction and Employee Innovation

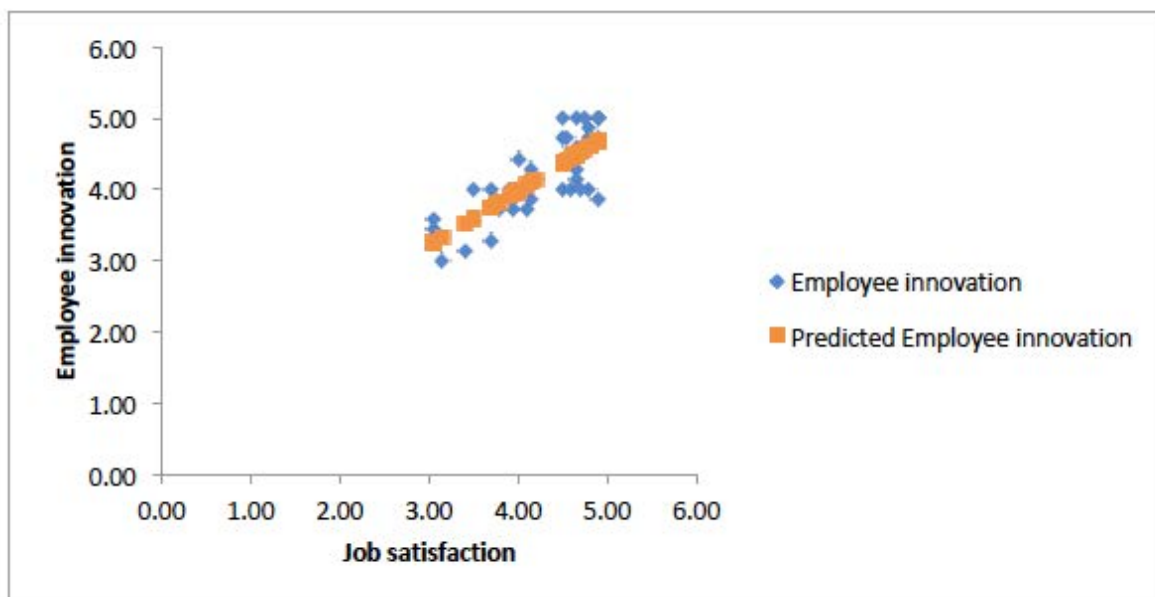


Figure 1: Line fit plot of job satisfaction versus employee innovation

The computed correlation coefficient (see Table 2) is 0.777682328. This value affirms the strong linear relationship obtained in Fig. 8. This only means that there is a very strong positive correlation, given that the coefficient is greater than 0.70, between job satisfaction and employee innovation.

*Value of the correlation coefficient r*

	<i>Job satisfaction</i>	<i>Employee innovation</i>
<i>Job satisfaction</i>	1	
<i>Employee innovation</i>	0.777682328	1

Table 2. Value of Correlation Coefficient r

Chi-square test for independence was used here to assess whether there is an association existing between the two variables, job satisfaction and employee innovation by comparing the observed responses and the expected responses if the said two variables were actually independent of each other. Computed chi-square statistic was compared against the critical value. Also, chi-square p-value was obtained to confirm results of the previously-discussed statistical tool.

*Data for Chi Square Statistic Test for Independence*

Observed			
Job satisfaction	Employee innovation		Total
	Average rating of 4 and above	Average rating below 4	
Average rating of 4.35 and above	19	1	20
Average rating below 4.35	9	11	20
Total	28	12	40
Expected			
Job satisfaction	Employee innovation		Total
	Average rating of 4 and above	Average rating below 4	
Average rating of 4.35 and above	14	6	20
Average rating below 4.35	14	6	20
Total	28	12	40

Table 3. Data for Chi Square Test for Independence

Since the computed Pearson chi-square value, which is 11.9047619 is greater than that of the critical value that is 3.84145882 (from Chi-square distribution for degrees of freedom equal to 1), the null hypothesis was rejected. Thus, there is an association between job satisfaction and employee innovation. The chi-square p-value of 0.00056 which is less than the alpha level of 0.05 for a 95% confidence level affirms that the variables are not independent of each other and that there is a statistical relationship between job satisfaction and employee innovation.

### Summary of Findings

The descriptive method was used to describe the demographic profile of the respondents and clustered them according age, gender, position level, civil status, and educational attainment. The chi-squared analysis method was used to answer the research question and the related hypothesis. This method confirmed that there is a relationship between the variables job satisfaction and employee creativity/innovation as perceived by the respondent student affairs practitioners. Pearson product moment correlation coefficient analysis was employed to validate and to determine the strength of relationship among the identified variables. The results confirmed that there is a strong relationship between job satisfaction and employee creativity/innovation and that the null hypothesis that there is no significant relationship between job satisfaction and employee creativity/innovation is rejected.

## **Conclusions**

This study was conducted to determine the relationship of job satisfaction and employee innovation among the student affairs practitioners employed in the Department of Student Life of the De La Salle-College of Saint Benilde. Practical applications focused on using the results to innovate management styles, policies, processes, and systems to ensure job satisfaction among the student affairs practitioners.

The results derived in this study can be utilized to pursue the current body of knowledge and provide practical applications to the student affairs practice and administration. Further research should also be piloted which targets other industry or profession using a longitudinal study. This kind of study will prove to be beneficial in evaluating changes in job satisfaction and employee creativity/innovation over time. Future studies should also be directed to include other countries and cultures to determine if similar findings would be revealed and to assess generalizability of the research findings. It could also prove interesting to conduct a similar study using the qualitative or mixed method to find out if the same findings will occur.

Personally, the administration and handling of student affairs practitioner or personnel should be taken seriously and be given enough consideration in order to ensure their job satisfaction. The function of the student affairs practitioners is crucial not only in the development of themselves but more so in the development of the students that are entrusted to their care. The management of the educational institutions must ensure that the needs of the student affairs practitioners pertaining to their job function is met and satisfied before they can promote and insist movements for innovation. This study could also help the top management of the educational institutions in innovating their management styles, policies, systems, and processes, in order to ensure that the concerns of the student affairs practitioners are addressed and that they are in the same page in terms of encouragement for creativity and innovation.



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***Development of a Creativity Framework for Filipino In-service and Pre-service Professionals***

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**Abstract**

The study explored and documented creative problem solving output of 12 Filipino in-service professionals, expert practitioners in the fields of Hospitality and Tourism, Engineering and Architecture, and Information Technology from one university and 191 Filipino graduating students, pre-service professionals proficient in the same fields from three universities in Baguio City, at the Cordillera Administrative Region of the Philippines. Research questions aimed to define creativity, determine the categories of creative problem solving output of the two sets of respondents based on the factors that motivated such. Qualitative data from the validated questionnaire and the focus group discussion were processed with thematic analysis through memoing and open axial coding borrowed from the Grounded Theory approach. Frequency count and percentage were used to treat the answers about daily creative problem solving activities. Quantitative data gathered with the Intrinsic Motivation Inventory by Ryan and Deci was processed using the one-way repeated measure analysis of variance (ANOVA) and t-test. Responses revealed the operational definition of creativity within acceptable parameters. Respondents manifested little-c, mini-c and Pro-c creative outcomes that had potential to become the next level category in all instances shown in a framework. Pre-service professionals scored the highest percentage on literary arts as little-c. Respondents were intrinsically motivated by desire for satisfaction and the subscale of value and usefulness. Extrinsic motivation was found through enabling policies and, supportive family members, workmates and schoolmates. No significant differences were found in the level of intrinsic motivation according to gender, course, or school graduated from.

Keywords: creativity, professionals, motivation

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## Introduction

Documenting creativity begins in the early years especially in early education art activities that could lead to pursuing a degree in Fine Arts, Visual Communication. Art activities are used as strategies for teaching students especially those with special needs particularly with mental retardation to provide an alternative form of communication and ease anxiety. A visual art production program could lead to a source of income when guided and mentored by professionals in graphic design, printing and marketing which was the purpose of an *Art Workshop for Persons with Mental Retardation* (Bautista-Rodas, 2006). The program aimed to produce marketable products using the artwork of the students with special needs as a source of income. Success relied heavily on the professional mentors for mass production and marketing. The whole process required creative people, creative potential, creative skills, creative processes, creative products and a creative society supportive of the whole endeavor.

This study documents creativity in another scenario. Research literature establishes that creativity exists not only in the arts. Professional creativity exists in all domains and fields of expertise. Creative professionals are described as those who engage in creative problem solving, are able to think on their own, troubleshoot to find problems and devise many possible solutions, but more importantly decide on the best possible solution for circumstances at hand (Florida, 2002). Creative solutions need to be acceptable to the relevant consumers in society in order to be useful.

Unfortunately, “the Philippines does not have a detailed and accurate baseline for the Creative Industries” (p.13, Fleming, 2017). The report shows data only on visual, performing and literary cultural arts with copyrights or patents but does not account for creative outcomes of professionals in other fields or professionals who work free lance. There is much hype on creative economies relevant to the performance of nations and yet there is no substantial data.

“All solution making and construction require creative thinking. Yet, almost no schools teach for creativity or train teachers to teach for creativity” (p.1, Kaplan, 2019). However, the study on the *Development of a Creativity Framework for Filipino Students and Professionals* (Rodas, 2017) shows that schools in the Philippines do teach creativity and teachers have it in them to do the task.

People in the learning stream, in schools, are often perceived as just students. Arguably, students on their last semester of their college courses have competently achieved enough to be granted on-the job-training programs and be identified as pre-service professionals ready to enter the workforce, ready to become professionals. After all, training programs prepare them to become professionals, ready for industries, required to perform competently and manifest creative outcomes on industry sites expected from actual professionals in their field of expertise.

## Creative Thinking Skills

In 1927, creative thinking skills were investigated by Wallas establishing phases in a creative process (Kristensen, 2004) that are preparation, incubation, insight, elaboration and evaluation. Stages of the thinking process and validation of thought

are encounter, preparation, concentration, incubation, illumination, verification and persuasion (Hull, 2007). These are described chronologically as, identifying the problem, gathering information, concentrating on problem solving, gathering all possible solutions, choosing the best solution, validating the chosen solution, and presenting the solution for acceptance. Wallas' stages of the creative thinking process have characteristics that include fluency, flexibility, originality, and elaboration (Yanti, Koestoro, Sutiarmo, 2018) that are parts of the paper-pencil Torrance Test for Creative Thinking (TTCT) wherein abstractness of title and resistance to premature closure were added (Hébert, Crammond, and Neumeister, 2002). According to Sternberg (2006) the TTCT is the most widely used creative thinking assessment tool commonly taken by students. In 1950 Guilford called for further research stating creativity as having many interpretations, expounding on the creative thinking process as divergent, convergent, transformative and evaluative (Basadur, M., Runco, M., & Vega, L., 2000). In 1953, Osborne advanced divergent thinking into a brainstorming process (Hauksdottir, F. B., 2011) and with Parnes (1961) used brainstorming as the main activity for the Creative Problem Solving (CPS) Method. Stein (1953 in Runco 2004 and 2007) argued that creative potential and the internal and external frames of reference must be considered in eminent creativity which he identified as the Larger C.

### **Aspects/Facets of Creativity**

In 1961, Rhodes established the four aspects or facets of creativity (Kozbelt, Beghetto and Runco, 2010). These are the creative person, the creative process, the creative product and the creative press. While the person and the product are identifiable, the creative process and creative press were examined. Researchers scrutinized the creative process in terms of creative thinking, creative personality, and motivation to manifest creative outcomes that are internal to the person. The fourth facet, the creative press was explained as the society that exerted social pressure on the acceptability of creative products requiring expert judges in a domain or societies in the world to deem a product indeed creative. In 1990 Simonton added persuasion as the ability to influence societies to deem a product creative and in 2004, Runco added creative potential making the aspects or facets of creativity six (Kozbelt, Beghetto & Runco, 2010).

### **Creative Press**

The external frame of reference of Stein and the creative press of Rhodes refer to the external environment of the person, that is part of the Componential Model of Creativity (Amabile, 2012) as the social environment working in confluence with three other components : expertise, motivation and creative thinking skills to manifest creative products. The creative press consists of a group of experts in the domain utilizing the Consensual Assessment Technique (CAT) (Baer & McKool, 2009), or the community or global society that informally evaluates creative ideas, products, processes or systems as new and useful.

### **Creative Product**

While Stein referred to eminent creative products as the Larger C, Kaufman and Beghetto (2009) referred to eminent creative manifestations as BigC in the Four C

Model of Creativity. The three other categories in the Four C Model are little-c, mini-c and Pro-c. Richards (1990 in Richards, 2007) described little-c creative outcomes as personal creative activities such as using leftovers to create a dish or combining colors and separates in dressing which the average person performs daily. Kaufman and Beghetto (2009) argued for mini-c category as creativity in the learning process by students or people still learning a creative activity. Pro-c creative outcomes were produced by professional level creators with about ten years of preparation including formal training in a domain of expertise and some specific achievement equivalent to manifestations through the expertise acquisition approach (Bloom, 1985; Hayes, 1989; Martindale, 1990; Gardner, 1993; Ericsson, 1996; Sternberg, 1999; Simonton, 2000; Kaufman & Kaufman, 2007; in Kaufman & Beghetto, 2009).

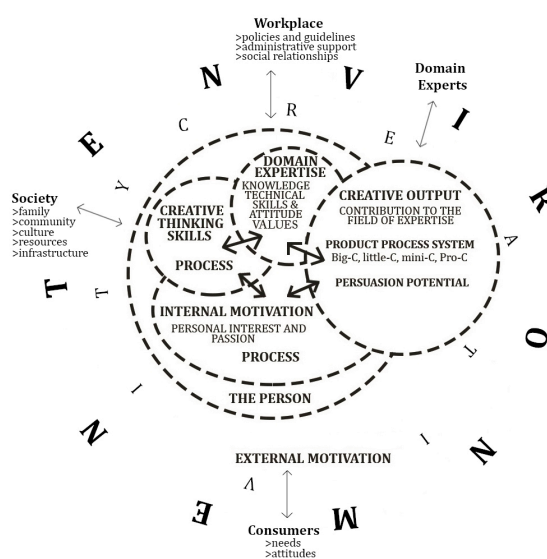


Figure 1: Creative Processes to Creative Outcomes

Creative output are creative outcomes. The schema of creative processes to creative outcomes (Figure 1) gleaned from related literature was utilized into a conceptual framework showing the person located in the social environment influenced by external and internal processes. External motivation could be people, members of society, family, domain experts, social relationships, culture, resources, infrastructure, workplace policies or consumers needs and attitudes. Internal motivation could be personal interests and passion, extent of creative thinking skills or domain expertise that include knowledge, technical skills experiences, attitudes and values that meld to manifest potential creative output or outcomes that could be ideas, products, processes or systems and ability to persuade society on the usefulness of these creative outcomes (Rodas, 2017). The term “creative outcomes” is used to replace “creative products” to establish that there are different kinds of creative outcomes. Products are one kind of creative outcome, the other three being ideas, processes and systems.

“Can creativity be taught? Can it become, for each of us, an endless renewable resource that can be tapped into at any time?” (Lambert, 2017, p.3). The study explored and documented creativity through the lens of the Componential Model (Amabile, 2012) and the Four C Model (Kaufman and Beghetto, 2009).



Respondents were 12 Filipino in-service professionals from one university in the fields of Hospitality and Tourism, Engineering and Architecture, and Information Technology and 191 Filipino pre-service professionals, graduating students in on-the-job training programs in the same fields from three universities in Baguio City, at the Cordillera Administrative Region of the Philippines. Research questions aimed to gather the operational definition of creativity, determine the categories of creative output of the two sets of respondents and the factors that motivated such. Data was processed with thematic analysis through memoing and open axial coding borrowed from the Grounded Theory approach on the validated questionnaire and the conduct of a focus group discussion. Frequency count and percentage were used to treat the answers of the pre-service professionals about daily creative activities. Data gathered with the Intrinsic Motivation Inventory by Ryan and Deci was processed using the one-way repeated measure analysis of variance (ANOVA) and t-test.

## **Conclusion**

### **Expertise and Creative Thinking Skills**

Five Levels of Expertise established by Dreyfus (in Lester, 2005) show level 1 as the lowest and 5 as the highest. The in-service teaching professionals also practitioners in their fields of Hospitality and Tourism, Architecture and Engineering and Information Technology held university academic management positions as Deans, Program Chairs and Subject Heads had the highest expertise Level 5. The pre-service professionals evaluated by experts as proficient Level 4 (Rodas, 2017). Both level 5 experts and level 4 proficient treat knowledge in context, recognize relevance, and assess context holistically. They however, differ in other areas. While experts have intuitive decision making skills, authoritative knowledge and understanding across the area of practice, achieve standards excellently with ease, create interpretations and take responsibility beyond standards, the proficient having less experience, make decisions on a rational level, deeply understand the discipline but without authority, achieve standards routinely and take responsibility only for their own work (Dreyfus, 1980 in Lester, 2005). Creative thinking skills are evident in their project based creative problem solving (CPS) activities (Rodas, 2017).

### **Defining Creativity**

Collated responses of expert in-service professionals define creativity as the process and the ability to use skills, imagination, and thinking to produce new, useful, and innovative products or work that satisfies the needs of people.

### **Categories of Creative Outcomes**

In-service expert professionals produced creative outcomes in three categories little-c, mini-c and Pro-c in both their personal and professional lives. Little-c and mini-c creative outcomes produced at home had the quality of Pro-c when the creative outcome was related to the creator's field of expertise such as the home dishes served by the Chef, the experimental drinks done by the professional Barista, the home gardening activities done by the architect and the engineer and the experimental hydroponic system by the architect. Pro-c creative ideas, products, processes and systems done professionally had potential to become BigC when subjected to

patenting, copyrighting, marketing for global consumption or proven useful to many in society and deemed so by the public.

Pre-service professionals (PSPs) produced creative outcomes in two categories little-c and mini-c in both their personal lives and on-the-job training programs. Little-c creative outcomes in literary arts had the highest percentage and frequency, while visual arts had the lowest (Rodas, 2017). PSPs produced creative outcomes in the mini-c category required in on-the-job training programs such as ideas, products, systems, and applications. These creative outcomes were categorized mini-c that had potential but could not be deemed Pro-c simply because PSP creators were still in the final semester of their learning process and were not yet employed as professionals in the field. Potential to be categorized BigC was evident but required exposure for further evaluation by experts and usefulness to a larger audience.

### Creative Outcomes Continuum

The emergent framework initially identified as Creative Production and Potential in a Seven C Model (Rodas, 2017) showed that potential to each category was evident such that potential mini-c from little-c, potential Pro-c from mini-c and potential BigC from mini-c and Pro-c were to be added to the Four-C Model of Kaufman and Beghetto (2009). However, mini-c category to become BigC requires the consensual assessment of experts in the domain to validate Pro-c quality work before the creative outcome can be offered for public consumption and effectively used before becoming BigC category. Further analysis evolved the framework into the Creative Outcomes Continuum (Figure 2).

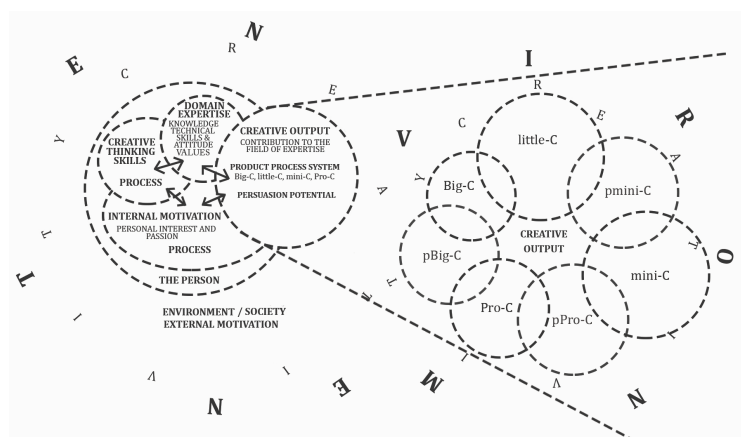


Figure 2: Creative Outcomes Continuum

### Motivation

Intrinsic motivation of in-service expert professionals were attributed to their personal inner desire for satisfaction, while intrinsic motivation for pre-service professionals was evident in the highest score of the sub-scale on value/usefulness in the Intrinsic Motivation Inventory. Extrinsic motivation of both sets of respondents came from enabling policies and supportive families, peers, colleagues and superiors. No significant differences were found in the level of intrinsic motivation of the pre-service professionals in performing creative problem-solving tasks according to

gender, course, or school graduated from (Rodas, 2017).

### **Recommendations**

Increase opportunities in education to demonstrate creative problem solving output of ideas, products, processes and systems to develop creative problem solving skills into a life skill. Increase value and usefulness to creators to increase production of creative outcomes. Build expertise of students by tracking creative outcomes through levels of education. Open access to opportunities for evaluation and exposure of creative outcomes through consensual assessment, patenting, copyrighting and marketing to increase the chances of being useful to global society.

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*The Impact of Mobile Learning on Academic Achievement and Learning Experience Using a Tailor-made Mobile App*

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Official Conference Proceedings

**Abstract**

With the rapid growth of mobile technologies, mobile learning becomes more and more popular where students can learn at any time and any place using their own mobile devices. A lot of researches have proven that mobile learning is feasible with various advantages such as diversifying learning activities and synchronizing learning experience. However, its impact on academic achievement is still controversy where contradictory conclusions were made in the literature. In this study, the effectiveness of mobile learning is further investigated. According to the teaching materials and schedule of a technical subject, a tailor-made mobile app was developed to assist students' learning along with regular lecture and tutorial classes. By deploying the mobile app at different stages of teaching, a 4-year experiment was conducted where 3 cohorts of students were involved. Students' subject results and mobile learning experience were statistically analyzed. Results showed that the use of mobile app has immediate effect on improving academic performance, but the effect becomes minimal when the mobile app is used for a longer period of time. Nevertheless, positive mobile learning experience was demonstrated, such as enhanced engagement and higher motivation of learning. These significant observations provide further information on how mobile learning could be effectively incorporated with pedagogical strategies.

Keywords: Mobile learning; academic achievement; learning experience; tailor-made mobile app.

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## Introduction

Mobile learning has been proven feasible with various benefits, such as diversifying learning activities; supporting learning process; and synchronizing learning experience (Crescente and Lee, 2011; Savil-Smith et al., 2006; and Elias, 2011). Learners can also schedule their learning at any time and any place as long as they are covered by mobile signal (Crescente and Lee, 2011). In addition to big data analysis, students' learning patterns, progress, weaknesses, etc. can be easily obtained (Bienkowski et al., 2012).

However, concerning the impact of mobile learning on students' academic achievement, contradictory conclusions were observed in the literature. For examples, Lu (2008) stated that the mobile learning group achieved higher score in an immediate quiz on vocabulary knowledge. Kattayat et al. (2017) also concluded that students performed better with mobile learning in a 4-day physics course. On the other hand, Miller and Cuevas (2017) argued that mobile learning played no significant effect on their 3-week learning setting. Similarly, Males et al. (2017) investigated the national test result in Australia for years and concluded that the impact of mobile learning on academic performance is minimal. More research is definitely required in this area of study.

In this paper, the effect of mobile learning on students' academic achievement and learning experience was studied. Instead of just simply digitizing the teaching materials, a tailor-made mobile app was developed for students to use as an additional learning tool along with normal classroom teaching. Since there were conflicting research on the correlation between mobile learning and academic achievement, the findings and conclusion in this paper would provide more insight and evidence on the effect of mobile learning.

## Research Context

This research was conducted in the Hong Kong Community College in Hong Kong. The college offers both associate-degree and higher diploma programmes in various major fields, such as engineering, information technology, social sciences, business, and arts. Although Hong Kong is a city of China, apart from those subjects teaching Chinese language, the college adopts English as the major medium of instruction.

Since technical competence is a key success factor of mobile learning (Alrasheedi and Capretz, 2015), a compulsory technical subject Computer Programming was used for investigation and three cohorts of students from technical-related sub-degree programmes were involved. The same set of teaching materials was used for all cohorts. While the assessments were different, they were designed to have the same level of difficulty. The subject consisted of six assessment components, among them individual assignment 1, group project and participation exercises were take-home assessments, while individual assignment 2, mid-term test and examination were immediate on-site assessments.

The three cohorts of students took the subject in years 2015 to 2018. A total of 1376 students who had attempted all assessment components of the subject were considered in the data analysis. Among them, 706 students were from Associate in Engineering



(AENG), 526 students were from Associate in Information and Technology (AIT) and 144 students were from Higher Diploma in Mechanical Engineering (HDME).

### Tailor-made Mobile App

In addition to normal classroom teaching, a mobile app was designed as an additional learning tool. Unlike other similar mobile apps about computer programming in the market, this tailor-made mobile app adopted the lecture and tutorial notes of the subject, and the content was arranged to follow the teaching sequence of the subject. It also included illustration and explanation of basic programming techniques, simple programming exercises for students' revision and practice, and small quizzes for checking their level of understanding.

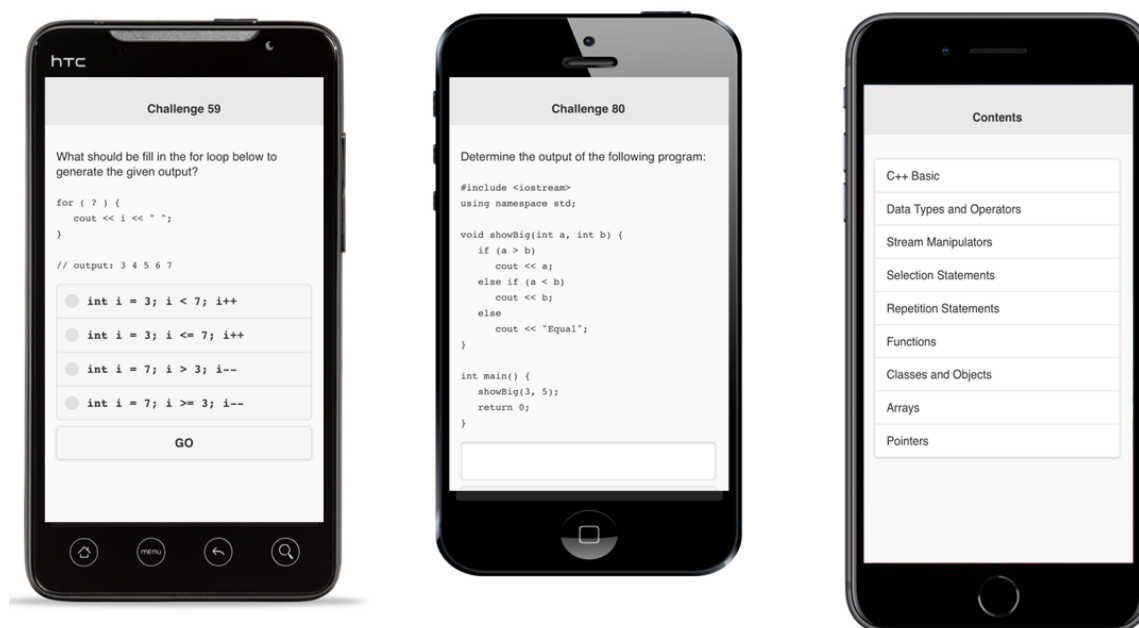


Figure 1: Demonstration of the tailor-made mobile app.

It was suggested that elements of competition could increase students' motivation and engagement (Ciampa, 2014). Therefore, to further improve the effectiveness of the tailor-made mobile app, the quizzes were divided into more than 150 levels, where students had to complete a quiz correctly to unlock the quiz in the next level. Students were encouraged to compete with their friends to achieve as high level as possible.

### Experiment Design

The subject Computer Programming was a compulsory subject in the curriculum. Students were required to attend lecture and tutorial classes regularly throughout the semester. The same teaching schedule was adopted for all the three cohorts. This ensured that students in different cohorts had the same amount of time in preparing and completing the assessments.

For the three cohorts, the mobile app was released and used at different stages. Cohort 2015 was the control group, where mobile app was not used. Students learned the subject in a traditional way by normal classroom teaching.

For cohort 2016, mobile app was used throughout the semester. In every lesson, teachers reminded students to use the mobile app as an additional tool for learning and revision.

For cohort 2017, the mobile app was released after all classes had been conducted. Students were suggested to use the mobile app for revision of the examination.

## Measures

This research aimed at evaluating the effectiveness of mobile learning on academic achievement and learning experience. The former was measured by statistically analyzing the scores of all assessment components. For the latter, students' feedback was collected where a 5-point Likert Scale questionnaire was used. Since students in cohort 2015 did not use the mobile app in their learning, the feedback was collected from students in cohorts 2016 and 2017 only.

## Results

Figure 2 presents the mean scores of the assessment components of the three cohorts. Students in general performed better in take-home assessments, i.e. individual assignment 1, group project and participation exercises. This observation was expected as students had more time in preparation and checking. Students might also collaborate with each other to complete the assessments. As a result, the effect of mobile app on these assessment components was minimal.

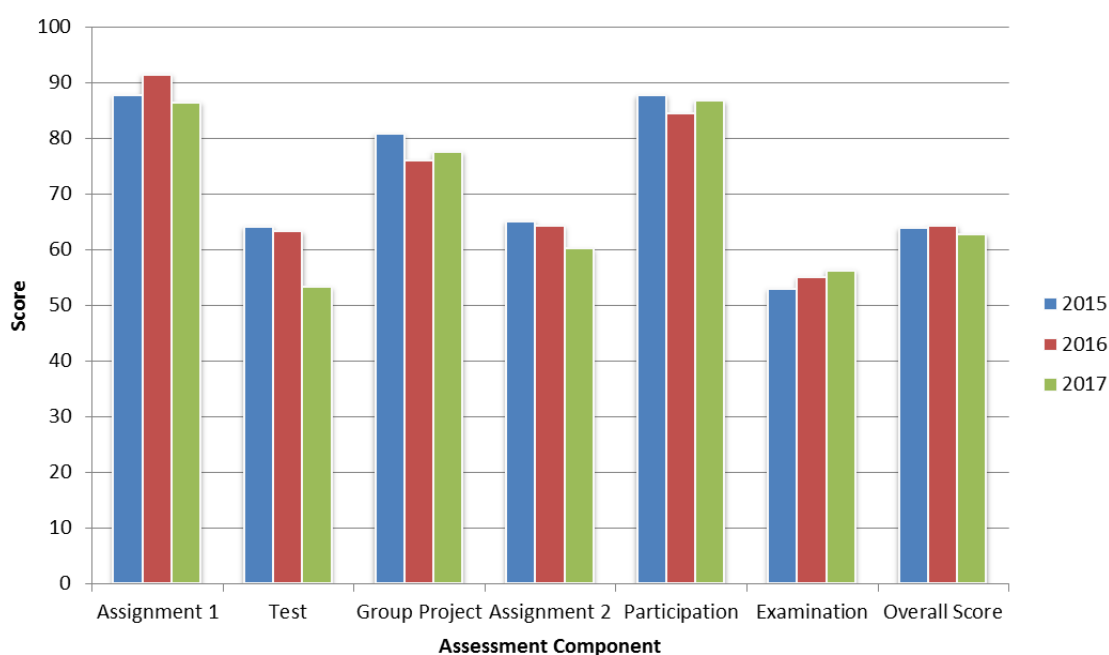


Figure 2: Mean scores of assessment components

On the other hand, immediate on-site assessment required students to have deeper understanding of the subject knowledge. Students needed to complete the tasks in short time. The scores of these assessments directly reflected the students' ability in the subject. The mean scores of these assessment components, i.e. mid-term test,

individual assignment 2 and examination, were further analyzed statistically by one-way ANOVA with Turkey HSD post-hoc test. The result was summarized by Table 1.

Dependent Variable	(I) Cohort	(J) Cohort	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Test	2015	2016	.848	1.221	.767	-2.02	3.71
		2017	11.252*	1.082	.000	8.71	13.79
	2016	2015	-.848	1.221	.767	-3.71	2.02
		2017	10.404*	1.077	.000	7.88	12.93
	2017	2015	-11.252*	1.082	.000	-13.79	-8.71
		2016	-10.404*	1.077	.000	-12.93	-7.88
Assignment 2	2015	2016	.842	1.146	.743	-1.85	3.53
		2017	4.974*	1.016	.000	2.59	7.36
	2016	2015	-.842	1.146	.743	-3.53	1.85
		2017	4.132*	1.011	.000	1.76	6.50
	2017	2015	-4.974*	1.016	.000	-7.36	-2.59
		2016	-4.132*	1.011	.000	-6.50	-1.76
Examination	2015	2016	-2.051	1.349	.282	-5.22	1.11
		2017	-3.180*	1.196	.022	-5.99	-.38
	2016	2015	2.051	1.349	.282	-1.11	5.22
		2017	-1.130	1.190	.609	-3.92	1.66
	2017	2015	3.180*	1.196	.022	.38	5.99
		2016	1.130	1.190	.609	-1.66	3.92

\*. The mean difference is significant at the 0.05 level.

Table 1: Analysis using one-way ANOVA with Turkey HSD post-hoc test

When comparing cohorts 2015 and 2016, the performance of mid-term test, assignment 2 and examination were comparable and had no statistically difference at a 0.05 significance level. In other words, using the mobile app throughout the entire learning period does not affect the students' academic achievement.

Taking cohort 2017 into consideration, the performance of students in this cohort was different from other cohorts. The difference was statistically significant with  $p < 0.05$ . To look into the performance difference in more detail, students in cohort 2017 had the poorest performance in mid-term test and assignment 2. This may due to the fact that students in cohort 2017 were admitted with a lower mean admission score. However, the mean examination score was the highest in cohort 2017, and hence the students in cohort 2017 had the largest improvement. Hence, using the mobile app before examination as a revision tool had positive impact to the examination performance.

These observations aligned with the literature that mobile learning is effective in short courses, such as the English vocabulary workshop by Lu (2008) and the 4-day physics course by Kattayal et al. (2017). The effect of mobile learning becomes minimal if the mobile learning tool is used for a longer period of time (Miller and Cuevas, 2017 and Males et al., 2017). Even for the same subject as in the current research, using the mobile app in different stages affects the effectiveness of mobile learning. To be more specific, strategically using the mobile app before the examination allowed students to have better performance; but prolonged use of mobile app throughout the semester did not have the positive impact as expected.

#	Question	Mean	Rate $\geq 3$
1	I would find mobile apps useful in my learning.	4.31	97.72%
2	Using mobile apps enables me to accomplish learning activities more quickly.	4.24	97.34%
3	Using mobile apps increases my learning productivity.	4.19	97.72%
4	If I use mobile apps for learning, I will increase my chances of getting a better grade.	4.05	97.72%
5	My classmates would suggest me to use mobile apps for learning.	3.79	89.73%
6	My teachers would suggest me to use mobile apps for learning.	4.17	96.96%
7	I had experience in using mobile apps for learning in other subjects.	3.41	73.00%
8	I would prefer using mobile apps for learning in other subjects as well.	4.14	97.72%
9	The app is easy to use.	4.13	97.34%
10	It would be easy for me to pick up subject content by using the app.	4.15	97.72%
11	I can learn the subject content by using the app.	4.19	97.34%
12	I can evaluate my subject knowledge by using the app.	4.21	97.34%
13	I can find out my misunderstanding of subject content by using the app.	4.16	96.96%
14	Using the app will give enjoyment to me for my learning.	4.00	95.82%
15	Using the app will stimulate my curiosity.	3.98	96.20%
16	Using the app will lead to my exploration.	4.07	97.34%
17	Using the app will encourage discussion among classmates.	3.87	93.16%
18	The app is useful to my learning.	4.22	99.24%
19	I would recommend the app to my fellow classmates.	4.18	98.48%

Table 2: Students' feedback on mobile learning experience.

For the mobile learning experience, students' feedback was collected using a 5-point Likert Scale questionnaire. The ratings ranged from 1: "strongly disagree" to 5: "strong agree". The survey result was summarized by Table 2.

As shown in Table 2, almost all items were rated with mean score above 4 points. The lowest mean score of 3.41 was observed in item 7: "I had experience in using mobile apps for learning in other subjects". This revealed that mobile learning was not common in other subjects. However, students would prefer to have mobile learning implemented, which was supported by the high rating of 4.14 in item 8: "I would prefer using mobile apps for learning in other subjects as well".

This positive survey result showed that students welcome mobile learning and enjoyed their mobile learning experience. In general, students agreed that the mobile

app was useful in their study. Students also found that their learning productivity was improved and they had higher confidence in getting a better grade in the subject.

### **Conclusion**

This research studied the impact of mobile learning on students' academic achievement and learning experience. Mobile learning allows learners to learn using mobile devices. The 4-year experiment evaluated the impact of mobile learning by implementing the tailor-made mobile app in different stages of the learning process. The results revealed that mobile learning has its short-term effect on academic achievement. By using the mobile app as an additional tool for revision before examination, students' performance was largely improved. However, the impact was minimal if mobile learning is implemented for a longer period of time.

Regardless to the impact on academic performance, students welcome mobile learning. It was interesting to know that mobile learning was not common in other subjects. Nevertheless, students expressed their positive mobile learning experience. They could learn faster and pick up the subject content easier. The learning productivity was increased and hence improving their self-confidence. They also found the app useful to their learning and could use the app as an additional tool for revision.

A strategic use of mobile learning is important, such that learner can benefit from its short-term impact to improve their academic performance. Educators should consider incorporating mobile learning into their pedagogical plan so as to enhance the learning experience of the learners, which in turns improve their interest and concentration to the class.

### **Acknowledgments**

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***Developing School-based Gifted Curriculum Through Professional Learning  
Community: A Case Study of a Junior High School in Taipei***

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The Asian Conference on Education 2019  
Official Conference Proceedings

**Abstract**

It is increasingly acknowledged by researchers across the world that professional learning community is a good means of school improvement. The Taiwanese ministry of education and local authorities have been promoting the idea and practices among various levels of schooling since mid 2000s. Both school-based and cross-school professional learning communities are in practice in Taiwanese context. This study aims at offering a case study of a school-based professional learning community with 5 members in a junior high school in Taipei. Initiated and facilitated by the researcher, this professional learning community focuses on developing a school-based English Talent program for language gifted students. Taking the action research approach, all teachers have to implement this school-based curriculum. Members of this professional learning community are going to observe each other's lesson and then discuss how the teacher teach and how the students learn. With the findings from action research, this school-based curriculum will be revised to offer better learning for future gifted students. Data are collected from mid 2017 onwards. The experience of this professional learning community can offer an interesting case to international audience regarding the development of professional learning community in Taiwanese context. The Taiwanese case might serve as a start for future international comparative study.

Keywords: Professional Learning Community (PLC), school-based curriculum, talent program, case study

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## **1. Introduction**

### **1.1 Professional Learning Community (PLC) in Taiwan: opportunity and practice**

Ministry of Education Taiwan (MOE, Taiwan) announced a new curriculum reform in 2014. The main purpose is to improve the quality of school curriculum (Ministry of Education, 2014). It offers school more space to develop school-based curriculum so that students could have an opportunity to explore their multiple talents (Chang & Lee, 2014). However, developing school-based curriculum requires teachers' ability of curriculum design and development. In Taiwanese school settings, teachers working in different school level seldom have the opportunity to do curriculum development. Most in-service teachers use textbook and follow the national curriculum in their daily routine. It is not compulsory for in-service teachers to develop curriculum in previous national curriculum such as the Grade 1-to-9 Integrated Curriculum. In other words, the proficiency of developing a curriculum among in-service teachers is insufficient.

To achieve the goal of developing school-based curriculum, how to empower in-service teachers becomes a priority (Chang & Lee, 2014). Therefore, teacher professional development (TPD) becomes a key factor to enhance the ability of curriculum development among in-service teachers. Professional learning communities (PLC) is regarded as an effective strategy for school and teacher improvement (DuFour & Eaker, 1998; Sun, 2010). Therefore, MOE Taiwan applies PLC as a major means to empower teachers and improve school (Ministry of Education, 2009).

As in other Asian countries, PLC becomes a popular form of professional development. There are, at least, two forms of PLCs in Taiwan. One is school-based PLC and the other cross-schools. MOE Taiwan and local authorities encourage in-service teachers to form PLC and provide various incentives such as a small amount of money for PLC to purchase stationary, books or invite speakers to share. In Taiwan, successful PLCs are usually on a voluntary and cross-schools basis and as a bottom-up practice.

### **1.2 Aim of this study**

As aforementioned, PLC is a popular form of empowering teachers to develop curriculum in Taiwanese context. Meanwhile, those PLCs initiated by teachers are often more successful. In the past decade, there have been various research exploring PLC in Taiwanese context. However, the study focusing on the PLC of teachers working in the field of gifted education is rare. This study provides a case to explicate the PLC operation among five teachers developing a new curriculum for an English Talent Program (ETP) in a junior high school in Taipei. This particular PLC is initiated by the researcher who is in charge of the ETP.

In this study, following aspects are going to be explored:

1. The context of forming a PLC: What makes these teachers form this PLC?



2. The process of this PLC: How does the PLC operate? What roles do the members play during the process?

## 2. Methodological Remarks

Qualitative case study is applied for this study because, as Lichtman (2010) indicated, it provides an explicit and detailed research on a specific case. The data is from interviews with PLC participants and documents including the meeting minutes, curriculum plan and individual lesson plans. Interviews with four teachers in this PLC were conducted by the researcher. All 16 PLC meetings were recorded via digital recorder and key points were transcribed by the researcher after each meeting. The official PLC meeting was held, at least, once per month. Before the curriculum was put into practice, PLC members met more frequent to ensure the implementation was on the right track.

The PLC, as aforementioned, consists of five English teachers in a junior high school located at the center of Taipei City. This school (School X afterwards) is an average size in Taipei with about 1500 students and 120 teachers. School X is a comparative new school in Taipei. It was established in 2004 to reduce the big student population in this district. These five teachers are voluntary to form a PLC while the rest of 8 English teachers in the school are reluctant to develop curriculum. In other words, the motivation of PLC members is high. The details of participants are listed in Table 1 below.

**Table 1: Backgrounds of PLC Participants**

Teacher	Age	Qualification	Year in teaching profession	Gifted Education Qualification
A*	39	TESOL (MA) from an overseas university	14	Yes
B	46	TESOL (MA) from an overseas university	18	No
C	40	TESOL (MA) from an overseas university	15	No
D	35	TESOL (BA) from a domestic university	12	No
E	30	Linguistics (MA) from a domestic university	5	No

\*Teacher A is the one who conducted this study.

## 3. The Operation of PLC: Context, Process and Outcomes

In this section, the context of forming this PLC is described and discussed firstly and followed by the operation of this PLC. In the last part of this section, the outcome of this PLC is discussed briefly.

### 3.1 The Context of ETP and the establishment of this PLC

In the case school, ETP has a developing trajectory. It started at 2005 that is the second year of the birth of School X. This is the mission given by the Department of Education in Taipei City government to the founding principal of School X. ETP has been the selling point of School X since then. In other words, ETP has a long history in School X. In the past, the curriculum of ETP was made by one enthusiastic English teacher, teacher H. Teacher H taught most of the lessons to students in ETP while other English teachers played less role in ETP. However, heavily relying on one teacher runs a huge risk for ETP in School X. In 2014, Teacher H moved to another junior high school in the southern part of Taiwan. The delivering of ETP lessons became an issue in School X. Other English teachers in School X were not able to take charge of ETP. As Teacher C mentioned in the interview, *'We are not familiar with how ETP is running so that no one in School X want to take over ETP'*.

When the researcher re-allocated to School X from previous school in 2014, the principal immediately asked the researcher to be the one in charge of ETP because none of the English teachers in School X wanted to do it. As a newcomer to School X, the researcher had to do it. It is described by Teacher B as follow:

No one [English teacher] wanted to take over [ETP] because it was mainly developed by Teacher H in the past. ... .. You were the newbie in our school and that was the reason why the principal asked you to be the coordinator of ETP. She [the principal] could not force other English teachers to do it. You were new here so that you became an easy target. She knew that you could not say no to her.

The researcher has been in charge of ETP in school X since 2014. With the understanding of the history of ETP, it is obvious that this program should not be one individual English teacher's responsibility. More English teachers should get involved. Otherwise, if the researcher leaves School X someday like Teacher H, similar thing may happen in School X. From that time on, the researcher begins to search for better practice and solution to keep the ETP sustainable.

When the researcher learns about the practice of PLC, it might be a good means to enhance teachers' professionalism as well as develop ETP curriculum collectively. But, motivating English teachers in School X to form PLC is not an easy task. As Chen (2017) points out, Taiwanese school teachers 'do not have sufficient time' and 'lack strong drive' to do their professional learning community. The first move of establish a PLC is to offer incentive and trigger teachers' motivation.

Applying for government funding is one of the means to provide incentive. As aforementioned, promoting PLCs in schools is a policy of MOE Taiwan. There are several grants for school to apply. One of the grants is up to NT\$ 100,000 per academic year. The researcher prepared the proposal for this grant and successfully secured it in 2017 and 2018. Part of the grant could be used to subsidize the PLC members. This could be a good incentive. It is like what Teacher E described:

To join this PLC for ETP is partly because we are friends and partly because there is subsidy. I mean that we can have attendance fee. That makes me more

willing to show up for PLC meetings. Also, you [the researcher] prepare some snack and drinks for meetings. I feel more relaxing to attend this PLC.

In this case, attendance fee and a relaxing environment for discussion are incentive to Teacher E. Meanwhile, personal network also plays a role in this formation process. To sum up, the establishment of this PLC is based on attractive incentive and personal network while the relaxing environment also functions as a positive drive for the teachers to participate.

### 3.2 The Process of this PLC

In 12-month time, the PLC members met 16 times. Each meeting is about 3 to 4 hours. 13 out of the 16 meetings are with all members. The rest of three meetings are with 4 members. Teacher B were absent for one meeting and Teacher E missed two. The meetings usually took place in the staff meeting room or staff lounge. Regarding the participants and the meeting place of this PLC, it is clear that this PLC is school-based.

As mentioned previously, the researcher initiated this PLC and furthermore played the leading role within this PLC. As Teacher B described, *'the operation of this PLC is highly relying on Teacher A because she kept reminding each member of the meeting time and the tasks we need to complete'*. Teacher E also mentioned that *'Teacher A is the leader [of this PLC] and she assigned task to each of us'*. However, Teacher A did not have any power over the other four teachers or possess official curriculum leader's role. She is an English teacher as the other four teachers. Although Teacher A does not have an official appointment or duty, she fulfills the definition of 'a leader' or 'a curriculum leader/teacher leader'. Teacher A did have influence on other teachers and brought these teachers together to make some changes in School X's school-based curriculum.

In the first four meetings, PLC members were doing brainstorm to come out with some good ideas and directions to develop a new curriculum for ETP. However, the process was not smooth. On the contrary, there have been challenges. Some major challenges in the first four meetings are listed below:

1. PLC members do not have experience in developing curriculum from scratch.
2. PLC members do not have common language to do a good discussion.
3. PLC members need time to know each other well and built up mutual trust.

During the first two meetings, the discussion is quite dry due to the above-mentioned reasons. Teacher D even wanted to quit after the second meeting because she could not see the progress. To solve this issue, Teacher A approached Teacher B in private asking for his help during discussions. When Teacher A led the discussion, Teacher B made a proactive response. They played the role as pitcher and catcher in the PLC meetings. Gradually, other members started to expressed their thoughts and shared their ideas.

Moreover, Teacher A suggested that PLC members can look for ideas and directions from their previous works while showing members with examples of curriculum from other schools. With these examples and the calling on previous experience, the

discussion got increasingly focused and meaningful. But, coming out with ideas is one thing while realizing these ideas into a workable curriculum is another. After overcoming the first few challenges, this PLC faced another issue: who is going to write the lesson plans in accordance with the curriculum design? As Teacher C stated:

I enjoyed the brainstorming and discussion. However, putting these ideas into real teaching is challenging. I bet all of us are reluctant to do it. ... I was thinking that I did not have the qualification of gifted education. Can I come out with the curriculum and lesson plans to those gifted students in the ETP? I have to admit that I am lack of confidence in doing it.

The worries expressed by Teacher C demonstrated the essence of this challenge. Among five members, Teacher A is the only one with proper qualification in gifted education. After realizing the core of this issue, Teacher A prepared the first lesson plan based on the discussions and shared it with others. Moreover, she explained some of the key concepts in teaching those gifted students. In other words, Teacher A did a demonstration and offered empowerment to other teachers.

To sum up, there have been various challenges at different stages of this PLC and the developing process of a new curriculum. Lacking of confidence was a big challenge while developing the curriculum. It is a fact that Teacher A is the only one with proper training in teaching the gifted. Therefore, empowering the rest of PLC members became a must-do thing.

#### **4. Concluding Remarks**

This study is an ongoing one. The PLC is still active in School X although one member, Teacher B, took a no-pay leave for two years. But, the rest of the PLC still meet regularly to evaluate the implementation of this curriculum. Developing a new curriculum is a long process but with the support from each other in this PLC, it becomes easier. In this paper, the researcher illustrates the context of this school-based PLC and how it works. The developed curriculum is currently implemented in School X from September 2019 onwards. Some challenges are mentioned and solutions are briefly discussed. As the PLC is still in operation, more new curriculum plans might be developed in the future.

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### *Hidden Treasures: A Meaningful 3D Experience*

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#### **Abstract**

This paper presents an experiment of pedagogy through active work in the classroom. It aims to give pupils the opportunity to create bilingual pop up books through a project-based teaching method. It has been successfully carried out for five years. They start developing the project in several steps throughout the year. First, they are asked to read a fantastic book based on archaeological findings. It is the inspiration for the research task and the creation of stories. Second, they do research on the most important archaeological discoveries in Colombia and around the world. Then, pupils have workshops with the publishing house for learning the main pop-up techniques. After that, working in pairs, they create their own stories based on their archaeological research. They translate stories from Spanish into French, make the pop-up books and present them to Elementary children as they teach them how to make their own mini books. The result: an innovative project set to capture young children's minds as they learn to read both Spanish and French. The authors also present their books in several settings. The best books are published. Some of them are donated and others are sold. The funds raised are intended to help public schools develop the same project. It also motivates pupils to find talents which teachers cannot always perceive in the classroom. This is an initiative which fosters intercultural education encouraging children to become more sensitive and tolerant as well as to understand that reading is a powerful tool to reach a more inclusive education.

Keywords: bilingual pop up books, project-based teaching method, research task, fantastic stories, pair work, intercultural education.

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## Introduction

The field of books is now in the midst of a major change in the digital world. In this context, many experiments are attempted by multiple actors to meet the new expectations of readers. In fact, society is changing in favor of new technologies and modes of communication and reading. With connected networks, more and more digital content is being read on social networks such as websites dedicated to information all the time. The main players in the media for information and reading are therefore trying to get closer to these new forms and to understand new ways of sharing information.

The digital era brings one of the biggest challenges for XXI century in terms of education since it makes students be more involved with their learning process, in other words, it allows students to become the main characters of their own stories. This is how bilingual pop-up books were born. As an initiative of the Spanish department of the French school Louis Pasteur in Bogota Colombia. This project has been developed to enhance Elementary pupils' reading skills and to empower seventh graders to teach younger kids how storytelling may be a fantastic way of discovering new worlds.

The term pop-up is widely used to describe “movable books”. However, the term goes beyond the idea of motion. It is to say that there are several mechanisms to make characters and landscapes come to life in order to make them interact with the reader: pop-up transformations, tunnel books, flaps, pull-tabs, pop-outs, pull-downs, etc. The first pop-up book was invented by Ramon Llull in XIII century, a Catalan mystic and poet. Movable books were not created for young audiences until the early XIX century. These types of books have been used in several fields like Medicine, Astronomy, Engineering and Education.

That is the reason why for the past five years, our Spanish department has been leading a project entitled Hidden Treasures: Let's discover magic stories together. This activity is carried out from the beginning of the school year. This is a project-based teaching method, a dynamic classroom approach which makes pupils work by actively engaging them in real-world and personally meaningful activities.

## Methodology

First, pupils read a book called *The Fourteen Mummies of Bakri* by Susana Fernández, a Spanish archaeologist and a writer of historical fiction for young adults. This book is about a group of young people going on a fantastic adventure to Egypt. The plot is full of intrigue and mystery. Then, we tell students to be inspired from previous research on the most impressive archaeological findings around the globe to create bilingual (Spanish French) stories to be illustrated with pop-up techniques. This is how pupils start their own quest. After reading the book, they do research on a famous discovery like Macchu Picchu in Peru or The Rosetta Stone in Egypt. In pairs, they create a story inspired from those findings. Later, pupils translate these stories from Spanish into French. The next step is to participate in workshops headed by Amapola Cartonera, a small craft publishing company working with us. They teach pupils basic pop-up techniques to illustrate their books. The best books of each class are selected and published. The seventh graders present their books to the Elementary school



pupils. This is an activity guided by pupils themselves taking the role of teachers. As they present their own books, the younger children also learn basic pop-up techniques to illustrate their own mini books.



**Figure 1: Participants learning pop-up techniques**



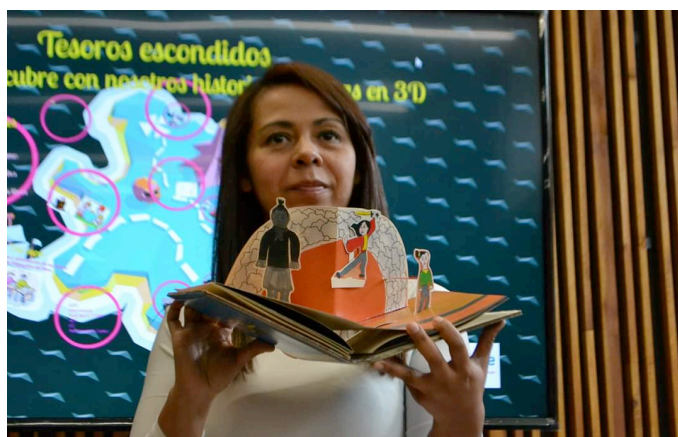
**Figure 2: Seventh graders teach pop-up techniques to Elementary pupils**

## Results

This project has allowed pupils to open up to new learning opportunities. They are very motivated and the parents are very proud of the publication of their children's books. As a matter of fact, this type of activity makes us discover hidden talents among shy pupils or youngsters who do not like writing, who do not believe in themselves or lack of self-esteem. We are very proud to see how positively the entire school community receives this project and even teachers from other schools and writers have been very interested. Additionally, we are very involved in creating our own publishing house so that we can publish our own books and have the opportunity to release other writing projects as appealing as this one. We are going to continue with this bilingual project for next year and intend to make it digital as well. Overall, pop-up books are an innovative way of conveying literature through animated storytelling.



**Figure 3: Pupils participate in the FILBO book fair**



**Figure 4: Teacher presents a pop-up book during the Spanish week at school**

## **Conclusion**

Hidden treasures is a very interesting way to appreciate literature for young people and to allow Secondary pupils to play their leading role in promoting reading and writing skills through art and creativity. Thanks to the support of the school, this activity turned into an international project sponsored by AEFÉ (Agency for the Teaching of French Abroad). This project now has a space in places like the famous Colombian book fair FILBO. There have also been alliances with high schools in France. These partnerships have enabled the integration of cultures and the exchange of experiences. With the sale of these books, donations are made to public schools in Bogota so that they can carry out the project as well. Our activity has been very well received throughout the school community thanks to all the intercultural, linguistic and citizenship skills involved.

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## ***Enhancing Teachers' Personality and Social Competence: MBTI Approach***

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### **Abstract**

This research aims to identify primary school teachers' personality profile in Jakarta using Myers-Briggs Type Indicator and design trainings to improve the social and personality competence accordingly. The research was conducted using mixed-method with qualitative and quantitative approaches. MBTI instrument was utilized to gather data from 350 elementary teachers aged between 21 – 60 years old, from 47 schools in 5 administrative districts (North, Central, South, East, and West) of Jakarta. The result showed ESTJ type dominates teachers' personality profile with 118 participants (33,7%), followed by ESTP with 59 participants (16,9%) and ESFJ with 51 participants (14,6%). Based on the type distribution, we designed pre-trainings which were held on 27-28 July, comprised of 15 elementary teachers in East Jakarta district. Treatments through multi-phase trainings were conducted according to each personality type. Pre-test, post-test and instruments related were distributed to measure the impact of given treatment on the subject matter. Using Kirkpatrick's four level of evaluation, we found that; all participants were satisfied with the training (level one), scored more than 80 out of 100 for written test on the training subjects (level 2), and showed significant change towards their behavior in school in terms of personal grooming and teamwork (level 3).

Keywords: Myers-Briggs Type Indicator, personality, social competence, elementary teacher, teacher training

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## Introduction

Education has been determining factor in every nation. Yet even in developed countries, education is continuously evolving, striving to catch up with development of social and technology. Education as a process of delivering knowledge, skills, and values-, utilizes several variables, and the importance of teacher's quality is unquestionable.

The Myers-Briggs Type Indicator instrument is a set of independent questionnaires designed to understand and apply Jungian personality type theory. MBTI identifies differences between normal people, where these differences usually cause miscommunication and misunderstanding (Briggs, Kirby, Briggs, 1998). MBTI was first created by Katharine Cook Briggs and Isabel Briggs Myers based on studies and research conducted by Swiss psychologist Carl Gustav Jung. After more than 60 years of development, MBTI has become the most widely used instrument for understanding personality types with a variety of potential uses (Briggs, Kirby, Briggs, 1998). This is also the reason for numerous research conducted using MBTI (11,000 researches, including 1780 dissertations) according to the Centre of Application of Psychological Type in 2008 (Quenk, 2009). In addition, The Journal of Psychological Type has also published 69 volumes that exclusively conduct research on personality types (Quenk, 2009).

The use of MBTI in business management has been carried out massively in various national and international companies. Eighty percent of the companies listed on the prestigious Fortune 100 list use the MBTI as an instrument to identify their employee personality types and overcome weaknesses and increase the potential of each employee. This is supported by Daft who explains that leaders should remember that each type can have positive and negative consequences for behavior. By understanding their MBTI types, their strengths and minimizing their weaknesses (Daft, 2008). Leaders must realize that each type of personality has positive and negative consequences related to behavior. By understanding the type of MBTI, leaders can maximize the potential of their employees and minimize their weaknesses.

Recent research regarding the use of MBTI instruments in identifying and correlating these personality types to variables within the organization has been widely carried out. As was done by Furnham and Crump who analyzed the relationship between the characteristics of MBTI and how quickly an employee got a promotion (Furnham & Crump, 2015). The results of the analysis show that extroverted personality types get a promotion in the work faster than the introvert type. In particular, the ENTP personality type (Extroversion - Intuition - Thinking - Perceiving) tends to get faster promotions. According to Myers in Furnham and Crump, the type of ENTP is described as someone who is agile, intelligent, stimulant, alert, and speaks openly. Whereas for people with Feeling dominance, they tend to require a longer time to get a promotion. Still according to Furnham and Crump, this might be because someone who has the domination of Feeling compared to Thinking is more prone to experience stress and is more interested in group dynamics than strategy (Furnham & Crump, 2015).

As one of the most widely used instruments in the industry, MBTI can also measure one's ability to innovate. This character is closely related to one's success which also

determines the success of the organization. Thus, the urgency in determining innovative human resources is one of the priorities of various organizations throughout the world. General characteristics that are correlated with one's level of innovation are; leadership, vision, teamwork, communication, curiosity, self-discipline, focus, and determination and desire to help others. These elements can be identified using MBTI, where the highest innovation tendency is in the ENTJ type (Extroversion - Intuition - Thinking - Judging) while the lowest value is ISFP (Introversion - Sensing - Feeling - Perceiving) (Amar & Mullaney, 2017).

Malik and Zamir in the *Journal of Education and Practice* explained that the MBTI instrument itself can be used to see the level of one's emotional intelligence (Malik & Zamir, 2014). Emotional intelligence is an essential aspect for an educator because this aspect indicates the level of emotional maturity of a teacher to be able to carry out his duties in educating the next generation of civilization (Malik & Zamir, 2014).

Subsequent research was carried out by Bower who conduct coaching with the help of MBTI instruments (Bower, 2015). Bower said that the basic principle of coaching seen from the point of view of Gestalt theory and Person-centered is the awareness of self (self-awareness) and others (other-awareness), where by knowing yourself and others, someone will be able to increase their capacity and solve problems with what they have. Awareness of other types of people will be able to provide benefits in terms of communication effectiveness, conflict resolution, leadership, and team building. The conclusion of the study is that recognizing one's own personality and others through the MBTI instrument can help increase capacity and self-potential and social interaction in the environment (Bower, 2015). Furthermore, Setiawati (2015) and her colleagues conducted research to implement MBTI as a basis for student career development. The research conducted to counselling & guidance students of UNY aims to identify the type of personality that is owned by students, as well as its relationship to counselor competence for each personality type. The results showed that there was an average of personal competence in extrovert and introvert subjects.

Moore et al in a study identified the character of students and developed a supervision strategy that can be carried out by supervisors for each personality preference (Moore & Detlaff, 2004). The results of this empirical study indicate that supervisors must have different strategies and approaches for each student. Students who have extroversion tendencies must be given time and space to verbally express what they feel. Students of this type must also be involved in a verbal discussion where the process of developing ideas occurs spontaneously. Unlike the type of introversion learners, they tend to have to discuss individually with supervisors. This is because they process and reflect on the experience they received first before they developed into a response and idea. Forcing introverted students into discussion forums will cause them to be uncomfortable and difficult to express their thoughts. The conclusion of this study is that each type of personality owned by students requires the right supervision approach and strategy to be able to obtain valid and reliable information for future evaluation materials (Moore & Detlaff, 2004).

Alić in his report entitled "The Relationship of Individuals and Organizations by the Method of the Myers-Briggs Personality Indicator" examined the personality types of the entire academic community in several schools using the MBTI instrument. He explained that personality types that exist in personnel in a school are very likely to

form a unique profile of the school itself. This profile, according to him, can be a basis for implementing various steps to strengthen and encourage the potential of the school and minimize the negative aspects that might occur. In addition, the culture that is formed in an organization depends heavily on the culture that exists in the social system of society, such as beliefs, value systems, and behavior patterns (Alic, 2010).

Furthermore, Rushton et al attempted to identify effective teacher personality types by collecting MBTI profiles from 58 of the best teachers in Florida. The instrument they used was MBTI and Beiderman Risk Taking (BRT), where a sample of 58 teachers was significantly different from the two comparisons, namely two groups of primary school teachers (N = 804, 189). In the study, significant differences occurred with ENFP and ENFJ profiles (Rushton et al, 2007). In addition, Rushton et al also conducted a study to identify the MBTI profile of prospective teacher students and program preferences for each profile at the Institute of Education. The number of respondents is 368 people from five different study programs. The results of the study show that 28 percent of prospective primary school teachers have a profile of Sensing, Feeling, Judging, with SF's mental functions. While most of the prospective early childhood teacher students have the type of Sensing, Feeling, and Judging and profiles of Extraversion, Intuition, Feeling, Judging (ENFJ). For Special Education teacher candidates, most of them have Introversion, Intuition, Thinking, and Judging (INTJ) profiles. Finally, postgraduate Education Leadership students have a tendency to profile Extraversion, Sensing, Thinking and Judging (ESTJ). This finding shows that four groups of teachers have a type tendency towards the program they choose (Rushton et al, 2012).

Similar research was conducted by Sears et al with the title "Myers-Briggs Personality Profiles of Prospective Educators". The first objective of this study was to identify personality profiles of 4,483 participants who attended the teacher training program who ultimately decided to continue and not continue the program. The next objective is to identify the personality types of 886 students who complete the program in accordance with their respective fields of expertise (Primary, Secondary, and others). The results show that the MBTI S-F-J profile tends to be owned by students who continue their education. The results also saw several types and anti-types related to teacher certification (Sears et al, 1997).

Various studies carried out using MBTI become evidence that the instrument is one of the instruments that is often used to determine a person's personality type. Simply put, knowing the personality types of yourself and others can provide many benefits. A person who knows his personality type well and cannot determine his potential and weaknesses. In addition, they can also set strategies and approaches they can do to develop themselves and their potential. MBTI is also able to provide a perspective on seeing one's own characteristics, where each person tends to experience bias in defining the character they have. MBTI in relation to social interaction also has many benefits, such as in building interpersonal relationships, building a team, understanding other people's personality types, and evaluating and implementing policy tools. By understanding the characteristics of others, effective communication, a strong and empathetic team, and more informed decision making will be established.



Apart from various advantages, the use of MBTI instruments in the field of education in Indonesia is still very minimal. The potential use of MBTI instruments in supporting the education system in Indonesia is very large. MBTI could be an alternative approach in carrying out teachers' professional development based on teachers' personality. Even educators, in understanding the characteristics and learning styles of students, can use the MBTI instrument as the basis for decisions taken. The leadership and communication style of the principal, who has been able to use MBTI in his school managerial, will be more effective and varied. Although challenges and obstacles are certainly found, research into the use of MBTI in education must be an alternative interdisciplinary research collaboration to achieve effective and efficient educational goals.

Based on the need assessment research that had been conducted in the first year research, we have designed trainings that aimed to enhance teachers' personality and social competence based on four dimensions of MBTI. The methods used in these trainings were mainly based on teachers' personality traits that has been identified using MBTI.

## **Conclusion**

## **Discussion**

After gathering MBTI profile of elementary school teacher in Jakarta, we started to formulate five trainings correlated with personality and social competence for teachers. The trainings were designed not only to meet their objectives but also to fit the needs of MBTI dimension of the teachers. The trainings are; interpersonal, multicultural, public speaking, personal grooming, and team building.

Public speaking training was designed based on extroversion – introversion dimension in which the training was specifically designed to accommodate each type's strength and weaknesses. For the extrovert type teacher, they mainly focused on understanding and using non-verbal language such as gesture, facial expression, and body language, while the introvert ones were mainly focused on overcoming anxiety and fear through a well-planned speech and data, as well as coaching and practice. The two separated groups were handled by professional trainer and learned mostly from experiential learning which gave them chance to practice directly.

Personal grooming was designed to meet the needs of judging – perceiving dimensions. This training was derived from the fact that teachers in Indonesia do not bother with their appearance too much. This might give the unwanted impression to their students, as they look untreated every day. While the judging trait tends to ignore their appearance, we tried to modify their look with a fresh touch without too many styles. On the other hand, perceiving trait is more likely to dress freely. The point of this training is to transform teacher's appearance as a part of their personal branding.

Team building was meant to raise awareness on extroversion – introversion style and their function in team. While they are not a good motivator, the introverts are able to contribute with their idea and suggestion as the extroverts become the ones who

motivate and be public figures. The training was focused on teamwork games and insight.

Multicultural and interpersonal trainings were designed to internalize the objectivity and acceptance of the teachers towards the diversity. It is particularly important as Indonesia consists of more than one hundred tribes with different culture and language. Teachers must accept student or colleague with different cultural background without prejudice and ethnocentrism.

A pre-test and post-test were given before and after the trainings in order to measure the effectiveness. We also collected response through video to further evaluate the training. We utilized Kirkpatrick's four level evaluation on this research, limited only until level three. The first level of evaluation that measures reaction was given through paper-based question. The result was all the participant were satisfied with the training's material, place, accommodation, and others.

The level two evaluation was measured through online-based quiz utilizing google form, the participants were asked to answer questions related to trainings they just finished. The result was all participants scored more than 80 out of 100 score. This indicated that the trainings were successful in giving the knowledge of respective subjects.

Level three evaluation was a little bit complex. We had to instruct principals to observe teachers who have participated in the trainings. A set of evaluation form was given to the principals to measure teachers' personality and social competence before and after joining the trainings, and a two-week observation was conducted to find whether there would be change on the teachers' personality and social competences. Based on t-test analysis, it is found that there is a significant difference in teachers' personality and social competence before and after joining teamwork training and interpersonal training. Furthermore, this research also found that there is no significant difference in teachers' personality and social competence before and after participating in public speaking training and multicultural training. While, personal grooming has been the only training that has not been observed yet.

### **Implication & Limitation**

As a trial phase of two-year R&D research, we realized that the result was not eligible to be disseminated widely yet. However, the trainings indicated positive result despite the flaws. In the future, we hope that the research will continue in order to formulate standardized trainings for teachers' personality and social enhancement.

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***From the Classroom to the Community and Back: The Development of a  
Community-Based Research Model for Contemporary Higher Education***

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**Abstract**

Community-based research is a collaborative research approach to address a community-identified need that can also be used as a pedagogical tool. In this study, we describe the development of the Capstone experience module, an academic module at a residential college in an Asian university. This module creates a unique learning environment through the formation of a tripartite partnership among undergraduates, educators and the community to collaboratively engage in research to effect social change. Through the 'inward' constructive alignment of the assessments to the module Intended Learning Outcomes (ILOs) and the 'upwards' mapping to the broader educational aims (i.e. Programme ILOs and Association of American Colleges and University Essential LOs), we were able to validate that this module fits coherently with the broader curricular approach to scaffold the students' personal development within the university. Through a hermeneutic analysis of the reflections of students in their learning journals, we demonstrate that such an approach can benefit the community partner and provide opportunities for the undergraduates' development of critical competencies. These results accentuated how community-based research projects hold significant pedagogical value for contemporary higher education.

Keywords: Community development, research methods, experiential learning

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## **Introduction**

Community-based research (CBR) is a collaboration between educators, students and the community to address emerging needs through inquiry (Strand et al. 2003). With early engagement of the community throughout project planning and execution, this approach enables deeper understanding of the community to develop more effective research (Anderson 2002). The emphasis on sustained communication throughout the project also allows timely feedback on the research methods and promotes collective decision-making to build rapport (Anderson 2002).

CBR differs from typical research programmes in which researchers are more task-oriented and adopt an objective stance (Strand et al. 2003). In CBR, researchers engage diverse communities in identifying the problem and developing solutions (Padilla et al. 1999). Furthermore, CBR distinguishes itself from service learning where students learn through exposure to different life experiences and activities without conducting academic research (Anderson 2002). In contemporary higher education, CBR enhances practical and research skills (Margolis et al. 2000) to facilitate the transition of students to practitioners (Anderson 2002). The ability to meet the academic missions of teaching, research and service has made CBR a revolutionary pedagogical tool (Strand et al. 2003).

To date, CBR is widely employed for the social service sectors and clinical work where the focus is on service provision to improve the community's well being (Strand et al. 2003). However, the application of CBR beyond interdisciplinary settings is scant. In recent years, the emergence of interdisciplinary subjects has created possibilities for CBR to be applied to a broader range of topics. For instance, environmental science synergizes principles from biology, geography and sociology (Franks et al. 2007) and local communities are often involved in programme development and decision-making (Hindmarsh and Matthews 2008). Recognising the pedagogical value of CBR and the need to develop a CBR model for interdisciplinary classrooms, the Capstone experience (CAPSTONE) module was conceptualized to create this unique learning platform.

In this paper, we describe the underpinning curriculum framework for the CAPSTONE module offered by the College of Alice & Peter Tan (CAPT), a residential college in the National University of Singapore, and we demonstrate how the module learning outcomes are aligned to broader educational aims. To demonstrate the pedagogical value of this module in enhancing student learning, we drew upon evidence from a pilot study from which we conducted a hermeneutic analysis of the students' reflections documented in their learning journals.

## **Curriculum framework and module design**

In our review of the literature, we were conscious of the need to find a higher education framework that facilitates student learning through research and yet, flexible enough to be applied across disciplines. Furthermore, the framework has to facilitate close collaboration among the college's academic staff, undergraduates and community partners, a prominent feature of CBR (Anderson 2002). Amidst the myriad frameworks available in the literature, the connected curriculum (Fung 2017) offered the closest alignment to what was required for the CAPSTONE module.

Fung (2017) listed the six dimensions of the connected curriculum as:

1. Students connect with researchers and the institution's research
2. A through line of research activity is built into the programme
3. Students make connections with subjects and out to the world
4. Students connect academic learning with skills for the workplace
5. Students learn to produce outputs – assessments directed at an audience
6. Students connect with each other, across phases and with alumni.

To situate the CAPSTONE module to the connected curriculum, the module was aligned to the connected curriculum framework through the module's design, supported by the formative assessments (Table 1). In the CAPSTONE module, three to five undergraduates work in a team to address a need identified by the community over the semester (13 weeks). Prior to the commencement of the module, each group is requested to submit a formal research proposal to outline the background of the issues they are addressing, aims, timeline, methodology for implementation and evaluation of their programme. The formal assessments for this credited module include: 1) situational analysis to link the scholarly underpinnings to the issues identified together with the partner, 2) a final presentation to the college's academic staff, undergraduates and community partners to share their work and findings, 3) a final report, 4) a peer and tutor review of the group members' performance and 5) a personal reflection of their learning points throughout the programme.

<b>Dimension</b>	<b>CAPSTONE module design</b>	<b>Supporting assessments</b>
1	Students work with academic staff and community partner to develop a project	Situational Analysis
2	Students conduct research or piloting an intervention on a topic identified by the community partner	Situational Analysis, final report
3	Academic staff provide guidance for students to relate issue to scholarship and broader discourse	Situational Analysis, final report
4	Community partner provide guidance for students to relate issue to practical application and constraints	Situational Analysis, final report
5	Students share their findings through a presentation with college staff, students and community partners.	Final presentation
6	Students work in groups of 3 to 5, of which up to 50% of the team can be college alumni	Reflection, peer review, tutor review

Table 1. The alignment of the CAPSTONE module design to each dimension of the connected curriculum framework and the supporting formal assessments.

## **Methods**

### *Constructive alignment of the CAPSTONE module*

To situate the CAPSTONE module within educational scholarship, we were guided by the four major steps highlighted by Biggs (n.d) to constructively align the module:

1. Defining the Intended Learning Outcomes (ILOs)
2. Choosing teaching/learning activities that lead to the ILOs
3. Assessing students' actual learning outcomes
4. Arriving at a final grade.

The module ILOs were developed based on the Structure of Observed Learning Outcomes (SOLO) taxonomy (Biggs & Collis, 1982) and subsequently aligned the assessments to the revised ILOs to identify key gaps in the module that can be supplemented by other teaching activities.

While this ‘inward’ constructive alignment was effective in mapping the teaching activities to the module ILOs, an ‘upward’ alignment was needed to help us understand the extent to which this module was in line with the broader educational aims (Figure 1). This alignment was done at two levels – the 17 proximal goals listed in the residential college programme ILOs and the 12 selected distal goals listed in the Association of American Colleges and University (AAC&U) Essential Learning Outcomes (ELOs). The latter was selected because of its focus on liberal education that resembled the approach used in the residential college programme and the scientific rigor that underpinned the development of the ELOs.

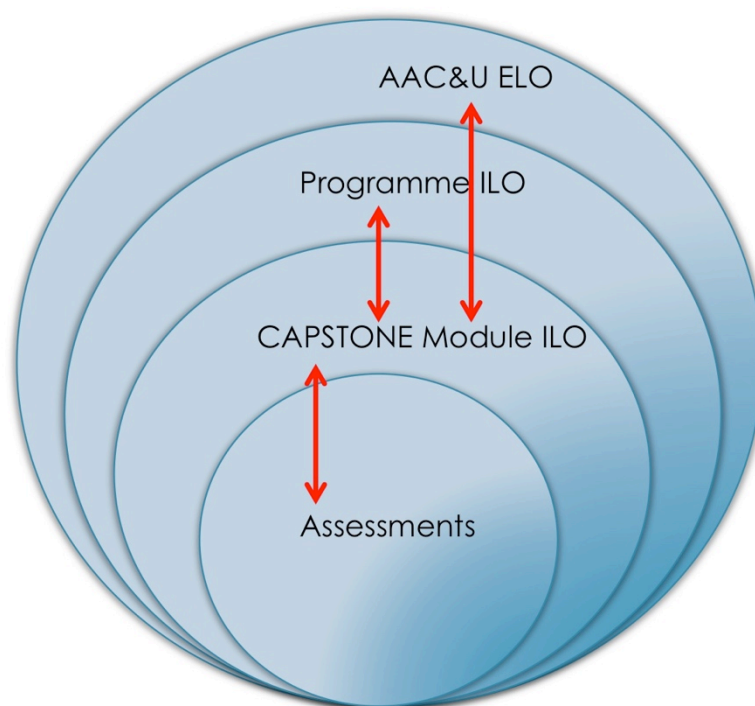


Figure 1. Approach to constructively align the CAPSTONE module.

### *Assessing the pedagogical value of the CAPSTONE module on undergraduate learning*

To evaluate the pedagogical value of the CAPSTONE module, a pilot study was conducted in 2018 based on an environmental science education CBR project, done by a group of three undergraduates from different disciplines together with a local high school (see Toh and Tambyah 2018). A hermeneutic analysis of the



undergraduates' reflective journals, which were submitted as part of the module requirements, was coded against 12 selected AAC&U VALUE ELOs classified under four categories: 1) Integrative and applied learning, 2) practical skills, 3) personal and social responsibility and 4) intellectual skills. To triangulate the data collected, the supervisor's observation and reflection on undergraduates' progress throughout the CAPSTONE project was also recorded for each variable.

## Results and discussion

### *Outcomes of the 'inward' and 'upward' alignment of the CAPSTONE module*

The constructive alignment of the module began with development of the ILOs for the CAPSTONE module, mapped to the SOLO taxonomy (Table 2). These ILOs were designed to scaffold learning and they included both cognitive (e.g. analyzing root causes) and practical skills (e.g. communication and teamwork).

<b>ILO</b>	<b>Module ILOs</b>	<b>SOLO level</b>
1	<i>Describe</i> the social, economic, cultural, historical and political context of the issue or question to be addressed within a defined community in Singapore or the region.	Multi structural
2	<i>Justify</i> the need to consider ethics, justice and equity in decision-making	Relational
3	<i>Analyze</i> needs and root causes pertinent to the issue or question, within an interdisciplinary framework	Relational
4	<i>Apply</i> sound and appropriate methods towards creating effective strategies to address the issue or question	Relational
5	<i>Apply</i> communication skills to effectively engage the stakeholders	Relational
6	<i>Reflect</i> on the impact of individuals, government, civic and private organizations on society, and the implications for policy making in the broader context	Extended abstract
7	<i>Build</i> cooperative relationships by accommodating different points of view and functioning effectively as a member of a team	Extended abstract

Table 2. Mapping of the module Intended Learning Outcomes (ILOs) to the Structure of Observed Learning Outcomes (SOLO) taxonomy.

The mapping of the original assessments to the revised module ILOs demonstrated that they were constructively aligned. Each ILO was adequately mapped to three assessments and thus no major changes were made (Table 3). To further enhance the learning value of the module, two teaching activities were introduced. Academic supervisors were encouraged to meet up with the students at different stages of the project so that there will be timely guidance on the academic and ethical contexts of the issues being addressed by the students, to support ILOs 1, 2, 3 and 4. In addition, it was suggested that the academic supervisors provide regular feedback on the undergraduates' performance and team dynamics collectively to support ILOs 5 and 7. More recently, a new research module was introduced in the college to equip students with community-based research skills. Hence, undergraduates who are enrolled in the CAPSTONE module were encouraged to attend selected classes in that module to build up the skills needed to support ILOs 4 and 5. Overall, this 'inward' alignment of

the module facilitated a clearer articulation of the module ILOs and enhanced the relevance of the teaching activities.

ILOs	Situational analysis	Final report	Final presentation	Peer review	Tutor review	Reflections
1	✓	✓	✓			
2	✓	✓	✓			
3	✓	✓	✓			
4		✓	✓		✓	
5				✓	✓	✓
6		✓	✓			✓
7				✓	✓	✓

Table 3. Constructive alignment of the assignments to the module Intended Learning Outcomes (ILOs)

The ‘upward’ alignment of the module ILOs to the residential college programme ILOs demonstrated the close alignment between the two (~90% alignment; Table 4). As the programme ILOs took reference from the AAC&U ELOs, the module ILOs and the AAC&U educational goals were also closely mapped (~87% alignment; Table 5). We are keenly aware that this is not indicative of the ‘success’ of this module nor will the module guarantee that the undergraduates achieve all the ILOs. Instead, this ‘upward’ alignment demonstrated that the module fits coherently with the broader curricular approach to scaffold the undergraduates’ personal development in the university and it helps us identify possible areas for improvement. In this case, the close alignment highlighted that we should focus on helping the undergraduates achieve the module ILOs, rather than institute major changes in the CAPSTONE module’s teaching and learning activities.

<i>Programme ILO/Module ILOs</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>
<b>Critical Thinking</b>							
Adopt a reasoned approach to analysing global and intercultural issues, taking into account multiple perspectives	✓	✓	✓	✓		✓	✓
Identify, access, organize and evaluate information, and apply appropriate frameworks to interpret data and knowledge, make inferences and evaluate arguments and claims	✓	✓	✓	✓	✓	✓	✓
Accept and manage ambiguity when faced with incomplete information and limitations	✓	✓	✓	✓	✓	✓	✓
Reflect on the assumptions and norms that shape one’s own thinking, and be open to a change in perspective		✓	✓	✓	✓	✓	✓
Think divergently, and creatively formulate questions and ideas that promote innovative solutions to global and social issues			✓	✓	✓	✓	✓
<b>Appreciation of Complexity</b>							
Understand how human society is shaped by a complex	✓	✓	✓	✓		✓	✓

<b>Programme ILO/Module ILOs</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
and diverse set of factors rooted in history, context, and culture							
Engage with contemporary and enduring issues, and the big questions of the day	✓	✓	✓	✓		✓	✓
Engage with multiple perspectives across academic disciplines and professional fields, and understand that many issues transcend particular disciplines	✓	✓	✓	✓	✓	✓	✓
Value diversity of identities, perspectives, opinions		✓	✓	✓	✓	✓	✓
<b>Effective Communication</b>							
Organize thoughts and arguments coherently and logically, in support of judgments, choices, claims or assertions	✓	✓	✓	✓	✓	✓	✓
Convey arguments and points of view, using both written and oral forms of communication, in a clear and effective way	✓	✓	✓	✓	✓	✓	✓
Collaborate with others who come from different backgrounds or hold opposing points of view, towards a common goal; work cooperatively in teams	✓	✓	✓	✓	✓	✓	✓
Practise self-awareness and empathy for other people's situations and contexts, and respect for others' arguments.		✓	✓	✓	✓	✓	✓
<b>Personal and Social Responsibility</b>							
Demonstrate understanding of local, regional and global issues using Singapore as a point of departure	✓	✓	✓	✓	✓	✓	✓
Practise ethical reasoning and action through active involvement with diverse communities and real world challenges		✓		✓	✓	✓	✓
Demonstrate intercultural knowledge and competence through the same		✓	✓	✓	✓	✓	✓
Establish foundations for lifelong learning, including formulating and prioritizing personal goals, managing time and resources, and learning from past actions			✓	✓	✓	✓	✓

Table 4. Constructive alignment of the module Intended Learning Outcomes (ILOs) to the residential college programme ILOs.

<i>AAC&amp;U essential learning outcomes/Module ILOs</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>
<b>Practical skills</b>							
Communication	✓	✓	✓	✓	✓	✓	✓
Teamwork	✓	✓	✓	✓	✓	✓	✓
Problem solving				✓	✓	✓	✓
<b>Intellectual skills</b>							
Inquiry and analysis	✓	✓	✓	✓	✓	✓	✓
Critical thinking		✓	✓	✓	✓	✓	✓
Creative thinking			✓	✓	✓	✓	✓
<b>Personal and Social Responsibility</b>							
Civic engagement		✓	✓	✓	✓	✓	✓
Intercultural knowledge	✓	✓	✓	✓	✓	✓	✓
Ethical reasoning		✓	✓	✓	✓	✓	✓
<b>Integrative and applied learning</b>							
Foundations and skills for lifelong learning	✓	✓	✓	✓	✓	✓	✓
Global learning	✓	✓	✓	✓	✓	✓	✓
Integrative learning	✓	✓	✓	✓	✓	✓	✓

Table 5. Constructive alignment of the module Intended Learning Outcomes (ILOs) to the Association of American Colleges and University (AAC&U) Essential Learning Outcomes (ELOs).

#### *Pedagogical value of CAPSTONE module – practical skills*

Since the undergraduates belonged to different disciplines, the module created a platform to learn and appreciate different practical skills. In the supervisor's personal reflection, it was noted that,

*“The evaluation of the programme outcome required a lot of collaboration, as the students needed to tap on each other's strengths (e.g., statistics, education and environmental science background) to develop a coherent report. The regular group discussions were important in helping them synergise their individual efforts”. Supervisor's reflection*

For instance, the use of statistical tools in the data analysis was the strength of the Mathematics major and he taught the skills to the other team members. The undergraduates also highlighted the need to understand and *“build on each other's strengths in a team, and that a team is really more than a sum of its parts”* (Undergraduate 2) and unanimously acknowledged that teamwork was essential to meet the objectives.

As a result of the dynamic nature of the project, the undergraduates had to change their plans and to learn to focus on solving the issue. The supervisor noted that,

*“The breakdown of the food digester was a huge surprise and the students had to quickly amend their proposal. This placed them under a lot of stress and I had to spend some time calming them down. Eventually, they revised the original content and I was surprised that they adapted so quickly to the changes.” Supervisor’s reflection*

Beyond developing the solutions, the undergraduates noted that it was equally important to learn how to manage their anxieties and emotions to respond to the problem, especially in light of the tight timelines. The undergraduates highlighted that,

*“This helped me realise that when unforeseen issues occur, we need to remain calm and focus first on doing what necessary and possible, then worry about the other details later.” Undergraduate 2*

*“With much guidance and thorough discussions within the team, we were able to plan for the changes requested by the school.” Undergraduate 1*

The undergraduates also appreciated the importance of communication as a practical skill to facilitate the delivery of knowledge and skills to the high school students. Peer learning was evident in the programme as the undergraduates were able to pick up communication skills from their team members. What was most significant was the realization that active communication with the partners throughout the engagement was essential in understanding each other’s perspectives and to keep up-to-date with the changes in their plans. One undergraduate noted,

*“I came to understand that when working with a community-based partner, communication between the parties and understanding the other party’s perspective is crucial.” Undergraduate 1*

This corroborated with the supervisor’s observations that they were quick to *“set up various communication channels (e.g., informal meeting, whatsapp groups) to ensure that the goals were mutually aligned and the logistics were prepared prior to each lesson”* (Supervisor’s reflection). The value of timely and constant communication was a clear learning point for the undergraduates.

#### *Pedagogical value of CAPSTONE module – intellectual skills*

While all the undergraduates had some exposure to environmental science through their formal curriculum in the university, the programme required a foundational understanding of pedagogical theories and methods, a discipline that the undergraduates were unfamiliar with. In this process of inquiry, the undergraduates found that consultation with the teaching staff and literature review were essential in structuring their lessons in the programme. They were able to *“understand more about pedagogy and ensure that helpful practices are adhered to”* (Undergraduate 2). The promotion of deeper and broader inquiry is likely a result of the interdisciplinary nature of the team facilitated through the CAPSTONE module that is enhanced by *“the element of peer learning evident in this project”* (Supervisor’s reflection).

The objectives and the constraints imposed by the partner also necessitated the undergraduates *“to be creative and work around the constraints”* especially when *“multiple unexpected events and developments occurred”* (Undergraduate 2). Creative

thinking was demonstrated when the team created an evidenced-based game that served as a pedagogical tool to help the high school students appreciate complexity, when the duration for the class was abruptly reduced. The team also decided to incorporate a field trip to maximize learning for the high school students when they *“could have stuck with classroom sessions that was originally discussed”*

(Supervisor’s reflection). Ultimately, the field trip to an eco-resort was rated the most effective component of the course and prompted deeper reflection among the participants. One undergraduate remarked,

*“Based on the feedback received in the Focus Group Discussions, the students generally enjoyed the novel teaching methods we employed, including games and references to real-life examples. This made the additional effort and time put in to design effective lessons feel worth it.” Undergraduate 2*

Furthermore, the process of reviewing the literature allowed them to critically examine what they initially thought was a *“convenient and efficient”* (Undergraduate 2) approach to delivering the content of the lessons in the programme and to discover the inadequacy of this approach with those suggested in the literature. The programme also prompted the undergraduates to challenge their preconceived notions of education and one of them remarked,

*“I have always thought that education is power, but I learned that power does not always lead to change” Undergraduate 3*

From the supervisor’s observations made during the students’ debrief, he also noted,

*“The initial literature review phase compelled the students to think deeply on how environmental education should be done and this academic grounding helped students constantly reflect and evaluate their assumptions and actions.” Supervisor’s reflection*

#### *Pedagogical value of CAPSTONE module – personal and social responsibility*

For the undergraduates, this project was their first attempt at engaging and mentoring younger students in a high school. The undergraduates noted they were *“nervous and unsure about how to approach, guide and mentor students of this age”* (Undergraduate 3). Through this process of civic engagement, the supervisor could see the undergraduates *“become more aware of their emotions in face of the uncertainty of their engagement and their attitudes towards the high school students”* (Supervisor’s reflection). One undergraduate also expressed that she was conscious *“not to misunderstand [the high school students] or easily pass judgment, in order to have more meaningful interactions with this community”* (Undergraduate 3).

This in turn, facilitated the undergraduates’ understanding of the challenges the high school students’ faced, and the *“need to meet academic, co-curricular and personal expectations, coupled with peer and societal pressures”* (Undergraduate 3). The supervisor noted that *“the undergraduates were clearly more emphatic towards the high school students as the programme progressed and grew more conscious of their choice of words”* (Supervisor’s reflection). They simplified the content to match the

aptitude and interest of the high school students and chose a non-directive approach that instils self-motivation. One undergraduate noted that,

*“It is always crucial that we, as mentors, do not get too caught up in “preaching” but more so in guiding and truly understanding what resonates with and motivates the students” Undergraduate 3*

In addition, they highlighted the importance of protecting the identities of participants in research studies, and appreciated that these studies have to be done professionally and ethically to safeguard the interests of young children ( $7.3 \pm 0.06$ , Table 7). One undergraduate noted,

*“I was unmotivated to complete this [ethics] document partly because it was due at around the exam period, and because I thought that it was unnecessary since we were just working with a group of Secondary 2 students. However, after much discovery of the roles of the Institutional review Board (IRB) in community-based research conducted in NUS, I realised that this document is necessary in minimising risks, such as personal data leakages. The IRB’s role in ethically protecting our partner prevents mistrust between the two parties, and is a conceptually small but important part of a research partnership (Hyatt, et. al., 2009)” Undergraduate 1*

In the supervisor’s observation, the undergraduates perceived administrative documents as tedious and ineffective during the preparatory phase, but when the rationale was clearly explained especially at the start of the engagement, they could learn from this experience and were more conscious of ethical considerations in their decision making process. These *“ethical principles were subsequently woven into their design and implementation of their questionnaires and discussion”* (Supervisor’s reflection).

#### *Pedagogical value of CAPSTONE module – integrative and applied learning*

The CBR approach provided the opportunity for the undergraduates to learn concepts derived from different disciplines and equipped them with the skills needed to work cohesively as a team. One notable learning point was that of humility, which was repeatedly mentioned in the reflections,

*“I really cherished the opportunity to learn from them, and was, on multiple occasions forced to be humble and recognise when others were better suited to a certain task than myself.” Undergraduate 2*

*“In times when I was the one falling short, I did feel guilty and a bit of a burden to the team, but I was reminded of the importance of supporting one another in difficult times, and more importantly, for me to have humility and be accountable for these instances.” Undergraduate 1*

They recognized that these skills and knowledge were crucial to their present work and *“believe that the concepts and skills I learnt in this aspect of the project will benefit me in the long run”* (Undergraduate 1). One of them noted,

*“Through this experience of working with different external agencies, I better understood the importance of networking, and moving forward, I hope to*

*continue to remain open to the possibility of meeting new people and building relationships.” Undergraduate 2*

In the supervisor’s interactions with the undergraduates, he observed that the *“students became more prepared for the uncertainty involved in scientific research and were keen to apply these skills to their final year project. For instance, the Environmental Studies major would like to take on a project related to environmental attitudes while the Applied Mathematics major has expressed interest in an interdisciplinary project that bridges Biology and his own discipline”* (Supervisor’s reflection). The team was also determined to write up their CAPSTONE project into a scientific publication to share their learning points. Through informal communication, they continued to support and encourage one another in their academic work, even though the project has ended.

The CAPSTONE module enabled undergraduates to synthesize, apply and evaluate their project and hence promoted integrative learning by leveraging on their respective disciplinary strengths. One undergraduate noted,

*“Besides being exposed to food waste management concepts and pedagogical theories, I was given the opportunity to learn how to design an environmental education programme, and methods to evaluate the effectiveness of our intervention.” Undergraduate 1*

Beyond this synergy, the undergraduates were also able to integrate the knowledge gleaned from the community to develop a programme that is relevant for the high school students, by taking into account the barriers they observed. This CAPSTONE project thus bridges formal and informal learning by linking theoretical and empirical evidence to create a programme that is suitable for 14 year olds. The undergraduates were clearly aware of the need to *“constantly reflect and incorporate the views of the community [high school students and teachers] into the programme and this was achieved through weekly discussion and revision of each module to keep it relevant and effective”* (Supervisor’s reflection).

Moreover, the experience also prompted them to think about issues on a broader scale and some had begun questioning if educators *“should rethink the conventional education model when it comes to environmental stewardship”* and to promote teaching in *“innovative and refreshing ways”* (Undergraduate 2) through collaboration between different parties. The supervisor recalled how the undergraduates remarked that,

*“Environmental issues cannot be taught in the high schools solely as part of the syllabus to prepare students for high stakes examinations, as the assumption that knowledge directly changes behaviour is invalid.”* (Supervisor’s recollection)

This *“realisation is critical, as it was evident that the undergraduates were relating this issue on a broader level, and has begun to challenge conventional views and assumptions. More importantly, they are asking themselves what their roles are in this issue.”* (Supervisor’s reflection)



## **Conclusion**

In this study, we described how the connected curriculum framework was useful in anchoring the CAPSTONE module. Through constructive alignment, the ILOs of the CAPSTONE module were aligned to the broader scholarship (i.e. SOLO taxonomy and constructively alignment) and educational aims (i.e. residential college programme ILOs and AAC&U ELOs). This ‘inward’ and ‘upward’ alignment identified minor gaps and new learning activities have since been recommended to the supervising staff to enhance the learning value of this module. The CAPSTONE module had very positive outcomes in the 12 selected ELOs and it was evident that CBR can help prepare undergraduates in expanding their skills beyond the intellectual content. The provision of opportunities in higher education to solve ‘real-world’ problems was a distinct strength of the module. In addition, a carefully supervised CBR project like this, can also benefit the community partner (see Toh and Siok 2018) and the instructors (Toh and Ortiga 2018). Beyond environmental science, the CBR model can be readily applied to other interdisciplinary fields such as urban studies and we strongly encourage educators to leverage on CBR as a pedagogical tool in higher education.

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*Developing an Informal Tandem Learning Scheme for Young Researchers and Academics*

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**Abstract**

The constant change in technologies and organizations today require higher education institutions to adapt just as quickly to the new situations. This is especially important for teachers in second language classrooms, as they try to prepare students for this changing world. In the EFL context in which this research took place, students were unable to find research partners to practice higher-level English in a more authentic environment. As such, a Tandem Language Learning (TaLL) approach was proposed. TaLL is recognized as an effective approach in improving the quality of the learning environment as ideally, the knowledge learned has intrinsic value to the learner and it can also be transferred to various real-world contexts. This longitudinal research project aimed to develop an informal environment in which students could freely practice research skills with students in other parts of Japan through video conferencing. The first step was to conduct a curriculum analysis to identify if the underlying principles were embedded within the curriculum and teaching practices. A Curriculum Analysis Framework was developed to address three areas: (1) Policy (2) Practice and (3) Process. Following this, the TaLL program could be implemented.

Key Words: Tandem Language Learning (TaLL), Informal Learning Environment (ILE), Video-mediated Conferencing, Social Constructivism, Learner-generated content

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## Introduction

Over the past decade, there has been somewhat of a technological revolution occurring in many universities in Japan. Traditional classrooms with rows of hard, unmoving seats have given way to Blended Learning Spaces (BLS) and Personal Learning Environments (PLEs) accompanied with the latest technology. More and more, language programs are beginning to incorporate self-study modules and out-of-class learning through online learning platforms. With all these innovations, one of the problems that many institutions face is the lack of use of the new systems possibly due to teachers continuing to hold on to tried and tested methodologies or anxiety over having to learn how to use the new technologies. In the specific context in which this research took place, for example, a PLE had already been established in the form of conversation and consultation rooms complete with wi-fi, loaner iPads, large displays, sofas and desks. However, the number of students actually using the space was minimal. As such, the researcher made a suggestion to repurpose the space by introducing a Tandem Language Learning program as a support service to young researchers and academics who required a PLE to practice and receive advice on scientific English.

Tandem Language Learning (TaLL) is a form of autonomous language learning in which two students work in tandem to help one another improve language skills. The idea was that students could use the PLE to experience authentic communication in a real-life situation and support each other. Traditional TaLL programs assume that one of the partners is an expert and the other is a beginner. In a sense, the principle of reciprocity needs to be maintained in order for TaLL to be successful (Brammerts, 1996). There have been several types of official tandem programs since the 1800s starting with face-to-face tandems. In the 1960s, a French-German Tandem partnership was organized which gave birth to TaLL as it is known today. Today, there are classroom TaLL projects, etandem (email) projects, instant-messaging and more recently video-mediated TaLL (skype, FaceTime). The common factor among these programs is that there is a mutual exchange of two languages. Previous studies have focused on areas such as improvement in language forms (O'Rourke, 2005; Kabata & Edasawa, 2011), fluency (Shuman & Stemberger, 2019), internationalization (Woodin, 2018; 2019) and professional skills (Aguilar Rio, Brudermann & Abbendroth-Timmer, 2019).

This research proposed an alternative to traditional foreign language based TaLL programs. Rather than focus on language gains or cultural exchange, the researcher focused on the immediate needs of the students, which was to improve scientific research language. This research was thus a somewhat unconventional Tandem Language Learning (TaLL) project in which young academics and researchers could meet, discuss and share scientific research through networking. Face-to-face and video-mediated TaLL were considered to be the best options for students to experience authentic and meaningful engagement with the target language (Lafford & Lafford, 2005; Muhr, 2012). Face-to-face learning in the same physical space, offered students the opportunity of engaging in a real-life social situation in which they had interact naturally with others such as greetings, small talk and other basic conversational civilities. In addition, they could get real-time feedback on posters and body language during presentations. Research suggests that during face-to-face dyads, partners employ a variety of non-verbal skills which is mirrored by their partner. It

further allowed for a larger number of students to interact at any given time. This kind of setting was more natural. Video exchanges aimed to bring together partners in distant locations. This was important to help students become accustomed to dealing with unfamiliar faces and situations. Through video conference, students would have to adjust in real-time to a 'fractured' environment (Hjulstad, 2016, Luff et al., 2003) in which they would have to deal with technical difficulties (such as volume or camera adjustment and time lag in voices), stand or sit in one spot and interact with only one person instead of engaging in larger, informal group discussion. Video-mediated tandem thus required students to be focused, clarify information, speak clearly and negotiate turn-taking.

Before development of the TaLL program could commence, approval first had to be granted to conduct the research. Once approved, the researcher was able to begin the project. A location had to be decided upon, participants had to be found and an underlying theory that would guide the program had to be established. Research literature was consulted to help situate the research within current TaLL theories, the institutional goals and the aim of the study. A curriculum analysis framework was developed in order to understand any potential challenges before implementing the program. Three areas were examined: university policy, teaching practices and the learning process as viewed by the learners. Workshops were offered as a way of understanding if there was a need for such a program as well as attracting potential research participants. The paper will present the TaLL framework and results of the framework analysis.

### **Practical considerations**

There were several things to consider at the beginning of the research and the first was location. At first, a classroom was first offered to the researcher to trial the program, but there were too many limitations to developing TaLL in a typical formal classroom setting. The first was the physical size and layout of the classroom with its traditional setup of rows of desks and chairs and a lectern at the front. As TaLL is based on the idea of natural social interaction, the setting necessitated a more natural, relaxed L2 immersion environment. There was no curriculum which is typically connected to learning in classroom settings. Instead, there was a list of themes negotiated by teacher and students depending on student needs. The final classroom limitation was the limited availability of technological tools with which the students could engage. Logistically, students were only able to meet at lunch time as it was the only time all students would not be in any classes. The setting that was eventually decided on was the conversation room which was built for language consultation and conversation purposes. These rooms included large displays, iPads and sofas so that students could feel more relaxed.

### **Theoretical considerations**

The TaLL design framework was founded upon social constructivist pedagogy (Vygotsky, 1962; Knowles, Holton & Swanson, 1998; Brookfield, 1986). The key point of this constructivist environment was promoting the following pedagogic and holistic ideals:

- |                               |  |
|-------------------------------|--|
| • <i>Learner control</i>      | Students decide content and theme                      |
| • <i>Authenticity</i>         | Language and situation is real                         |
| • <i>Flexibility</i>          | Students can come and go as they wish                  |
| • <i>Freedom of choice</i>    | Students are free to participate or not                |
| • <i>Reflexivity</i>          | Think about the benefits of participation              |
| • <i>Interaction</i>          | Be natural and get to know each other                  |
| • <i>Cultural sensitivity</i> | Be aware of cultural differences and try not to offend |

It was essential that the program, through these ideals, could establish a non-threatening environment through which learners could feel supported.

### Research context

Participants involved with the research were students at a top national university in Japan, ranging from first year undergraduate to second year doctoral student. There were learners from eight different countries: Japan, China, Vietnam, Cambodia, Korea, Bangladesh, Taiwan and Thailand (Figure 1). English was the common language used between students for communication. English proficiency levels varied widely from intermediate to fluent for daily conversation (CEFR B1-C2), but beginner to intermediate (CEFR A2-B2) when communicating about research matters. This made the program unique as students were learning and practicing techniques to improve specific language skills.



Figure 1: *Representation of participants' various languages and countries*

### Curriculum Analysis Framework

A curriculum analysis of the current situation was the first stage of the research. It was developed to address three areas: Policy, Practice: and Process (see Figure 2). Each area was explored to identify the connection to the curricular vision, mission and directives (VMD) of the institution. The first step was to examine online syllabi guidelines and how it connected to the VMD. The underlying philosophy of Kyoto University is “academic freedom”. As such, institutional policies required learner autonomy to be an integral part of the curriculum in order to encourage independent



learning. The researcher examined the online syllabus of mandatory language courses to understand if they reflected the policy of freedom and self-reliance and to address how they fit within the TaLL framework. Second, explicit and indirect approaches teachers used in the classroom were examined. Eight full-time teachers of freshman students were interviewed about teaching practices in the current curriculum. Teachers were selected due to their extensive knowledge of the curriculum and experience teaching in all areas of the curriculum over many years. Guided questions helped the researcher to understand general teaching practices as well as to gain greater insight on specific curricular issues. The final area addressed was the learning environment. Data was collected from a survey disseminated to freshman students and interviews were held with graduate students from various labs. The purpose of the survey was to understand students' feelings about the current curriculum.

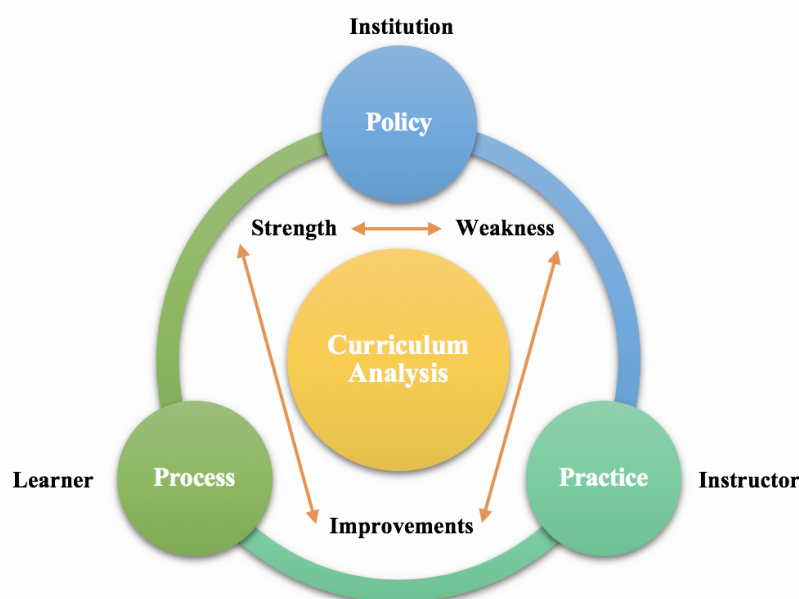


Figure 2: *Curriculum Analysis Framework*

## Discussion

Analysis of syllabi showed that in line with curricular VMDs, the syllabi reflected the underlying philosophy of the university in every course. Students at the freshman level required more teacher guidance as they were not ready for full autonomy. The syllabus for the freshman courses was the same for all teachers so there was little freedom of choice. Textbooks were pre-selected and standardized tests were given to teachers before the start of the semester. Reflecting on learning and progress checks were built into the course to help students understand how they were progressing. Between the second and fourth years of study, students and teachers were given more academic freedom. Teachers incorporated project-style learning and there was more chance for output through discussions and presentations. Graduate students were almost fully independent. At this level, teachers became supervisors and students were responsible for their learning. From the students' perspective, freshman classes were, for the most part, sufficient for advancing their academic skills. For second to fourth year students, they could use the academic skills learned at a more advanced level through discussion or giving presentations. Upon entering the graduate course,

students commented that they had to learn how to explain scientific research using specialized language, and also interact with students from various countries.

Critically speaking, it was also important to recognize curricular weaknesses and then make suggestions for improvements. For the purpose of TaLL, the researcher tried to identify if there were any gaps in the curriculum that could help frame the TaLL program. These gaps became part of the TaLL design. Three main weaknesses which became apparent were the balance of skills, lack of authenticity in language materials and transferable skills for scientific research practices. For freshman students, they mostly preferred a more balanced curriculum with regards to skills. The curriculum focused mainly on writing, listening and vocabulary. Speaking skills were not emphasized and many felt this was the area they needed to improve mostly due to the fact that they had studied reading and listening at advanced levels to pass the examination to enter the university. Communication skills were not a part of the examination, therefore, students found it difficult to express opinions in a logical manner. Lack of authenticity also became a problem later on for students as the language used in academic materials did not prepare them for content-based classes taught completely in English. Many were unaccustomed to the speed and accent of the new teachers and they had not learned discussion or presentation skills in the previous year to participate fully in classes. Therefore, there needed to be more transferable skills for students as they advanced. In particular, skills that were required were logical thinking, response time, presentation and critical thinking skills. With regard to conversational skills, students needed to improve in areas such as expanding on responses, interrupting, turn-taking and building rapport. This was particularly necessary when meeting international students in the same lab. For graduate students, although they learned research skills in their labs, there was not enough exposure to real-life settings or English practice to present their research to both general and specific audiences. As such, these weaknesses or gaps in the curriculum became the starting point for establishing iLearn.

### **iLearn**

The TaLL proposal was developed to match the unique context and gave way to establishing an Informal Learning Environment for Academics and Researchers through Networking (iLearn). The proposed aim of iLearn was to offer a PLE where students could feel comfortable to relax with other young scientists. Two particular areas that would be focused on were social skills and improving scientific English. The organizational method was as follows: Offering workshops to teach basic research skills, followed by weekly peer-consultation and discussion (Figure 3.). Finally, video conferencing was organized to practice skills with other students. Each week, themes were decided on by students and advice was given on specific aspects of research by the group.

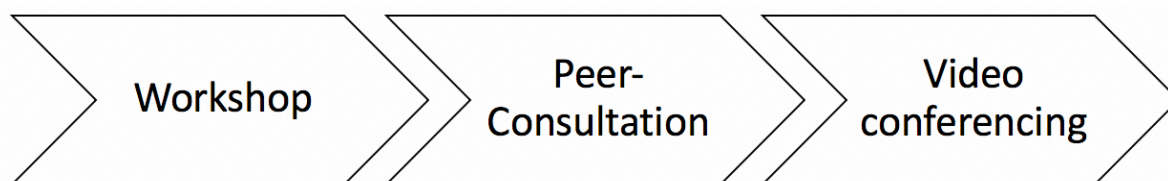


Figure 3: *iLearn Organization*

## **Conclusion**

This research aimed to develop an informal TaLL program to help young researchers practice research skills in an authentic language environment. In order for the program to be implemented, an analysis of the current learning environment had to be conducted to establish gaps that needed to be filled. Once this was completed, the researcher was able to organize a personal learning space where students could meet, share and discuss their research as well as receive critical feedback on their presentation performance. TaLL is by no means an innovative approach to out-of-class learning. Indeed, its merits have been proven empirically over the past five decades. However, there are few programs that focus on the professional side of tandem learning in which participants assist each other in preparing for future real-life situations (conferences, networking, or collaborations with other researchers). This research was only the first step in a longitudinal project. Following this, more workshops will be organized to cover aspects of learning that were not possible in previous workshops. The themes and content will be student-generated and weekly meetings, which have already begun, will encourage students to practice giving critical feedback. The final aim of the research is to organize a day for all participants to participate in a conference, both physically and virtually, to show that they are ready for their future roles as top researchers in the scientific community.

## **Acknowledgments**

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***The Significance of Media in Literary Theory:  
Shaping The Future of Literary Criticism of Electronic Literature***

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**Abstract**

Today, the development of digital media, which has influenced the world has greatly influenced the development of literature. The emergence of electronic literature is the product of digital media and technology. The emergence of electronic literature has become the fundamental drive to look into the importance of the media in literary studies specifically the need of literary theory and criticism that look into the effect of media on literature. Media plays an important role in literary studies. Nevertheless, the media has been neglected since the emergence of literary theories and criticism. The aim of this paper is to provide further insight into the need to have the fifth categories of literary theories and criticism. Using a cinematic approach which is media and technology-based, video poetry entitled “Aku” (Me) by Barlycine from Indonesia will be discussed. This video poetry is an adaptation of a written poetry by Chairil Anwar, an Indonesian poet with the same title. In this paper, only the aspect of the representation will be explored in detail and apply to the text studied. The method of textual analysis will be used to analyse the elements of audio, text and image in the context of cinematic approach that reflect a set of semantic meaningful representations of a video poetry. This paper shows important literary theory and criticism to incorporate the elements of media that will give a better understanding of reading, writing, authorship and meaning of literature in the different context of media usage.

Keywords: electronic literature, literary media approach, video poetry

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## Introduction

Language is a human communication tool that has been established for centuries. Literature is an art that uses language as a means of communication. Literature is not only about language. It has much more than language. So, literary theory has been deployed as an analytical tool for understanding, explaining, and making predictions about literature. Since the published a book titled *Theory of Literature* (1956) by Rene Wellek and Austin Warren, literary theory has developed into more systematic discourse with numerous definitions. For example, according to Roger Webster:

Literary theory, or rather theories, do offer various ways of defining literature, or least thinking about what the issues might be in attempting any kind of definition.

(Webster 1996: 5).

There are more than one category of literary theory and each of the theories try to answer the question, what is literature? The development of literary theory has the connection with the development of literature. Basically, there are four categories of literary theory and these categories have been accepted by scholars in literary studies. M.H. Abrams in his book titled *The Mirror and Lamp: Romantic Theory and the Critical Theories* (1975) have introduced four categories of literary theory. The four categories are; mimetic theories, pragmatic theories, expressive theories and objective theories. Within these four categories, literary theories grow and expand from the classical tradition to the contemporary theory.

The arrival of electronic literature has given a new perspective of literature which has been ignored for decades. Electronic literature has revealed the medium of communication is not only about language, but other forms of communication. Multimedia or hypermedia become a part of electronic literature which can be identified as production, representation and reception or appreciation of the literary texts.

## Media Theory As The Fith Categories of Literary Theories

Media theory organizes ideas about the relationship between media and society, specifically how media technology affects the society. Marshall McLuhan in his book *Understanding Media* (2001) traces the history of media technology and illustrated the ways. These innovations had changed both individual behaviour and the wider culture. McLuhan, who created the notion: "The medium is the message" works on the notion that regards media as instrumental in shaping human and cultural experience. In other words, media theory can give a great explanation about media technology and illustrates the ways how media technology changes both individual behaviour and the wider culture. In understanding electronic literature, it is important to comprehend how digital technology affects the production, representation and reception of the literary works. In the context literature, the creation of electronic literature in 1980s marked a new era in understanding literature and literary criticism.



What is electronic literature? According to Katherine Hayles (2008: 3):

Electronic literature, generally considered to exclude print literature that has been digitized, is by contrast "digital born", a first generation digital object created on a computer and (usually) meant to be read on a computer.

In other words, Hayles defines electronic literature is a kind of literature created on a computer by using certain software and it is read on the computer only. Electronic literature cannot be printed because electronic elements such as sound cannot be printed. Electronic literature involves the development of the creation process, various presentation techniques and media used. In electronic literature, writing and materiality come together. Hayles (2002), considers that produce literary text like the computer is writing machine which produce technotext (hypertext) or cybertext (Aarseth, 1997, George Landow 1997 and 2006, Ladan 2015).

Besides the text, another aspect has been written is the aesthetic experience of the reader of electronic literature. Digital technology has revolutionised aesthetic experience. Interactive fiction is a genre of electronic literature which has the immersive spaces where the reader has an opportunity to interact with the text. It is an immersive literary genre that creates an unprecedented aesthetic experience known as an immersive experience (Monfort, 2007 and 2005).

The development of electronic literature is different from one country to another due to different environments. The history of electronic literature has proven the scenario Electronic literature started in Europe in 1980s (Rettberg, 2015). As an early genre of electronic literature, video poetry is very moderate in its structure. The lacking of interactivity has effected the appreciation of it. Eventually, no immersive aesthetic experience for the viewers as compared to interactive fiction. Video poetry is a kind of electronic poetry and the are a few terms associated with electronic poetry. In other words, video poetry is a kind of electronic poetry or digital poems. According to Christopher Funkhouser (2007: 319) the term digital poem refers to:

A poem is a digital poem if computer programming or processes (software, etc.) are distinctively used in the composition, generation or presentation of the text (or combinations of texts).

Funkhouser defines digital poetry as a poem produced by using a computer through certain software. This software is used for composition, generation and representation of text or a combination of any text. The creation of electronic poetry is the same as the digital poem. According to Funkhouser (2007), digital poem/poetry can be divided into several types such as; computer poetry, graphic poetry and hypertext poetry. In other words, electronic poetry is a computer generated poetry which is read on the computer screen.

### **Literary Criticism and Electronic Literature**

Literary criticism is an effort to read, analyse and make judgments about any literary text and the assessment effort is based on literary criticism approaches used. The development of literary criticism approaches has its bearing with the development of

literary genres. The emergence of electronic poetry not only requires another category of literary theories but also an appropriate literary criticism. As stated earlier, electronic literature requires a media-based approach, especially in relation with digital technology. Thus, this paper will adapt a new approach in literary criticism that is, cinematic approach. The purpose of the cinematic approach is to analyse the representation of the video poetry .

### **Cinematic Approach**

Cinematic approach is a media and technology based approach which is appropriate to study video presentation. According to Tom Konyves (2012: 5), a video poetry/video poem is:

Video poetry is a genre of poetry displayed on a screen, distinguished by its time-based, poetic, juxtaposition of images with text and sound. In the measured blending of these three elements, it produces in the viewer the realization of a poetic experience. Presented as a multimedia object of a fixed duration, the principal function of a videopoem is to demonstrate the process of thought and the simultaneity of experience, expressed in words - visible and / or audible - whose meaning is blended with, but not illustrated by, the images and the soundtrack.

A video poetry provides a 'verbal/visual' cluster, a complex, a nexus, a multiplicity composed of vectors that intersect. A video poetry is a hybrid with the cinematic elements. The video poetry casts moving images of poetry into a film stream in ways that enable it to become a visual poem. The main function of video poetry is to show the process of thought and experience expressed in the form of visible and/ or audible words. In order to communicate meaning and to evoke particular emotions in viewers, cinematic approach works on cinematic technique. Cinematic technique is a method or analytical tool that a director uses to communicate meaning and evoke particular emotions in viewers. Cinematic techniques consist of framing of the subject, camera movement, angle, sound and editing (Jackson 2010, Newman 2009). Generally, there are seven types of framing; pan, tracking, tilt, crane, handheld, zoom in and zoom out. There are three types of angle; high, low and normal. The three types of shot are; extreme wide, long/far, full, medium, close and extreme close shots.

#### **i) Framing the Subject**

A video consists of many frames and each frame is a still image like a photo. What is a video? According to Norazlin Mohammed (2007: 133) "Video is an electronic technology capable of recording, processing, storing and distributing a still image that produces an illusion of movement". Framing is a construction, composition and placement of visual elements to form a focussed image or subject. Framing creates a structure and shapes the video poetry. There are a few techniques to frame a shot such as, full shot/ long shot, medium long shot, medium shot, medium close shot, close up and extreme close up. Images are created to communicate meaning to viewers. Images can be understood by analysing the two levels; the connotative and denotative levels (Lacey, 1998). Today, digital images such as graphic and

animation are the product of the digital culture and it also representing meaning (Darley 2000).

## **ii) Shots and Framing**

A shot in video/film making is a series of frames, that runs for uninterrupted period of time. In video production, a shot starts when the camera starts rolling and it stops. Usually, there are several shots to make a scene and every shot contain visual elements that communicate meaning to the viewers. Shot helps framing the subject, for example, long shot or wide shot, show the subject from a distance, emphasizing the location. While close shot shows details of the subject and highlight the emotions of the character.

## **iii) Camera Movement**

Movement of the camera is important that contribute to the meaning and appreciation of the text. Camera movements might involve the moving of it from one angle to another or no physical movement but it moves on its axis. Basically, there are two types of camera movement; the machine movement (e.g.: padestral, dolly and truck) and the human movement (e.g.: tilt, roll and pan). Zoom movement is most popular. Pan movement is moving the camera horizontally, either left or right and the camera remain firmly on its axis. Tilt movement is moving the camera vertically, up and down and, the camera remain firmly on its axis. Truck movement involves the moving of the camera to the left or right and dolly movement is the movement of the camera forward or backward, both involve the movement of the camera.

## **iv) Camera Angles**

The camera angle is a place where the video/movie camera is placed to take a shot. Several angles can be used to take a scene and it invokes a different experience and emotion. In other words, the angle of a camera shot is important for shaping the meaning of the video or film. There are many types of camera angle such as; OTS (over the shoulder), up and down, work and bird views and Dutch angle. The function of the Dutch angle is to show weird or unstable character.

## **v) Lighting**

Lighting is essential to videographers. Light can enhance a scene in a variety of ways to help tell the story and heighten its dramatic and emotional impact. Lighting has the power to enhance emotion, mood, and composition of the video. There are several kinds of lighting; high key, lower key, bottom or side, front and back and direct lightings.

## **vi) Sound/Audio**

Basically, there are two kinds of sound/audio - diegetic and non-diegetic. First diegetic sound is the sound that be herd by the characters in the video or film. Non-diegetic sound is the type of sound which cannot be heard by the characters of the video. Sounds can be dialogue, music, and sound effects. According to Rozinah Jamaludin (2000: 74) "Audio is a sensational sound for multimedia presentations".

Audio is the key function to reinforce messages like animal sounds. Secondly, the audio can determine a person's mood or mood. According to Vaughan (1996: 234), there are three categories of audio; music, voice and sound effects. Each category has a function. In other words, audio is used for help in explaining something.

#### **vii) Video Editing**

Video editing is the process of manipulating and rearranging video shots to create a new work. This process involves the process of assembling shots into a coherent sequence. There several editing techniques such as, cut, fade, dissolve, wipe, flashback and cross cutting. Cut is the most common editing technique, where one shot is instantaneously replaced on screen by another.

#### **iv) Text**

Besides the cinematic techniques, cinematic approach also looks at the text. Analysing the text is important to depict meaning from it. In other words, the interpretation of the text goes along with the analysis of the cinematic techniques. In general, a text can be described as words formed into one sentence or one paragraph that will convey the message to generate a communication. According to Rozinah Jamaludin (2000: 42-43); "The text in multimedia presentations consists of two categories of texts; text as reading material and text as visual images". In video poetry there may be a text or not text. In film, the subtitle is not the text because it does not contribute in enhancing the communicating of meaning to the viewers.

#### **The Analysis of Video Poetry - "Aku" (Me).**

This paper will analyse a video poetry by Barlycine, titled "Aku" or "Me". This video poetry has three components of a video; images, text and audio. The moving images are the video clips which were taken or adapted from a Korean musical video titled "Heartbeat", performed by a popular group artists, known as 2MP. And these video clips need cinematic techniques as an analytical tool to understand it. The analysis of the video poetry will be divided into three parts.

#### **Beginning**

Comparatively, the video poetry entitled "Aku" by Barlycine has been adapted from a poetry with the same title by the famous Indonesian poet Chairil Anwar (1922-1949). The translation of the poetry is as follows:

"Me"  
 When my time comes  
 No one's going to cry for me,  
 And you won't, either

The hell will all those tears!

I'm a wild beast  
 Driven out of the herd

Bullets may pierce my skin

But I'll keep coming,  
 Carrying forward my wounds and my pain  
 Until sufferings disappears  
 And I won't give a damn  
 I want to live another thousand years

(Raffel, 1993:18-19)

Structurally, at the beginning, the aspect of exposition is important. This video poetry is exposing the background of the subject, a man who has been deprived from the humanity. He was mentally tortured and at last he made a decision to fight for freedom from any unjust deeds or humiliation. This poetry was created by Chairil Anwar in 1940s, exactly when Indonesia was occupied by the Japanese in the Second World War. The background or context of this poetry will help the reader to understand the theme and issues in this poetry.

The analysis of this video poetry starts from the beginning of the video. It starts with the images, music and sound effect. The movement of the frames is slow and this slow movement is perfectly presented to show the distorted and disturbed emotional male character or subject in the frames. The mind state of the character is not properly grounded.



Figure 1: The above print screen shows the extreme close up framing of the face of the male character in agony. The subject is properly framed. Viewers can see and feel the agony of the character. The Dutch angle captures the emotional expressions such as anger and frustration of the character as vividly depicted in his face.

(Source: <https://www.youtube.com/watch?v=8y16q-zFgpo>)



Figure 2: The above print screen shows another the extreme close up framing of the face of the male character in pain. Viewers can see and feel the agony of the character. The zoom in angle captures the emotional expressions such as anger and frustration of the character as vividly depicted in his face.

(Source: <https://www.youtube.com/watch?v=8y16q-zFgpo>)

These images are accompanied with the sound effect of monotonous sharp heartbeats which represent the agony of the character. He is not dying or giving up but he is going to fight for his dignity or humanity. The faces taken from a close-up shot have shown a clear emotional expression such as anger and frustration which come from a man who is depressed and mentally tortured. The sound effect of a sharp monotonous heart beat reveals the hardship experienced by the man.

### Middle

At the mid-stage of this video poetry the audience/viewer is presented with an important still image that reflects the inner development of the character. At this stage, dramatic elements and tensions are presented to describe the character. He is having a conflict with the society. He is feeling the society doesn't care about humanity. Problems accumulate as days go by. Eventually, the conflict generates tension in this man.



Figure 3: The full shot framing of the subject, kneeling with the background and the lighting, supported by the audio and the text.  
(Source: <https://www.youtube.com/watch?v=8y16q-zFgpo>)

The long shot framing creates a scene which not only show the subject in the center of the frame but also the background the subject. In analysing this middle stage of the video poetry, the man as the subject, background and lighting have to be observed in depth. The subject is kneeling, while his face is facing down. The position reflects the subject is emotionally down because as a human his humanity has been discarded by the authority. He is building his strength to resist the pressure or humiliation. The dark background reflects his life is full of darkness. Nevertheless, there is a hope for a better future when there is white lighting and the white smoke (from the smoke machine). The bright lighting together with the dark background form a message. It is a critical stage of the subject to make the decision to fight for his life and dignity. The life is dark and frightening, but there is hope.

In the context of the audio, the three types of audio are found in this episode. First, there are voices of hope though it is not clear. The unclear voices symbolise the uncertainty, and at the same time there is hope creeping out. Eventually, there is an emerging energy from the body of the subject for the next move. Second, music from the high-pitched violin shows how the subject feels at this particular moment. He feels furious, nervous and excited. Third, fast heart beat reflects the awakening moments on the subject to fight against the oppressors. There is a sound of lightning and this shows a sense of self-indulgence within the willing subject to be free and fight.

The last aspect of the content is the text. The main task of the text in this video poetry is to reveal the inner voice and spirit of the man. The subject has come to a point the he is determined to rise and fight and no single objection will be considered. The translation of the text is as follows:

When my time comes  
No one's going to cry for me,  
And you won't, either



Figure 4: The subject is framed at the center with clear background and the text.

(Source: <https://www.youtube.com/watch?v=8y16q-zFgpo>)

From the aspect of the static frame, it shows a momentary break in which the viewer has to concentrate on the subject and the moving text from the bottom to the top. This text acts as an interior monologue of the subject and reading text by the viewer is like exploring the mental state of the subject in. According to the text, the subject is going to make bold decision, that is, he is going to fight for his dignity. When the time comes he aspects nobody will stop him. He will rise and fight as a fighter and he doesn't care about the tough challenges ahead. All the pain and the sufferings will be ignored and he will reach to a level of a great fighter:

Bullets may pierce my skin  
But I'll keep coming,

Carrying forward my wounds and my pain  
Attacking  
Attacking  
Until sufferings disappears

And I won't give a damn

I want to live another thousand years



Figure 5: The subject has made the decision to stop all the humiliation and fight.

(Source: <https://www.youtube.com/watch?v=8y16q-zFgpo>)

The still image of a man is burning in himself as he decided to fight for his dignity. Although, the mental state of the subject is changing but background and the lighting have not changed. If the viewer keep watching the video, in the next frames, there is a change of visual. The subject is no more kneeling but lying down.

The tension grows bigger and at last he makes a decision. The third part of the video is the reflection of the mental state of the subject. As the frame moves slowly it comes to a moving image represents the spirit and determination of the subject to rise and fight the humiliation and oppressions of the oppressors. The first of the two print screens below show that the subject is lying down and the position of the man is well represented in the verse:

I'm a wild beast  
Driven out of the herd

Bullets may pierce my skin  
But I'll keep coming,

Carrying forward my wounds and my pain  
Attacking  
Attacking  
Until sufferings disappears

And I won't give a damn

I want to live another thousand years

The man rises from the humiliations and oppressions by the oppressors and forever he will keep fighting the unjust deeds. The medium long shot framing of the subject allows the viewer to view closer but not too close. This shot provides viewer a scene where the subject is lying down and gradually awakening and start to rise. The camera position is relatively to the ground. It is the same level as the human eyes. The effect of this angle is to suggest the madness of humiliation and brutality which have inflicted on human. In the time of the war (The Second World War), the madness of human, killing each other is unberable. These people are, "... a wild beast/Driven out of the herd" as reflected in the text in the frame below:





Figure 6: The subject believes he is, "I'm a wild beast/Driven out of the Herd",  
And the shot reflects the agony.

(Source: <https://www.youtube.com/watch?V=8y16q-zFgpo>)

From the eye level shot, the framing shot changes to a medium shot. The viewer can observe the rise of the subject. This medium shot will help the viewer to pick up on the subject movement and gestures. It shows the upper body of the subject and is interesting to observe the body language of the subject because it is conveying the message and emotion.



Figure 7: The medium shot is integrated with the text.

(Source: <https://www.youtube.com/watch?V=8y16q-zFgpo>)

From a 'wild animal thrown from the herd,' the subject has a new proclamation to make. He wants another thousand years to live. The change does not take him away from his roots as reflected the grasp the soil in his hand as he rises. The integration between the image and the text is supported with the audio. Voices of people which acts as the background, helps to give an ambiance of the rise of a fighter. While the sound effect of the heartbeats, slow and then begin to accelerate fast, shows the energetic moments of a man who has decided to be a fighter. The man has decided to fight the mental torture of humiliation and nobody can stop him. He has gained a new energy, and he wants to fight and fight. The angle of the camera shot is at the lower angle and this angle reflects the strength or power of the man. This power which grow within his mind acts as an energy that has awakened him from all the sufferings and ready to fight for his freedom from any humiliation by the authority. These two print screens show the climax of the story of a man who wanted to be a fighter.

## End

This video poetry ended with a frame with an image of fire. The fire is a symbol of courage that has awakened in this man. The symbol of this fire reinforces the spirit of the character who was sitting on his knees and gradually rise to fight and the fire of a fighter is burning in him. He is no longer the same person. He is new in spirit. This is the resolution of the conflict faced by the man.

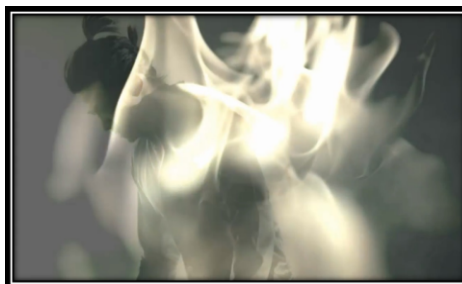


Figure 8: An image of fire reflects the power in the man who has overcome his weaknesses and he ready to face all the challenges ahead.  
(Source: <https://www.youtube.com/watch?v=8y16q-zFgpo>)

The audience or viewers participation of this video poetry is discouraging because interactivity is minimum – play and pause. It is just a mechanical interactivity. This is because the user interface or the web-based application which respond to viewer's action was not applied in the video poetry. The viewers cannot control, response and manipulate the video. Consequently, the viewers are passive and will not experience the immersive experience from the video poetry.

## Conclusion

In conclusion, the new horizon created by electronic literature has become an eye opener for literary critics. The four categories of literary theories and criticism are not sufficient to indulge with this new horizon. Media theories and criticism are another category which discusses media and its impact on literature. The impact of media on literature can be analysed in three aspects: production, representation and appreciation. There are already written materials - articles, books and thesis on the aspects especially with regard to genres of electronic literature such as hypertext novel and video poetry. But there was no serious effort to establish the fifth category of literary theories and criticism. This paper has given a great emphasis to establish the fifth category. Cinematic approach deployed in this paper shows how media and technology have given an impact on the representation of the genre.

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## ***Customer Relationship Management in an Educational Institution in the Philippines***

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### **Abstract**

Customer Relationship Management is the process of carefully managing detailed information about individual customers and all customer “touch points” to maximize loyalty. A touch point is any occasion on which a customer encounters the brand and product- from actual experience to personal or mass communication to casual observation (Anabila & Awunyo-Vitor, 2013). Universities and colleges provide education service which requires high customer contact with all the sensitivities that go with it. Marketing in general refers to the concept of choosing the target market and get, keep and grow customer through creating, delivering, and communicating customer value (Kotler, 2012). It is further stated that attracting a new customer is 5 times costlier than pleasing an existing one. Customer retention is more important than customer attraction. In satisfying customer needs, service performance must be able to attain, or better, exceed the customer expectations. This condition is requisite in building customer loyalty—that is patronizing or "staying in" the school and up to the future in whatever circumstances. This study is undertaken to determine the current status of the customer relationship management practices of a Philippine Catholic Higher Education University and its impact on student and parent satisfaction and retention. Primary respondents are the Junior, Senior High School and college students of the University for academic year 2019-2020 and their parents. Recommendations on customer service, marketing, and internal processes are given to address the gap between customer expectations and customers' actual experience.

Keywords: customer relationship management variables, customer satisfaction, intention to recommend

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## **Introduction**

Universities and colleges provide education service which requires high customer contact with all the sensitivities that go with it. Marketing in general refers to the concept of choosing target market and get, keep and grow customer through creating, delivering, and communicating customer value (Kotler, 2012). It is further stated that attracting a new customer is 5 times costlier than pleasing an existing one. As such, customer retention is more important than customer attraction. Likewise, it is said that it might cost 16 times to bring the new customer to the same level of profitability as that of a lost customer.

Customer value refers to the difference between a customer evaluation of all the benefits and all costs of an offering as well as substitutes/alternatives. This is what a university needs to establish-maximizing value. It involves making its offering, which is educational service, satisfying the customer needs for formal education. This matter must be a major concern of any university among its clientele-personalized customers.

In satisfying customer needs, service performance must be able to attain, or better, exceed the customer expectations. This condition is requisite in building customer loyalty -- that is patronizing or "staying in" the school and up to the future in whatever circumstances. Or if in the opposite such as customer disappointment, the university will be bad-mouthed by its abandoning clientele, further damaging its image to the public and making recruitment of new students more difficult.

It may be noted that the clientele refers to the inseparable tandem of parent and student, the former as provider while the latter as consumer. In such case, both must be satisfied.

With these foregoing discussions, it timely to revisit the status of customer relationship marketing as currently practiced at St. Paul University Quezon City. This is to address on purpose the anxiety that enrolment is decreasing and student attrition is increasing. Hence, if these are meant to be real and alarming it becomes imperative to make the necessary measures to reverse these trends.

## **Review of Related Literature**

Creating loyal customer is the heart of every business. "The only value your company will ever create is the value that comes from customers- the ones you have now and the ones you will have in the future. Businesses succeed by getting, keeping and growing customers" (Kotler,2012).

It was further stated that successful marketing companies invert the traditional organizational chart. At the top are the customers, next in importance are the frontline people who actually meet, serve, and satisfy customers; under them are the middle managers, whose job is to support the frontline people so they can serve customers well, and at the base is top management, whose job is to hire and support good middle managers. Managers at every level must be personally involved in knowing, meeting, and serving customers.

Consumers have varying degrees of loyalty to specific brands, stores, and companies. Loyalty is defined as “ a deeply held commitment to rebuy or re-patronize a preferred product or service in the future despite situational influences and marketing efforts having the potential t switching behavior. (Kotler,2012)

### **Customer Satisfaction**

As noted, satisfaction is a person’s feeling of pleasure or disappointment, the result from comparing a product’s perceived performance/outcome to expectations. Customers who are dissatisfied with their purchases only about 5% complain or just stop buying. About 50% to 70% will do business again if their complaints is resolved higher if felt the complaint is resolved quickly. Customers whose complaints are satisfactorily resolved tell an average of 5 people about the good treatment they received. The average dissatisfied customer, however, gripes to 11 people. If each tells other people, the number exposed to bad word of mouth may grow exponentially.

According to Kotler (2012), complaints should be resolved quickly otherwise slowness makes dissatisfaction further grow and lead to negative word of mouth. Accept the responsibility for the customer’s disappointment and don’t blame the customer. The customer service people should be emphatic- always look at the situation from the point of view of the customer. Ultimately, it is attracting and keeping profitable customers.

What is pointed out is that institution must be able to empathize the needs of student in order to address them properly and satisfaction provided. Gone are the days for a school to be authoritative and commanding to students instead of being inspirational and listening to their needs for resolution.

### **Customer Relationship Management**

Customer Relationship Management (CRM) is comprehensive approach for creating, maintaining and expanding customer relationship. It integrates people, process and technology to maximize relationships with all the customers (Roopchund, 2017). He further reiterated that market-oriented or customer –oriented strategies have been increased among universities willing to focus in satisfying the needs and preferences of their target markets/students in order to enhance their competitive positions. It was said that most educational institutions have specific functions regarding marketing activities such as admissions, alumni or international offices and employing advertising and PR efforts. While doing these marketing activities, it does not mean they are already market-oriented. In fact, students are viewing themselves as consumers and are demanding value for money for their education.

CRM is the process of carefully managing detailed information about individual customers and all customer “touch points” to maximize loyalty. A touch point is any occasion on which a customer encounters the brand and product- from actual experience to personal or mass communication to casual observation.

CRM enables companies to provide excellent real-time customer service through the effective use of individual account information.

## **Student Relationship Management**

According to a joint study by Rigo, Pedron, and Araujo (2017), a new concept of CRM education is emerging and still in the development: Student Relationship Management (SRM). SRM is oriented specifically towards Higher Education environment where strategy, processes, and philosophical lines are oriented to academic goals and student needs. The core values of CRM is to develop organizational capabilities that enable educational institutions to construct a holistic understanding of their students and consequently, to increase student retention levels. This study, involving people as a resource for CRM, urged organizations to get their employees committed to a customer-centered strategy. Employees need to be trained as well as motivated to meet customer expectations and needs. They have the role in the relationship between organizations and their customers especially those in the frontline positions. Further, this study has impressed upon that the main customer for an HEI is the student with proper balance to other stakeholders such as enterprises and partners. It suggested a “high school relationship” strategy which can strongly attract potential students through a process defined as “develop one to one marketing”, requiring a more personalized approach in dealing with students.

## **CRM Approach and Student Satisfaction**

Based on a group study by Ogunnaike et al (2014), revealed that if student life cycle is properly managed and satisfied, students are willing to recommend the school to others due to two (2) major dimensions, namely; quality admission and graduate progress-monitoring. On the other hand, a student repeat patronage has significant impact on quality admission, good induction to the school, effective communication and graduate progress-monitoring.

With regard to the parent relationship management, the same results are derived, meaning quality admission has a main impact on recommending the university to others as well as the graduate progress-monitoring while repeat patronage added good induction and effective communication as the student is immersed in the school environment.

To synthesize the various literature and studies, it is highly noticed that whatever is the impression of the students about the school, is also the impression of the parents. Hence, the primary objective of this study was to determine the current status of the customer relationship management practices of St. Paul University Quezon City and its impact on student and parent, satisfaction. Specifically, this study sought to determine if the customer relationship management variables have a significant relationship with the students' and parents' satisfaction and their intention to recommend the university to others.

## **Method**

The research is descriptive in nature with 269 senior high school and college students and 147 parents of senior high school and college students. The study made use of bonding, reciprocity, empathy, trust and responsiveness as customer relationship management (CRM) variables.



## Conclusions

The following findings were derived from the gathered data:

- Students gave the highest rating on SPUQC's responsiveness while parents gave the highest rating on SPUQC's trustworthiness. Students agree that SPUQC personnel are always willing to help the students, and that they give sincere and detailed information about all the conditions of the service and provide them with enough attention and is able to answer their concerns within reasonable time. On the other hand, parents strongly agree that SPUQC is a trustworthy university based on their past relationships with the school.
- Both students and parents gave the lowest rating on SPUQC's empathy. In this dimension, both students and parents gave the highest rating on the account that SPUQC understands and answers their specific needs within the agreed time, but both gave the lowest rating on the statement that the SPUQC knows how they feel and sees things from both parties' point of view.
- Bonding, student satisfaction have positive relationship while bonding and intention to recommend have high negative relationship
- Reciprocity, student satisfaction and intention to recommend have low positive relationship
- Empathy and student satisfaction have moderate positive relationship while empathy and intention to recommend have negligible relationship
- Responsiveness, student satisfaction & intention to recommend have high positive relationship
- Trust and student satisfaction have low positive relationship
- Bonding and parent intention to recommend have high negative relationship.
- Trust and parent intention to recommend have moderate negative relationship.
- Reciprocity, empathy and parent intention to recommend have low negative relationship.
- Reciprocity, empathy, trust and satisfaction have high positive relationship
- Responsiveness and parent satisfaction have high negative relationship
- Responsiveness and parent intention to recommend the University to others have low positive relationship
- Overall, relationship between student/parent satisfaction and intention to recommend is insignificant

## Recommendations

The following recommendations are derived from the findings of the study:

1. It is highly suggested that a further study that will incorporate other intervening variables such as communication, commitment and loyalty (Matilla & Lec, as cited in Ibok & Sampson, 2014) be undertaken.
2. For more comprehensive results, the management may consider including more respondent-parents and the expansion of the method used to include focus group discussion with respondents.
3. Immediate action steps are needed to address identified gaps in the study

### **Initial Action Steps Undertaken by St. Paul University Quezon City**

1. The Academic Team has immediately tackled the full report on the customer relationship management study in order to take concrete steps and develop programs aligned with the SPUQC CRM dimensions, including:
  - a. Tailored online and offline communication and open-house events for parents with minimal disruption in their personal and business schedule.
  - b. Integrate teacher empathy skills in faculty growth sessions and training programs
  - c. Develop programs that are responsive to the needs of both students & parents
2. Integration of SPUQC CRM variables in the faculty and employees monthly faculty development and learning sessions.
3. Prioritization of CRM activities for the Senior Highschool programs. The deans will undertake curriculum review and development, which will include participation of SHS faculty, parents and students
4. Collaborative activities among Center for Admissions and Linkage, Basic Education Department and Higher Education Department units for the evaluation & matching of Senior Highschool programs with the College's top and banner programs in order to determine gaps

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*Authentic Learning in Dynamic Globalization Context:  
Experiential Learning through Students Business Projects*

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**Abstract**

This study aims to explore the experiential learning of students in a business management class at bachelor degree level, for better coping and understanding of students in real business world within the dynamic globalization context of their generation. The qualitative method of study was used for data collecting and analysis: participant observation and in-depth interview. It is found in this study that students could continue to study and develop their business ideas after being challenged to design and implement their own business projects in class. The experiential learning is thus a good initiative to life long learning of students in business management field. Students have become more perceptive and adaptive to the dynamic of globalization.

**Keywords:** authentic, learning, experiential, projected-based, globalization, business management, classroom

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## **Introduction**

As teachers in the age of digital communication and globalization, the task of navigating students' learning through this dynamic world of information and diversities has been truly challenging. To prepare students to be able to cope with the real world situation after graduation, especially in business management field, it is thus practical to adopt the method of experiential learning through project-based class assignments. The idea of authentic learning, especially as the learning design in real life context, has been inspiring.

In this study, key elements of experiential/authentic learning would be explored for the betterment of understanding and practice within the limited context of formal education classroom at the higher education of bachelor degree level.

## **Objective**

This study aims to explore the experiential learning of students in a business management class at bachelor degree level, for better coping and understanding of students in real business world within the dynamic globalization context of their generation.

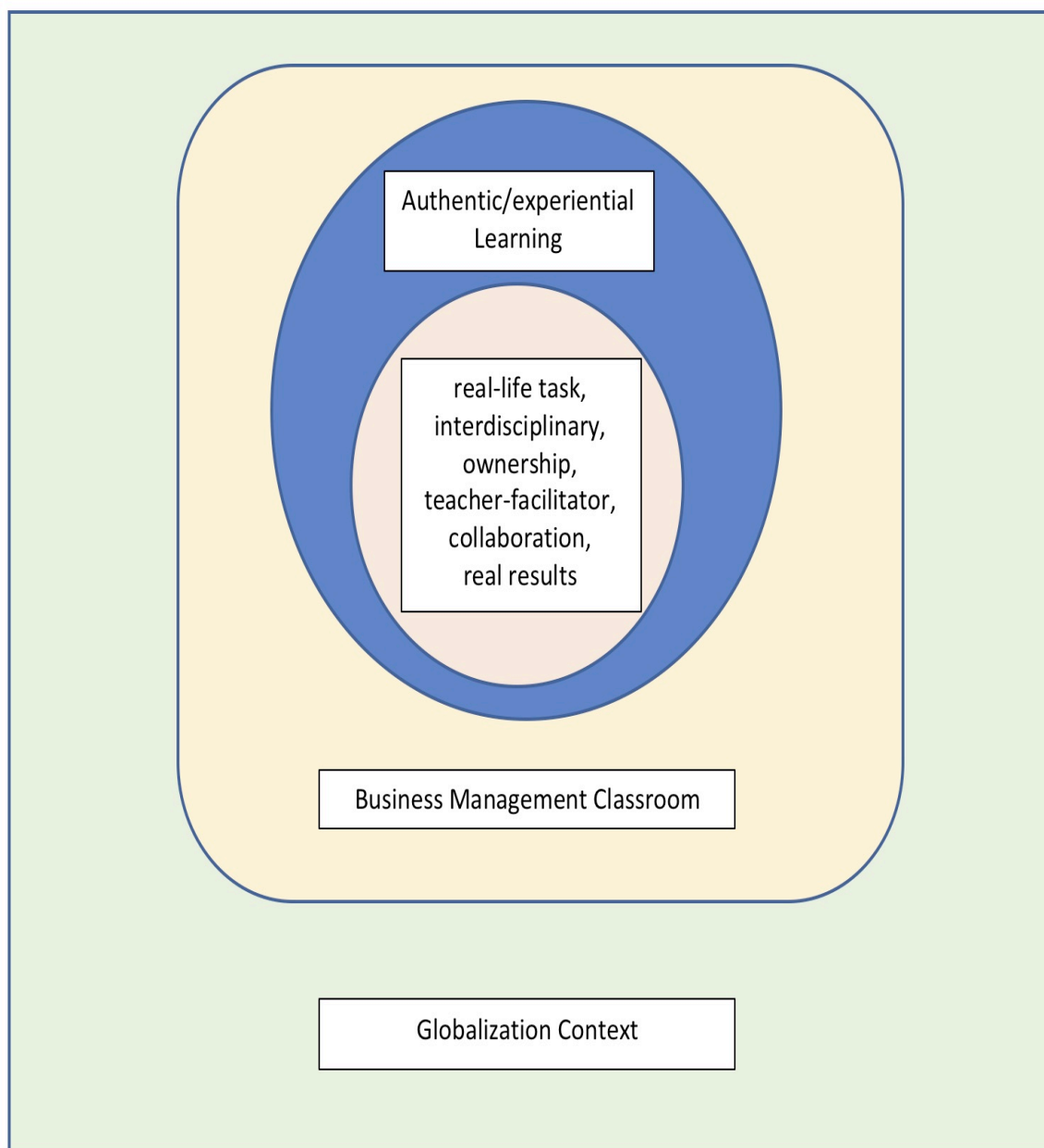
## **Methodology**

The qualitative method of study was used for data collecting and analysis: participant observation and in-depth interview. The key informants were chosen by purposive sampling method.

## **Conceptual Basis**

To design the learning of a business management classroom, it is important to be aware of nowadays dynamic globalization context. Students need to be prepared for a challenging, globalized world with its rapidly ever-changing information. The business management classroom should thus be able to prepare students to own their own learning. This could be done through authentic/experiential learning, that is, through real-life task with real results, with students' ownership to interdisciplinary, collaborative projects, with teachers acting as facilitators.

The conceptual basis of this study could be shown as in the following diagram:



### Literature Review

Authentic/Experiential Learning:

Key elements of Authentic/experiential Learning are as following:

*1. Real-life task*

Students learn through simulated-based project in order to be able to experience/confront with real problems in real context. This could provide seamless

transition for students from school to future professional work after graduation. (Newmann et al., 1996)

### *2. Interdisciplinary*

Students in this dynamic context of diversified information need to learn through projects which would encourage them to use interdisciplinary knowledge to implement: business planning, marketing, communication, language skill, design skill, mathematics. This would prepare students to be more ready for the real world of complexity in their profession after graduation.

### *3. Ownership*

Students are given control/ownership of the project from start to finish. This would encourage them to own their own learning experience, which would be crucial in nowadays world of dynamic change. Students would be able to continue their life-long learning process after graduation. (Peterson, 2016)

This could be done through inquiry-based learning. Students start by posing questions to develop solution. (Blumenfeld et al., 1991)

### *4. Teacher-facilitator*

Teacher should provides support to students' learning as facilitator, not lecturers. Students generally learn better through their own experience than listening to experiences lectured by others. Students are interested in learning more with students-centered activities.

### *5. Collaboration*

To prepare students for real life work environment, students should be encouraged to work in group with others.

### *6. Real result*

Students should be working on solving the problems of the real world, to get the real results towards real people. Students would then be more aware of real life context which could be crucial to their professional work in the future.

## **Results**

In a business class on SME (Small and Medium-sized enterprise) Management for bachelor degree level students, students designed and implement their own SME projects: business analysis and planning, cost analysis, product making and package designing, as well as marketing and selling.

In globalized context, SMEs (Small and Medium-sized enterprises) have been greatly affected (Mwika et al., 2018). It was thus crucial to prepare students in this class to understand the situation through authentic/experiential learning of real-life tasks and real result.

Case Study 1: The Thai traditional crispy fried flower-shaped, rice-floured chip of "Kanom Dok Jok" project



This group of students explored the Thai traditional snack of 'Kanom Dok Jok', or fried flower-shaped, rice-floured chips. After finishing the cooking and packaging design process, they also explored the selling and marketing of the product.

They had found through this experiential process that when a product was at the right time in the right place, it could be in high demand with good value.

They learned this through real-life task while selling this snack product at an office to hungry employees who needed fast, filling, healthy snack. The products were sold well with daily orders. One of the student in the group had decided to continue selling this snack product after finishing the project for class, due to the continuing demand of the product.



One of the reasons why the product was sold well was that it was a traditional snack quite rare to find nowadays. The nostalgic feeling for long lost tradition, as well as the rarity of the products, had attracted city customers who generally could find only fast food, ready-made snacks sold in convenient stores.

"...It is a Thai traditional snack quite difficult to make. It is rare to find for customers, especially in a city like Bangkok. That is the reason why it has been sold well. This snack is rare to find in the city..." (S. Gornboonsai, personal communication, September 24, 2019).

The fact that it was homemade had also made it more appealing to customers in the present days who were health-concerned. The homemade snacks was a great advantage since the snacks could be tailored-made according to the preference of taste of the customers.

"...Our homemade snack products use healthy, natural ingredients, which is better for health comparing to ready-made snack in convenient stores. The customers can also order less or more sweet taste, with less or more sesame which they could not do with ready-made, fast food snacks. We could produce according to customers' orders and preference..." (S. Gornboonsai, personal communication, September 24, 2019).

#### Case study 2: The Thai steamed rice roll of "Kao Kriab Pak Maw" project

This group of students explored the Thai traditional recipe of 'Kao Kriab Pak Maw', or steamed rice roll.

Kao Kriab Pak Maw is a combination of meat, vegetables, spices covered with thin steamed rice flour wrap. The wrap is a paper-thin steamed rice flour pancake, much like delicate sheets of fresh rice noodles. These pancakes are immediately rolled with other ingredients while it is still hot.

Students had quickly identified that the products were sold well among elderly people who knew this traditional snack well. They chose the right market where elderly people often went in order to sell the products.

"...It is sold well among elderly people. Teenagers mostly don't buy this kind of traditional snack..." (T. Woradit, September 20, 2019).

They also learned to listen to customers' comments on taste and ingredients and adjusted accordingly to improve the product. They had learnt the importance of market analysis and demand of customers.

"...We had to adjust the taste of the fillings. We received the feedback from customers that we put in too much prickled Chinese radish..." (T. Woradit, September 20, 2019).



## Discussions and Conclusion

Lesson-learnt of students from these experiential learning from students projects were immeasurable to them in various aspects:

1. Students learned from confronting with the real customers how importance market analysis was in business: choosing the right products for the right market is essential to success in both projects.
2. Students learned from real-task experience the importance of business planning: business concept, cost analysis, SWOT analysis, packaging design, and quality of products.
3. Students learned the real-life business lesson: listening and adapting to customers' need is the key to business success.
4. Students learned the real world context, which could not be taught through lecturing by teachers in the classroom: the real world customers, demand and supply, and competitive products in the market.
5. With teacher acting basically as facilitator in class, students took ownership of their own projects and learning. They collaborated in group to initiate their own ideas, working the interdisciplinary real-life tasks, and tried solving the real problems to get the real results. These key elements of authentic/experiential learning design had greatly supported students to take responsible for their own learning, which would be a strong foundation for their continuing, life-long learning, the essential kind of learning to cope with the dynamic, diversified, and changing world of globalization.

It is found in this study that, in order to provide students with true understanding of globalization context of SMEs, it is very efficient and practical to provide the experiential learning space, through authentic learning concepts of project-based learning. Students could continue to study and develop their business ideas after being challenged to design and implement their own business projects in class. The

experiential learning is thus a good initiative to life long learning of students in business management field. Students have become more perceptive and adaptive to the dynamic of globalization.

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***Using Mobile Games to Enhance English Vocabulary Knowledge:  
A Case Study of Thai Employees in an International Workplace***

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**Abstract**

Vocabulary knowledge is significantly vital for English language communication. However, research studies have reported that Thai employees have insufficient English words to use for speaking and writing. The issue is currently being problematic for employees in many international workplaces; they specialize in other skills rather than English, but require the skill of English to use in their workplace. This study was designed to investigate the effects of mobile games on Thai employees' vocabulary knowledge, as well as to investigate attitudes of Thai employees towards vocabulary acquisition through mobile games. The participants were 25 Thai employees in an international workplace. The research instruments employed in this study comprised of an English vocabulary test and a semi-structured interview. The quantitative data from both pretest and posttest were analyzed using mean scores, standard deviation, and *t*-test analyses. The qualitative data from the semi-structured interview was analyzed using content analysis. The results from the posttest and interview responses demonstrated that mobile games had positive potential in enhancing Thai employees' vocabulary knowledge. This suggested that they favored learning vocabulary through mobile games. The results of this study pointed out that mobile games can be good tools to engage players in learning the English language if the games are used properly.

Keywords: Vocabulary Knowledge, Mobile Games, Vocabulary Learning, International Workplace, Digital Games

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## Introduction

English dominates the world as the international language for communication. It has been reported that approximately 1.5 billion people speak English (Nordquist, 2019). This is related to the fact that individuals use English to communicate with people of different nationalities all around the world. Nishanthi (2018) pointed out that English is an essential language that connects people at the international level. Moreover, English has been the “main part in several sectors including medicine, engineering, and education” (Nishanthi, 2018, p. 871). Therefore, it is important to learn English in order to obtain advantages from people around the world.

In Thailand, people are more interested in learning English, especially those who work in international companies. This is because Thai employees have to utilize English to communicate with co-workers from different nationalities. Besides, Thai employees are seeking for career development. As Rose of York Language School (2016) stated that employees can also have a chance to be promoted if they have a good knowledge of English language skills. Ultimately, Thai employees want to work abroad. Hence, being competent in English can be beneficial for employees who prefer to work overseas (Rose of York Language School, 2016).

Unfortunately, the English proficiency of Thai employees is not at a satisfactory level. In general, they primarily specialize in occupational skills required in job descriptions. According to the EF English Proficiency Index (2018), the English proficiency of Thai people was ranked 64 out of 88 countries in the world which was far behind China and Japan. Thus, Thai employees should enhance their English communication skills to be competent in English.

To communicate in English, knowledge of vocabulary is essential. Without sufficient knowledge of vocabulary, English language learners cannot have an effective verbal communication (Min, 2013). For example, received messages with grammatical errors are comprehensible whereas received messages with inadequate vocabulary knowledge are incomprehensible (Wilkins, 1972, as cited in Caro & Mendinueta, 2017). For this reason, vocabulary knowledge is undoubtedly useful for language learning.

Although the knowledge of vocabulary is significantly useful in English language communication, the issue of how English language learners can learn English vocabulary effectively is being problematic. Witchaiyutpong (2011) found that Thai employees did not acquire sufficient English words to use for speaking and writing. The major problems which affect the progress of Thai employees' vocabulary knowledge stem from insufficient knowledge of vocabulary and English vocabulary retention (Saengpakdeejit, 2014). Therefore, Thai employees need a tool to support their English vocabulary learning.

Much research claimed that digital games can support vocabulary learning (Ashraf, Motlagh, & Salami, 2014; Mäki-Kuutti, 2014; Vidlund, 2012; Yip & Kwan 2006). First, digital games motivate players to learn vocabulary. Digital games have options to interact with a variety of fun and challenging tasks unlike watching movies and reading books (Ashraf et al., 2014; Lund, 2012). Beavis, Dezuanni, and O'Mara (2017) noticed that digital games comprise of unique tools and techniques which can



draw engagement from players. The tools and techniques are rooted in game mechanics such as competitive, narration, and quests. Digital games also encourage players to find the meaning of a word to continue playing games (Vidlund, 2012). Regarding game mechanics, players need to know English vocabulary to overcome difficult challenges they have to conquer in digital games. Second, digital games can help learners to memorize words. Digital games consist of pictures and texts. Players can memorize and learn vocabulary by visualizing repeated pictures and texts on the screen (Yip & Kwan, 2006). Third, players are allowed to communicate with others by using voice chat or text messages (Mäki-Kuutti, 2014; Vidlund, 2012). As a result, they can learn unfamiliar words from other players.

However, the use of digital games as tools to improve vocabulary learning is being a challenging task for educators. Currently, criticisms against gaming are still discussed everywhere. Research studies claimed that playing digital games can only result in less academic performance (Anad, 2007; Weis & Cerankosky, 2010). Moreover, playing digital games is time-consuming, which could distract children from doing other activities after school (Weis & Cerankosky, 2010). In the worst case, spending excessive time playing digital games tends to cause a high tendency in digital game addiction (Skoric, Teo, & Neo, 2013).

As discussed above, the use of digital games in enhancing vocabulary remains questionable. Because there are two sides of perspectives of using digital games in vocabulary learning as discussed above, this study aimed at examining whether digital games enhance vocabulary learning. It focused on investigating the effects of mobile games, digital games played on handheld devices, on vocabulary knowledge of employees working in an international company in Thailand.

The purposes of this study are:

1. To investigate the effects of mobile games on Thai employees' vocabulary knowledge, including the knowledge of form, meaning, and use of vocabulary appropriately.
2. To investigate the attitudes of Thai employees towards vocabulary learning through mobile games.

## **Literature Review**

### **Mobile Games**

It is useful to provide some background knowledge of digital games—an umbrella term used to cover mobile games.

The contemporary term has been defined by various authors in different ways. According to Clark et al. (2016), the digital game is “a set of challenging and/or novel experiences, scenarios, or decisions, structured by rules and/or goals, and mediated by a digital electronic device.” Alternatively, Karasavvidis (2018) defined the terms of a digital game as kind of games played on digital devices; “a game whose system is (partly or wholly) implemented in a digital device such as a game console, a personal computer, and a smartphone or tablet” (p. 3295). To simplify these definitions, digital

games are a kind of game played on electronic devices which comprise of stories or stimulations for players to achieve their goals.

Generally, digital games include several types. First, action games refer to physically challenging games, such as shooter games. Second, adventure games encompass exploration and puzzle-solving. Third, puzzle games include games that attract players with puzzles. Fourth, role-playing or long story games provide players with an immersive experience as a character in a particular situation. Fifth, simulation games are the type of games which mimics the real-world situation. Sixth, strategy games refer to problem-solving games (Grace, 2005).

With the advance of technology, digital game resources are increasingly developed for learning. The resources also include mobile games, which are small forms of digital games. According to Pannu and Tomar (2010), mobile games refer to digital games played by using technologies within mobile devices. A mobile game also means “a video game played on a mobile phone” (Petrova, 2010). Therefore, mobile games simply refer to any type of digital game which can be played on mobile devices.

Mobile games differ from other platforms. Mobile games are with the characteristics of “portability, accessibility, networkability, and simplicity” (Jeong & Kim, 2009, p. 186). Mobile game types and mechanics are similar to digital games played on computers—regardless of the limited screen size and memory of mobile devices.

#### Digital Game-Based Learning and Vocabulary Learning

The Digital Game-Based Learning (DGBL) approach originally emerged in the last decades of the 20th century (Prensky, 2001). Prensky (2001) claimed that the approach has occurred when there was a global technology boom. He stated that during the particular period, teenagers of the last 20th century were fascinated by digital music and devices. He also asserted that digital game-based learning has become one of the significant materials in learning, especially language learning.

There have been many academic educators who reviewed the effects of digital games integrated into learning. For instance, Whitton (2009) pointed out that characteristics of digital games could be underlying to good learning. In terms of digital game-based pedagogy, the concept could be related to “active learning and constructivism, experiential learning, collaborative learning, and problem-based learning” (Whitton, 2009). Moreover, Griffiths (2002) claimed that “video games can provide elements of interactivity that may stimulate learning.” He also indicated that the outcomes of games for educational purposes should be clarified to teachers and students. Consequently, it is important to set the goal of gaming, otherwise playing games for pleasure and educational purpose might not be different.

In recent years, many scholars have insisted that learning English vocabulary from digital games results in positive effects. Digital games could be introduced as an alternative tool to assist language learners in vocabulary learning for three main reasons: to encourage vocabulary learning, to improve vocabulary knowledge, and to use vocabulary to communicate.

First, digital games can encourage English language learners to learn vocabulary. Yip and Kwan (2006) pointed out that learning vocabulary face-to-face in classrooms or reading from textbooks may not engage student's attention in the digital age. Instead, people nowadays gradually prefer to play games as one of their recreational activities to enhance their English skills. Unlike television, books and other media, games can moderate players' intensity in learning by interaction (Lund, 2012). In other words, television and books only engage audiences/readers' attention passively. On the other hand, game players have options to interact with a variety of fun and challenging tasks while playing digital games which could motivate learning. According to Vidlund (2012), the perception of using digital games to encourage vocabulary learning was a positive result. One respondent reported that unfamiliar words were acquired from using digital games. Moreover, Ashraf et al. (2014) also claimed that digital games can encourage learners with fun, interactive content which was suitable for vocabulary acquisition.

Second, the features of mobile games help improve players' knowledge of vocabulary. Repeated words in digital games assist players in memorizing vocabulary. By exposing to English vocabulary games online, Yip and Kwan (2006) reported that ESL learners were able to memorize words in the long term. Schmidt (2010) also claimed that "frequency of input is an important factor for language acquisition." To this extent, digital games facilitate players by frequent vocabulary input as the games allow players to interact with each word repeatedly. Ranalli (2008) reported that every time players press a scroll bar in the Sim 4, they will see a word such as 'decorations' that appear in a row. In this way, players can see the word repeatedly before start looking for some desirable objects.

Besides, digital games promote communicative abilities in the target language. Players need to use English vocabulary to communicate while gaming. Social interaction is essential for students' language proficiency. It is noticeable that without social interaction, players feel a lack of motivation, opportunities for practicing target language skills, and immediate feedback; all three components are crucial if language learners desire to increase their communicative abilities in the target language (Cabraja, 2016; Mäki-Kuutti, 2014; Rudis & Svetozar, 2016; Vidlund, 2012). By doing so, language learners have an opportunity to acquire English vocabulary and practice their English while gaming. For example, in role-playing games type called Multiplayer Online Games (MMOs). MMOs are old text-based adventure games with online environments where multiple players log on to participate and interact in real-time (Saulter, 2007). This type of game contains various types of tree names, fictional creature names, names of everyday life items, old proverbs, dialogues written in old English for players to memorize and use them to communicate with their team during gameplay.

### **Research methodology**

The research study is a mixed-method—combining quantitative and qualitative approaches to ensure the conclusion is accurate and reliable. The quantitative data comprises of pretest and posttest scores while the qualitative data was obtained from a semi-structured interview for information in depth.

The participants were 25 employees from a full-service animatic company located in Bangkok, Thailand. They were 25-35 years of age. They were selected by purposive sampling as a single group participant. The reason for choosing these participants for the study was that they work for an international company but their English language proficiency was not at a satisfactory level.

The research instruments used in this study were an English vocabulary test, three mobile games with English voice announcer and subtitles, and a semi-structured interview.

To compare the level of participants' vocabulary knowledge before and after the treatment, an English vocabulary test was developed by the researcher to use for both pretest and posttest. The test consists of 20 multiple choice items. Three types of target vocabulary covered commanding, communication, and in-game objects vocabulary. The questions included the definition of words, spelling, and using words in context.

Three mobile games that were selected as a treatment of this study included *Life is Strange*, *Dead Island*, and *Iron Blade*. The criteria for choosing the three mobile games were: 1) the three mobile games are free to play; 2) the three games are categorized as top-grossing games on smartphones; 3) English vocabulary in the three mobile games includes commanding, communication, and in-game objects.

A semi-structured interview was employed to investigate the attitudes toward vocabulary learning through mobile games. The interview included five open-ended questions. The participants were able to express freely about their attitudes toward learning English vocabulary through mobile games.

This research study lasted six weeks. At the beginning of the process, the participants who agreed to participate were asked to sign a consent form. In the first week, the researcher presented the plan for gaming for an educational purpose. After that, the participants were asked to complete the English vocabulary pretest. In the second week, they were asked to install *Life is Strange* in their smartphones at home and play it after work for two times (30 minutes per day). To control the activity, the participants were observed by the researcher while gaming. In the third and fourth weeks, they did the same with the other two games, namely *Dead Island*, and *Iron Blade*. In the fifth week, the participants were asked to take a posttest. Finally, five participants were randomly selected for an interview after completing a posttest.

Data from the pretest and posttest were analyzed using mean scores, standard deviations, and the *t*-test analysis. Dependent *t*-test analysis was used to determine whether there were any differences between the vocabulary knowledge mean score of the participants before and after the treatment. Besides, data from the semi-structured interview was analyzed by content analysis.

## Findings

The effect of using mobile games to enhance English vocabulary knowledge for Thai employees in an international workplace

It was found that the use of mobile games was effective in enhancing Thai employees' vocabulary knowledge. The analysis is shown in Table 1.

Experimental Group	n	M	SD	t	p-value
Pretest	25	4.39	1.749	11.163*	0.000*
Posttest	25	7.39	1.524		

\*Significance at the 0.001 level ( $p < 0.001$ )

Table 1: The Comparison of the Mean Scores of Pretest and Posttest

Table 1 shows that there were statistical differences between the mean scores of the pretest and posttest ( $p < 0.01$ ). The mean scores of the posttest ( $M = 7.39, SD = 1.524$ ) were higher than the mean scores of the pretest ( $M = 4.39, SD = 1.749$ ), indicating that the use of three mobile games had a positive impact on Thai employees' English vocabulary knowledge. The improvements in each aspect of vocabulary knowledge, including spelling, meaning, and use are also shown in Figure 1.

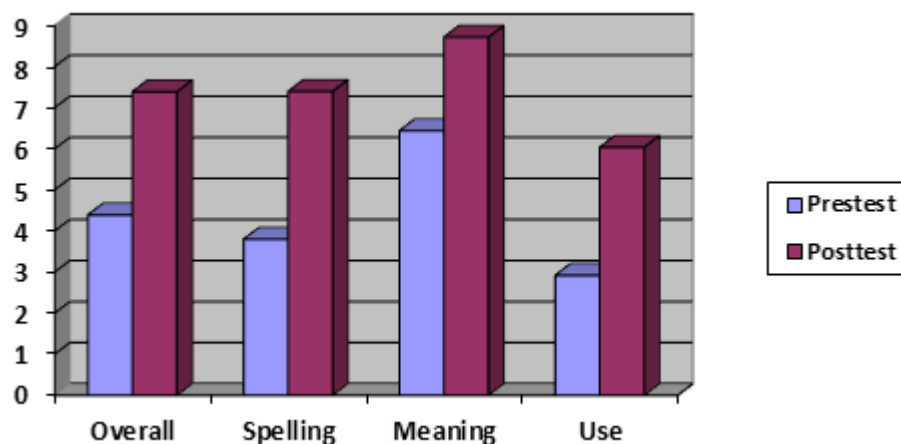


Figure 1: The Overall Mean Scores and the Mean Scores of Vocabulary Knowledge in Each Aspect

### Thai Employees' Attitudes toward Using Mobile Games to Enhance English Vocabulary Knowledge

It was found that the data from the interview supported the result of the test. The volunteered participants reported that they were satisfied with using mobile games to enhance English vocabulary. Generally, all of the participants mentioned that the three mobile games: *Life is Strange*, *Iron Blade*, and *Dead Island* equipped with interesting content and challenging tasks which encourage them to continue playing. Most of the participants stated that the three mobile games can motivate them to play because of beautiful scenarios, especially *Life is Strange*.

To investigate the attitudes of using mobile games to enhance English vocabulary, the semi-structured interview was collected. The result from a semi-structured interview indicated that all interviewees (100%) agreed that mobile games supported English vocabulary knowledge. Also, there were positive attitudes from the participants using mobile games to support vocabulary knowledge of spelling, meaning, and use. First, mobile games supported Thai employees in memorizing English words. All of the interviewees (100%) asserted that they could remember and spell unfamiliar words correctly from playing three sample mobile games. Second, mobile games assisted Thai employees to understand the meaning of words in context. Four of the interviewees (80%) claimed that the meaning of words was obtained from playing these three mobile games. Two participants mentioned that “Mostly we can understand the meaning of words by looking at images of objects on the screen without using translating programs.” Third, mobile games aided Thai employees to use words in context appropriately. Three of the interviewees (60%) reported that they can learn how to use vocabulary in context properly. One interviewee stated that “I learned new words by reading subtitles and descriptions provided in the three mobile games.” Therefore, the use of mobile games in enhancing English vocabulary results in various positive feedbacks from the participants.

## **Discussion**

It was found that using mobile games to enhance Thai employees’ English vocabulary was effective. After the experiment, the English vocabulary knowledge of the participants was increased. Moreover, the knowledge of each aspect of vocabulary knowledge: spelling, meaning, and use was found to be developed. In addition, employees had highly positive attitudes toward using mobile games to improve vocabulary knowledge.

By inspecting the insight effects of mobile games on English vocabulary knowledge, there were several factors that helped to improve English vocabulary knowledge. First, mobile games engaged players to acquire vocabulary knowledge. Similar to the idea of Rudis & Svetozar (2016), the content and internal lore of three sample mobile games stimulated interaction from players. Therefore, knowing English vocabulary was useful for employees to interact with particular game content. Second, mobile games supported employees to memorize English words and phrases. In agreement with Vidlund (2012), the participants could retain words and phrases in a long period of time. Third, mobile games encouraged players to communicate with peers in order to develop their vocabulary knowledge. As stated by Mäki-Kuutti (2014), digital game players can discuss with other players to progress specific game tasks.

More importantly, mobile games had positive effects on the participants’ attitudes. The reason is that the elements of sound, visual, and contents in mobile games positively motivated players to learn new words. It is reported that employees were stimulated by voiceover sounds during gameplay. In addition, employees asserted that the narrative style of game content made vocabulary learning to be more interesting. In accord with the idea of Rasti and Dehaan (2018), players felt more immersed in the virtual world of fantasy settings. As a result, all of the elements in mobile games were reported by employees that they helped to enhance vocabulary knowledge.

The findings of the study are in line with previous studies. It was found that using mobile games could foster players to learn English vocabulary. This is similar to the result of Huang, Chang, and Wu (2017) who conducted a study on using a mobile game-based learning application in a bilingual setting that using mobile games could motivate a group of people to learn new words. In addition, the result of this study is also in line with Dore et al. (2019) who investigated the effects of how narrative mobile games create an immersive experience and learned English vocabulary in a meaningful context.

Overall, this study points out that using mobile games in a meaningful context builds an ideal learning environment for language learners. Instead of solely playing mobile games for enjoyment, employees can acquire useful knowledge of English vocabulary to use in their workplace.

### **Suggestions**

The study of using mobile games to enhance English vocabulary proved that using mobile games was effective for Thai employees. It can be advantageous not only for adults but also for students who learn the English language. In schools, using mobile games to enhance language skills can be implemented as a teaching tool as well. The findings suggested that mobile games can make language learners be more active. Students can enjoy learning English vocabulary during the process of acquiring vocabulary. Therefore, it can be an alternative way to enhance language learning in classrooms.

It will be better if the treatment is examined through a longer period of time. In this study, the duration of using mobile games to enhance English vocabulary was a short period of time. By extending the duration of the study, it can be confirmed that English language learners still use mobile games to enhance language learning.

Furthermore, it will be interesting to study the effects of using other categories of mobile games to enhance other English language skills: reading, writing, speaking and listening.

### **Limitations**

The findings of the study may not confirm that all types of mobile games can support English language learners on improving English vocabulary as it was conducted by using only three sample mobile games.

Besides, the results of this study may not generalize to a large amount of people in other companies. The participants were restricted in a group of 25 participants. It was only a particular group of Thai employees who were willing to improve their English vocabulary knowledge.

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## *Qori Learning Model to Foster Learning Autonomy*

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### **Abstract**

The awareness of rural communities in the province of West Java, Indonesia to further their education to a higher level remains low. In general, most teenagers only go to junior high school; only a small proportion continue to high school. Those who have graduated from junior high school generally look for work in big cities, making the high school gross enrollment ratio (GER) in the province of West Java surprisingly low. To circumvent this issue, the Government of West Java Province has since 2017 offered free Open High School in parent schools in each sub-district. It is hoped that such an initiative will enable children to learn independently. Ideally, good learning autonomy allows children to develop optimally. In reality, however, the student learning independence in Open High School is very low. Among the numerous contributing factors are the learning environment in school that is less conducive and the use of monotonous learning models. This study adopted the QORI (Quantum, cOllaboRative and Independent) model as an alternative learning model through an R&D design. Findings reveal that the QORI model had an impact on enhancing learning autonomy constructed from the stages of building quantum interactions, collaborative learning so that self-regulation emerged, leading to independent learning.

Keywords: learning autonomy, quantum interaction, collaborative, independent learning self regulation.

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## Introduction

Autonomy of students' learning as an embodiment of the values of character has been the main focus in the fundamental failure in the implementation of education in Indonesia in the past two decades. In the study of general education can be said as an exclusion of aspects of affectoral education, so that the problem of basic values as students is ignored, especially closely related to the implementation of Open High School, which demands more aspects of independence.

The reality of education in this country is found many problems relating to the autonomy of learning in school institutions. Some journals research results, such as that stated by Dian Lestari (2010), A Saefullah et al (2013), Arif Widiyanto (2013), intrigued about the learning independence of students which is quite low, so that in the teaching and learning process it seems necessary to reconstruct internal needs. learners. The need includes psychological factors such as; achievement motivation, attitudes, interests and study habits and factors originating from outside the students themselves, namely natural environmental factors, socio-economic factors, teachers, teaching methods, curriculum, subjects, facilities and infrastructure. By understanding the needs of both internal and external students, it is hoped that they can encourage their independence or learning autonomy.

Furthermore the issue of learning autonomy is widely discussed by experts such as; Grolnick & Wendy. (1987), and McCharty<sup>1</sup>, Ciaran<sup>2</sup> (2000), and Simon<sup>1</sup>, vanstenn<sup>2</sup>, lens<sup>2</sup>, Sheldon<sup>2</sup>, Deci<sup>2</sup> (2004), who illustrate that the implementation of education has many problems with learning autonomy, apart from the study that self regulation in each student is his need so that conditioning so that learning independence can be done as a stage of better development.

Theoretically the term independent learning itself is often associated with the special education system, because in general the special education system applies the concept of independent learning. This term is used to distinguish it from the concept of learning in general which depends on the control and direction of the teacher. In special education systems, most student learning activities are carried out by students independently, with limited guidance from the teacher. This raises the consequences of the demands for independence of students in learning. Various studies on the independence of learning in the special education system are often discussed with the starting point of the concept of independent learning. In the special education system there are several terms that can be referred to to explain the concept of independent learning. In connection with the concept of independent learning, Malcon (1975) uses the term "self-directed learning". In addition, he also mentioned other terms such as: self-planned learning, independent learning, self-education, self-instruction, self-teaching, self-study and autonomous learning.

Basically, the learning process at Open High School refers to the implementation of various learning activities that are oriented towards improving the services of students who experience obstacles and special needs. The students are expected to become a balanced human being between their body and spirit, between their physical and mental, between their outward and inner, so that they bring themselves and their attitudes and personality to something better in society. In other words, students will develop their aspects of independence, attitude of initiative, confidence, and

enthusiasm for learning, because indeed in the concept of this Open High School students will always be invited to contribute directly to the learning process. In this case, the school and its learning institutions only provide facilities and facilities and infrastructure to support learning, so that students who are categorized as having barriers and the need for special education services will always feel comfortable in learning, because indeed they themselves feel part of the whole teaching and learning process.

The formulation of the learning model that carries the independence of learning is quite a lot and from some research results can influence such as, inquiry models, PBL (problem based learning), cooperative learning models etc. However, from some analyzes of these models, special models need to be adjusted or studied when they are to be implemented, adjusted to the context of the needs and constraints of students and cultural systems inherent in certain regions, especially West Java. Non-technical factors turned out to be very significant in the implementation of a learning model, moreover the models were constructed from different cultural systems. Scientifically in the basis of the study of logic is not a problem, but when it is built from the study of ethics, of course it is necessary to adapt the culture system.

In its implementation there are procedures that are adopted or syntax (stages of activities) in the model, which are generally the results of the study of the author that focuses on the readiness of students for academic learning, and students in general also tend to accept it. The thing that is done by the teacher at the beginning of learning is to do an apperception as a form of organizing students in the early stages of the learning procedure.

This is the author's concern to study more closely related to this initial step. Rests from the results of the assessment will certainly be highly adapted to the actual milestone of students 'mental development and students' readiness in the early stages of learning, including mental readiness and readiness to accept learning material.

In the end the results of the analysis of the readiness and learning activities at the beginning of the beginning and mental readiness become a construction of a learning activity plan that has a theoretical basis of how students actually learn according to their needs well, students feel comfortable and pleasant, building positive values from values independence of students in learning.

The study of Autonomy learning includes several scopes which later became the basis for designing the learning independence measurement instrument. Ormrod (2009: 38) in his book, Educational Psychology Helps Students Grow and Develop, states that aspects of learning independence include the following sub-aspects: 1) Goal setting (goal setting); 2) Planning (planning); 3) self-motivation (self-motivation); 4) attention control (attention control); 5) The use of flexible learning strategies (flexible use of learning strategies); 6) self-monitoring; 7) Looking for appropriate help (appropriate help seeking); 8) Self-evaluation. The formulation eventually gave the researchers the signs to make a grid from the study of students' learning autonomy in the Open High School.

Therefore, the picture above researchers trying to make the QORI Learning model formulation (Quantum interaction, collaboration and independence) learning is based on the concept of scaffolding which brings students in the learning process by

promoting the process of interaction as a good form of adaptation of individuals, towards well adjustment person so that there is a reciprocal relationship. When quantum is realized between students and teachers, the next process makes it easier for students and mentors to collaborate so that learning independence can ultimately be achieved.

## **Method**

The ultimate goal of this study is to formulate a learning model to increase children's learning autonomy in schools that provide Open High School student services. To achieve these objectives, this study uses a mixed research method (Mixed Method Research) with a qualitative research pattern followed by quantitative research (Exploratory Research Design).

This design was chosen because the researcher must handle two types of data, qualitative and quantitative. Qualitative data in the form of descriptive data about the formulation of a learning model. While quantitative data are in the form of the results of the measurement of learning autonomy for Open High School students in the implementation of the effectiveness of the QORi Learning model.

The research design used was exploratory mixed method research design (Creswell, 2008). This design is applied to explore a phenomenon, identify themes, design an instrument, and then test it. Visually.

## **Learning Model**

The term model has various meanings, some experts analyze the concept of this model from a variety of different perspectives, of course with the intention of obtaining a clearer formulation of the understanding of the model, especially related to the learning model.

In this case Shertzer & Stone (1982), expressed his opinion that: "... the model refers to the representation of which a final product is abstracted because of its inherent worth". According to this concept, the model refers to a picture of an abstract end because of inherent or inherent values. While in the context of teaching, Joyce & Weil (1980: 1) in (Aprilia, 2010), stated that: "... a model of teaching is a plan or pattern that can be used to shape the curriculum (long-term courtesy of studies ). To design instructional materials and ti guide instructions in the classroom and other settings ". So the essence of the model of recruiting this concept is a plan or pattern of activities.

With reference to these opinions, it can be formulated that the model is a set of sequential procedures for realizing a process, or a plan or pattern used for guidance in planning learning in Joyce's class (1992 in Trianto (2007).

## **QORI Learning Model**

The QORI Learning model is designed based on constructivism learning theory and the deepening of the ZPD concept carried by Lev Vigotsky. This becomes the basis of the concept of thinking of a concept model to be operationalized as a practical

learning model that can be implemented by the teacher. Besides that, this model focuses on the development of the concept of Zone of Proximal Development, which was conceived by Lev Vygotsky. That becomes the rationale and framework for the formation of the model.

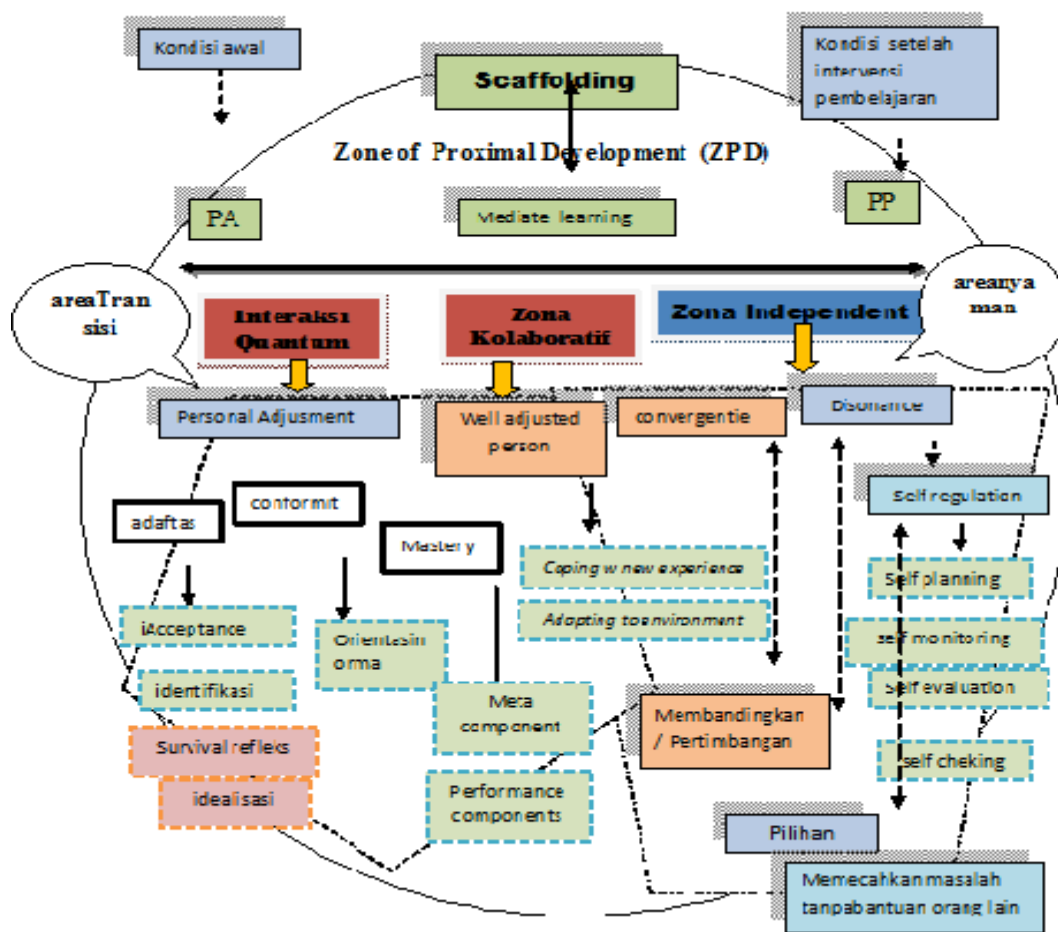
Systematic efforts in making models based on the underlying theory, so that this model can be accounted for as a research product developed by researchers, certainly based on applicable research rules. Efforts to reconstruct by synthesizing theory and facts, as well as phenomena in the world of education are important to understand besides the lack of accompanying.

The QORI Learning Model concept will be illustrated by uniting stages of operational activities so that the teacher can carry out according to the procedures made. The stages are formed based on the assumption that when a child enters something new will experience a critical phase, where something foreign will have an impact in his mental turmoil so that the environment seeks to reduce the situation, so that the child is made comfortable with the condition. The aspect of self-adjustment becomes important at the beginning of the activity. When the adjustment aspect can run well, it will lead to the independent learning process that can run well. In an independent learning process, students can finally gain the strength to become individuals who have self regulation, meaning that the child has the ability to self-regulate. Being independent in the learning process is characterized by being able to solve problems independently.

It can be concluded that teachers in implementing this model deliver children, from initial conditions or early development (PA) to potential development (PP), teachers only create two categories: first, to build quantum interactions that impact the existence of an integral relationship or the existence of reciprocity so as to create comfortable conditions for children and conducive efforts to be able to adjust well, both in learning materials or environmental situations, as well as personal relationships with outside themselves,

Secondly with good adjustments so that the collaborative learning process can be done well too, then the third category directs children to be able to learn independently (conditioned) with the condition that children gain confidence and confidence can increase as the formation of independent learning patterns in the child. And the end of all that children are able to solve problems independently.

The framework for thinking the QORI Learning model as scaffolding learning in the learning of students in Open High Schools



**Autonomy Learning**

The autonomy of learning itself becomes one of the educational studies in the MPR decree constructed by MPR TAP Number: II / MPR / 1988. The contents of the TAP are quite detailed, namely; cognitive aspects (intelligence, innovative, and creative), affective aspects (having faith, being devoted, virtuous, having personality, discipline, tough, responsibility, social solidarity and self-confidence), and psychomotor aspects (working hard, tough, skilled, physically healthy and healthy spiritual).

Besides listening closely, in article 3 of Law No. 20 of 2003 above that national education functions to develop capabilities and shape character, illustrating that what must be developed in learners is the potential they have, it does not mean cramming with science alone without considering its potentials in life and livelihood as humans who have their desires, passions, intellect and human instincts. Furthermore it is said there "and forming character", this implies that the education carried out can shape the character, attitudes, characteristics of individuals who are in the environment of society, which tends to be positive and does not conflict with the order of character, character, other human characters. That is the essence of character education that is being echoed by the government in recent decades.



With the development of learning autonomy in students on Class X of High Open School, we need a strategy from the environment to be able to develop learning autonomy. One of them is by developing alternative learning models that are quite strategic in accommodating the needs of the class X High Open School students.

In other words to bring up the creative attitude there are several forms of learning that can be accommodated, one of them is a learning model approach based on constructivism learning theory. The alternative model that carries the 2013 curriculum. This is a quite challenging approach to be applied in the Class X Senior High School. The design of the alternative model must also describe the relationship that is well established, giving rise to reciprocal relationships between teachers as adults who guide learners in the area of proximal development.

The above problems can occur because they have not received adequate education services unconsciously, they should try to provide differentiated educational services, namely the provision of educational experiences that are tailored to the talents, interests, abilities, and intelligence of students, so they can manifest their potential as their characteristics as stated above

### **The Role of the QORI Learning Model as scaffolding learning in increasing student learning autonomy in Open High Schools.**

The educational policy for students at the Open High School departs from a pedagogical, psychological and philosophical point of view, which is rooted and actually takes place in this country, as stipulated in Law number 20 of 2003 concerning the National Education System.

Theoretically the term independent learning itself is often associated with the open education system, because in general the open education system applies the concept of independent learning. This term is used to distinguish it from the concept of learning in general which depends on the control and direction of the teacher. In an open education system, most student learning activities are carried out by students independently, with limited guidance from the teacher. This raises the consequences of the demands for student independence in learning. Various studies on the independence of learning in an open education system are often discussed with the starting point of the concept of independent learning. In the open education system there are several terms that can be referred to to explain the concept of independent learning. In connection with the concept of independent learning, Malcon (1975) uses the term "self-directed learning". In addition, he also mentioned other terms such as: self-planned learning, independent learning, self-education, self-instruction, self-teaching, self-study and autonomous learning.

Thus the teacher is required to be able to develop themselves so that in the implementation of learning can accommodate the needs of students in high school, especially related to efforts to increase the power of learning autonomy of students in high school as an inherent characteristic of him. This means that teachers can create a learning approach model to increase the learning autonomy of Open High School students, so that learning autonomy can be realized.

The above will happen by deepening the teacher in creating a conducive learning atmosphere. Therefore, it is related to the development of learning autonomy for students in Open High Schools, so we need a strategy from the environment to be able to develop learning autonomy. One of them is by developing learning strategies or learning models that accommodate the needs of students in Open High School, or further creating a learning model.

Besides that Open High School is an education subsystem at the secondary education level that prioritizes independent learning activities of its students with limited guidance from others. Open High School is one model of alternative education services for secondary schools that is organized by regular high schools. Open High School is not a new stand-alone institution or UPT, but it is the main regular SMA. Thus, the regular high school which is the Open High School Parent School organizes education in a dual mode system (dual task). That is, the Open High School Parent School simultaneously serves two different groups of students, with different learning methods. In this case, the Open High School Parent School is given an expansion or an additional role, namely in the form of educational services with a distance learning system intended for students who have certain obstacles. (Pustekkom, 2005).

### **Recommendation**

Based on the result of the study, the researcher proposes some recommendations as follow.

Basically, the learning that is carried out is to plan learning by making effective steps to design the environment so that the learning process can run well in accordance with the objectives to be achieved.

In the implementation of the teacher together with students to develop learning plans and the teacher prepares steps.

1. Application of learning approaches and strategies to the QORI Model as scaffolding learning.
2. The implementation of the QORI Model as scaffolding learning which has been constructed as an alternative to increasing the learning autonomy of Open High School students, can be practically operated in the learning process.
3. To make it easier for teachers to implement the QORI Learning model for Open High School Students, the following illustrates what teachers must pay attention to, namely:  
The initial stage of doing the Assessment, To determine the initial conditions / PA (actual development). In determining PA, the teacher can conduct an assessment, In PA containing empirically real conditions that occur in children, PA becomes the initial step in determining success in the guiding process in ZPD towards PP (potential development)

The second step is to pay attention to the things below:

The QORI model as a Scaffolding learning is implemented with an approach

1. collaborative learning

2. Learning is more oriented to problem-based learning (Problem-based Learning.)
3. the method used is more in the scope of the CTL (Contextual teaching learning) approach, for example; inquiry method, experiential learning, travel tour method, exploration method ... etc.
4. This model is most suitable for subjects that have an orientation to performance or performance such as writing, reading, mathematics, music and physical education. Besides that it is also suitable for teaching the components of the skills of history and science.
5. The teacher must set the weight of the material at least C4 (analysis) and if possible up to C6 (evaluation) which encourages students to think at a high and critical level.

## Conclusion

In this QORI Learning model there are five very important phases. The explanation is as follows:

The first phase is included in the preparation phase, which is to build Quantum interactions so there is a reciprocity in creating a good emotional bond between the teacher and students. The content is more on building children's presentations on situations and problems related to social relationships and learning material. In other words in this phase the teacher motivates students to be ready to learn by starting the lesson with an explanation of the aims and background of learning and preparing students to receive further explanation.

In addition, the teacher provides comfortable conditions both in aspects of social relations and in aspects of learning material that will be rolled out and then the teacher explains the learning objectives and adaptation of children with phenomena analysis, mass demonstrations, and student motivation to engage in problem solving.

The second phase the teacher organizes children in adjusting themselves to the situation and problem. In other words the teacher conditions the child in the process of self-adjustment in the collaborative area to run well. Aspects that are formed from self-ignorance in children with adjustments that achieve the ability to accept both morally, socially and emotionally.

Fase ketiga guru membimbing individu dalam aktivitas dan belajar. Artinya Guru membimbing dan mengkondisikan siswa menerima tugas dalam pembelajaran dan peran aktif memecahkan masalah.

In addition, the teacher conditions students to collaborate, both teacher and student or students and students to work together in solving problems in learning

The third phase of the teacher guides the individual in activities and learning. This means that the teacher guides and conditions students to accept assignments in learning and the active role of problem solving.

Besides that the teacher can maintain the condition of the child who has been able to adapt to the transition area by strengthening the collaborative agenda so that the

ability to adapt continues to the ability to plan and organize responses in certain ways so that conflict, difficulties and frustration do not occur when in the collaborative area.

The fourth phase the teacher can develop learning by preparing learning material with problem solving settings. In other words the teacher helps and facilitates and encourages students to plan and help divide tasks in problem solving independently. In this phase the condition of the child can adjust to the environment both social relationships and in the context of learning material.

Such conditions are very conducive to be able to develop their potential independently. So that in the end the child can solve and solve the problem independently. The end of the child can develop themselves into potential development.

The fifth phase as the last phase in learning activities where the teacher can analyze and evaluate the problem solving done by students.

In addition, the teacher helps students to reflect and evaluate what they do and the processes they use. So that it is expected that independence in learning and self regulation can be formed with the apparent appearance of children being able to solve problems independently.

It can be concluded that teachers in implementing this model deliver children, from initial conditions or early development (PA) to potential development (PP), teachers only create two categories, namely first creating comfortable conditions for children and conducive efforts to adjust well, both on learning material or environmental situations, as well as personal relationships with outside oneself, so that the collaborative learning process can be done well too, then the second category directs children to be able to learn independently (conditioned learning) with the condition that children gain confidence and self-confidence can increase along the formation of independent learning patterns in these children. And the end of all that children are able to solve problems independently.

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***The Roles of Islam Students in Preserving the Indonesian Value of *Bhinneka Tunggal Ika* (Unity in Diversity)***

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**Abstract**

Students' organizations play very important roles in delivering the knowledge, the impression, and the spirit of Indonesian nationalism under the umbrella of *Bhinneka Tunggal Ika* (Unity in Diversity). One of the challenges currently faced by Indonesian students' organizations is their capabilities, or lack thereof, to protect their noble intentions from the interests of certain parties that take advantage of the students' activities and lead them towards something that in fact hurts the motto. In this context, the selection and orientation process is important in creating and strengthening the spirit of nationalism. Moreover, the emergence of religious students' organization contributes their own characteristics that are interesting to be studied further. Therefore, this research looks closer at how the concept of selection and orientation process in religious students' organizations, especially Islam Students' Association. In this article, the researcher sees that the selection and orientation process in religious students' organizations, such as Islam Students' Association have its own uniqueness and strength. It can be observed from the big number of members of Islam Students' Association who work in government offices, non-governmental organizations, private sectors, and other types of employment. They welcome differences and subscribe to the ideology of unity and what it entails, such as pluralism, democracy, as well as state administration and law enforcement. The three championed programs are the determinant factors in preserving Indonesia that unites in its diversity.

Keywords: Islam Students' Association, *Bhinneka Tunggal Ika*, pluralism, democratic, the supremacy of the constitution

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## Introduction

Islam Students' Association (HMI) is a modern organization that still exists in Indonesia, as a cadre-based student organization which has given birth to cadres engaged in every line of life of the nation. Education or cadre pattern has given birth to capable cadres in various competencies. As stated in the articles of association, the vision of the Islam Students' Association is: "The establishment of academics, creators, servants who are based on Islam and is responsible for the realization of a just and prosperous society who is blessed by Allah ta'ala"

The article about HMI appeared in Andreas Ufen's article in the journal South East Asia Research, entitled From aliran to dealignment: political parties in post Suharto in Indonesia, which explained that after the Soeharto era, many political parties were occupied by organizational cadres in Indonesia and one of them is the Islamic Student Association. Thus, the kaderization process carried out by organizations in Indonesia, especially in the Islam Students' Association went quite well with or without the support of the government. This happened from the process of kaderization where the definition of cadres and kaderization in the book entitled Intellectual Cadre (half a century of HMI ciputat branch) is "Human resources who carry out management processes in an organization". In another opinion, the cadres of an organization are people who have been trained and prepared with various skills and disciplines, so that they have abilities that are above the average person. "

The cadres who are expected to carry out leadership in the future according to Alfian (1980) should have the following qualifications: 1) have reliable leadership qualities; 2) dedication becomes the basis of work, and the organization as a place to serve for a greater purpose; 3) not oriented to power, but rather to serving others, and power only as a tool to serve; 4) someone who has a high need of achievement motive; 5) sensitive to environmental changes, especially those that have a direct influence on self and the organization. The kaderization process in HMI has standard from Cadre I Training, Cadre II Training to Cadre III Training. This is clearly seen from the orientation to be achieved by the organization, where Islamic values become the main domain in the process of kaderization, this organization has the aim to maintain the integrity of Republic of Indonesia and strive to carry out the mandate of the 1945 Constitution. In short, this organization is consistent to maintain Pancasila and Unity in Diversity as the national identity of the Indonesian people.

The process of revitalizing the nation's identity to maintain diversity in Indonesia today is increasingly important, because we are being persistent in applying the principles of "good governance", where three actors namely the government (state), private (private sector) and society (civil society) must synergize constructively to create a better government. So that it will be realized in the form of optimal public services. In relation to the threat or influence of globalization, it must be faced with a strong mental attitude and character as the identity of the Indonesian people, which is actually Bhineka Tunggal Ika (Unity in Diversity).

For this reason, in this research, the researcher identifies and offers an idea to safeguard future generations with regeneration. From this background, the basis of

this research is the Islam Students' Association Maintains Unity in Diversity (*Kebhinekaan*) as the National Identity.

The main focus of national development is actually to grow and strengthen national identity, maintain the integrity of the Unitary Republic of Indonesia, and form a noble Indonesian society as a dignified nation (Curriculum Center for the Ministry of National Education, 2010). Therefore, it can be said that the process of building the nation's character has a very broad scope and level of urgency and is multidimensional. It can be said broad because it is related to the development of all aspects of the potential superiority of the nation and multidimensional because it includes national dimensions which are currently in the process of "becoming" (Winataputra, 2012: 34)

Therefore, the roots of Indonesian nationalism that developed in a historical perspective are elements of National Identity, the values that grow and develop in the history of the formation of the Indonesian nation. Indonesian National Identity, i.e.:

**1) National Language or Language of Unity: Bahasa Indonesia**

Each country has a different language as a characteristic. Likewise with Indonesia, Indonesia has a variety of languages almost every region has it, such as Javanese, Madurese, Papuan, Batak, Sundanese, Ambon, Aceh, etc..

**2) National Flag: Red and white flag**

The flag is one of the symbols of identity that can be recognized when looking at the color and image motifs in it. The red and white color to symbolize Indonesia has a meaning where Red means "Brave" and White means "Holy".

**3) National Anthem: Indonesia Raya**

The Indonesian national anthem was published in 1928, composed by Wage Rudolf Soepratman in 1924.

**4) National Symbol: Garuda**

Garuda as a national symbol has a golden color that symbolizes the glory of Indonesia.

**5) National Motto : Bhinneka Tunggal Ika (Unity in Diversity)**

Bhinneka Tunggal Ika contains pluralistic and multiculturalistic concepts in life that are bound together as a whole.

**6) National Principle : Pancasila**

Pancasila is a unity so that it functions as an idea which is the main goal as the national principle.

**7) National Constitution (Law of Indonesia) : UUD 1945**

The basic law of the Indonesian state is the 1945 Constitution, which has applicable laws in Indonesia.

**8) Form of State: Unitary State of Republic of Indonesia**

Unitary State of the Republic of Indonesia means the form of the state is the Unity while the form of government is the Republic.

**9) Conception : Archipelago Concept**

Concept means to show activities and to find out the effects on the life of the nation and state.

## 10) Culture: National Culture

National Culture is defined as the custom or traditions that are often carried out by a large number of residents in certain areas which are often referred to as "Adat" (custom).

National identity will appear in the character of the nation which is an embodiment of the nation's noble values. Character is a determining factor for a person in advancing the nation, in this case as a leader, both a leader in the school, family, community, Nation and State and the most important is as a leader for self. According to Budimansyah (2010: 1) "the core character is goodness in the sense of thinking good, feeling good, and behaving good". Furthermore Budimansyah (2010: 23), states that "character as the values of goodness (know the value of goodness, want to do good, and actually do good) that is embedded in the self and embodied in behavior".

For the Indonesian people, the noble values of the nation are found in the basis of the Republic of Indonesia, the Pancasila, which is an embodiment of the concepts of religiosity, humanity, nationality, sovereignty and sociality. Building the identity of the Indonesian people means building the identity of every Indonesian human being, which is nothing but building a Pancasila Man.

Quoted from an article with the title "back to identity" published by the *Pikiran Rakyat* Thursday, June 2, 2016 written by Prof. Elly Malihah Msi page 26 "... if you see the formulation of Pancasila as the basis of the state and interpret the true meaning then with full awareness as the people implement it, then it is believed the idea of Indonesia to be a safe and peaceful nation will be implemented. On this basis, we miss Pancasila again. "

Based on the opinion above, then providing understanding and character of national identity through extra-campus student organizations, namely HMI, is expected to be a starting point for the concept of structured and sustainable activities in understanding the values of love for the nation.

Pancasila as an ideology has the main character as a national ideology. It is a perspective and method for all Indonesian people to achieve their goals, namely a just and prosperous society. Pancasila is an ideology of nationality because it was formulated for the benefit of building the nation state of Indonesia. Pancasila provides guidelines for achieving unity among the nation's citizens and building inner ties between citizens and the nation.

Pancasila and identity cannot be separated. Pancasila as the ideological foundation, the philosophical foundation of the nation, the source of all the laws in this country, while identity is the daily implementation, the behavior of Indonesian people, which is described in each of the Pancasila precepts:

1. Belief in the Almighty God As a form of identity that Indonesia is a religious nation. This shows that Indonesia is a religious nation, which has clear meanings, consequences, and forms. As a religious nation, a nation that believes in the existence of God, a nation of faith. Then it is clear that

Indonesia is not purely a secular state. Indonesia has become an ideal country in harmony among religions because it has one state philosophy, namely Pancasila. Other Muslim countries do not have a philosophical model like Indonesia. In Indonesia, Pancasila as a state ideology; 6 official state religions; citizenship is not determined by religion; all the same before the applicable national law.

2. A just and civilized humanity is a form of identity from the second principle of Pancasila that the Indonesian people respect human rights. Indonesia is a state of law. In a state law, state power is carried out in accordance with the principle of justice, so it is bound to the law (rule of law). The principle of the rule of law is the distribution of power and guarantees of human rights for the people. Pancasila is the ideology of the nation and the basis of the Indonesian state, therefore it is an ideological foundation for the system of government and an ethical-moral foundation for the life of the nation, state and society. The values contained implicitly or expressly do not conflict with human rights values. Even if it is examined philosophically, especially in the second principle, namely a just and civilized humanity is the basic formulation of the core of political ethics.
3. A unified Indonesia is a form of identity of the third principle, namely a nation with nationalism. Nationalism is a sense of pride, a sense of belonging, a sense of respect, and loyalty possessed by every individual in the country which is reflected in the behavior of defending the nation, protecting the motherland, willing to sacrifice for the sake of the nation and state, loving custom or culture by preserving it, and preserving nature and environment.
4. Democracy led by the wisdom in a consensus or representative is the fourth manifestation of the principle of a democratic Indonesian nation. Democracy is a word that every state/nation always glorifies. The word has an extraordinary effect. In general, it can be said that democracy is a political system that allows all citizens of the nation to have the opportunity to realize their aspirations. Each nation has its own way of realizing democracy. Implementation or realization of universal democracy and applies to all nations. Even within one nation changes can occur in the implementation of democracy in accordance with developments. The manifestation of democracy for the Indonesian people is not the same and does not have to be the same as other nations, including Western nations which have different views of life from Pancasila as the view of life of the Indonesian people
5. Social justice for all Indonesians is the fifth precepts in the form of togetherness, or a nation that respects togetherness. Social Justice is a golden bridge towards the realization of people's welfare for all the people of Indonesia.

Soekarno described the urgency of the Pancasila for the Indonesian people in a concise and convincing manner: "But unless Pancasila is a Weltanschauung, a philosophical basis, Pancasila is a unifying tool, which I believe is as sure as the

Indonesian people from Sabang to Marauke can only unite on the basis of The Pancasila. And not only a unifying tool of the Republic of Indonesia, but also essentially a unifying tool in our struggle eliminates all the diseases of society that we have fought for decades, namely imperialism. The struggle of a nation, the struggle against imperialism, the struggle to achieve independence, the struggle of a nation that carries its own style. There are no two nations that fight the same way. Each nation has its own way of fighting, has its own characteristics. Because the nation as an individual has a personality that is manifested in various things, in culture, in the economy, in character and so forth "(Soekarno in Latif Y, 2011: 41)

The statement made by Sukarno in describing the urgency of the Pancasila illustrates that the Indonesian State has its own characteristics, and has a clear and visionary nationality and national foundation. This is the starting point of a goal and ideals that are fundamental to the civilization of a nation. The importance of conception and ideals as the foundation of morality of a nation is shared by one of the United States intellectuals and politicians, John Gardner, "No nation can achieve greatness unless it believes in something, and unless that something has moral dimensions to sustain a great civilization" (Gardner in Latif Y, 2011: 42). As a basis for morality and nationality, Pancasila has a strong ontological, epistemological and axiological foundation. Each principle has noble values which are manifestations of the justification of historicity, rationality, and actuality, which if understood, lived, trusted, and practiced consistently can sustain the achievement of a nation's civilization.

Islam Students' Association was founded in Yogyakarta, 5 February 1947 is one of the student organizations that gave birth to the nation's cadres. They hold positions in various government and non-government institutions. HMI graduate affiliates also take part in political parties both Islamic and nationalist (Sidratahta, Media Indonesia: 19 Juni 2002). HMI's tendency to be in power is not a coincidence, but it is part of the results of the political struggle and its kaderization since the inception of the HMI until now. This reality is reinforced by Azyumardi Azra's view that the political atmosphere at the birth of HMI was strongly colored by the revolutionary zeal of Muslims and nations that were used up in order to maintain the proclamation of independence and drive out the colonialists who re-colonized the Indonesian people (Azyumardi Azra, 2002: xi). With the atmosphere and political climate that was in a state of war and the upheaval of the revolution, the founder of HMI, Lafran Pane, et al put an elevated enthusiasm and purpose with the challenges of the times, as stated in article 4 of the HMI's Articles of Association namely (1) maintaining the Republic of Indonesia and enhancing Indonesian people degrees (2) uphold and develop the teachings of the Islamic religion. The nationalism and Islamic commitment of HMI was quickly actualized in the form of a work program as a result of the HMI congress I, 30 November 1947 which included two things. First, HMI works with the Indonesian people in general and the army in particular, in defense of the Unitary State of the Republic of Indonesia. Secondly, in collaboration with associations and other parties in improving the political and economic life of the people and Muslims (Agussalim Sitompul, 1976:20 and Ramli HM. Yusuf, 1997:36)

The initial goals of HMI:

- Maintaining the Republic of Indonesia and enhancing Indonesian people degrees.
- Uphold and develop the teachings of the Islamic religion.

The current goals of HMI:

The establishment of academics, creators, devotees who are based on Islam and are responsible for the formation of a just and prosperous society, who is blessed by Allah Ta'ala.

Cadre of Muslims Students' Association has special characteristics, and is currently a prerequisite for anyone who will join, namely:

- Based on Islam or based on the Qur'an and Sunnah
- Indonesian and nationality concept
- Have the aim to maintain the quality of human beings
- Independent
- Has a status as a student organization
- Has a function as a cadre organization
- Has a role as a social movement organization
- Has a duty as a source of national development institutions
- Has a position as a modernist organization.

Social change is basically one of the important elements in the transformation of society which can be marked by changes in composition, structure, function, boundaries and environment in a social system of society. In addition, some figures also argue that social movements are one of the main ways to restructure society in a better direction.

One of the most important parts of the scope of social change is the existence of agents of change itself. According to Adamson and Borgos, 1984 in a book entitled *Sociology of Social Change*, the main agent of social change is interpreted as a mass movement and the resulting conflict.

The presence of HMI as an Islamic organization that struggles during Higher Education and the world of student affairs requires its cadres to become a new phenomenon in the instrument of da'wah in the community. HMI cadres must be able to guarantee the sustainability of the student movement and be able to help the community in facing the adverse effects of the dynamics of social change. By taking an external basis, HMI positions itself as a social movement organization that has a role and function in controlling policies for any social changes that can harm the community while at the same time making efforts to serve the community in order to maintain the stability of the state.

Principles are the foundation of thinking, acting and behaving. Thus, the principles of kaderization are the principles that are used as a basis in running the kaderization system. The principles used in kaderization are:

**a. Integrative**

Integrative principle directs that all aspects in kaderization can be used as a whole, connected, not partially and not dichotomizing between one aspect and other aspects.

**b. Balance**

The principle of balance is a necessity in the development and formation of humans so that there is no lameness and gaps between material and spiritual as well as physical and spiritual elements.

**c. Equality**

In undergoing the entire kaderization process, nothing must be distinguished between one cadre and another cadre. All cadres are entitled to receive the same treatment, guidance and facilities, especially in fulfilling their rights and obligations as cadres and instructors.

**d. Compassion**

The principle of compassion is nothing but the nature of God Almighty, namely Ar-Rahman and Arrahim. As the position of humans as God's representatives on this earth, then humans should imitate all the qualities that exist in Him, the attributes of God should also be actualized in the process of education and kaderization. This principle directs that every human being basically has the potential and good character, and always has a tendency towards the truth.

**e. Exemplary**

The principle of virtue is intended that kaderization is not only tasked with providing learning conditions for cadres, but to shape personality by the treatment and example shown by the instructors. The application of this exemplary principle also serves as a foundation for the application of other kaderization concepts.

**f. Obedience**

The principle of obedience is born from submission (din) and resignation (al-Islam) so as to form a unity and attitude to obey each of the rules that have been enacted. Because, there is no obedience without submission and resignation towards something that is being believed. In this context, that every cadre should obey all the rules of kaderization accompanied by practice in the scope of daily life, especially obedience in terms of carrying out daily worship (yaumiyyah) in daily activities.

Based on the explanation above, it can be said that the principle of kaderization in HMI is systematic and in accordance with the standards. Conceptually, the kaderization process in HMI is good at the organizational level.

Identity is a characteristic that determines an individual or entity, such that it becomes a person that distinguishes it from other individuals or entities. Characteristics that describe an identity are unique, distinctive, reflecting the individual or entity. Identity will be personal in individuals or entities that will always appear consistently in the attitudes, behavior and actions of individuals in dealing with each problem.



By having identity and applying it consistently, a person will not be easily swayed by various shocks that hit because of self-confidence, self-esteem, and self-confidence, so it is not easy to be tempted by astray things.

In HMI, efforts to strengthen national identity are reflected in various ways, namely the kaderization process, which is in the content of cadre training material contains the way to strengthen national identity in maintaining diversity in Indonesia.

The material is described as follows:

1. Basic Value of Struggle. This material discusses the Islamic view of state administration, the position and status of religion and its relationship with Indonesian-ness. Development of contemporary discourse.
2. Islamic Doctrine and Civilization. This material discusses building civilization through Islamic doctrine, the relationship between Din and Tamaddun. The foundation of building civilization.
3. National Concept. The discussion will focus on political history in the archipelago (political historiography of the archipelago), political developments in two perspectives: culture and institutions of institutionalization of power structures in each period of the archipelago's history.
4. Analysis of Political Economy. This material will discuss the close relationship between economic activity and political life that is reciprocal. Also discusses the interrelationship of economic variables (capital, labor, technology, land, innovation, entrepreneurship, consumption, production, etc.)
5. Explore ideology, politics, rhetoric of action and strategies and tactics.

The material flow is arranged in such a way, it is a process flow to provide the ability of a leader to be able to analyze, design, formulate, transform, and implement a social change based on divine values for the realization of the ideal civilization which is aspired as a form of manifestation of intelligent Muslim.

## **Conclusion**

First, the HMI organization is an organization that has kaderization patterns and concepts that are arranged systematically and has guidelines in the kaderization process. The concept of kaderization in HMI is carried out according to the results of the Congress in each period. This organization also applies a strong cadre formation pattern, especially in achieving the goals and vision and mission of the establishment of academics, creators, servants who are based on Islam and are responsible for the formation of a prosperous, just society who is blessed by Allah Ta'ala.

Second, the HMI organization applies a gradual kaderization model. These stages must always be passed by each cadre to become a perfect cadre. In each stage, the HMI organization applies a concept that upholds values based on Islam and Indonesia. This is embedded from the cadre through the recruitment stage then to the introduction stage by applying several principles such as the principles of integration, equality, balance and others. By upholding these principles, each cadre will have a positive culture of the problems posed by the diversity that occurs in Indonesia. At

the stage of forming and developing HMI cadres, some training is implemented with the aim of improving the quality of cadres, cadre training is carried out with three levels on an ongoing basis. This will make each cadre able to maintain consistency and commitment in carrying out the vision and mission and objectives of the HMI organization.

Third, the HMI organization has stages of implementing kaderization in both categories. This can be illustrated from the process of the cadre stages carried out by HMI, especially from the beginning of the introduction stage to the service phase, each cadre is required to have high levels of implementation of the kaderization process. This will also have a positive impact on the formation of the identity and character of each cadre in carrying out their activities while serving in the community, nation and state.

Fourth, the HMI organization has a systematic and ongoing effort to strengthen national identity in maintaining diversity in Indonesia. This can be proven after the researchers conducted observations and interviews with informants that the data and information showed in each level of cadre training that always contained material related to the concept of Indonesia and Nationality. This material always increases in every step of cadre training level. So that each cadre is able to understand the concept of Indonesia and nationality as an implementation of strengthening national identity. The cadres also showed the synergy between the materials in each cadre training level and the activities carried out by the HMI organization. In addition there is also an ideological defense for each cadre through the activities carried out by the HMI organization which always upholds the concepts of Indonesia, Islamic, Democratic, aware of pluralism, and upholds the rule of law.

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## *The Use of Local Genius in Strengthening Student Character*

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### **Abstract**

Strengthening Character Education is an education program in school whose chief goal is to reinforce student character through the harmonization of heart, mind, and body. The program is part of Mental Revolution National Movement in the contest of realizing an advance and civilized Indonesian nation. However, in reality, such a program has not had a profound impact on student character. One concerning problem is that students are not familiar with local cultures. Addressing this issue, this study used local genius as a medium for strengthening character education. Wayang Golek (wooden puppet) – a form of performance art that grows and develops in West Java. This performance art not only presents a spectacle, but also encapsulates values that need to be practiced in life. This study was conducted at 16 public junior high schools in the city of Bandung, West Java province, where Wayang Golek performance were utilized as a media to foster character education. Findings reveal that the program serves a dual function, as a vehicle for preserving regional culture and at the same time a means for strengthening student character education. The letter was seen in students' knowledge about Wayang Golek, the famous puppeteer, and the story in an intriguing performance concept, whereby the students as spectators could enjoy and love the performance.

Keywords: local genius, character education, wayang golek

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## Introduction

The Indonesian government believes that preparing the young generation is the only way to become a strong country by 2045. This is consistent with the Indonesian government's agenda contained in the agenda of the Mental Revolution. To answer that challenge, education is considered as the best vehicle to prepare agents of change to shape attitudes, behavior, and character (Rokhman, et.al, 2014, 1161). However, education has not fully been able to play a role in preparing the young generation.

Some events that have emerged lately, there are students cheating during tests, fighting, and skipping school. National scale cases continue to occur, such as leaked national examinations, plagiarism, and even forgery of diplomas (Megawangi, 2007; Winataputra & Budimansyah, 2007; Nurgiyantoro, 2011). That happens because education in Indonesia is still mechanistic, rote, and stifles student creativity (Musfiroh, 2008, 25).

Seeing these conditions, how important is character education for students in school (Nurgiyantoro, 2011, 27). One that can be developed to strengthen character education is through local culture with puppet show<sup>1</sup> for students. Puppet show can be used as a good tool for character education (Astuti, 2014: 137). Therefore, puppet show acts as a spectacle as well as guidance, meaning as a spectacle of entertainment as well as a role model or example (Sabunga, 2016; Asturi, 2014; Taweethong, 2010) which entertains people through ethical, aesthetic and value-filled packaging.

From previous studies, the use of certain puppet figures is effective in strengthening character education. This is because wayang is a form of local wisdom that appears in every story (Wardani & Wisyastuti, 2013) like Arjuna, one of the Pandava warriors who had good character (Astuti, 2014, 131). In the story about Bima, there are many good qualities that can be emulated such as being brave, honest, having a clean heart, and having a strong determination to achieve his goals (Albiladiyah, 2014, 139). The Bathara figure from the puppet works of Murwakala, contains philosophical life values exemplified by various puppet characters such as the characters of Guru Bathara, Bathara Endra, Bathara Bayu, Bathara Rama, Bathara Aani, Bathara Kala each have a character that can be a good model for a character leader (Lestari, 2014, 1). Bhishma figures, serve as a reflection of society in forming a superior character for the nation and state (Arifin, 2014, 97). The Gatotkaca figure is described as a hero of the nation who is willing to sacrifice for someone he thinks is more valuable than himself, a brave knight with a strong and brave character (Purwanto & Yuliana, 2016; Mertosedono, 1994).

Seeing the results of the study, the author is interested in using local genius through puppet show with the title "Gatotkaca Sabda Guru" to strengthen character education, bearing in mind that this is very closely related to the world of education and there have been no previous studies. This interest is very reasonable, because puppet show has the ability to connect the "real world" and the world that might be imagined

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<sup>1</sup> Puppet show including puppet of2 purwa, is a symbol of human life in the world. Puppet show has its own distinctiveness and characteristics that distinguish it from other puppets, because it has a style of speech and uniqueness which is an original masterpiece from Indonesia

(Ahlcrona, 2012; Dunst, 2014) and philosophical conditions of life which are a reference to perfect behavior from politeness to the ethical system.

The study of character strengthening through the use of local genius through puppet show performances to foster student character is done through a qualitative approach with phenomenological study methods. Meanwhile, participants in this study are: (1) schools that have participated in puppet show performances with the Gatotkaca Sabda Guru; and (2) students and parents who take part in the puppet show with the Gatotkaca Sabda Guru.

This research was conducted at a junior high school in Bandung, West Java Province. The selection of research sites was based on the consideration that the school was involved in a puppet show with the Gatotkaca Sabda Guru play. Data collection techniques are interviews, observation, study of literature, and document analysis. The data obtained were analyzed through a data analysis process with Interpretative Phenomenological Analysis. The results showed that students from 4 (four) junior high schools in the city of Bandung had differences although not much different in answering interviews. The values that grow in the puppet performance by playing the Gatotkaca Word of Teacher, are:

**a. Religiuos**

Reflected in the interview passage "*sakola anu bener solatna anu bener ameh bisa ngabanggakeun nagara Indonesia*" (Good schools, good prayers in order to be proud of the country of Indonesia).

**b. Honest**

Reflected on the interview excerpt "I am very happy with Gatotkaca, because there are inspiring conversations '*jadi jalma kudu jujur ka sadaya jalmi termasuk ibu rama, ulah ngabohong*'. (So humans must be honest with all humans, including mothers and fathers, don't lie). The conversation gives meaning, that what is done must be honest in all kinds including all humans ". Apart from that, inspirational conversations, "*mun hidep hayang berhasil, kudu boga hiji konci nyaeta jujur*" (If you want to succeed, you must have the key, which is honesty). Students again said, "I will try to live honestly, so I can achieve the success that I want". The next interview excerpt even said "so that we are always honest in everything" and "if you want to be successful, you must be honest and instill a sense of patience".

**c. Tolerance**

Reflected on the interview passage which explains, that after watching him reflect on the story line that he never thought of people's opinions before, but after watching the show, he had the view that advice is important and life does not have to be serious ". In addition, he gets advice "to help, and do not discriminate against others, love those under your age".

**d. Hard work**

Reflected on the interview passage that by watching the puppet show "I get the mandate like, "*kudu rajin diajar jeung teu poho kana budaya sorangan* (I have to study hard and not forget my own culture), and it feels like I love culture more and study harder ". This is reinforced by the statement that "I was taught to study hard in school" and "to study hard to be useful in society". This is reinforced by the next statement which states "keep on studying hard, because by learning we get useful knowledge for daily life" and "even though he is great but he must

continue to learn, and do not forget to always ask permission and approval of parents. so that everything goes smoothly as he wishes ".

**e. Friendly / communicative**

Reflected on the interview passage that, the life value obtained after watching the puppet show is "we must not be arrogant and must be polite".

The special character in connection with the puppet show with the title Gatotkaca Word of Teachers can be identified based on the results of the following interview passage.

**a. Salute to Parents**

Reflected on the interview excerpt "parents' prayers and blessings are everything".

**b. Not arrogant / big-headed / arrogant**

Reflected on the interview passage that by watching wayang golek, he got life lessons "to be a smart and not arrogant child".

**c. Live in order**

Reflected on the interview excerpt "inspiration not to focus on gadgets like what was said by Abah Dalang, and to always use the rules in life and to always study hard.

**d. Patience**

Reflected on the interview excerpt "if you want to succeed, you must be honest and instill patience".

**e. Wise**

Reflected on the interview passage that he was inspired by Gatotkaca's father, Bima, "because he always gives support and advice to his children, and is wise in giving advice".

From the overall results of interviews with students who came from Junior high school of Negeri 4 Bandung, Junior high school of Negeri 11 Bandung, Junior high school of Nugraha and Junior high school of Nusantara Bandung, it can be drawn a conclusion that the characters that grow after watching puppet show are good characters in general that refer to eighteen characters, namely: ( 1) religious, (2) honest, (3) tolerance, (4) hard work, and (5) friendly. Meanwhile, special characters related to the work of the teacher's Gatotkaca Word are: (1) respect for parents, (2) not arrogant, (3) living orderly, (4) patient, and (5) wise. There are five main values that are interrelated to form a network of values that need to be developed as a priority for the Strengthening of Character Education Movement. The five main values of the nation in question are (1) religious, (2) nationalist, (3) independent, (4) mutual cooperation, (5) integrity (Ministry of Education and Culture, 2017, 7-9). Thus, puppet show with the main character gatotkaca said the teacher can have an impact on the attitudes, behavior, and character of students (Rokhman, 2014, 1611).

That is because puppet show contains symbolic-philosophical values that contain valuable values with high artistic and philosophical values that can be used to convey moral education to the community (Bonafix, 2017; Haryono, 2007; Sulistyobudi, 2014). In addition, puppet show acts as a spectacle as well as guidance. Puppets can reduce anxiety and foster moral values, even students are more active and creative, because it can encourage student participation (Boeriswati, 2013; Lukenbill, 2013; Gauda, 2001). Puppet show can provide a lot of moral learning because it gives positive values in every play. In addition, it can build confidence and provide



opportunities to learn communication skills at an early age (Korosec, 2013; Brezigar, 2010).

By watching puppets children have some understanding of the functional relationship between emotions and behavior, and this can support social emotional adjustment (Dennis & Kelemen, 2009, 251). The use of certain figures can be effective in strengthening character education, it can be seen from the results of research that says the characters in puppet shows can be one of the tools to shape national character, because puppets are a form of local wisdom that appears in every story (Wardhani & Widyastuti, 2013).

One of the functions of the puppet show that is as one of the media spread the values of goodness, especially in fostering and advancing the life of the nation and state. In puppet terms these tasks are outlined in teachings "*mahayu hayuning proja, mahayu hayuning bangsa dan mahayu hayuning bawana*" namely to maintain, foster, advance the country, nation and world. While the main task of humans is to eradicate the evil taught in the teachings "*sura dira jayaningrat lebur dening pangastuti*" (Soeparno & Soesilo, 2007, 18).

From the axiology point of view, the wayang golek purwa performance can be used as a source of the search for values, because it contains the values of various teachings originating from various religions and philosophies. As the definition of Axiology is science that investigates the nature of values which are generally viewed from a philosophical point of view. Axiology includes values, parameters for what is called truth or reality, as our lives explore areas, such as social areas, physical areas of material and symbolic areas, each of which shows its own aspects (Komara, , 2011, 14).

Character values conveyed in puppet show are based on monotheism values and are derived from six life value systems including theological, physiological, ethical, aesthetic, logical and teleological (Sabunga, 2016, 1). Character values conveyed can be divided based on the quantity of appearances of each puppet show purwa, both based on observations and study of documents that researchers have examined. The main character value is a string of values that can be ascertained firmly appear in every show. Basajan characters are character values of moderate quantity, meaning that they do not appear explicitly in every puppet show and / or puppet show. While the cast character is a character value that only appears occasionally in the show, meaning that this character value is rarely conveyed in the puppet show (Sabunga, 2016, 10).

The philosophical values of life in the wayang golek purwa show are conveyed through the character or character of the puppet characters. In the puppet story, each character is a reflection or representation of attitudes, character, and human character in general. Good and evil, sleaze, ugliness, affection, love, defending the country, tolerance, tolerance and mutual cooperation are the values conveyed in every puppet show (Aizid, 2012, 15). That is the task of the puppet puppeteer as the communicator of these good values.

Performing wayang golek purwa, aside from being a vehicle for strengthening national character values, is also seen as a vehicle for cultural preservation, namely in

the context of maintaining and preserving the values of local cultural wisdom. Cultural preservation leads to being controlled, owned, and preserved the cultural aspects of the community by their descendants. The process of civilization through this decline is possible to be certified in the development of culture itself, namely the dynamics that allow aspects of old culture to change and be accepted as part of (new) culture. In addition to the process of innovation within a particular cultural environment, cultural preservation includes the process of diffusion, acculturation and assimilation which can, to a certain extent, add and enrich, change, to replace cultural aspects in question (Prayitno, 2012, 251).

The link between the purwa puppet show and character education that is equally functioning in forming the nation's personality (nation and character building), the socialization of Pancasila values, the formation of ethics, and the behavior of citizens and so forth. Therefore, the Purwa puppet show performances can be understood as one vehicle or a good character education tool. As a vehicle for character education, puppet show has several uniqueness. First, the purwa puppet show itself is a character education tool that offers a very interesting educational method, because wayang teaches teachings and values not dogmatically as an indoctrination, but it offers those teachings and values, it is up to the audience (the public and individuals) themselves to interpret, assess and choose which teachings and values are appropriate to their personal or life. Secondly, the wayang golek purwa show conveys the teachings and values not only theoretically (in the form of teachings and values) but rather concretely by presenting the lives of its concrete figures as role models (Amir, 1991, 19).

Performing wayang golek purwa as a vehicle for character education, because in its implementation there is a strengthening of the values of the puppeteer to the audience who then the audience examines, analyzes, and identifies these values and is contextualized in daily life. The process is in line with eight approaches to value education, namely:

- a. Evocation; namely an approach so that students are given the opportunity and flexibility to freely express their affective responses to the stimulus they receive.
- b. Inculcation; that is the approach for students to receive a stimulus directed towards a ready condition.
- c. Moral Reasoning; that is, an approach for high taxonomic intellectual transactions to take place in finding solutions to problems.
- d. Value clarification; namely the approach through directed stimulus so that students are invited to look for clarity of the message content must moral values.
- e. Value Analyze; that is, the approach for students to be stimulated to conduct moral values analysis.
- f. Moral Awareness; that is, an approach so that students receive stimulus and raise awareness of certain values.
- g. Commitment Approach; namely the approach so that students are invited from the beginning to agree on a mindset in the value education process.
- h. Union Approach; namely the approach so that students are directed to carry out in real life (Djahiri, 1996, 2).

Characterization uses various methods. The character's character can be revealed through: (1) his actions, (2) his speech or speech, (3) his thoughts, feelings, and

desires, (4) his physical appearance, and (5) what he thinks, feels, or wants about himself or himself other people (Satoto, 1985, 24). From the results of Sabunga's research (Sabunga, 2014), puppet show Purwa show as a vehicle for strengthening the character and personality values of the nation is full of nuances of character values which are manifestations of human love for God. Good values conveyed through wayang golek purwa performances are oriented to fostering community behavior in an effort to advance the life of the nation and state.

All stories have strong moral implications, teach the difference between right and wrong, and can be a way out for opinions (Scott-Kemball, 1970, 22). That was according to Lickona (2000, 62) will have a clear religious vision because it can inform all efforts of character education through the puppet show. On the other hand, puppets have an emotion for the audience so that the show is considered to have a value contained in it (Arifin, 2014, 97).

### **Conclusions**

Strengthening character education through local genius with puppet show performances with the play "Gatorkaca Sabda Guru" contributes positively to students, although in some cases still needs to be improved so that the implementation of puppet shows can be optimal. In addition, the feedback given by students must be optimized in order to provide a holistic picture of the role of puppet shows in strengthening character education. But in general, the implementation of puppet show with the play Gatorkaca Word of Teachers succeeded in giving emphasis to figures that impact on student behavior. This success can occur because of the synergy between the Education and Culture Office of the City of Bandung, Schools, and Puppeteers through Sundanese local wisdom programs, and compatibility with students' thinking and catching abilities. The characters that grow after watching the puppet show are good characters in general that refer to eighteen characters, namely: (1) religious, (2) honest, (3) tolerance, (4) hard work, and (5) friendly. Meanwhile, special characters related to the work of the Gatorkaca Sabda Guru are: (1) respect for parents, (2) not arrogant, (3) living orderly, (4) patient, and (5) wise.

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*How to Create Educational Children's TV Programs: A Strategic Practice for Survival in the Digital Age*

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**Abstract**

Since the past to the present, the television is one type of mass communication that plays a significant role in influencing people in many areas. However, in the era of digital age, it is challenging for the educational TV channels to create the programs that gain interest from the current individual audience. This documentary research aims to give insights into the situation of current educational TV programs in Thailand and attentively proposes the strategic practices for the channels to survive in this digital age. The educational channels cannot only rely on the content of pure knowledge anymore. They must also specify the target group of the channel, use an idol and create contents and activities that serve the needs and interests of the generation Z. Significantly, the programs must be broadcasted on various media channels, especially online social network and working together with the government, community and private sectors to achieve more than anyone sector could achieve on its own.

Keywords: Educational TV Program, Children, Digital Age, Thailand

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## Introduction

Since the past to the present, the television is one type of mass communication that plays a significant role in influencing people in many areas. However, in the era of digital age, it is challenging for the educational TV channels to create the programs that gain interest from the current individual audience. The television industry in Thailand has a proportion of educational programs in the broadcast schedule of each channel is less than entertainment programs, which account for more than half of all television programs. One of the crucial factors is that educational content is commonly judged as uninteresting content which cannot create commercial TV rating, meaning not able to reach the popularity from the audiences.

However, content is of crucial importance to this argument, because educational programming is correlated with learning outcomes in children, whereas exposure to entertainment content is associated with poorer cognitive development and lower academic achievement (Jensen, Martins, Weaver, & Ratcliff, 2016).

The results of Fisch and Truglio (2001) found that in the short-term, studies of three- to five-year-olds show that heavy viewers of children's educational television program have higher skills related to the alphabet, numbers, and shapes than do lighter viewers. In the long run, longitudinal studies show that exposure to educational programs in preschool is associated with significantly higher grades in English, math, and science in high school, even after statistically controlling for other known predictors of academic performance (e.g., language skills, family background). These studies also found that educational television viewing in preschool is associated with more leisure reading in high school.

Notwithstanding, in this digital age, more than 60% of the populations turn to prefer online exposure than watching traditional media likes television. It is predicted that by 2025, more than 50% of viewers under the age of 32 will stop watching television and 1 in 3 internet users are attracted by YouTube (Wittawin, 2019). Internet and online media have replaced educational television. Computer, smartphone or iPad is used as a babysitter. Thai children use an average of 6-10 Hours of internet per day, even more than a decade ago, most of the children watch online video from YouTube (The 2018 DQ Impact Study, 2018) while some play online game more than three hours per day (Komchadluek, 2019). The Pediatricians suggest more than two hours a day has been shown to have a negative impact on academic achievement. They urge Thai parents to limit their children to a maximum of two hours a day (Angwittayathon, 2017), even if that means that the smartphone or iPad may have to disappear on occasion.

It is no secret that the television media have a dramatic impact on children's ability to learn and their interest in learning. Yet the media have a mixed record when it comes to using their power to promote the executive function growth of children. In the television channel, while there have been remarkable success, including high quality signals and various programs, there have also been too many commercial that offers little positive support for learning. Children deserve the opportunity to see and hear message that will teach, encourage and inspire.



In Thailand, there have been little television channels that promote the social, emotional and intellectual growth of children. One of them is the *True Plookpanya channel*, a new type of television program to inspire and encourage youth to find ways to succeed with confidence and courage to change. The channel aims to develop knowledge and morality by creating content on education and all-round knowledge both inside and outside the classroom along with moral development ethics of children and youth, as well as interested audiences 24 hours a day. By using case studies from True Plookpanya channel, this research aims to give insights into the situation of current educational television programs in Thailand and attentively proposes the strategic practices for the channels to survive in this digital era.

### **Methodology**

The research method for this study was documentary methodology. Essentially, method of this study involved critical interpretation by means of study, reflection, and generalization of a selected and classified body of information secured from the available literary and documents. Data were collected exclusively from the available and literary documents. Primary data were obtained from critical articles, statistics data, television channels and websites. Secondary data were taken from text materials.

### **The situation of current educational TV programs in Thailand**

Television programs in Thailand at present do not promote children learning as they should. Television program management in Thai society often depends on the requirements and various limitations. For example, it is being determined by the product owner who is the program sponsor, by the lack of technology, by the Code of Ethics Journalism Profession and by consumers that are in accordance with current trends and tastes of the audiences. In addition, if we analyses from the Thai culture, the way of Thai people life is bound to love for fun. When it comes to television programs, one thing that clearly reflects this Thai culture is that Thai people like to watch fun things regardless of the format or content.

The television station in Thailand is a commercial system. The advertising time of the programs must be sold for profits, so it must be popular and well rated. Therefore, most of television channels in Thailand focus on entertainment. Educational programs have a little time to broadcast and not popular enough to motivate viewers. Most commercial television for children is inadequate at best and damaging at worst. Broadcasters program to children only when there is no more commercially attractive audience. Since kids generally do not have disposable incomes, television makes them alternate salespersons. They want something and tease their parents for it. Young children have great difficulty distinguishing between reality and fantasy, yet they advertise directly to them. While National Broadcasting and Telecommunication Commission of Thailand periodically sounds an alarm about the quantity and quality of children's television and its intense commercialization, interest and enforcement tend to up and down.

At first, National Broadcasting and Telecommunication Commission of Thailand set up the policy for digital educational channels to promote education and learning. The Guidelines asked for more programming for kids, youth and family, and mostly it did not carry commercials. The policy said the channels have to contain a proportion of

programs to promote education and learning for children, Youth and family at Primetime period between 4 p.m.to 10 p.m. at least 1-1.30 hours and during the hours of 7:00 am to 10:00 pm on Saturday – Sunday (Sittisaman, 2019). But as the matter of fact, the channels unable to follow the policy. Most of the programs offerings are for all demographic of audiences, just only 2 percent are for 3-6 years old kids with only 2 minutes per day (Marketeer, 2019) . To be concerned, the existing digital educational channels for young children mainly focus on the cartoons and further start to earn additional income from advertising or online shopping program, such as Channel 3 Family and MCOT Family Channel.

For the formal educational television programs, the contents in the programs have no different from the lessons in the classroom. They are only switched to television as a means of disseminating lessons such as programs of Ramkhamhaeng University, Sukhothai Thammathirat Open University or Klai Kangwon School (eDLTV). Even the television for education of Office of the Basic Education Commission, Ministry of Education (ETV, DLIT, OBEC) aim at the target group at the lower secondary school level, upper Secondary and higher Education. These television channels provide long distance learning via satellites and do not seek profitability and support from the government or private organizations. They show their social responsibility under the ethics involved in development for local communities and society at large, known as corporate social responsibility. Similarity, True Corporation Limited (Public Company) has established a project to grow intelligence True's Social Project that can return good things to society. By providing TV sets and set-top boxes and channels with quality educational content and learning named True Plookpanya channel.

### **The strategic practices for the channels to survive in this digital age**

Although children's entertainment programs may have educational value (in a very broad sense of the term), we expect to see a reasonable amount of programming which is particularly designed with an educational goad in mind. There are many imaginative and exciting ways in which the medium can be used to further a child's understanding of a wide range of areas: history, science, literature, the environment, drama, music, fine art, human relations, other cultures and languages and basic skills such is reading and mathematics, which are crucial to a child's development. This research study proposes the list of strategic practices for the children's television channels. The practical practices must be adapted to keep up with the times. By using these proposed strategies that vary according to the environment, context, and limitations of each channel of education programs. It can be summarized as 7strategics as follows:

#### ***1. Creating a niche target group (Niche Market)***

The educational channels are not possible to gain interest from all the audience groups. They thus should aim to a specific target group such as students and academics. This will help the channels gain insights of the needs of the audience in depth. Additionally, the channels must be ready to protect themselves from market-leading channels. They must create their own unique image for the audience to perceive the prestige or differences. Even if the market-leading channels try to get into this field of market, they cannot win us in terms of knowledge and expertise

because we have highly specialized in this field with direct responsive to the target audience.

## ***2. Adjusting the program format to be an educational program in the form of entertainme***

Since the needs of consumers are entertainment media, yet the entertainment programs have only focus on entertaining, not really care about including good life lessons for children. Therefore, the educational television program must bring both entertainment and knowledge together into their programs in the form of entertainment education TV Programs (Learning with Pleasure). The program will provide knowledge regarding the development of quality life with fun at the similar levels to entertainment programs produced for commercial purposes.

## ***3. Hosting by an idol***

The educational television channels will be able to gain interest and attention from the audience when the host of the channel is an idol. This idol must be a person who the audience most favorites. When this person presents as a content presentation of the program, the number of audiences increase. Still, the qualification of the idol must be cautious. The person who is able to be a host of the educational program has to have an adequacy that is suitable for modeling such as knowledge, reliability, good personality and language usage, not just a person with high popularity only.

## ***4. Creating a new content or activity***

Creating new contents or activities in the program will stimulate viewers to get involve with the channels. The activity could be a contest or competition or activities that help various societies. This new activities can be used to request support from new sponsors that are in line with the organized activities and also helped to bring more sponsors.

## ***5. Having a professional production process***

It can be noticed that the distance education channel of the government often has poor production, such as unclear pictures, inconsistent of images and sound, or unappealing design of the program. These can cause viewers to feel uncomfortable to watch. Therefore, it must be a new development in the production process. The educational program must have a quality production system comparable to commercial television channels, appealing more audiences to the channels.

## ***6. Expanding the distributions of the channels***

Since the audiences turn to access online media more than traditional media, the television channels therefore must focus on the responding of the consumers' lifestyle. The educational television channels must provide quick and easy access to their television programs wherever the audiences are, wherever the audiences are. The programs must be easy for the audiences to track and access the contents in many ways with a variety of technological devices. For instance, apart from the television channel, the educational media must be distributed through the website, airing live

from the online website together with the television program. In addition, various programs must be re-viewing on YouTube channel. Setting up Facebook fanpage is also very important. Facebook offers various news that relating to the channel, recommending various programs of the channel along with linking for enter to the website to view more programs.

### ***7. Establishing a network and cooperate with government agencies***

The educational television channels seem to be effortless than commercial ones if they want to establish the network and cooperation with the organizations related to nation education. The mutual supports from the government agencies provide various benefits for the channels. For example, it may help bringing famous and skillful teachers from prestige institutes to the programs or promoting various learning such as a learning museum, park or archives. By collaborating with the government agencies, good images for the educational television media along with great support from the government are highly perceived.

### **Conclusion**

In a world with such extraordinary technological opportunities as ours, the media can and must do more to serve our children. The author encourages educational media professionals to link knowledge with entertainment more effectively, and to help parents and schools at every turn to challenge our young people to begin a lifetime of learning.

Since children learn from all media, especially now online. The question is what do they learn? No one can deny television's great potential. Therefore, children still deserve education and experience from television media channel that result in more than incidental learning. Media sparks curiosity and opens up distant worlds to children. Through its magic, youngsters can travel to the outer space, the bottom of the sea or inside a cell. They can visit old castles and climb highest mountains. They are exposed to history, science, technology, art-all with a finger. Let's use the exciting, almost unlimited potential of the electronic teacher to uplift rather than degrade. The promise is to enrich the lives of all children, to give them an exciting new window to the world. By so doing, we will improve the quality of education and, ultimately, help secure the future of the nation.

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***Encouraging Independence and Interdependence in Assessment:  
Moving Towards Assessment for Learning in Heritage Language Classrooms in  
Singapore***

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**Abstract**

Assessment for learning (AfL) can be viewed as a set of practices that enhance student learning. AfL is applicable in many varied contexts, yet the necessary situation-specific enactment (reflecting, for example, the learner's age, subject matter and resources available) can impede critical examination and thoughtful dissemination. This study explored the extent by which teachers in Malay heritage language classrooms understood, believed and practiced AfL. The three principles underpinning AfL were originally formulated by a large multi-university team working with over 40 schools in England, and can be summarised as: making learning explicit, promoting learner autonomy, and focusing on learning rather than grades. The research reported in this paper involved Malay Language teachers from multiple secondary schools across Singapore. The study involved a survey completed by 121 teachers to indicate the extent of their belief and practice of AfL, 8 classroom observations and 20 in-depth interviews with teachers who have different AfL profiles. It was found that while Malay Language teachers were keen to develop their AfL understanding, they did not associate changes that they had to implement in their classroom assessment practices with the principles underpinning AfL. Also, teachers' attempts to carry out independent self-assessment and interdependent peer assessment were successful only to a certain extent due to the reluctance of students to switch their focus on learning, rather than task performance. It is suggested that the application of AfL principles can make assessment reform in heritage language classrooms more coherent and practices meaningful for teachers.

Keywords: Assessment for learning, Assessment, Heritage Language

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## Introduction

This study focuses on how Singaporean Malay Language (ML) teachers comprehend assessment for learning (AfL). How do these teachers mediate their existing assessment practices in light of AfL, the assessment reform that has taken centre stage in worldwide educational reform? Although AfL has been studied extensively in the western classroom context, relatively little is known about how teachers in heritage language classrooms, perceive AfL. Heritage languages such as Malay, Tamil and Mandarin are offered in all Singapore schools and the sociocultural contexts surrounding the teaching and learning of these subjects are rich and unique. In choosing to research the practice of AfL within ML classrooms, the sociocultural context of the Malay teacher, known as a *Cikgu*, has to be highlighted.

The context of ML teaching and learning in Singapore is weighted with history, culture and social etiquette. Although the main working language in the country is English, ML is constitutionalized as Singapore's national language. The Constitution of Singapore 'recognizes the special position of the Malays, who are the indigenous people of Singapore, and accordingly it shall be the responsibility of the Government to protect, safeguard, support, foster and promote their political, educational, religious, economic, social and cultural interests and the Malay language' (Singapore Const. art. 152). Every morning, across all schools in Singapore, the national anthem is sung in ML by all students and teachers, regardless of their ethnicity. In schools, while the main medium of instruction is English, all pupils learn an official Mother Tongue Language (MTL). Students from the three major ethnic groups in Singapore: Chinese, Malay and Indian study their corresponding MTL. This bilingual policy aims to "equip our students with language competencies to access Asian cultures and develop a global outlook." (Planning Division Ministry of Education, Singapore, 2014, p. vii)

In the social context of schools, ML teachers are specially addressed by everyone as *Cikgu*. While other subject teachers are called by their surnames, for example Mrs Lee the Science teacher, ML teachers always have the designation of *Cikgu* attached to their names. It is also a cultural norm for students to kiss the hands of their *Cikgu* at the start and end of every ML lesson as a mark of respect and gratitude for the knowledge gained (this does not happen for other subject teachers). In ML classrooms students rarely challenge a *Cikgu*'s decision or give any negative feedback about lessons. A *Cikgu* is always in charge of the teaching and learning that happens in the classroom. In such learning environments, where respect for teachers' authority is highly valued, the philosophy of AfL, which changes the power structure between the teacher and the learner, may be unclear and challenging to implement. This research was initially driven by a deep concern about what effective learning looks like in an ML classroom, what teaching practices support this and what can be done to help ML teachers master such practices. In 2010, based on "external scans of international language assessment systems" (Ministry of Education, Singapore, 2010, p. 52) a committee consisting of experts in ML education and assessment specialists from the Singapore Examinations and Assessment Board (SEAB) noted a strong impetus towards promoting AfL in the teaching of language. The committee recommended that AfL strategies be integrated into the teaching and learning of ML in secondary schools (Ministry of Education, Singapore, 2010, p. 52). AfL was then introduced into the ML (Secondary) syllabus in 2011.



Seemingly substantial effort has been put in to develop AfL practices amongst ML teachers over the past six years. New secondary school ML textbooks published in 2013 contain many activities that support AfL practices such as self and peer assessment. ML teachers are encouraged to share their innovative assessment practices at the national ML seminar 2016 organized by the ML Centre of Singapore (MLCS). However, despite such endeavors by the Ministry of Education (MOE) in Singapore to move towards a more holistic form of assessment, Singapore's education system is often portrayed by local researchers as examination-oriented (Hogan, 2011; Lim-Ratnam, 2013; Ratnam-Lim & Tan, 2015; Tan, 2011a, 2011b). This research is timely and supports efforts by MOE and its ML curriculum experts at the ML Curriculum Planning Development Division (CPDD) to establish the development of assessment knowledge and sustainability of AfL practices amongst ML teachers since its introduction in 2011.

Recent international research indicate an interest in this aspect of AfL implementation (Arimoto, Clark, Yamamoto, & Shinkawa, 2015; Ho, Adie, & Klenowski, 2016). Arimoto et al.'s (2015) research focuses on the importance of cultural context in the implementation of AfL as an assessment reform in the Japanese education system. The research reveals that while practices such as retaining students' focus on learning and conducting peer lesson observations are common in Japanese school culture, other practices such as students' spontaneity and creativity are sometimes discouraged as "language and social customs often emphasize distance" (p.50). Ho et al. (2016) echoes the opinion that emphasis has to be placed on AfL strategies that are situated and culturally relevant. Their research uses a sociocultural lens to examine the assessment practices of three lecturers in a Vietnamese teacher-training institute. The writers argue that Vietnamese values such as respect for harmony and hierarchy can either encourage or suppress AfL practices. My research sheds light on the influences that Malay cultural values have on AfL implementation in the classroom settings of various schools across Singapore. Other than deliberating these cultural factors, an examination of social and historical factors that regulate ML teachers' belief in AfL also contribute to the ongoing discourse in the field of assessment.

## **The research**

The central research question of the study is:

To what extent do ML teachers practise AfL in their ML classrooms?

The Assessment Reform Group (ARG)<sup>1</sup> first defined AfL as follows:

Assessment for Learning is the process of seeking and interpreting evidence for use by learners and their teachers to decide where the learners are in their learning, where they need to go and how best to get there. (Assessment Reform Group, 2002, pp. 2–3)

The ARG members also produced ten guiding principles for the use of AfL in practice and these principles situate AfL as intrinsic to teaching and learning. Within the

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<sup>1</sup> ARG established in 1988 as the Assessment Policy Task Group of the British Educational Research Association (BERA) and funded by the Nuffield Foundation (since 1997), is an independent group that looks into improving assessment in all of its forms (Gardner, 2006, p. 5).

context of ML education in Singapore, the ARG's definition is certainly adopted. The ML (Secondary) syllabus states the following:

Assessment for Learning aims to monitor the progress of pupils continuously and interactively. In the process of learning, the teacher has an opportunity to give continuous quality feedback to the pupils. Hence, the pupils' learning abilities and needs are identified [*decide where the learners are in their learning*]. Subsequently, the teacher can plan suitable teaching activities [*how best to get there*] to increase student achievement [*where they need to go*]. (Curriculum Planning and Development Division, 2011, p. 30)

However, 'deciding where the learners are in their learning, where they need to go and how best to get there', has sometimes been misinterpreted by teachers to mean that they should frequently conduct "mini tests" to ascertain where the pupils are in their learning standards vis-à-vis the national set standards (Klenowski, 2009) whereas authentic AfL should really allude more towards "assessment as a support for learning" (Swaffield, 2011, p. 434). Klenowski in her position paper generated at the Third International Conference on AfL, mentioned that teachers would conduct lessons to bridge gaps of knowledge in order to bring the students' scores closer to the desired high level of performance in national tests and exams, sacrificing real learning along the way (Klenowski, 2009). The conference held in New Zealand, was attended by 31 academics and consultants considered internationally as authorities in assessment. They met to advance the understanding and practices of AfL at all levels of education (Klenowski, 2009). The second definition of AfL was then crafted at this conference:

Assessment for Learning is part of everyday practice by students, teachers and peers that seeks, reflects upon and responds to information from dialogue, demonstration and observation in ways that enhance ongoing learning. (Klenowski, 2009, p. 264)

This definition of AfL no longer mentions an intended target of learning or deciding whether or not a student has achieved a particular learning objective which Harry Torrance and John Pryor (1998) term as convergent assessment (Torrance & Pryor, 1998). Instead it focuses on efforts to make current learning better by taking a divergent approach (Torrance & Pryor, 1998) which seeks to ascertain students' level of understanding. The definition also explicitly clarifies AfL as being part of the usual process of learning and teaching practice. In the case of ML education, this definition will definitely be useful in reifying AfL and grounding it within a regular ML classroom. It is imperative to examine how ML teachers define AfL. Prior to the introduction of AfL in 2011, two types of assessment were outlined in the ML syllabus: formative and summative assessment. ML teachers might be struggling with AfL perhaps because they see it as a term that merely replaces "formative assessment."

Figure 1 depicts the theoretical framework of the research. This framework synthesizes three central tenets of the Vygotskian framework; social sources of individual development, semiotic mediation and genetic analysis (Wertsch, 1993) with Bourdieu's concepts of *habitus*, *field*, *doxa* and *capital* (Bourdieu, 1977a). In

order to better understand the extent to which ML teachers’ accept or reject AfL as an innovation, I adopt Fullan’s sociocultural perspective on the importance of “reculturing” (Fullan, 2007a, p. 25) which emphasizes the importance of understanding how teachers come to question and change their beliefs and habits in the event of a reform. To date, the ML secondary school syllabus has undergone two revisions since 2000 and AfL was introduced as a key innovation within the syllabus in 2011. Another syllabus revision is slated for 2016. Frustrations with change and resistance to innovation is normal, as asserted in the innovation literature (Fullan, 2007a; Fullan & Miles, 1992).

Looking at Figure 1, in Column A are the core premises for successful assessment reform. The one-way arrows moving from Column A to B signify that these core premises impact teachers’ beliefs and practices of AfL. The sociocultural experiences that exist in the various contexts of the teachers are mapped onto Column C. The two-way arrows from Column C to B signify that these experiences affect the teachers’ beliefs and practices of AfL as much they are also shaped by the teachers’ themselves.

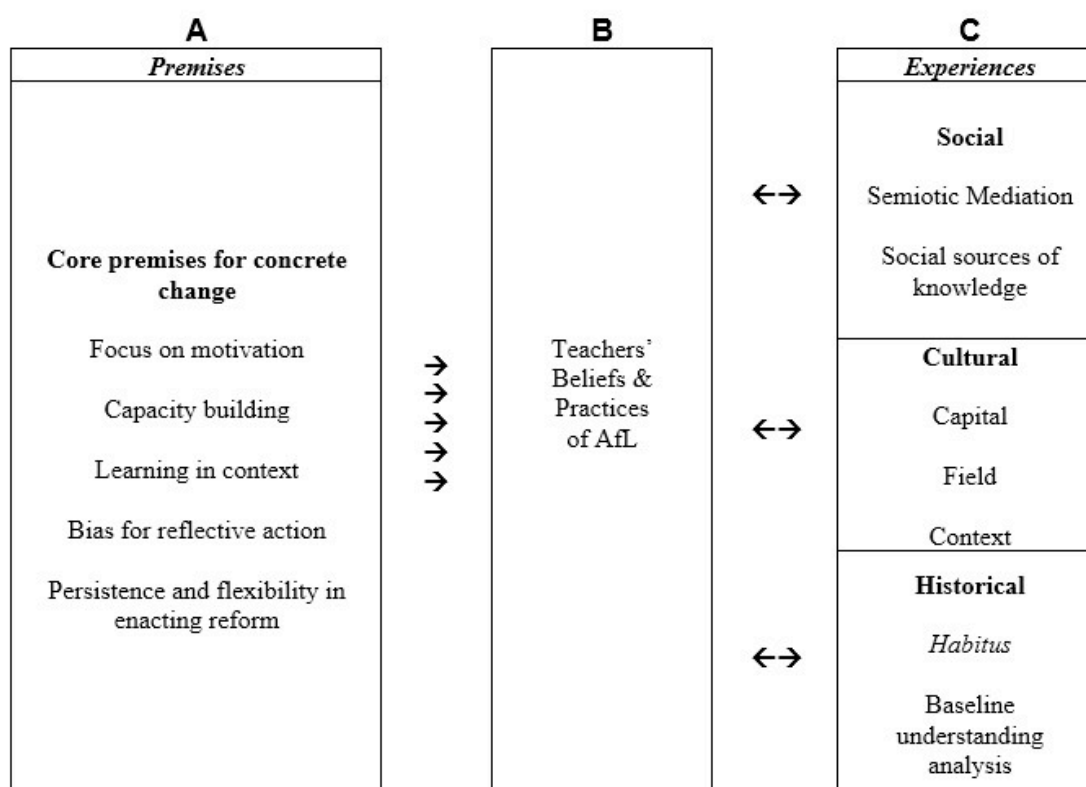


Figure 1: Theoretical framework of research

The methodology of the study takes a pragmatic orientation (Tashakkori & Teddlie, 1998) utilizing the collective “picture-drawing” (Basse, 1999, p. 62) case study as an overarching approach. Pragmatists believe that decisions regarding the use of qualitative or quantitative methods (or both) depend upon the research question and the phase of the ongoing research cycle (Tashakkori & Teddlie, 1998). The case to be investigated here are secondary school ML teachers and their AfL practices in the ML classroom. According to Yin (2009) a case study inquiry depends on multiple sources of evidence, with data needing to converge in a triangulating manner. I am employing the use of various methods of data collection and analysis in order to achieve

triangulation. The research involves three stages of data collection. The first stage is a cross-sectional survey questionnaire electronically distributed for completion by ML teachers across secondary schools in Singapore. The second stage involved classroom observations of eight ML teachers to examine their AfL practices within a real classroom setting. The last stage consisted of in-depth interviews with 20 ML teachers, including the eight teachers.

In Singapore, schools are clustered according to the geographical areas that they are in. These clusters are known as the North, South, East and West school clusters. In total there are approximately 150 secondary schools offering ML (Ministry of Education, Singapore, 2013). In each school, there are typically three to four ML teachers making the total population of secondary school ML teachers in Singapore approximately 450 to 600 teachers. For this study, a purposive sampling (Opie, 2004) procedure is undertaken for the cross-sectional online survey.

Initially, I had planned to invite principals and subject heads of ML in all the 150 schools to participate in the survey. However in an email exchange with MOE during the application for data collection MOE requested for the number of schools involved to be decreased while maintaining the sample size of 150 teachers. Hence I have decided to include 20 secondary schools from every cluster making it a total of 80 schools altogether.

The choice of the 20 schools was based on the number of ML teachers within the school. Preference was given to schools that have a higher number of ML teachers. Based on my experience as an ML teacher, a large ML department is a good indication of better workload distribution amongst teachers and a wider coverage of various ML programmes. I believed that schools with an ML department that had better workload distribution were more inclined to participate in the research as the existing demands on the teachers might be lesser. Hence such schools should be more accommodating to my request to involve their ML teachers in the research. A link to the online survey via an email to principals and subject heads of ML in these 80 schools was sent together with an explanation and invitation to participate in the study. The aim was for at least two ML teachers per school to participate in the survey in order to obtain a sample that was representative of the population. In order to increase the response rate and encourage schools to participate, I offered each school that was able to submit responses from all their ML teachers, a full breakdown analysis of their assessment values-practice gaps, as a department.

Initially I wanted to carry out “within-case” sampling (Punch, 2005, p. 188) to select the next sample of 20 teachers from the pool of respondents to the cross-sectional survey. In order to generate rich information from the sample yet maintain feasibility in terms of amount of data collected I initially decided to purposively sample 20 teachers across the different group profiles (based on the survey results) for in-depth interviews at the end of the research. These teachers would be contacted via email and given an option of participating in both the interview and classroom observations. They would have been informed that only eight teachers will be chosen for classroom observations and the rest approached for in-depth interviews only. They would also have needed to seek consent from their principals to be part of the research.

However, during the process of contacting principals for permission to access their ML teachers, some principals replied that they were only willing to allow their teachers to participate in the survey only and I was not to proceed to involve them in classroom observations or in-depth interviews due to the teachers' busy schedules. Others who were agreeable for their teachers to proceed to later phases of the research were also particular with regards to which teachers I could interview or observe, again depending on the teachers' timetable. This limited my choice of teachers for observations and interviews. However, within the eight teachers that I secured for lesson observations and 20 for interviews, I was fortunate that there was a good mix of teachers with different AfL survey profiles and years of teaching experience. Figure 2 depicts the sampling process of the research from the online survey to the interviews and classroom observations. Given the constraints imposed, I believe I have done my best to increase the trustworthiness of the data collected by ensuring that samples from different phases of research were representative of the population.

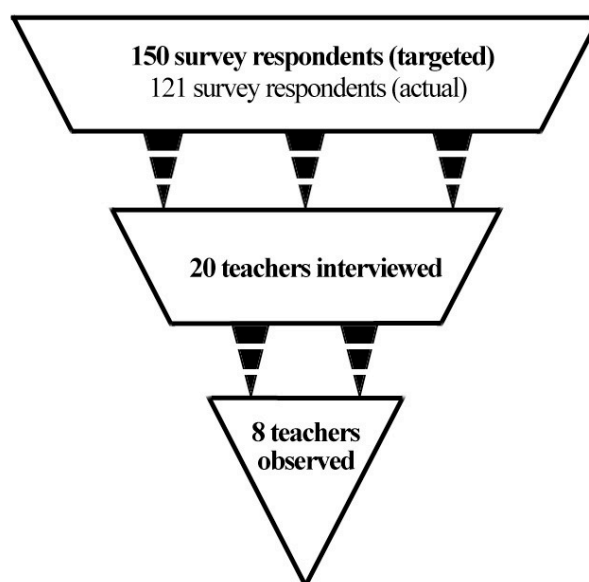


Figure 2: Research Sampling Process

The main aim of the survey is to examine the extent of pragmatic knowledge regarding AfL amongst the ML teachers and to begin mapping out the field of ML assessment. The survey questionnaire design is largely adapted from Section A of the Staff Questionnaire administered by the team from the LHTL project (Pedder, 2006). The LHTL questionnaire was designed to collect systematic data on teachers' views regarding classroom assessment, professional learning and school management. Section A, which I adapted for my research contained 30 statements about classroom assessment. Within these 30 statements seven describe processes having to do with performance oriented assessment practices while the rest allude to practices more in line with AfL principles of making learning explicit, promoting learner autonomy and focusing on learning (James et al., 2007). I excluded the other two sections in the original LHTL questionnaire that contain statements about teachers' professional learning and school management practices and systems as these do not directly address my research questions.

The ML teachers were asked to make two kinds of responses to each of the 30 questionnaire items. The first response on Scale X focuses on assessment *practices*. It asks respondents to share, in relation to their own teaching, whether the particular assessment practice mentioned in each statement was true, rarely true, often true or mostly true. They then made a second response on Scale Y with regards to their *values*. On this scale, respondents indicated how important they felt the particular assessment practice was for students' learning, regardless of how often they actually practise it in their teaching. The response categories here are: not at all important, of limited importance, important, crucial and bad practice. The 'bad practice' category is provided to enable respondents to flag out practices that they consider to be particularly unacceptable. The survey uses a dual Likert-type scale design with the assessment practice statement placed in the middle (see Figure 3).

Scale X				Section A Assessment practices	Scale Y				
Your assessment practices					How important are assessment practices for creating opportunities for students to learn?				
(About You)					(About your values)				
Never true	Rarely true	Often true	Mostly true						
				Not at all important	Of limited importance	Important	Crucial	Bad practice!	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Parents are helped to think about how their child learns best.					
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Figure 3: Dual Likert-type scale format for online questionnaire

The classroom observations provided me important opportunities to immerse myself within real classroom and school contexts where assessment activities were taking place. These non-participatory unobtrusive observations took place over Term 2 of the school year. I observed each teacher at least three times within a space of two weeks. Suurtamm, Koch, and Arden (2010) in their case studies of teachers' assessment practices in mathematics classrooms in Ontario, utilized such an observation schedule to ensure that they could observe how teachers developed their lessons and avoid merely observing selected "best lessons" (p.405). The observation dates were negotiated with the teacher so as to avoid interference with any school events but I requested to observe the teacher on at least two consecutive days. I have chosen to conduct the observations at least three months after the collection of survey data to avoid any priming effect. Also, in all three observations, the teachers are not obliged to hand in their lesson plans to me and are free to choose which classes are to be observed. All these are to avoid any priming effect where the teachers are sensitized to my research questions. Short discussions before and after the observations clarified any questions I have about the teacher's actions in class but in-depth interviews were only carried out after the third observation session.

The interviews provided in-depth information pertaining to the teachers' experiences and viewpoints regarding AfL. Through the interview protocol, I sought to address all the research questions. Together with data collected from the online survey and classroom observations, the interviews provided a well-rounded collection of information for analysis. A specific aim of the interviews was to discover the teachers' *habitus* and degree to which they internalized AfL concepts and regard it as *capital*. These were issues which could not be addressed using the online survey. Further information on the *field* and *doxa* within ML assessment was also sought,

especially with regards to distinct social and cultural factors within the teachers' context that affected their beliefs and practices of AfL.

## Conclusion

The survey findings examine the extent of pragmatic knowledge and reported practice of AfL amongst the ML teachers. Respondents were grouped based on the Values-Practice scores. The level of importance they attached to AfL statements was the defining criteria for the final grouping of respondents. Based on the criteria applied, four distinct profiles emerged.

These profiles (from the largest to smallest clusters) are:

1. Respondents with Higher AfL values scores **but** Lower AfL practice scores
2. Respondents with Lower AfL values scores and Lower AfL practice scores
3. Respondents with Higher AfL values scores and Higher AfL practice scores
4. Respondents with Lower AfL values scores **but** Higher AfL practice scores

The highest possible total values and practice score for statements alluding to AfL practices was 60. The highest reported score for both Values and Practice was 59 while the lowest score was 41. In terms of grouping the 121 respondents according to their scores, for Values, I considered a score above 48 as high while scores of 48 and below was considered low. For Practice, I considered a score above 50 as high while scores of 50 and below were considered low. These benchmarks are based on the mean scores derived from the survey that was 48 for Values and 50 for Practice. Table 1 shows a breakdown of the various groups of teachers and the scores.

69% of respondents had low AfL practice scores. The HVLP group formed the largest profile cluster of respondents. 44% of respondents (53 teachers) valued AfL highly but reported that they did not practise AfL as often despite considering it important. Within this group 12 teachers had Values-Practice gaps scores larger than +10. The teacher with the biggest Values-Practice gap scored 59 for Values and only 44 for Practice (Values-Practice gap: +15). She clarified that AfL is “no doubt important” and understood the value it had for advancing students' learning. However, she was not confident in her ability to enact AfL in her classroom, citing her preference for “drill and practice”. She also felt that time management was her main challenge:

Honestly, when it comes to assessing students, it is better to follow the old method of drill and practice. To truly put AfL into practice, a lot of work needs to be done and to me the problem is time management. (Ainul)

On the other hand, the smallest percentage of respondents belonged to the LVHP profile. Only 7% of respondents reported that despite not seeing much value in AfL, they still carried out AfL practices in their classrooms. One of the teachers who belonged to this profile, Saufi, scored 45 for Values and 51 for Practice (Values-Practice gap: - 6). He clarified why he still attempted AfL in his classroom regardless of his lack of belief in it:

I see AfL as a gateway to further students' learning and not just to get marks for promotion only...I think it is important to practise AfL more than just knowing it n theory. (Saufi)

<b>AfL Profile</b>	<b>Score</b>	<b>Number of respondents</b>	<b>Percentage of respondents</b>
Higher Values + Lower Practice (HVLP)	Values Score > 48 Practice Score ≤ 50	53	44%
Lower Values + Lower Practice (LVLP)	Values Score ≤ 48 Practice Score ≤ 50	31	26 %
Higher Values + Higher Practice (HVHP)	Values Score >48 Practice Score > 50	28	23%
Lower Values + Higher Practice (LVHP)	Values Score ≤ 48 Practice Score > 50	9	7 %
<b>Total</b>		121 respondents	

Table 1: Breakdown of various groups of teachers and scores

The lowest Values-Practice scores among the LVLP respondents were 2 teachers with V(44)-P(42) and V(41)-P(43). Both these teachers had more than 5 years of teaching experience. Within their schools a majority of survey respondents had low practice ( $P \leq 50$ ) scores too, as shown in Table 2:

<b>Score of teacher with LVLP profile</b>	<b>Values: 44</b>	<b>Practice: 42</b>
Score of other colleagues in same school	49	45
	52	43
	55	45
<b>Score of teacher with LVLP profile</b>	<b>41</b>	<b>43</b>
Score of other colleagues in same school	53	49
	51	50

Table 2: Scores of teachers with LVLP profile and scores of their colleagues



11 teachers interviewed mentioned that having supportive colleagues who shared their AfL practices was an important element to inculcating AfL in their classrooms. Two teachers belonging to the same school spoke of how they participated in discussions regarding AfL knowledge with their peers:

Because one topic can be taught by many teachers, so amongst us we discuss and in the lesson plan the teachers are supposed to put into place how they include AfL. (Aisha, Green Vista School)

So for AfL, there is sharing [sessions] with different people. We brainstorm with one another...what are the structures we know, then after that we look through our lesson plan, which parts we need to focus on and we share lesson plan exemplars with teachers within and across department. (Azimah, Green Vista School)

One subject head from a particular school who used to carry out in-house AfL workshops for her teachers reminisced about how important it was to have leadership support in order for AfL to gain momentum amongst teachers. Under a new school leadership, this particular subject head felt that the direction was no longer the same with regards to developing teachers' capacity in AfL:

Ever since the new principal arrived this year, our professional learning committee (PLC) has taken a different direction. If it was last year, we can see that with every teaching activity that they shared, they could highlight the AfL aspect of it. Teachers can share resources, so last year I saw a lot of AfL. But this year, I have yet to see anything much because there has not been much professional sharing [sessions]. (Erfa)

From a sociocultural perspective, the actions and thoughts of the interviewed and observed ML teachers are dynamic, interconnected and situated within the social and cultural context of their classroom practice. ML teachers mediate their perception and practice of AfL with the social, cultural and historical experiences they bring.

Teachers' perception that peer support is crucial for the advancement of their AfL practice could be associated with the social dynamics of the working environment within schools in Singapore and specifically within the ML department of a school. Typically a secondary school ML department consists of two to four teachers working closely together to determine the scheme of work, assessments and how much of the curriculum is to be covered within the school year. In such a compact working environment, peer support for AfL seems even more important as ML teachers share teaching plans, assessment materials and also play the role of peer observers in one another's classroom. In the wider school setting, having teachers from other subjects who put AfL into practice within their classrooms is also essential because collectively these teachers make AfL a normal everyday classroom assessment practice that students experience. The resistance that teachers like Hanim faced due to students' lack of familiarity with AfL strategies could be related to the lack of a school-wide approach towards AfL. Peer support in this instance is vital as it has the twofold function allowing peers to exchange ideas with one another and to also share the frustrations they might experience when implementing AfL strategies.

Indeed, a significant number of respondents identified leadership support as being essential. This is related to the level of autonomy given to principals regarding the implementation of initiatives rolled out by MOE. While MOE is clear on which initiatives have to be introduced within schools, the fervour of the execution and the extent of capacity building that occurs is usually at the principals' discretion. When AfL was introduced in the ML syllabus in 2011, some principals may have taken the opportunity to fully invigorate the practice of AfL across all other subjects. However some others may have left it to the responsibility of the heads of department or the teachers themselves. Fundamentally, when there is no clear vision for an initiative such as AfL within heritage language classrooms, it is likely that the initiative does not develop and full reform is not achieved.

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*Impression of Japanese Universities' Specialized Courses among Chinese Overseas Students*  
*—The Outcome of a PAC Analysis—*

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Official Conference Proceedings

**Abstract**

This paper aims at revealing the impressions of Japanese universities' specialized courses among Chinese overseas students and showing some viewpoints in international education support. It is processed by 3 Chinese students' interview and investigated by PAC analysis. In the result, clear explanation, collaborative learning with Japanese students, relaxing class atmosphere, teachers' respectful attitude towards student, qualified language skill and adequate professional knowledge are suggested as being important class elements among Chinese overseas students. Moreover, the author discusses some viewpoints for the education support on Chinese overseas students in Japan, such as the professional Japanese language learning support, the professional report writing support, the construction of Japanese teachers' reliability, the improvement of positive participation among Japanese student, and the development of smooth international communication.

Keywords: Chinese overseas students Japanese graduate school specialized education course PAC analysis international students support

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## Introduction

According to the Japan Student Support Organization (JASSO) published in December 2018, the results of the 2018 International Student Enrollment Survey, the number of Chinese students at Japanese higher education institutions as of being the largest number is 86,439, accounting for 41.4% of the total. Therefore, the presence of Chinese students in Japanese university and graduate school education cannot be ignored. Chinese students in Japan are adapting to different cultures. According to Ge (2007), the Chinese mainly face 7 problems as ① Japanese, ② Study, ③ Health maintenance, ④ Human relations, ⑤ Money, ⑥ Mental condition, ⑦ Japanese culture and customs. Chinese students enrolled at Japan University / Graduate School face various problems both in the study of specialized knowledge and in the progress of research, as well as in building human relations with Japanese teachers and Japanese students.(Guo 2019) As the classroom is a place where international students would learn specialized knowledge and communicate with Japanese teachers and Japanese students, there is no doubt that specialized education class playing a very important role to Chinese students' culture adaption and study. However, we cannot find any previous study about Chinese students in specialized education classroom in Japan. In this study, we aim to revealing the impressions of Japanese universities' specialized courses among Chinese students by using PAC analysis, and showing some viewpoints in Chinese overseas students support.

## Research method

PAC analysis is abbreviated by Personal Attitude Construct analysis. This analysis method is applied to asking the survey collaborator to do free association on the theme or subject, and do assessment of similarity between association items, and then cluster analysis by similarity distance matrix, reporting of the image and interpretation of the cluster structure, and do comprehensive interpretation by the survey collaborator. It is an effective way to analyze personal attitude and image structure. (T. Naito 2002)

The three survey collaborators H, K, and Y who are enrolled in the second year of the master's program at T University in Japan. The 3 survey collaborators graduated from the university in China and passed Japanese Language Proficiency Test level 1 and do not have any prerequisite knowledge for taking a specialized education course. The survey was conducted in December 2018.

The survey method used in this study is the PAC analysis (T. Naito 2002). The procedure is as followed.

1. An associative stimulus sentence `` What kind of image do you have for specialized education course at Japanese universities? Please have a look back and write down what you can think of now, whether it's a word or a sentence. "is presented from the investigator to the survey collaborator.
2. The survey collaborator write associate words or sentence on a card.
3. The survey collaborator arranges the cards in the order of importance.
4. The survey collaborator randomly select two cards, and intuitively evaluate the closeness of the two images in seven stages (very close (1) to very far (7)).



5. Perform cluster analysis (Ward method) based on the distance matrix obtained in step 4. and output a dendrogram.
6. The investigator conducts an interview based on the dendrogram to the survey collaborator, and receives explanations of each cluster and each association item.

Ask the survey collaborator to name each cluster and answer the image of each item intuitively with plus (+), minus (-), or neither can be said (0).

### Result and Discussion

According to the interpretations of three survey collaborators, there are four parts can be concluded as the practice method of the class, Japanese teacher, Japanese students and class content, and each part of them can be divided into *excellent point* and *mismatch* based on their item image and interpretation.

Table1 practice method of the class

<b>Excellent point</b>	<b>Mismatch</b>
Specific example and drawings in explanations	Stuffing education
Speak slowly and use simple expressions for foreign students	The teacher required students to do the presentations in the whole semester and rarely do explanations
Group discussions and role-play activities	
Relaxing class atmosphere	

Table2 Japanese teachers

<b>Excellent point</b>	<b>Mismatch</b>
Give individualized instruction to students	Seems strict
Active response to students' inquiry	Less smile
Lots of interactions with students	Speech lacks rhythm
Praise students a lot	Worry about what kind of person the foreign students regarded as being
Give high grades to students in the final	Speak fast
Finish the class on time, no delay	
Put emphasis on the students' understanding	
Respect students	
Take kind attitudes toward students	

Table3 Japanese students

<b>Excellent point</b>	<b>Mismatch</b>
Have good classroom manner, no whisper, no smartphone play	Do not prefer to speaking out the opinion in group discussions
Make a confirmation with Japanese students about the class content	Do not response positively to teachers' questions
	Do not start a talk with foreign students forwardly unless foreign students start firstly
	Speaking speed is fast to foreign students
	Some phrases and expressions only Japanese understand

Table4 Class content

<b>Excellent point</b>	<b>Mismatch</b>
Class content have some connections with my interest	Trouble in understanding the terminology written in Japanese
The example with high topically included in explanations would raise up my study motivation	The grades basically depend on the report, no examination
	Few homework
	Few class content
	Try to figure out the keywords spoken by the teacher during the class, but have forgotten when the class finished
	Hard to catch up the class pace
	Misunderstanding in the communication between Japanese and me
	Compare with Japanese students, I always spend more time on the preparation for class and seminar
	Feel really nervous when asked by the teacher in the class

## Conclusion

Overall, the three survey collaborators show high satisfaction upon the practice method of class, Japanese teachers, still a lot mismatch upon Japanese students and class content. Moreover, there are some viewpoints for the education support on Chinese overseas students in Japan can be concluded, such as

- the professional Japanese language learning support
- the professional report writing support
- the construction of Japanese teachers' reliability
- the improvement of positive participation among Japanese student
- the development of smooth international communication

## **Acknowledgement**

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## *A Causal Model of Student Teachers' Ambition for Becoming Teachers*

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### **Abstract**

Student teachers' ambition for becoming teachers is crucially vital in effectively making the decision to be in the teaching profession. The current research endeavor attempted to 1) study levels of motivation to be teachers, pedagogical knowledge, perceiving of their teaching abilities, and the ambition for having a teaching profession. 2) Also, the current research study developed and investigated the causal model of student teachers' ambition for becoming teachers. The sample consisted of 350 student teachers from three universities in Chiang Mai (Chiang Mai University, Chiang Mai Rajabhat University, and The Far Eastern University). The data was collected by means of a questionnaire with the reliability of 0.94-0.95 and analyzed by using descriptive statistics calculated by SPSS. Also, the model for structural equation was analyzed using Mplus. The results revealed as follows: 1. Student teachers were highly motivated to become teachers and possessed a high level of pedagogical knowledge, perceiving of their teaching abilities, and ambition to become teachers. 2. The developed causal model of student teachers' ambition for becoming teachers was consistent with the empirical data. Factors that influenced their ambition included the motivation to become teachers, the perceiving of their teaching abilities, and pedagogical knowledge, all of which had a direct impact on their ambition for becoming teachers. Meanwhile, pedagogical knowledge indirectly affected the ambition for becoming teachers through their perceiving of teaching abilities.

Keywords: Causal Model, Student Teachers' Ambition, Becoming Teachers

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## **Introduction**

Student teachers' ambition for becoming teachers is crucially vital in effectively making the decision to be in the teaching profession. To develop and increase number of becoming teacher to be a professional one with teaching spirit is almost concerned for school of teaching, to make an expert in pedagogy knowledge, teaching profession, perceiving teaching ability and motivation to be a teacher promoting for teachers' ambition. (Ajzen & Fishbein, 1977; Alderman, 2013; Benjamin, Kattlyn, & Cano, 2011; Bruinsma & Jansen, 2010; Cruz & Arias, 2007)

Student teachers' ambition for becoming teachers is one of mental process and trust that could be developed during studying. It was found from some research studies that student teachers' ambition is one of intention from self-confidence in teaching profession. It could be developed by learning and experience in education, however, it also found that decision making to be a teacher would be decreased due to the higher level of academic years with lower perceiving teaching ability and motivation to be a teacher. Some research studies showed the effects of motivation to be a teacher, pedagogy knowledge, perceiving teaching ability, and teachers' ambition for decision making to be a teacher. It would be continued to study causal relation of student teachers' ambition to promote their intention for decision making to be a teacher. (Garvis & Lemon, 2015; Ghanizadeh & Moafian, 2011; Justin & Maguire, 2011; Lee & Chan, 2015; Sakui & Cowie, 2012; Schoopieray, 2006)

## **Research questions**

- 1) Which level of motivation to be teachers, pedagogical knowledge, perceiving of their teaching abilities, and the ambition for having a teaching profession for becoming teachers?
- 2) How is the causal model of student teachers' ambition for becoming teachers?

## **The purposes of this study were to**

- 1) Study levels of motivation to be teachers, pedagogical knowledge, perceiving of their teaching abilities, and the ambition for having a teaching profession
- 2) Develop and investigate the causal model of student teachers' ambition for becoming teachers

## **Scope of study**

- 1) The student teachers' ambition for becoming teacher was selected to study due to its relation to decision making to be a teacher. It could be developed by learning experience and during pre-service teaching experience. Also, it was noted that some variables such as goal, background, and expectation, there would have limitation to develop student teachers. Therefore, levels of motivation to be teachers, pedagogical knowledge, perceiving of their teaching abilities, and the ambition for having a teaching profession were selected for this study.

2) Fifth-year university student teacher was selected to be sample since the variables in this study could be changed during two to four months of their pre-service teaching experience.

### Definition

**Perceiving of teaching ability** is student teachers' self-confidence in classroom management and pedagogy for the purpose of classroom efficiency and educational commitment.

**Motivation to be a teacher** is power or encouragement from internal and external factors affecting decision making to be a teacher when graduated.

**Pedagogy knowledge** is experiences regarding to teaching abilities for student teachers.

**Teachers' ambition** is intention to be a teacher when graduated.

### Research Steps

Stage 1: Developing conceptual framework with identifying research problem, research purposes, and definition by literature review

Stage 2: Developing model and measurement for variables

Stage 3: Data collection

Stage 4: Data analysis with descriptive and inference statistics from basic analytic statistics as well as causal model

Stage 5: Research conclusion and report

### Population and Sample

The Population of this study was fifth-year student teacher in public and autonomous university during their pre-service teaching experience in different schools.

The sample consisted of 350 student teachers from three universities including public and autonomous university in Chiang Mai (Chiang Mai University, Chiang Mai Rajabhat University, and The Far Eastern University). The samples were selected by multi-stage random sampling.

**Table 1: the sample of this study**

No	University	A	B	C	Total
SEX	M	79	46	31	156
	F	71	66	57	194
	Total	150	112	88	350
Sub	Math	25	21	12	58
	English	33	13	14	60
	Science	21	23	20	64
	Elementary	36	28	22	86
	other	35	27	20	82
	Total	150	112	88	350

## Instrument

The data was collected by 40 items of questionnaire for student teachers with the reliability of 0.94-0.95 and analyzed by using descriptive statistics calculated by SPSS and Mplus.

## Results

The results of this study were divided into 2 parts including 1) the results of motivation to be teachers, pedagogical knowledge, perceiving of their teaching abilities, and the ambition for having a teaching profession and 2) the results of the causal model of student teachers' ambition for becoming teachers with following details;

1) High level of all variables were revealed with ambition for having teaching profession at  $M = 3.74$ ,  $SD = 0.55$ , perceiving of teaching abilities at  $M = 3.68$ ,  $SD = 0.64$ , and pedagogical knowledge at  $M = 3.62$ ,  $SD = 0.68$  in priority as showed in following table 2

**Table 2:** Level of motivation to be teachers, pedagogical knowledge, perceiving of their teaching abilities, and the ambition for having a teaching profession.

No	Variables	M	Level	SD	CV	Sk	Ku.
1	Motivation to be teachers	3.61	High	0.54	<b>19.88</b>	<b>-0.27*</b>	<b>0.04</b>
2	Pedagogical knowledge	3.62	High	0.68	20.48	-0.24*	0.16
3	Perceiving of teaching abilities	3.68	High	0.64	21.64	-0.29*	-0.14
4	Ambition for having a teaching profession	3.74	High	0.55	19.89	-0.22*	-0.15

\*p<.05

2) The developed causal model of student teachers' ambition for becoming teachers was consistent with the empirical data. Factors that influenced their ambition included the motivation to become teachers, the perceiving of their teaching abilities, and pedagogical knowledge, all of which had a direct impact on their ambition for becoming teachers. Meanwhile, pedagogical knowledge indirectly affected the ambition for becoming teachers through their perceiving of teaching abilities.



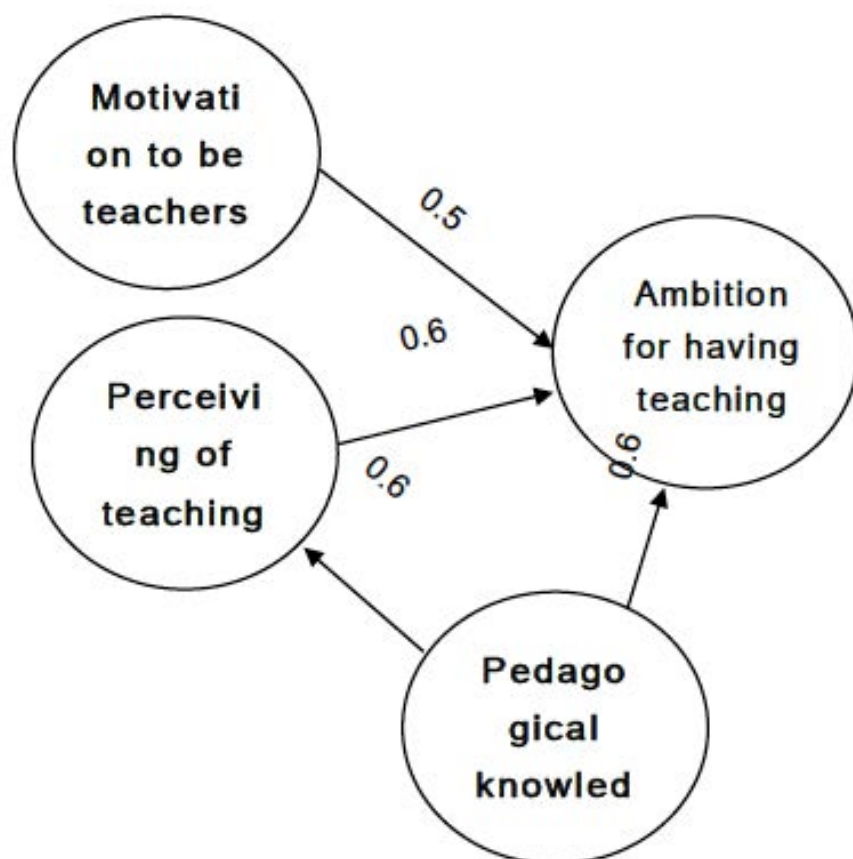


Figure 1: causal model of student teachers' ambition for becoming teachers

### Recommendation

- 1) It is recommended for further study to explore the factors affecting the trend of ambition for having a teaching profession with mixed methods to collect qualitative and quantitative data for identifying information.
- 2) It is recommended to consider the change of ambition for having a teaching profession for student teachers in different level of academic years including freshman, sophomore, junior and senior.

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## *A Prototype System for Practicing English Speaking*

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### **Abstract**

In this study, we developed a prototype system that helps students practice speaking English. When students speak English, they may have difficulty expressing their intentions in real time, even when they know the correct words and phrases. To think of the correct English terms smoothly, it is important that students use the language knowledge they have acquired. By using probable linguistic situations, our system attempts to check and provide information about the words and phrases learners can use. We conducted an experiment with 105 first-year Japanese university students to investigate the following research questions: (1) Does the prototype system run properly, provide questions, and save the log data as expected?; (2) When we check the learners' answers in real time, how many evaluation items and evaluation levels are appropriate?; and (3) How should we display the results of the evaluation to ensure visual comprehension? Concerning the first question, the results of the experiment show that the system runs properly and saves the log data. For the second question, the results suggest that a few evaluation items and a few evaluation levels are preferable for checking the learners' answers in real time. Results for the third question suggest that a color-coded table could help visually interpret the learners' results. In this table, English sentences grouping probable linguistic situations are classified according to the percentage of the correct answers, such as less than 50%, 50–80%, and more than 80%.

Keywords: language learning system, speaking practice, language use, CG characters

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## Introduction

In response to the policy of the Ministry of Education, Culture, Sports, Science and Technology (2014a, 2014b), oral English proficiency in Japan must be improved. However, the results of our previous study indicate that many students feel that they are not good at listening/speaking in English (Kashiwagi et al., 2018).

When students speak English, they may find it difficult to express their intentions in real time, even when they know the correct words and phrases. In such cases, students are not making full use of their English language knowledge. To think of the correct English terms smoothly, it is important that students use the language knowledge they have acquired.

In our study, we proposed a method for creating questions that help students practice speaking English (Kashiwagi et al., 2019). By using probable linguistic situations with target words and phrases, our system attempts to support learners by checking and providing the information about which words and phrases learners can use. To produce rough probable situations in the system, the introduction of CG characters mentioned in the following chapter is considered to help learners become familiar with speaking English.

In this study, we develop a prototype system and conduct an experiment to investigate the following research questions:

- (1) Does the prototype system run properly, provide questions, and save the log data as expected?;
- (2) When we check the learners' answers in real time, how many evaluation items and evaluation levels are appropriate?;
- (3) How should we display the results of the evaluation for visual comprehension?

The prototype system is described in the following chapters, after which, the experiment, its results, and discussions are presented. Finally, we give our conclusions, and suggest additional studies for improving the system.

## Prototype System

This chapter introduces CG characters, the structure of the prototype system, and an example use case for the system.

## Introduction of CG Characters

To produce CG contents in the system, we use TVML (TV Program Making Language, TVML Home Page) Player X. TVML is a text-based scripting language that automatically generates television programs (Hayashi, 1999). TVML Player X is software used to read a script written in TVML (hereinafter called TVML script) and to automatically generate the program's video and audio. TVML Player X consists of AnimeViewer and SendScriptX. AnimeViewer is a viewer tool for generating and displaying a CG content from a TVML script, while SendScriptX is a tool for sending a TVML script to AnimeViewer.

TVML Player X not only generates static content that remains the same, it also generates dynamic content that changes according to external input, such as selecting a question on the teacher’s side. By using an API (Application Programming Interface) that is open to the public, application software that controls TVML Player X can be developed to realize these dynamic contents.

Kashiwagi, Kang, and Ohtsuki developed an application tool called “MINI BASIC” in the article “A study on a method for dynamic control and use of TVML contents.” In this tool, a template file in TVML format is prepared to create a TVML format question file. A TVML format question file is created in the tool by obtaining question sentence text data from the “Qdata file” mentioned later, and by putting the obtained question sentence data into the template file in TVML format. When a teacher selects a question, corresponding question sentence data is obtained, and a TVML format question file is automatically generated with the obtained question sentence data. The TVML format question file is then sent to the AnimeViewer and a CG content is produced.

### Structure of the Prototype System

The structure of the prototype system is shown in Figure 1. The system consists of a question setting tool, “MINI BASIC” mentioned above, and AnimeViewer. In the question setting tool, questions are selected and sent to “MINIBASIC.” In “MINI BASIC,” a TVML format question file is generated with the question sentence data sent from the question setting tool. The generated question file in TVML format is sent to AnimeViewer and a CG content is produced. The results of the evaluation are saved in the question setting tool. To exchange data between the question setting tool and “MINI BASIC,” virtual communication ports are used here.

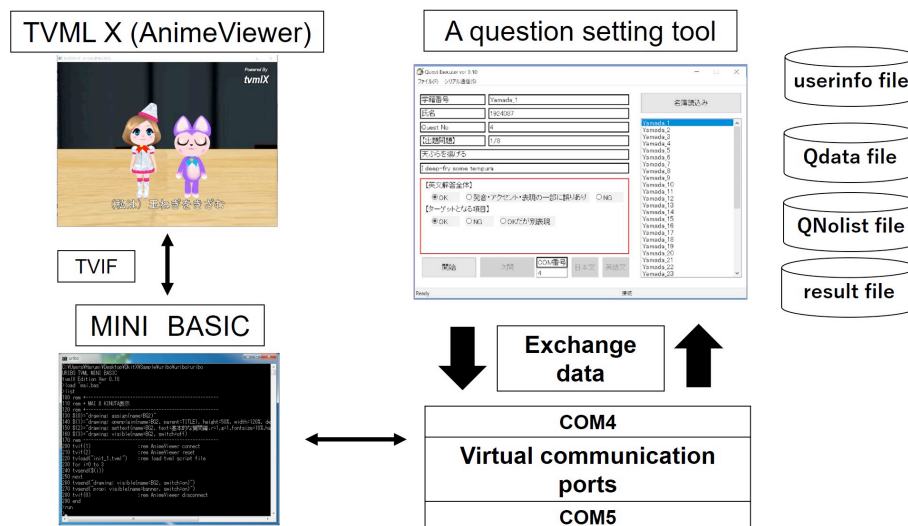


Figure 1: System overview

Related data are prepared in the following files: user information, such as the student name, student number, and a question set number for the corresponding student are incorporated in a CSV file named “userinfo file.” In the “Qdata file,” Japanese and English sentences are organized in situational categories, such as “Kitchen,” “Bath and Laundry,” and “Commuting.” In the “QNolist file,” sets of question numbers representing which Japanese/English sentences are provided as questions are grouped

together. The results of the evaluation of the answers for respective students are saved in the “result file.”

### An Example Use of the System

An example use case for the system is described below in Figures 2 and 3.

1. When a teacher presses the button “Read in the user information” on the right top side of the screen in Figure 2 (1), the “userinfo file” opens, and user information is read in. Usernames are then displayed on the right side of the screen (2) in the tool.
2. When the teacher selects a username (3), corresponding question data are presented in the middle of the screen (4). For example, in Figure 2, the username “Yamada\_1” is selected, and the information from the first question is displayed, that is, the Japanese sentence “*Tempura wo ageru*” and the English sentence “I deep-fry some tempura.”

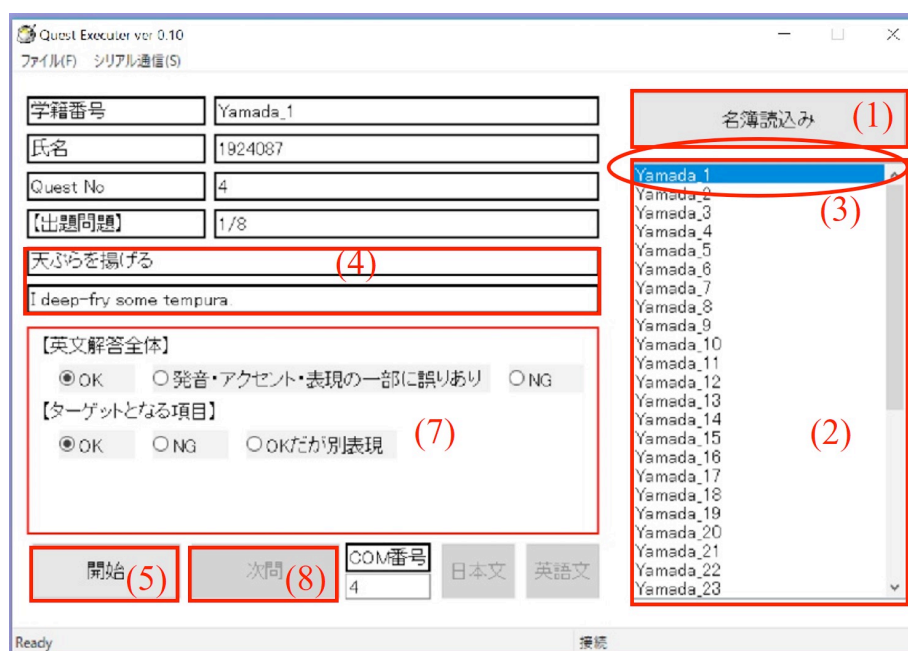


Figure 2: Example screen from the question setting tool

3. When the teacher presses the “Start” button (5) on the left bottom of the screen, related question data are sent to MINI BASIC and converted into a TVML file. The converted TVML file is then displayed on the AnimeViewer. In this example, CG characters appear on the screen of the AnimeViewer, as shown in Figure 3, and the learner is given instructions such as “Please translate the following Japanese sentence into English.” The Japanese sentence of the first question “*Tempura wo ageru*” in Japanese is then displayed on the AnimeViewer in Figure 3 (6). At the same time, a synthetic voice is generated based on the same Japanese sentence text data, and the synthetic voice is provided to the learner.
4. The learner orally translates the Japanese sentence into English.
5. The teacher evaluates the learner’s answer by checking the items shown in Figure 2 (7) and goes on to the next question by pressing the “Next” button in Figure 2 (8).
6. When the system finishes providing questions, the results after checking the answers are saved in the “result file.”



Figure 3: Example screen of AnimeViewer

## Experiment

### Participants

In the experiment, 105 first-year students who were learning English at a university in Japan took review quizzes. They translated the Japanese sentences into English, and their answers were checked and saved in the system.

### Procedures

We first provided students with the Japanese and English sentences in advance for review quizzes. The Japanese and English sentences shown in Figure 4 are expressions related to “Kitchen” and “Bath and Laundry.” We instructed the students to practice speaking English sentences without looking at the text information. Next, using the prototype system, we gave them review quizzes one by one as shown in Figure 5. In this experiment, a doctoral course student checked the students’ answers by checking items on the screen of the system shown in Figure 2.

Concerning the review quizzes, 53 of the 105 students took pattern 1 of the review quiz, and the remaining 52 students took pattern 2. Similarly, 55 out of 105 students took pattern 3 of the review quiz, and the remaining 50 students took pattern 4. Some sentences were not shown to the students in advance. Unannounced sentences are highlighted in orange in Figure 5.

In the review quizzes, a CG character gave students instructions, such as “Please translate the following Japanese sentence into English.” The Japanese sentence of the first question was then displayed on the screen of the system, as shown in Figure 3. At

the same time, a synthetic voice was generated based on the same Japanese sentence data, and the synthetic voice was provided to the student.

Situation	English	Japanese
Kitchen	I deep-fry some tempura.	天ぷらを揚げる
	I grate daikon radish.	大根をすりおろす
	I tear some lettuce.	レタスをちぎる
	I cook thin Japanese noodles in boiling water.	そうめんをゆがく
	I heat frozen food in the microwave.	冷凍食品をレンジで温める
	I turn on the stove.	コンロの火をつける
	I turn down the stove.	コンロの火を弱める
	The flame goes out.	(コンロの)火が消える
Bath, Laundry	I get in the bathtub.	湯舟に入る
	I soak in the bathtub.	湯舟につかる
	I get out of the bathtub.	湯舟から出る
	I push down the body soap pump.	ボディソープのポンプを押す
	I air out the bathroom.	風呂場を換気する
	The laundry has really piled up.	洗濯物が山のようにたまってしまった
	I hang the laundry out to dry.	洗濯物を外に干す
	I fold the laundry.	洗濯物をたたむ
	I pull out a drawer.	引き出しを開ける
	I put the folded clothes away in the drawers.	たたんだ服をタンスにしまう

Figure 4: Japanese and English sentences provided to students in advance

Quiz pattern	English	Japanese	Number of participants
1	I deep-fry some tempura.	天ぷらを揚げる	53
	I tear some lettuce.	レタスをちぎる	
	I cook thin Japanese noodles in boiling water.	そうめんをゆがく	
	I chop the onions.	玉ねぎをきざむ	
	I scrub the bathtub with a brush.	ブラシで浴槽をこする	
2	I grate daikon radish.	大根をすりおろす	52
	I tear some lettuce.	レタスをちぎる	
	I heat frozen food in the microwave.	冷凍食品をレンジで温める	
	I hang the laundry out to dry.	洗濯物を外に干す	
	I grill the fish.	魚を焼く	
3	The flame goes out.	(コンロの)火が消える	55
	I soak in the bathtub.	湯舟につかる	
	I push down the body soap pump.	ボディソープのポンプを押す	
	I air out the bathroom.	風呂場を換気する	
	The laundry has really piled up.	洗濯物が山のようにたまってしまった	
	I pull out a drawer.	引き出しを開ける	
	I put out a towel.	タオルを出す	
4	The flame goes out.	(コンロの)火が消える	50
	I soak in the bathtub.	湯舟につかる	
	I push down the body soap pump.	ボディソープのポンプを押す	
	I air out the bathroom.	風呂場を換気する	
	The laundry has really piled up.	洗濯物が山のようにたまってしまった	
	I pull out a drawer.	引き出しを開ける	
	I lay out a bath mat.	バスマットを敷く	

Figure 5: Review quizzes



## **Results and Discussion**

In this section, we discuss the research questions mentioned in the first chapter.

### **Operation Verification of the Prototype System**

Concerning the first research question, we verified the operation of the prototype system. In the experiment, a doctoral course student was able to use the prototype system after listening to a brief explanation of how to use it. When he used the prototype system in the experiment, the system ran properly. The CG characters appeared on the screen of AnimeViewer without undue delay, provided students with questions, and saved the log data as expected. The percentage of correct answers in respective questions based on the log data are described later. The results of the experiment indicate that the prototype system runs properly and saves the log data.

### **Number of Evaluation Items and of Evaluation Levels**

Concerning the second question, we prepared two evaluation items in the experiment, as shown in Figure 2. The first item was used to check whether the answer was correct as a whole sentence including vocabulary, grammar, and pronunciation. Regarding this item, we set three evaluation levels: “correct,” “some mistakes in the answer,” and “wrong.” When there were some mistakes in the answer, such as mistakes in the pronunciation of the word, vocabulary, and grammar, we evaluated it as “some mistakes in the answer.” Another item was used to check whether the target word or phrase was correct. Here, we prepared some transitive verbs and phrasal verbs as a target word or phrase in the English sentences. Regarding this item, we set three evaluation options, that is, “correct,” “wrong,” and, “correct, but another expression.”

In an interview, the doctoral student who used the system for evaluation said that a few evaluation items and a few evaluation levels in respective evaluation items were suitable numbers for checking answers in real time, and that they had difficulties evaluating students’ answers in real time if there were more than four or five evaluation levels. Also, we observed that two evaluation levels, such as “correct” and “wrong” would be preferable when evaluating target words or phrases in real time. These results suggest that a few evaluation items and a few evaluation levels are preferable to check the learners’ answers in real time.

### **Display of the Results of the Evaluation for Visual Comprehension**

Concerning the third research question, we proposed the use of a color-coded table to help visually understand the learners’ results. In the table, English sentences are grouped according to probable linguistic situations, such as “Kitchen,” “Bath and Laundry,” “Commuting,” and so on. These sentences are then classified according to the accuracy rate of the questions; for example, the percentage of the correct answers in respective question is less than 50%, 50–80%, and more than 80%.

An example image of the color-coded table is shown in Figure 6, which shows the results of the percentage of correct answers in the experiment. We calculated the percentage of correct answers concerning the evaluation items to check whether the

answer was correct as a whole sentence. The percentage of correct answers was calculated only by using the results of the evaluation option of “correct,” excluding those of the other options, that is, the options of “some mistakes in the answer” and “wrong.”

In Figure 6, the sentences for which the percentage of the correct answers in the experiment was less than 50% are highlighted in red, those for which the percentage was 50–80% are highlighted in yellow, and those for which the percentage was more than 80% are highlighted in green. Some sentences that were not yet given in the review quizzes are not colored. Sentences marked with \* represent those that were not shown to the students in advance.

Percentage of the correct answers of the questions related to respective situation			
Kitchen		Bath. Laundry	Commuting
I deep-fry some tempura.	89%	I get in the bathtub.	I walk on the sidewalk.
I grate daikon radish.	94%	I soak in the bathtub.	The light turns red.
I tear some lettuce.	32%	I get out of the bathtub.	The light starts to blink on and off.
I cook thin Japanese noodles in boiling water.	60%	I push down the body soap pump.	I go through the ticket gate.
I heat frozen food in the microwave.	85%	I air out the bathroom.	I go up the stairs.
I turn on the stove.		The laundry has really piled up.	I catch the train.
I turn down the stove.		I hang the laundry out to dry.	I get into the train.
The flame goes out.	85%	I fold the laundry.	The train arrives on time.
I chop the onions.*	62%	I pull out a drawer.	The train is a few minutes late.
I grill the fish.*	71%	I put the folded clothes away in the drawers.	I get off the train.
• • •		I scrub the bathtub with a brush.*	• • •
• • •		I put out a towel.*	• • •
• • •		I lay out a bath mat.*	• • •

Figure 6: The color-coded table

Most of the sentences in this table are green-colored, indicating that more than 80% of students gave correct answers. Meanwhile, the sentences with \*, that is, sentences to which the students were not exposed in advance, are yellow or red colored, indicating that 50–80% or less than 50% of the students gave correct answers.

This indicates that as most of the sentences were shown to the students in advance in the experiment, they had enough time to prepare for the quizzes; therefore, they were able to give correct answers.

Concerning the sentences with \*, we assume that most of the students were not able to give correct answers because they had never seen the sentences before.

Also, concerning the sentence “I tear some lettuce,” the percentage of correct answers is 32%. The percentage is low even though this is a sentence that was shown to students in advance. This is mainly because of pronunciation mistakes for the verb “tear.” A certain number of students mistakenly pronounced it as the noun “tear,” which means a drop of salty liquid that comes out of one’s eye when one is crying.

The results of the percentage of the correct answers of the target words or phrases in the questions were similar to the results in Figure 6.

Thus, the color-coded table makes it easy to understand students’ performance on respective sentences. These results suggest that a color-coded table could help visually interpret the learners’ results.

However, a limitation of the current study should be mentioned. This study was conducted mainly for verifying the system's operation. We need to prepare more sentences in probable linguistic situations toward full-scale operation. We should also implement the color-coded table in the system. In addition, we should prepare a similar color-coded table for individual students to support their practice.

## **Conclusion**

In this study, we developed a prototype system to help students practice speaking English. When students speak English, they may find it difficult to express their intentions in real time, even when they know the correct words and phrases. To think of the correct English terms smoothly, it is important that they focus on the use of the language knowledge they have acquired.

By using probable linguistic situations with target words and phrases, our system attempts to check and provide information about the words and phrases learners can use. We conducted an experiment to investigate the following research questions: (1) Does the prototype system run properly, provide questions, and save the log data as expected?; (2) When we check the learners' answers in real time, how many evaluation items and evaluation levels are appropriate?; and (3) How should we display the results of the evaluation for visual comprehension?

In the experiment, we gave review quizzes to 105 first-year Japanese university students using the prototype system. They translated the Japanese sentences into English, and their answers were checked and saved in the system.

Concerning the first question, the results of the experiment show that the system runs properly and saves the log data. In response to the second question, the results suggest that a few evaluation items and a few evaluation levels are preferable for checking the learners' answers in real time. Results for the third question suggest that a color-coded table could help visually interpret the learners' results. In this table, English sentences grouping probable linguistic situations are classified according to the percentage of correct responses to questions, such as less than 50%, 50–80%, and more than 80%.

As a continuation of this study, we hope to prepare more sentences in probable linguistic situations toward full-scale operation. We also intend to implement the color-coded table as part of the system.

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***The Effectiveness of Character Education in Special Education Curricula  
for Students With Mental Retardation at Special School in West Java***

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**Abstract**

The addition of character education in the 2013 special school curriculum or commonly called the K-13 curriculum, has a significant influence on learning services in special schools. Implementation of character education becomes mandatory for all students including, students with mental retardation. Some teachers have tried to implement character education with a variety of learning strategies that integrate character education with special school curriculums of 2013, but currently have not found a model or learning strategy that is considered suitable for character education of students with mental retardation. This qualitative research analyzes the cases of students with mental retardation who study in special schools in West Java Indonesia. The discussion focused on developing character education learning strategy for students with mental retardation in developing the value of independence, discipline, and responsibility. We then suggest recommendations for improvements in implementing character education at special school in Indonesia.

Keywords: character education, mental retardation, character values, learning strategies

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## Introduction

Character education stands a strategic position, given that each learning step and activity the teachers carry out basically build the students' character. The school has a strategic position to build students' and nation's character since it is an educational institution with structure, system, and educational set that supports character education, which is integrated into the whole education activity, school culture, and teamwork with the school community. One of the educational sets in school is the curriculum. In Indonesia, special education employs special education curriculum 2013, or usually known as K13. Special Education Curriculum 2013 is officially stipulated in 2014, yet it is fully implemented in 2015 after the special education teacher receives training. The training emphasizes more on the improvement of teacher's skills in developing instructional sets, learning strategies, evaluation, and learning outcome reports. In 2017, the President of the Republic of Indonesia issued President Regulation no. 87 of 2017 on the strengthening of character education. It obliges to add character education to all education curriculum in Indonesia, including special education curriculum. The obligation to add character education to the lessons in special education applies to all students, including mentally retarded student. This addition requires special education teacher's additional competence. It particularly requires adjustment on the procedure of the development of instructional set that is integrated with character values.

K13 has four core competencies (KI) namely, spiritual (KI-1), social (KI-2), knowledge (KI-3), and skill (KI-4) competence. Each competency is developed in basic competence that can be adjusted to each student with a number of indicators formulated by the teacher. The indicators formulated by the teacher should be able to lead to student's character education. The implementation of character education for children with mental retardation in special school becomes unique and more difficult, given that the teachers consider the student's intellectual as an inhibiting factor. The teachers face difficulties due to their lack of skill in developing a learning program that is integrated with character education. The implementation result of character education in special school in general has not been optimum. Many obstacles arise when adding character education to special education curriculum for mentally retarded student, especially regarding the program development and the making of instructional set.

Adding character education to K13 aims to prepare students to face various issues in their daily activities. Character education for children with mental retardation needs to be developed to prepare them facing various social situation. It is also important to teach children with mental retardation pivotal characters needed to build a good character. Character education is a planned and intentional attempt to develop noble character and virtue for individual and for the community. It requires thorough and calculated planning to obtain learning success.

The present research studies and analyzes the addition of character education for mentally retarded student by analyzing: a) the implementation of character education in education curriculum in Indonesia, b) the development of special education curriculum since Indonesia independence period until the present, c) the effectiveness of Special Education Curriculum 2013 in implementing character education for mentally retarded student in special schools in West Java, and d) giving

recommendation to improve the quality of character education for mentally retarded student in special school using Special Education Curriculum 2013.

### **Method**

The study was conducted qualitatively to analyze the development of character education curriculum in Indonesia and Curriculum employed in special schools. The study involved 100 special education teachers who had participated in K13 training in West Java, and they were selected randomly. Character education addition to special Education Curriculum is made to the component that directly affects the success of the learning process. It is done especially on the procedure of learning program development, educational service standard, teacher's strategy, and students' learning success. It focuses on the procedure of instructional set development, including assessment, lesson planning, learning implementation, and evaluation. The study used interview, observation, and documentation as the analysis technique.

### **Character education**

Character education is not an instant improvement program that instantly transforms the students, yet it is a part of life and educational activities at school. Character education, as a part of school activities, is the responsibility of all involving parties. It strengthens the quality of the existing character and develops the character values that are in line with culture, norms, and value held by the institution/ school.

Its general character is identified by good behavior, an individual who is able to follow the rule. Character education is viewed as identical to how the students well-behaved, can follow the rule, not violating the school rule, and can complete the task and is graduated with a satisfactory score. The description as mentioned earlier is relevant with character education, yet has not been adequate. Character education always refers to attitude, behavior, motivation, and wider skill. It is more than avoiding unexpected social behavior. Character education at school begins in classroom practice. Classroom is a place to strengthen, to model, and to practice daily positive character, accordingly, teacher plays as the main actor of character education. Teachers have strategic role in character education, especially in learning process. They take roles by creating conducive learning environment to develop character values in every classroom learning activity, starting from developing effective lesson plan. If teachers, school principals, and all stakeholders want their students to have and exhibit positive character, teachers should possess different ways of thinking about educational system that allows students to grow with character and dignity. From school managerial perspective, character education is a school-based activity that aims to systematically form student's positive behavior, which is formulated in school programs. Character education, as a program, should be designed through a collaboration with other community institutions in order to directly and systematically form the youth's behavior by clearly influencing non-relativistic values seen as resulting in such a behavior. (Nuci 2014: 131)

Character education in Indonesia is a national movement to improve student' character to be in line with the purpose of national education. As a national movement, character-building creates schools that are able to develop ethics, responsibility, and to treat the youth by modeling and to teach good character that

emphasize the universal values. These all are provided in purpose as schools, regional, and provincial government's proactive attempt to internalize the students with the core values, such as caring, honesty, impartiality, responsibility, and respect both to oneself and others. (Barkowitz 2005 : 2) Based on the description as mentioned above, school and the educator are responsible for providing an innovative learning environment that continuously integrates the core values of character education. The core values of character education are respect, responsibility, impartiality, and hard work (Anderson 2000 : 139 ). In Indonesia, character education is stipulated by Presidential Regulation no. 87 of 2017 on The Strengthening of Character education, this presidential regulation stipulates the character education values that are used as the core values of character education in Indonesia, namely, religious, nationalism, mutual cooperation, autonomy, and integrity. Character education that is carried out in school should integrate positive values into each aspect of daily activities at school ( Mike Frye 2002: 2). This is in line with the Regulation of Minister of Education and Culture no. 20 of 2018 on Character education Strengthening, article 1 paragraph (1), which reads that character education is an educational movement under the responsibility of educational institution to strengthen the students' character through spiritual and emotional development, intellectual development, and physical development by involving collaboration among education institutions, family, and community, as a part of National Mental Revolution Movement.

Character education, following the description as mentioned earlier, consists of moral/value, attitude, behavior, positive values, which are done purposefully and systematically by all stakeholders. It is done by referring to source of values, and is integrated into all educational activities at school. It can be actualized and exist in every learning activity carried out by teachers and education staff at school, or education performed by parents at home.

### **Character Education in Indonesia**

Character is the combination of attribute, attitude, and behavioral pattern that forms an individual's identity, making them different from one another. Every individual develops a unique character. It is shown by a unique combination of attribute and behavioral pattern. Character education in school education refers to the area of educational system that is related to student's attribute and behavior development. It encourages better personal and academic function, positive interpersonal relationship, school environment that is conducive for learning and academic achievement, adults' role success, and civil community. Character is described as relatively stable personal trait that becomes a foundation for behavior in high standard of value and norms (Budimansyah2012: 3). Character consists of three interrelated elements, namely, moral knowledge, moral feeling, and moral behavior. Good character consists of knowing good things, willingness to have good things, and doing good things. (Lickona 2012 : 82). From Islamic Perspective, the definition of character is close to (or similar to) *Akhlaq*, it refers to human spontaneity in behaving, or behavior that has been integrated within one's self, which appears spontaneously (Tafsir 2000 : 15). *Akhlaq* is originated from word *khalafa*, which means 'a creation' or behavior caused by good deed, or behavior with good connotation and that is in line with Islamic norms. *Akhlaq* is also equal to morals and ethics that discuss the human manner to communicate with God, with other humans, or with the universe (Sauri 2016 : 160-



161). *Akhlaq* contains the element of cognitive, affective, and psychomotor element, which is implemented in human life and activity. *Akhlaq*, as a component of Islamic teaching, has a parameter, the Islamic scholars provide *Akhlaq* parameter with all behaviors that considered good by Al-Quran and the Prophet's sunnah. Good behavior can be measured universally such as being just, obeying parents, doing good for friends, being friendly, helping others, being humble, patient, and forgiving. Shar'i teaching is viewed as a good behavior by major religions in the world. For Muslim people, character education can be done by educating student's *Akhlaq* as an ikhtiar, considering that *Akhlaq* is universal moral and ethics (Syauri, 2013: 24)

Character education in Indonesia has been implemented even before Indonesia gain its independence, it is carried out religious educational institutions such as pesantren. Formal Character education in Indonesia is implemented and stated in education curriculum since Indonesia Independence Day (17 August 1945) which is implemented in civic education. From 1945 until 1977, Indonesia's curriculum underwent a number of adjustments, yet, civic education is not changed and is maintained. Curriculum change that is related to character education was done in 1977. In Curriculum 1977, character education is integrated into Pancasila Moral Education (PMP), by curriculum structure change in 1977, character education was asserted in PMP, it referred to the value system, i.e., Pancasila. the core values of pancasila are 1) belief in the one and only god, 2) just and civilized humanity, 3) the unity of Indonesia 4) democracy guided by the inner wisdom in the unanimity arising out of deliberations amongst representatives 5) social justice for the whole of the people of Indonesia. In 1984, Indonesia Education Curriculum was changed, and character education was structurally changed from PMP to Pancasila and Civic Education (PPKN), substantially, the source of values still refers o Pancasila as the main source of values, with an addition of civic education. In 1994, Education Curriculum was once again changed, Character education is particularly implemented in Civic Education, or returned to the structure of Curriculum 1945. In 2004, Indonesia Education Curriculum experienced a change by the implementation of School-based Curriculum (KTSP), within this change, character education did not experience any change, it was still implemented through civic education subject. KTSP is implemented along with school autonomous policy/school-based management. During this implementation, curriculum development became the school responsibility. Following the global transformation, in 2013, KTSP was transformed into Curriculum 2013. The fundamental change in this curriculum is the presence of Core Competence (KI), it is the main competence comprising religious (KI-1), social (KI-2), knowledge (KI-3), and skill (KI-4) competence. Character education in K-13 structure is implemented in religious and character education and Pancasila and Civic Education. Character education in K-13 is developed based on KI-1 and KI-2.

### **Special Education Curriculum**

Special education in Indonesia had existed even before Indonesia gained its independence. After Indonesia's independence, special education in Indonesia has experienced some curriculum changes. From 1945 until 1977, special schools in Indonesia did not have special education curriculum, they employed regular school curriculum, with some adaptation and modification for the purpose of students with special needs. In 1977, Indonesia Government stipulated Special Education Curriculum, it was goal-oriented (institutional, instructional, curricular), b) procedure

of development of instructional system (PPSI), c) subject-integrative (Religion, PMP, and social science subject), d) its principle was : flexibility, efficiency, goal-oriented effectiveness, and e) long-life learning. In 1984, Special Education Curriculum was revised, this revision contained learning guidelines, subjects, guidance and counseling, and evaluation. In this curriculum 30% of lesson hours are devoted to Bahasa Indonesia. The learning activities were carried out based on 'how students learn', not 'what students learn'. In Curriculum 1984, teachers took role as the implementer of curriculum, the teacher's responsibility is related to the learning activity. All programs had been designed by the government; after ten years of implementation of Curriculum 1984, the improvement was made by designing curriculum 1994. There were improvements in curriculum structure of special elementary school, special junior high school, special senior high school. Besides, there was an obligation to add the local subject and vocational program for junior and senior high school level. In 2004, Special Education Curriculum was revised following the changes in Regular Curriculum, it became Competence-based curriculum. The curriculum development is carried out based on students' needs assessment. Curriculum 2004 took effect in 2006 with improvements in Standard Competency (SK) and Basic Competency (KD) (Sunardi 2010). In 2013, Indonesia Government stipulate Curriculum 2013, or known as K-13. In K-13, standard competence is changed into Core competence, it is described by Basic Competence (KD), K-13 is more flexible, especially regarding the learning program development because the evaluation is measured based on indicator, minimum mastery criteria is determined by the teacher based on the assessment result. In K-13, character education is asserted in "Religious and Character Education" subject. K-13 is implemented in all special schools in Indonesia in 2015. Character education in K-13 is developed not only in religious and character education subjects and Pancasila and Civic Education.

### **The Effectiveness of Adding Character Education to Curriculum 2013**

Substantially, Special Education Curriculum has contained character education through religious and character education and Pancasila and Civic Education subjects. The curriculum contains two core competencies that can be used as the basis of character education, KI-1 and KI-2. Adding character education to lesson plan does not factually change the structure of the lesson plan; however, to strengthen the character values developed based on KI-1 and KI-2, competence achievement indicators are made. The addition of indicator of character education, in addition to refers to KI-1 and KI-2, it refers to five main character values determined in Presidential Regulation no. 82 of 2017, namely religious, nationalism, autonomy, mutual cooperation, and integrity. Those five values become the reference to build the character of discipline, autonomy, and responsibility. For the purpose of learning activities for mentally retarded student, needs assessment is required. Needs assessment is mandatory in order to find out the students' level of development and skill. Based on needs assessment results, the teacher can map values required to build the target character. Based on the analysis result above, adding character education to K-13 does not change the structure of the curriculum. However, it requires additional procedure in designing lesson plans, requiring teachers to develop character value assessment. The analysis result found that the addition of character education in Curriculum 2013 is quite effective, the addition of character assessment procedure

does not affect the content change, instead, it strengthens the content of special education Curriculum 2013.

Based on the evaluation of teacher's comprehension of the Special Education Curriculum 2013, it was found that not all teachers possess good comprehension on Special Education Curriculum 2013. 20% of special education teachers have excellent comprehension of Special Education Curriculum 2013, 34% of them have good comprehension of Special Education Curriculum 2013, 27% of them have fair comprehension, while 19% of them have poor comprehension of Special Education Curriculum 2013.

It was found that not all teachers understand the strategy of adding character education for mentally retarded student. 33% of the special education teachers found it difficult to develop character education in Curriculum 2013.

Based on the implementation of character education carried out by the special education teacher. In general the teacher's teaching activity is dominated by lecturing (65%), training activities (15%), modeling (10%), conditioning (5%) and habituating (5%). With this condition, the nature of character education is information regarding values or knowledge about moral/character.

Based on the discussion as mentioned earlier, the main problem that arises in the addition of character education in Special Education Curriculum 2013 lies in human resources, i.e., teacher. The teacher's problem lies in the curriculum mastery and classroom implementation.

### **Recommendation**

Based on the result of the study, the researcher proposes some recommendations as follow.

1. The procedure of character education program development for mentally retarded student should pay attention to the students' developmental level.
2. Teacher training is necessary to improve teacher's competence in developing lesson plan, assessments, learning activities, particularly in integrating character education into learning process.
3. It is recommended to conduct further studies to find out the character education program that suits the learning characteristic and needs of mentally retarded student.

### **Conclusion**

The effectiveness of character education in Special Education Curriculum 2013 for mentally retarded student is determined by the accuracy of the procedure addition, starting from needs assessment, lesson plan designing process, the implementation of learning activities, and evaluation. Adding the procedure of character education program development in Special Education Curriculum 2013 should be done in order to integrate the character values into student's learning activity. It should be done by still referring to five main character educations in Indonesia, i.e., religious, nationalism, autonomy, mutual cooperation, and integrity, by utilizing local wisdom

to develop the autonomy, discipline, and responsibility of mentally retarded student. The strengthening of character education for mentally retarded student requires the values that are integrated into learning activities in the form of task analysis.

There were still teachers who find it difficult to develop character education program at school. Accordingly, it is necessary to develop teachers through educational activities and training to strengthen character education.

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***REFLECT: Engaging and Empowering Critical Thinking Through Creative Process Journals***

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**Abstract**

Disruption is not only changing the landscape of businesses and the workforce but also pushing learning and teaching approaches to re-evaluate themselves in order for educators to motivate learners to learn in a digital world. In Singapore's tertiary education, learners have moved from the proponents of STEM to STEAM, where an integration of the arts is embedded in most curricula to develop capabilities which are important to a future-ready workforce. Undergraduates must now possess combined competencies, such as problem-solving, creativity and critical thinking. This paper aimed to propose a practical framework underpinned by propositions of the reflective practitioner championed by Donald Schon, with discussions on how the Creative Process Journal (CPJ) is primed by critical and reflective thinking. Its research method would include looking at case studies and gathering insights from the CPJ, a mandatory Unit Of Assessment (UOA) of the main module of a Bachelor of Arts (Hons) programme in Singapore. For the UOA, students would be assessed if they could successfully analyse design paradigms and practices to develop a critical understanding of contemporary design culture as the learning outcome. The paper also aimed to demonstrate positive results of how its students are able to form iterations of creative output through risk-taking, collaboration and experimentation. The pedagogical approach of this study would then be able to nurture future competencies and support strategies for students in other disciplines to enable the scaffolding of the creative process in order to facilitate critical thinking through critical making.

Keywords: Critical thinking, reflective thinking, creative process journal

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## Introduction

Singapore's education system is known for its achievements in delivering quality education. This system is strong because students aim high and often achieve good results that is recognised around the world. The core subjects taught in primary and secondary schools prepare learners for tertiary education. (Ministry of Education Singapore, n.d.) Progressing onwards, the Science, Technology, Engineering, Arts and Mathematics (STEAM) empowers students to be capable of making informed decisions and to find alternate solutions for problems that the real world is facing. This mode of learning is inspiring and engaging because it can relate better to the real world, hence, moving from STEM to STEAM education becomes complementary.

With that said, how do Educators continue to prepare learners in tertiary education with emerging 21st century competencies? Singapore's Ministry of Education produced a framework that list 'Global Awareness', 'Cross-Cultural Skills', 'Critical and Inventive Thinking' as competencies that will enable our youth to find themselves new opportunities within the new digital age. (Ministry of Education Singapore, n.d.) Additional to this, the skills future framework designed by the Government of Singapore maps skills and competencies for designers and signals design thinking practice, critical thinking, sense-making, empathetic thinking, as core skills to attain. (Skills Future Singapore, n.d)

Collectively *"The institutes of higher learning (IHLs) here are set to infuse a wider appreciation of design into their curriculum at a time when job scopes are changing and demand is rising for people with design skills."* (Ang, 2019) While all these are intended and prepares the nation for the future, the aims and curricula and approach to Design Education has been honing these skills for a long time. While design education is not a factory that churns out artists, but has been serving as a platform for young people to discover, enhance and pursue the alternate career choice. Design education has been teaching students to develop critical thinking and creative expression, nurture self-development and leadership qualities. A World Economic Forum report, The Future of Jobs 2018 looked at the employment, skills and workforce strategy for the future and it listed the top 3 skills, complex problem solving, critical thinking and creativity. (World Economic Forum, 2018) This connects with what David Ross wrote in "Getting Smart", that the future of work meant having analytical skills needed to generate meaningful insights, know persuasive communication and able to reflect critically on learning experiences and processes. (Ross, 2019)

Design schools have been cultivating independent learners and thinkers for a while now, *"for the business world, design thinking might seem like a new concept from this side of the millennium, but within design research characteristics of designers' work and practice have been discussed for at least 40 years, while the management discourse of design thinking developed over the last decade is only slightly related to the earlier discourse."* (Johansson-Sköldberg, 2013)

With that said, one of the key learning outcomes of a good design education is for learners to practice iterations of the creative process. The focus of the creative process in the design school is nothing new. This method of learning enabled design students to understand the value of the creative process is often a journey that is rewarding,

especially for projects that have “process” and “reflection” as core components. The BA(Hons) Design Communication Programme in Lasalle College of the Arts has a component called the Creative Process Journal and it was created and used by students to explore their processes of creativity and innovation.

*Research objective:*

The paper studies the pedagogical approach on how critical thinking occurs during the design process and how has it been taught to students in LASALLE for the BA(Hons) Design Communication Programme. It presents a framework on how the Creative Process Journal (CPJ) is primed by critical and reflective thinking, in turn, supports the main modules of the course.

*Research Methodology:*

Secondary research includes readers from various scholars who are pioneers in concepts of being reflective practitioners and the importance of building criticality in design education. The readers are benchmarked against the setting of a Singaporean education system to review how design education has been evolving towards. Primary research builds a case study to examine the CPJs produced between 2017 to 2019. The case study conducts an in-depth investigation on a group of final year students to explore the underlying principles of the creative processes for their final year projects to uncover insights and/or information.

**Body:**

*Literature Review -*

- a) Design Education in SG - Charting the future of design by Design Singapore Council

The 2025 design masterplan vision for Singapore is to be a thriving innovation-driven economy and a lovable city by design. The Ministry of Communication and Information appointed a panel called the Design Education Review Committee in August 2017 to create strategies that can strengthen design higher education as well as benefit Singaporeans from design-led creative thinking skills. (Design Singapore Council, 2019)

The report endorsed how design can be placed into the national mindset as an essential life skill that can qualify Singaporeans to navigate complex problems that might occur in the complex 4th industrial revolution. The 5 core recommendations in the report aims to advance design education in Singapore and these strategies empower Singaporeans to appreciate the value of design and apply them to their work. (Design Singapore Council, 2019, p. 16)

The 2025 vision is an innovative driven economy to drive Singapore. Recommendation 2, *‘impart design-led skills to students across more disciplines’* encourages design-led creative thinking not only a 21st-century competency skill but also a valuable life skill. This pushes away the old adage where, *“individuals often view design as a technical skill or a purely aesthetic tool, and fail to recognise its*

*potential to intersect with or bring value to non-design areas.”* (Design Singapore Council, 2019, p. 35)

b) Skills Framework for Design (Singapore)

The SkillsFuture Framework for Design, established by The Future Economy Council Chaired by Deputy Prime Minister & Minister for Finance Mr Heng Swee Keat, drives the growth and transformation of Singapore’s economy for the future. This platform guides Institutes of Higher Education as well as creators of continuing education to develop and future proof of their curriculum. The skills and competencies listed for a designer has been identified for each of the job roles fall under two broad classifications: (i) Technical Skills and Competencies, and (ii) Generic Skills and Competencies. Listed under the category of ‘Analytical Thinking’, it further iterates critical thinking as, *“Examine, manage and connect issues and ideas from multiple perspectives to identify reasoning in a variety of fields with differing assumptions, contents and methods”*. (Skills Future Singapore, n.d)

c) EDUCAUSE: The Horizon Report - Higher Education Report 2019

The Horizon report mentioned significant challenges like adopting more technology in higher education and institutions to re-examine the academic and social needs of the students. The shift to student-centred learning and providing student learning experiences to connect with other disciplines are key concepts and one of these solvable challenges discussed how improving digital fluency and well as meeting the demands for digital learning experiences and instructional design expertise (Educause, 2019, p. 5) While the main discussion based itself around technology literacy, it also advocates that the 21st century learner thrives on the appropriate use and integration of technology.

d) Designerly Ways of Knowing - Nigel Cross

His seminal book, ‘Designerly ways of Knowing’, examines how designers think and make decisions that is different from other professions. He was keen to find out unique influences for ways of thinking in the design practice that help construct design thinking. The concept of ‘designerly ways of knowing’ emerged in the late 1970s with the development of new approaches in design education. Since then, the field of study has grown considerably. Succinctly put, *“The thinking processes of the designer seem to hinge around the relationship between internal mental processes and their external expression and representation in sketches.”* (Cross, 2007, p.53)

e) Donald A. Schön - The reflective practitioner

Schön, a philosopher and urban planner, defined reflective practice as the practice by which professionals become enlightened by their implicit knowledge base because they learnt from their experiences. Donald Schön with Horst Rittel and Herbert Simon are amongst the early contributors of cognitive design theory. The reflective practitioner is a key text in which Schön formulated his theory about reflective activity, knowing in action and reflection in action. He argued that reflection *“is susceptible to a kind of rigor that is both like and unlike the rigor of scholarly research and controlled experiment”* (Schön 1983, preface ix).

## f) Teaching Design - Meredith Davis

Meredith Davis is a professor that writes about Design based teaching. Davis embodies meaning onto why self-assessments and class critiques are key in learning. Through critiques and peer to peer evaluation, an activity that is common and necessary in a classroom, can engage the learner differently. *“It is equally important to be specific in class critiques and to develop in students the ability to make detailed evaluation of peer work. The critique is a time-honoured tradition in design education - a feature of the signature pedagogy...”* (Davis, 2017, p.134)

*Key Research Inquiry -*

The research questions studies the effects of the creative processes and proposes a clarification of a framework to support critical thinking. The questions are 1) How do designers approach critical thinking in their creative processes? This question aims to uncover the motivation behind the creative process and how students achieve learning outcomes. 2) What is critical thinking in the practice of design and how can it encourage and innovate creative output? This studies the underlying effects of a Singaporean education and 3) How can the Creative Process Journals empower and foster future competencies? This question aims to gain insights from the CPJs to read the processes that value risk-taking, collaboration and experimentation.

*Discussions –*

## a) What is the Creative Process Journal (CPJ)?

The CPJ was created as a required design outcome in 2005. The programme envisioned how the CPJ should move away from the adage of the sketchbook. The CPJ was meant to collate the invisible but yet crucial processes that informed the design practice. This practice mirrors Schön’s reflective practitioner and puts into context of how designers need to frame the problem and what it means to gain professional knowledge and reflection in action. (Schön, 1983)

The CPJ resides as a single unit of assessments that maintain a healthy balance within the module. The CPJ critically assesses all research findings and development of ideas and concepts, as well as the application thereof. The marking criteria for the component accounts for 20% of the module and resides as a unit of assessment. The learning outcomes aims to build essential skills and competencies that feed into the ecosystem of design education and for Lecturers to identify what students will know and be able to do by the end of the programme during Assessments. Through such requirements, students critique existing design paradigms and practices and develop a critical understanding of contemporary design culture. Hence, this endorses the recommendation of Schon’s, *“...then the practitioner may surface and criticize his initial understanding of the phenomenon, construct a new description of it, and test the new description by an on-the-spot experiment.”* (Schön, 1983, p.63)

## b) From prescriptive to self-initiative

Professor Nigel Cross wrote about how Engineers and Scientists tend to systematically work to understand the problem. While designers explore the problem

and propose a variety of possible solutions and then work towards finding a solution that is satisfactory. *“The evidence from the experiments suggests that scientists problem-solve by analysis, whereas designers problems-solve by synthesis; scientist use ‘problem-focused’ strategies and designers use ‘solution-focused’ strategies.* (Cross, 2007, p. 22) In early 2007, the Creative Process Journals iterated sketch forms, the study of printed matter and note-taking as structures of inquiry. This was instructed to students to move away from just producing sketchbooks, and to begin to question the creative process instead. Lectures and prescriptive assignments were provided to the students in order for the shift in mindset.

**Case Study 1 - Creative Process Journals (CPJs)**

A range of final year students’ Creative Process Journals has been collected to study how students work on their independent creative process for their final year project. This analysis is based on their method of documentation, ability to critique and reflect on their own practice and how they articulate their processes which in turn informs the Lecturers during Assessments.

Parameters to set the study:

1. Context
2. Methodology of inquiry
3. Data that signifies criticality and reflection
4. Discovery or insights

The parameters indicated above was used as a guideline to study how students embark on research. The first step was to analyse how student understood the context of the research they’ve selected, followed by the methods students used to perform inquiry and collation of data that determines criticality and reflection through the creative process. Lastly, new findings and insights to provide future recommendations for enhancement.

<b>A study of creative process journal reflections and insights based on 5 students</b>		
<b>Timeline</b>	<b>Reflection by students</b>	<b>Insights</b>
<b>Week 1-6  (Work in Progress)</b>	<p><i>“Made the mockup from scraps of leftover material laying around the house. There were no definite dimensions planned except what’s convenient [.....] Had to redo the box compartments three times because I forgot to [...]. ” - Ng Pei Ling</i></p> <p>-----</p> <p>-----</p> <p><i>“Earlier on in the discussion [...] mentioned on the point that how will the complexity of my project be solved in terms of designing logotype and also adhering to both the</i></p>	<p>Critical thinking occurs when they start asking questions or begin experimentation, “The work of the practicum is accomplished through some combination of the student’s learning by doing, her interaction with coaches and fellow students, and a more diffuse process of ‘background learning’”. (Schön, 1987, p.38)</p>

	<p><i>English and Chinese logo-type methodology. From here, I begin to explore and look into how English logotype is developed and build a few case studies which will help me organise the methods together.” - Chen Zhi Liang</i></p>	
<p><b>Week 7:</b> <b>(Work Check Week)</b></p> <p>The Work check week requires students to present their work to the entire student body and teaching team.</p>	<p><i>“Another idea I explored was a possible application of a lino-stamp or print [...] I thought to use the same but [...] Since I’m not well versed or even familiar with etching into hard materials, I decided to try it out with lino rubber sheets, as seen in the following pages.”</i> - Ng Pei Ling</p> <p>----- -----</p> <p><i>“During one of the interview sessions, one of the local brand owners asked, “Why did you choose such a topic? The local street scene is rising, yes. But with the help of global brands. The local brands are not doing anything to create noise for Singapore. That’s why I decided to bring in global brands to market my own line-up.”</i> - Jerome Yap</p>	<p>From here, we can see that students gained confidence through self led reading and by being able to evaluate skill set, “reframing the problem is also a reflective conversation with the situation...and then to develop the implications of a new whole idea.” (Schön 1987, pp.58)</p> <p>-----</p>
<p><b>Week 8: Mid term break</b> <b>(Project Week)</b></p> <p>- Self Assessment as a form of reflection and students catching up on what needs to be done to speed up with work progress</p>	<p><i>“I went and experimented with creating my own sci-fi-ish/futuristic font for this poster. Made to different types of font, one very tall and condensed version with an extremely high x-height ↑ and a thinner, slightly wider, but still tall version with a “pregnant” “R”. [...]”</i> - Ng Pei Ling</p> <p>----- -----</p> <p><i>“After the work-check, [...] also added on how I should be even more critical with each deliverable—question and challenge its forms. There are things that I could have improved on too, such as the details within the collage and probably done with more attention to it.”</i> - Jessica Emily</p>	<p>This week is a personal week to catch up with projects: Realisation on what needs to be done to speed up with work progress</p>

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<b>Return to Term 2</b> <b>- Ideate -&gt; Prototype</b>	<p><i>“Brainstorming processes are as important as the results. Thus, I always begin by questioning myself about my project; who, what, why, when, where and how. These are basic steps that I needed to jot down to gather all my thoughts. The sketching and brainstorming process helped me to articulate my ideas better, with a clear and solid concept.”</i> Jessica Emily</p> <p>----- -----</p> <p><i>“As I tried to edit the illustration, I played with the different line weights and preferred the relatively thinner look. Moving on, the next step would be the layout for the final design of the photopolymer plate. On a side note: I had also stretched the individually drawn sugarcane to make it longer as I felt like the one that I drew in my sketchbook seemed very thick and stumpy.”</i> - Zoe Yan</p>	<p>Students embark on different considerations of all iterations -  “Seeing as it not enough, however. When a practitioner sees a new situation as some element of [her] repertoire, [she] gets a new way of seeing it and a new possibility for action in it...” (Schön 1987, pp.68)</p>
<b>Week 12 (Open Studio Week)</b> <b>- Peer to Peer Feedback</b>	<p><i>“In consideration with my website and the way it is design, I tried out with two different variations of the design to see which fits into my design more. I come to a conclusion that a search button is not necessary for the UX but it fit nicely into the UI. I will be keeping the search button and improve on the microcopy of the search field.”</i> - Chen Zhi Liang</p> <p>----- -----</p> <p><i>“Different trials were done in order to push the boundaries of how one can possibly communicate visually. The different experiments are done based on different chain of thoughts and hence result-ing different execution.”</i>  - Jessica Emily</p>	<p>She reflected on knowledge and understanding for a situation that has led her to adopt a particular course of action or how her peers have provided her clarity or alternatives. This may have re-framed the problem she is trying to solve, or on the role she has constructed for herself within a larger institutional context. (Schön 1983, pp. 62)</p>
<b>Week 13 - 15 (Assessment)</b>	<p><i>“The biggest challenge here is to create a poster with two dates and timing. Due to the</i></p>	<p>Doing and thinking are complementary -</p>



<p><b>- Individual Consults, weeks leading to Summative Assessments</b></p>	<p><i>two phases of the showcase, the poster need to show the two different timing and date. Information can come in as too heavy and confusing for the readers. The best way to do perhaps is to split it to two different poster.”</i>                      - Chen Zhi Liang</p> <p>-----                      -----</p> <p><i>“I have learnt that holding a showcase requires a lot of meticulous planning. It was important for me to plan the layout of the space and how I wanted people to move around from station to station. I had to plan how to place every pedestal in a properly allocated space in order to ensure the guests would fully understand the project.”</i>                      - Zoe Yan</p>	<p>(Reflection in action)                      Doing extends thinking and in this case, time management, consistent work flow and making decisions independently have been made known and with boundaries (Schön 1983, pp.280)</p>
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*Insights from Case Study 1: Realisation as a ‘creative leap’*

The students critical analysis in the CPJ have provided a certain reflection of the practice and the realisation of their own learning curves. They have provided detailed explanation of how such an event occurs as a sudden insight, in which they recognised a learning event as a significant increment to the process. This occurs when students have a retrospect of their own design process and are able to identify a point during the design process at which the key concept began to emerge. Kees Dorst wrote in the ‘Creativity in the design process: co-evolution of problem–solution’, that *“creativity in the design process is often characterised by the occurrence of a significant event - the so-called ‘creative leap.’”* (Dorst & Cross, 2001) Students indicated how such an event occurred as a sudden insight and most of them recognised the learning event as a significant increment to the process.

***Proposed Framework to support critical thinking in the creative process***

<b><u>Modes of Approach</u></b>	<b><u>Types of Articulation</u></b>	<b><u>Processing information</u></b>
<b>Visual Research</b>	<b>A study of:</b> Objects, mood boards, drawings, photography, film analysis, illustrations, videos, environments, buildings, people, etc.	<b>Methods used to process:</b> Sketching, drawing, writing, photo taking, Mood Boards, etc.
<b>Readers or Literature Review</b>	<b>Beyond required reading:</b> personal interest topics, observations, data gathering, polling, readers from the community, online content, audio/visual, movies, current news, magazines, reports, etc.	<b>Methods used to process:</b> Data collection, annotated bibliography, bite size information gathering, content analysis, etc.
<b>Ideation, Processes and/or Techniques</b>	<b>Discover and Ideation Process:</b> Body of Sketches, drawings, inking, etc. <b>Techniques:</b> digital tools, software, production methods, etc.	<b>Methods used to process:</b> Sketch noting, writing, mind maps, Gigamaps, concept maps, visualisation, etc.
<b>Creative Prototypes, Iterations or systems of testing</b>	<b>Using methods or systems of craft:</b> Making, craftwork, reverse engineering, hacking, material study, composing, experimentation, prototypes, etc.	<b>Methods used to process:</b> 2D or 3D mockups, printed matter, raw materials, processes, user testing methods, etc.

**(Figure 1.1)**

Figure 1.1 is a proposed framework to guide design students to better connect theory to practice with critical thinking. Some learners are natural critical thinkers, while other learners need to be taught, but both kinds of individuals will benefit from learning how to think critically. In the field of design, it would involve observation, understanding, questioning, concluding, and iterations. Whilst this framework aims to provide a guideline to students to critically analyse & perform reflection to different design processes as well as the self-evaluation.

Within the self, there is a discovery of challenges whereby determined by failures and successes, the capacity to build core understanding of subject matters, to build upon a reflective practice, gather and collate discussions and data points and explore types of collaborations. Additionally, critical thinking is the ability to think clearly and rationally, understanding the logical connection between these ideas. It is also described as the ability to engage in reflective and independent thinking. (Piotrowski, 2011, p.1-9)

### Case Study 2 - Reflective Journals

A range of final year students’ Reflective Journals has been collected to study how students work on their independent creative process for a 3 weeks immersive workshop which introduces research methods for design practice and digital content generation. This analysis is based on their ability to critique and reflect on their own practice for the final year project.

*Parameters for the study:*

1. Context and relevance of workshop
2. Introduction to ‘working’ framework to support critical inquiry
3. Student’s methodology of criticality and reflection
4. Discovery or insights

Students were provided with mini-lectures to facilitate the core of the workshop that aids in the production of a designed outcome. The students were provided resources and tools such as extra readers, examples of best practices, and in-class assignments. The proposed framework (Fig 1.1) was presented to explain how students can begin on this process and eventually for them to design a working methodology of their own to lead the inquiry.

A study of creative process journal reflections and insights based on 5 students		
Timeline (Stages)	Reflection	Insights
<p><b>Workshop 1</b> (Design Road Mapping) - Design research methods - In-class assignment</p>	<p><i>“However, the fact that I could and was able to find so many of such images makes me realise that people are looking forward, that designers, are probably using the trend topics technique to see what trends were hot are what is not at that moment, and probably then learning on how to develop those trends that are “not hot” as I learnt also that those trends at the bottom of the list are usually those with the most potential to be the next trend.”</i> - Aretha Cheong</p> <p>----- -----</p> <p><i>“Creating the publication had enabled me to relook at previous connections I thought were strong: with the visuals I have, I realised I might not have enough to maintain the thread of comparison between traditional luxury brands, new luxury and copied goods. Do I want to</i></p>	<p>The designerly way of knowing is not only embodied in the process of designing but equally the products of design also carry knowledge. (Cross, 2007)</p>

	<p><i>maintain this approach for all the items featured? How would I progress then - using colour or do I want to merely stick to black objects in its varying categories [...]”</i>                  - Joseph Kwok</p>	
<p><b>Workshop 2 (Content Generation)</b>                  - Content planning method                  - Group critique</p>	<p><i>What I noticed thereafter, that I wasn't feeling the planned sequence(s). It felt rigid, and stagnant, despite the variation of visuals in alternating posts. Perhaps it is the clash between analogue imagery and crisp pictures of products? Moving on, I decided to think about rationale and sequence as I went along: the posts before and after the existing post, for example, would be varied for the current post.”</i>                  - Joseph Kwok</p> <p>-----</p> <p>-----</p> <p><i>“The feedback proved to be important, guiding me in a new direction. After much confusion and uncertainty I decided to shift my focus onto fabrics, textiles and how silhouettes affect our perception of masculinity.”</i> - Shree Narain</p>	<p>The three main stages of critical thinking for designers: Observe, Question, and Answer. (Elmansy, 2017)</p>
<p><b>Workshop 3 (Digital design experiences)</b>                  - User experience                  - Group critique</p>	<p><i>“I would say that the workshop really did help a lot in the thinking and creating process, especially because in the workshops I created after learning about “something”. The “something” referring to a certain kind of knowledge about the world, about my audience, about technology and about experiences.”</i>                  - Aretha Cheong</p> <p>-----</p> <p>-----</p> <p><i>“In order to understand the process in which the consumer would or should interact and engage with the company, I looked at these few segments to</i></p>	<p>Small Group Critiques: “...under this strategy, students talk about work in greater depth and are more critical than in the public settings of a full class critiques.” (Davis 2017, p.136)</p>

	<p><i>understand the process that brands can better interact with the consumer through their brand messaging.” - Joshua Yeo</i></p> <p>-----</p> <p>-----</p> <p><i>“Having a small class was the best aspect to this. Sharing ideas, group discussions and individual attention to detail really helped us all get more involved in each other's work and gave us fruitful work and hours spent at the end of the workshop.”</i></p> <p>- Shree Narain</p>	
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## Conclusion

Critical thinking and reflective thinking has always been part of design education. Students may not be aware of their practice until the end of a project or the programme, therefore, this means that attention needs to be paid to lessons that significantly iterates risk taking, advocate the acceptance of failures and collaborative work to become more evident. Donald Schön equalised Herbert Simon’s description of a “Science of design” by explaining how designers deal with messy, problematic situations that demand intuitive and reflective practices and common design problems has uncertainty and values in contrast to the well-formed questions of science. (Schön, 1983) The proposed framework (Figure 1.1) aims to guide students to reflect on a deeper level, and through the Creative Process Journal, they have demonstrated different stages of reflective learning.

It is important to develop an understanding of assessment literacy for students. This means explaining the module learning outcomes and Lecturers must provide clarity for the assessment criteria, facilitate checkpoints throughout the semester with peer to peer assessments, informal and formal feedback channels.

It is also pertinent to shape a sense of awareness in students for transferable skills like, self-directed learning, active engagement, active planning, and being able to accept feedback in order to direct the learning so that it supports risk taking and innovation. Being a reflective thinker can empower independent learners to develop core skill sets and attain professional attributes such as research skills, team work, communication skills, analytical and problem solving skills.

### *Further Recommendations*

- a. Technology can empower as a tool:

The physical Creative Process Journal eventually becomes a form of mindful assessment of the creative process for every design student. This mechanism was used

to support and nurture creatively independent critical thinking and learners, however, with the advancement of online learning tools and resources, for example, students & lecturers can track real time online writing, create mood board mapping through online platforms like *Pinterest*, *Canva*, *Milanote*, etc. There are many possibilities and tools out there that could empower the creative process and critical learning can also occur in these spaces.

b. Critical Making in Design Practice:

There are many support strategies available for students in other disciplines for them to learn how to scaffold their own creative process in order to facilitate critical thinking through critical making. Critical making refers to the hands-on productive activities that link digital technologies to society. It was invented to bridge the gap between creative physical and conceptual exploration. Matt Ratto commented in 2008, "*Critical Making can be introduced to those in fields of communication, information studies, science and technology studies.*" (Ratto, 2008) Critical Making is the combination of critical thinking with hands-on making—a kind of pedagogical practice that uses material engagements with technologies to open up and extend critical social reflection. (Hertz, n.d.)

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## *Empowering Students through Tutor's Feedback in Online Learning*

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### **Abstract**

Online learning students may encounter adjustment difficulties particularly in the early semesters. Students with lack of computer literacy and related educational background might result in withdrawal from the course of study prematurely. The current research was carried out to investigate tutor's feedback as a means to empower online learning students, including to build autonomy, help-seeking initiatives, and connectivity. The qualitative descriptive analysis was conducted on 135 students and tutors' comments given in three different online classes. The primary data were students and tutor's comments. To explore more information from the students, a set of open-ended questions provided at the end of the online tutorial sessions. Data analysis adopted thematic analysis. Three main themes were identified, including independent learning, connectivity, and help-seeking initiatives. Meanwhile, an emerging theme was identified, namely solitary learning styles. The findings indicate that tutor's feedback played an important role in empowering students. Individual feedback helped students understand independent learning more comprehensively, build connectivity with tutor and institution, and find possible solutions for each problem they met. Students with solitary learning styles, however, preferred feedback that pointed out the weaknesses or inappropriate answers they submitted. In addition, they showed lack interest in other feedback given by the tutor.

Keywords: autonomy, connectivity, feedback, help-seeking initiatives, and online learning

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## **Introduction**

This paper reports the results of the study that investigated the tutor's feedback as a means to empower online learning students. The study was conducted in Indonesia which involved students of Universitas Terbuka who took translation online tutorials in three different classes in the first semester of 2018. These online tutorials were capped at 150 students per class and lasted eight weeks (8-week sessions). The Moodle Learning Management System (LMS) were used to deliver the online tutorials.

Several activities were offered in each session, including group discussions, additional learning materials and resources, and formative tests. The tutor supervised and participated in the group discussion. The tutor also encouraged the inactive students to comment or convey their ideas. To make a more extended the discussion, the tutor raised some further relevant issues and provided additional learning material as an enrichment which is relevant to the issues being discussed. In the third, fifth, and seventh sessions, the students had to do assignments individually. In the following weeks, the tutor returned the assignments with individual formative feedback. The students may comment on the feedback given and discuss it with the tutor and other students within the class.

It is important to bear in mind that participating the in online tutorials are elective. In other words, the students may not enroll in the online tutorials. In addition, they may withdraw from their online classes at any time. Furthermore, if a student does not log in and access the online classes for three weeks consecutively, his enrollment is automatically removed from the class. Although it is elective, the scores of student participation and assignments contribute 30% towards the final grades.

## **Literature review**

Feedback plays a vital role in the learning process, including in a distance learning environment. Distance learning students who feel alone and isolated (Budiman, 2015) may receive benefits from the feedback giving by the tutors. A study conducted by Jokar and Soyoo (2014) to investigate the effect of explicit and implicit corrective feedback on learners' grammatical accuracy found that feedback is unique and individual. In other words, there is no one feedback template fits all. Similar finding was echoed by Ene and Upton (2018). This indicates that to make feedback effective tool to help students learn better, tutors should be aware of the characteristics of the subject(s) they teach and the students.

A multi-stage study conducted by Burns and Foo (2013) that examined students' perspective on feedback, both formative and grades. Surprisingly, the study found out some interesting findings. For instance, feedback did not affect students' confidence. The study also was unable to answer how the students used the feedback for better learning. Although the context is different from the current study, the nature of the study is particularly similar so that it provides valuable insights into the nature of feedback.

## Methods

Data for this study were collected from student-tutor interaction in the discussion forum as well as from the open-ended questions. All students participating in three different classes were invited to answer three questions provided at the end of session 8. The questions were in the form of open-ended questions that sought students' views on the tutor's feedback given for the assignments and for their comments on the discussion forum. At the end of the questions, a space was provided in case they wanted to add some comments. The benefit of this approach was that more comprehensive and personal information could be obtained as the students had more autonomy to express their experiences and comments that might be unique and individual. To maintain confidentiality, it was mentioned that completing the questions were not mandatory; students might skip the questions they did not want to answer, or they might refuse to answer all the questions. The questions were:

1. What did you think of the feedback given by the tutor?
2. How did the feedback help you learn the subject?
3. What did you learn from the feedback given?

There were 135 responses to the questions. Each response was analyzed to group for thematic analysis, reduce redundancy, display, and yield the conclusion (Braun and Clarke, 2006).

## Findings and Discussion

The tutor's feedback basically fell into two main categories, including constructive feedback and corrective feedback. In addition, the tutor also provided guidance and links to resources that introduces the students to new information and ideas. Both constructive and corrective feedback were given individually. A number of issues were identified. Mostly, the students positively valued the feedback, particularly the formative feedback. Examples of the tutor's feedback given to the students are:

*Check subject-verb agreement! (Tutor)*

*Which one is correct, di dalam or didalam? (Tutor was correcting the preposition in Indonesian). (Tutor)*

*I suggest that you read PUEBI. Check the link I provide. (Tutor)*

The students admitted that they learned from the feedback. One student gave a comment as follows.

*Thank you. I did not know if Guardian is a name of newspaper. (the student translated Guardian into penjaga (Indonesian for guardian)). (students)*

A response given by a student to the tutor's comment was:

*Thank your Sir. I will check the PUEBI. (Student)*

Three main themes were identified, including encouraging independent learning, building connectivity, and developing help-seeking initiatives. One theme was emerging during data analysis, namely solitary learning styles.

*Encouraging independent learning*

The theme of encouraging independent learning reoccurred throughout the data set. Common comments given by the tutor are:

*I think you did not fully understand the source text. Consequently, the translation was not good. I suggest that you have more reading practice. Try to make a daily program. (Tutor)*

*The topic for the discussion is based on the materials in the link below. Please check and give your comment in the Discussion Forum. (Tutor)*

Most of the students' responses to the tutor's comments were particularly short, including *Thank you* and *Thank you, Sir*.

The open-ended questions generated deeper information. Students felt more positive about the comments given by the tutor. One student commented:

*I thank you for your feedback. There are some words I don't know the meaning in Indonesian. Therefore, I cannot understand the passage. I don't know where to find the meaning. (Student)*

*Building connectivity*

Distance learning students are naturally separated from each other. However, online tutorials may function as a connector. The students are able to connect with their colleagues and the tutor. The tutor in his comment encouraged the students to communicate with each other in the discussion forum by actively commented on their peers' comments or ideas.

*Please comment on your friends' ideas. (Tutor)*

*As this is a discussion forum, feel free to give your opinions or ideas. There is no right or wrong answer. (Tutor)*

*I will be participating in a group discussion after at least five students gave comments. (Tutor)*

Students received benefits from the discussion forum. They interacted with each other. A comment below illustrates the interaction among the students.

*Hallo, XXX (name of a student). Your answer is very clear. But, I think you forgot to attach the source of the information. Be aware of plagiarism. Thank you. (Student)*

It is important to note that the interaction among the students was particularly low. It seemed that they were uninterested to participate in group discussions.

*Developing help-seeking initiatives*

Another effort to empower the students was through developing their help-seeking initiatives. Developing help-seeking initiatives was important to broaden the students'

knowledge and experience. The tutor commonly provided a link to a webpage and materials in PDF for further learning and discussion. A comment given by the tutor is:

*To know further about equivalence in translation, please check the following website. (Tutor)*

### *Solitary learning styles*

There were some negative comments given by a student. The student indicated that he was neither interested in the discussion nor guidance from the tutor. The student preferred to have corrective feedback that showed the mistakes and the correction from the tutor instead of looking for further information about the mistakes by himself. The students seemed to have different learning styles and enjoy learning individually. The student said:

*I am not interested in group discussion. It was not interesting. I don't like to read feedback that ask me to read more information. I want the tutor shows me the mistakes and how answers should be. That is all. (Student)*

The themes above indicates that the students valued the feedback from the tutor. Although student interaction in group discussion was low, the comments indicate that interaction in distance learning is one of the key components to ensure the effective learning process. Feedback cannot be separated from the learning process as students need it (Tait, 2003). Feedback is a communication channel that connects the students and the tutor. The students liked individual formative feedback better than scores or grades. This finding is contrary to previous studies, including the study conducted by Burns and Foo (2013) which have suggested that students valued feedback given in the form of score or grades. For most students, feedback helped them learn the subject better. The students also appreciated feedback that included further information and explanation. Individual formative feedback served as a reflection to evaluate the competency level of the students in the subject they were taking. This result also reflects those of Jokar and Soyoo (2014) who also found that explicit feedback was the best tool to improve student writing skills. Another important point is that the tutor should consider punctual and appropriate feedback. This finding is consistent with that of Bruno and Santos (2010) who argued that feedback should be given timely.

## **Conclusions**

The purpose of the current study was to investigate tutor's feedback as a tool to empower online learning students. The results of this investigation showed that feedback was an effective medium for empowering distance learning students. Formative feedback enabled the students who were separated geographically to build independent learning skills, build connectivity, and develop help-seeking initiatives. The study also found that feedback should be given timely and individually. Although the findings are particularly rich, the study has some limitations. The most important limitation lies in the fact that the students know that the researcher was their tutor. Although it was mentioned that the researcher guaranteed privacy and confidentiality, participant biases might occur.

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## *Development of a Questionnaire System with a Response Analyzer*

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### **Abstract**

It has been increasing that the number of universities which try to give a bidirectional lecture by improving the contents of it from responses of students. To achieve this, instructors need to know them efficiently and easily. Questionnaires are general methods used to grasp the situation of students. A lot of universities have been adopting them. In general, instructors collect the results of questionnaires after their classes and examine them to improve their next lectures. However, it is difficult to understand students' questions and responses during classes since questionnaires are distributed after them. In order to solve this problem, a response analyzer can be used to make it easier to grasp students' reactions. A response analyzer is an educational device that aggregates students' situation and shows the results of it in real time. Instructors can fix their lectures according to them during their classes. In this study, a questionnaire system has been developed with the response analyzer. Adding to the existing questionnaires, this study's system enables instructors to make a single-question questionnaire and let students answer it. Instructors can know the results in real time with graphs and tables. They can improve their lectures not only after classes but also during them. Although there is also a problem that many of the existing response analyzers need specific devices and introduction costs, this system can be used through a browser and is easy to be introduced to a lecture since this system has been developed as a web application.

Keywords: Response analyzer, Questionnaire, Response, Question, Web application

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## Introduction

The Ministry of Education, Culture, Sports, Science and Technology states that conventional single-directional lectures need to be changed to bidirectional ones where students can solve problems actively (The Ministry of Education, Culture, Sports, Science and Technology-Japan, 2012). In order to realize the active leaning, instructors are required to encourage students to do the leaning by pulling out their ideas and representations. For the reason, instructors should improve their lectures by understanding their students' reactions.

The level of knowledge and understandings for a lecture can vary according to each student. Especially at a university, there are a lot of single-directional lectures. Because of this, it is not easy to catch each student's questions and/or learning situation. Additionally, there are a few students who ask their instructors some questions in Japan since they usually care what other students think (Fuji & Yamaguchi, 2003).

One of the usual methods to grab students' reactions is one using a questionnaire. A questionnaire is a means to catch their situation adopted by a lot of universities. Instructors can improve their next lectures by viewing results of questionnaires done during class. This method can work to a certain degree; however, it cannot be possible to improve lectures during them. To understand students' levels in more detail, questionnaires should be used and the results of them should be reflected during class. But it is difficult to implement this because instructors' burdens are not light.

One of the solutions to the problem is to utilize a response analyzer to catch students' understandings easily. A response analyzer is an educational device that collects reactions from students and shows the results of them in real time. Because of this, instructors can improve their lectures during class.

In this study, a questionnaire system with a response analyzer has been developed. In addition to the existing functionality, this system also enables instructors make a questionnaire during class and get feedback in real time to improve their lectures.

## A Response Analyzer

A response analyzer is an educational device that collects responses from a lot of learners instantly and quantitatively and shows the results. It shows aggregated results to an instructor after learners answer some questions using such as a clicker. An instructor can gain materials for deciding how s/he proceed his/her lecture, and s/he also can advise learners properly. Unlike existing way to collect reactions such as raising hand, learners can response secretly so their opinions are tolerant to others' ones. Learners may feel resistance to raise their hand for some reasons. This device can ease the feeling and make it possible to catch responses from learners instantly and efficiently.

But many types of a response analyzer such as a clicker system requires a special device and a software that cost a lot for both students and instructors (Ohinata et al., 2015). By considering device-independence, our system has been developed as a Web application.



## System Overview

In this study, a questionnaire system with a response analyzer has been developed. This system is a Web application consisting of a server, a client on an instructor side, and a client on a student side.

This system has two types of a questionnaire: one that can contain multiple questions and one that has a single question. Like an existing questionnaire, a multiple-questioned one allows instructors to create a questionnaire before class, then submit it to students at an arbitrary time. A single-questioned one can be made during class when instructors want to know students' situation or to ask some questions. We call this single-questioned one a simple questionnaire. A simple questionnaire is submitted to students as soon as instructors have created it, and students are required to answer it. This is one of the response analyzer's functionalities that enables instructors to know their situation instantly.

This system has been assumed to be used in class in Japan so the language used in it is Japanese correspondingly. But it is replaced with English in examples of this paper.

### A Client on An Instructor's Side

Main functionality of a client on a instructor's side contains creating a questionnaire and gaining students' reactions. There are differences in creation and management between a multiple-questioned questionnaire and a simple one. A multiple-questioned one can be managed per subject. And a unique ID will be assigned to a subject when an instructor types the name of it in this system (See Figure 1). A student can learn the subject and view and answer a questionnaire by entering an arbitrary ID assigned to a client on his/her side.

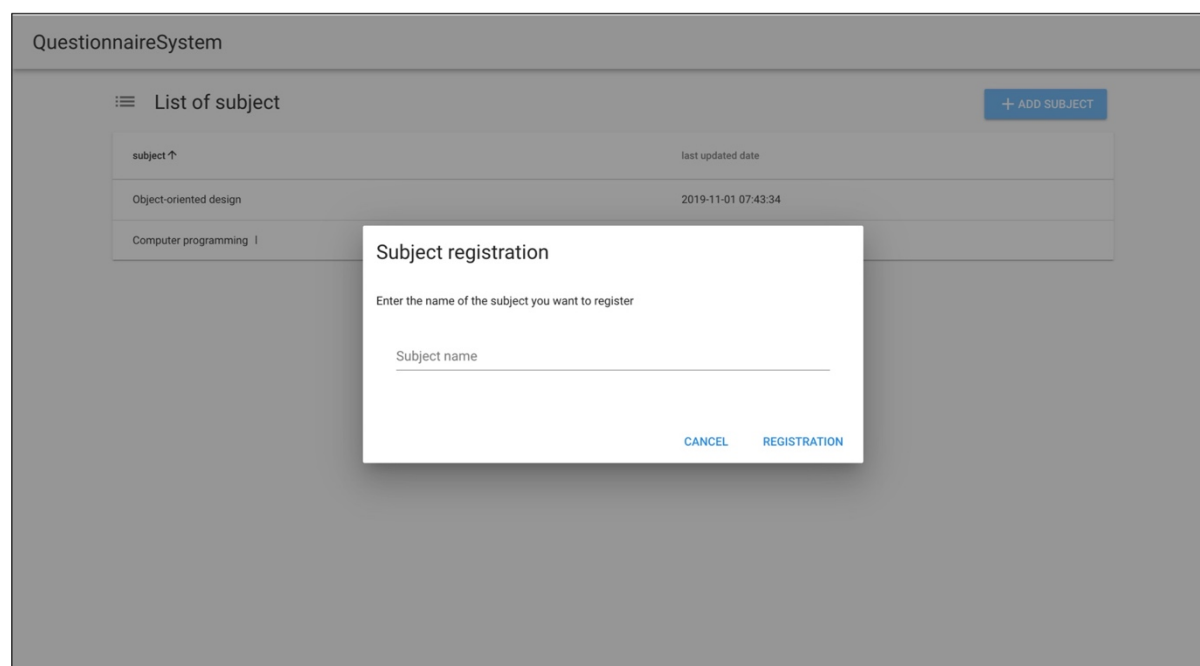
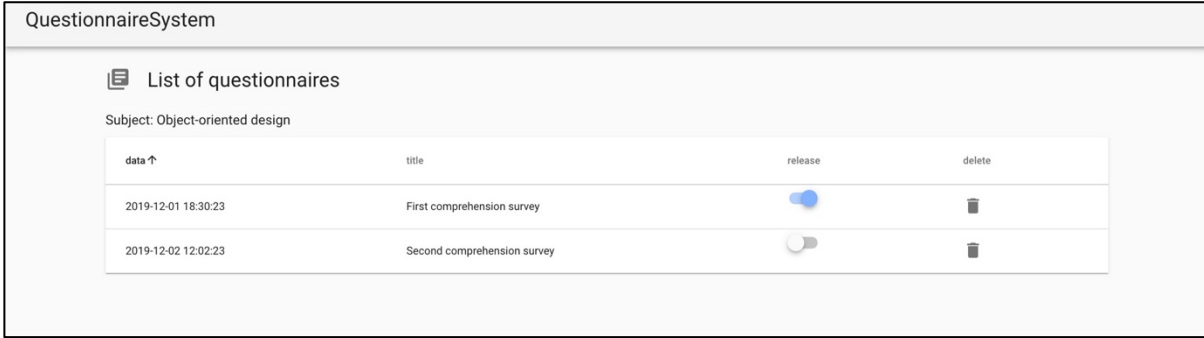


Figure 1: Subject registration on an instructor's side

Two or more multiple-questioned questionnaires can be made for each subject so they can be divided based on such as date and time, usage, and so on. The multiple-questioned questionnaires are also shown as a list for each subject, and an instructor can jump to a screen s/he wants to go to such as their names, date and time they were created, toggling of public and private, and their results (See Figure 2).



The screenshot shows a web interface titled 'QuestionnaireSystem'. Below the title is a section 'List of questionnaires' with a sub-header 'Subject: Object-oriented design'. A table lists two questionnaires with columns for 'data', 'title', 'release', and 'delete'.

data ↑	title	release	delete
2019-12-01 18:30:23	First comprehension survey	<input checked="" type="checkbox"/>	
2019-12-02 12:02:23	Second comprehension survey	<input type="checkbox"/>	

Figure 2: List of questionnaires on an instructor's side

The state to be public or private means the questionnaires can be toggled to appear to students or not. After creating the multiple-questioned questionnaire, its state is going to be private automatically, so an instructor needs to toggle it to be public at an arbitrary time. Private ones cannot be shown in a client on a student's side, so they cannot be answered and their results cannot be viewed.

A simple questionnaire is a questionnaire containing a single question. This questionnaire appears to students as soon as this is created, and forces them to answer. Since a simple questionnaire contains only one question, can answer it without thinking about other ones.

The ways to create a multiple-questioned questionnaire and a simple one are the same (See Figure 3 and Figure 4). Available formats to answer are a single selection, a multiple selection, and a free description. A single selection requires only one from some options whereas a multiple selection need arbitrary numbers of answers. A free description allows an answerer to write letters s/he wants to freely. Arbitrary items of a multiple-questioned questionnaire can be toggled to be answered absolutely. If some items are toggled in that way, a student cannot send the questionnaire without answering them, in other words, those items must be answered. Since a simple questionnaire consists of only one question, it requires an answerer to answer absolutely.

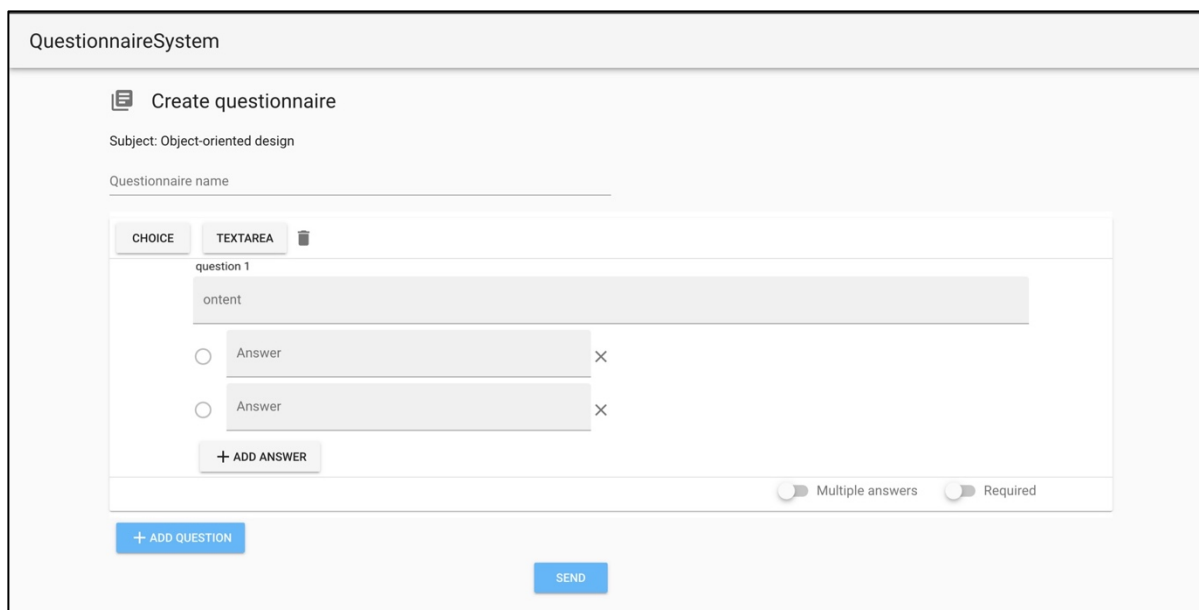


Figure 3: Screen to create a multiple-questioned questionnaire

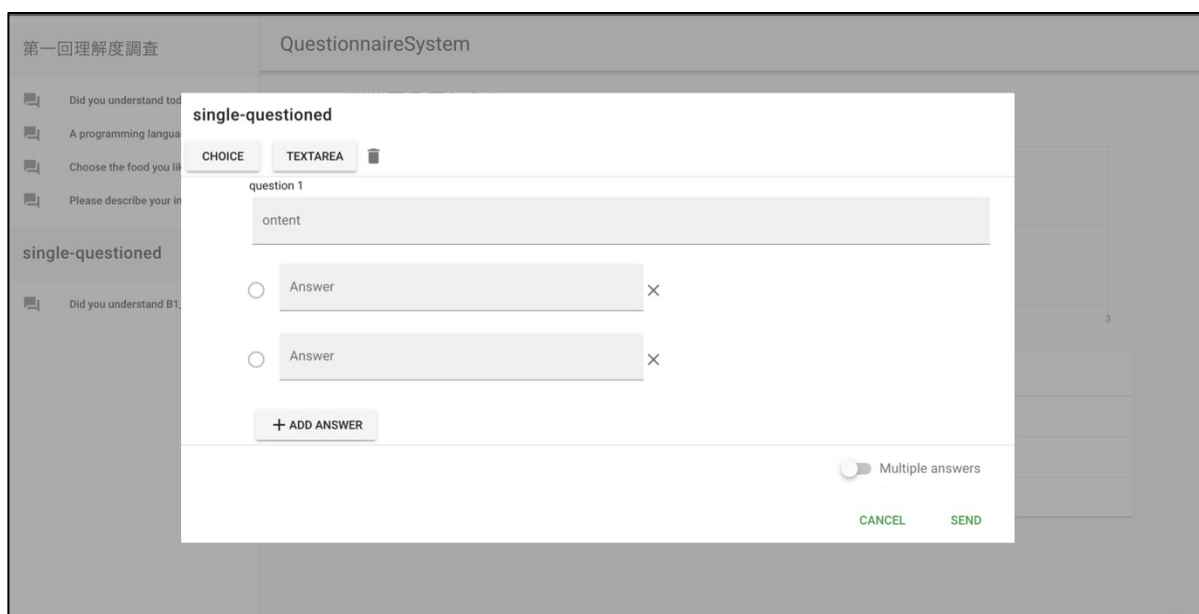


Figure 4: Screen to create a simple questionnaire

An instructor can view the situation of students on the screen of questionnaires' results (See Figure 5). On this screen, an instructor can choose which item to see at the bar on the left-hand side. The results of questionnaires are shown as graphs or tables. In terms of graphs, the aggregated results are shown as a bar graphs where maximum value is the number of students who take a subject. Because of this, an instructor can see the results graphically. In terms of tables, an instructor can view answered data in more details such as a student's name and ID number. And each column can be sorted so the instructor can control the table. Students who did not answer are shown as "Unanswered" so an instructor can monitor those students accordingly. Since the values of the results will be updated and shown in real time, an instructor does not need to operate this system to view their reactions during class.

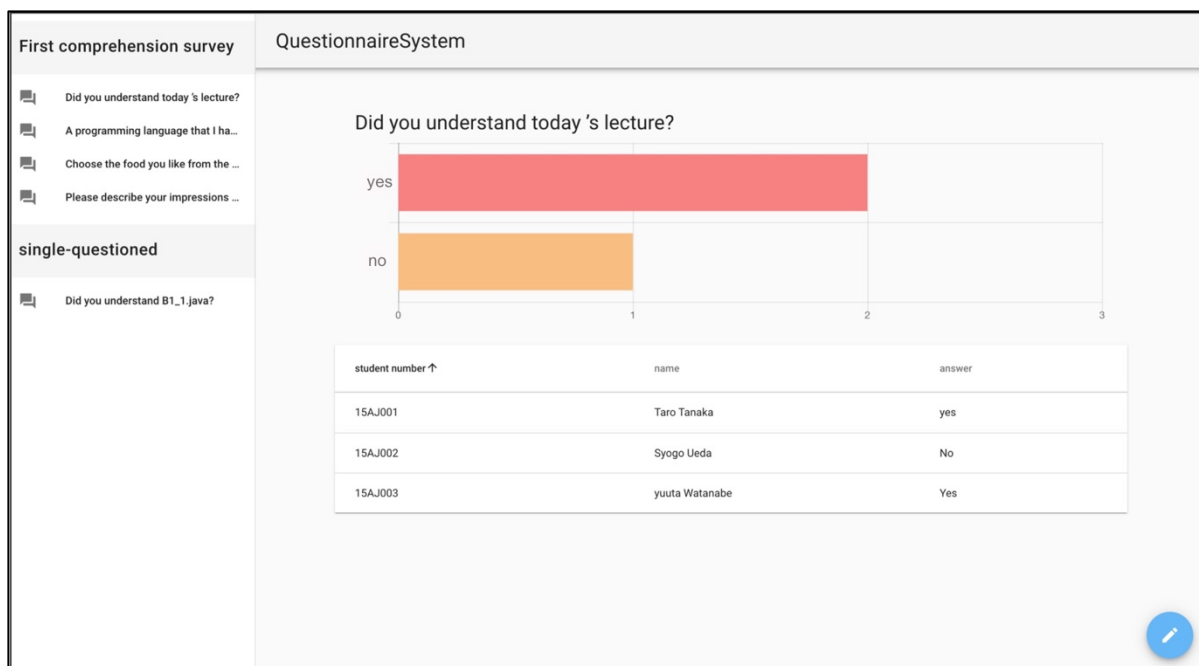


Figure 5: The results of a questionnaire on an instructor's side

### A Client on A Student's Side

Main functionality of a client on a student's side contains answering a questionnaire and gaining the response status of a questionnaire. A unique ID is assigned to each subject and a student can answer a questionnaire and view the results of aggregation by entering the subject's ID in this system. Because of this, a client on a student's side needs to register a subject (See Figure 6). The registration is complete by typing a subject ID provided by an instructor.

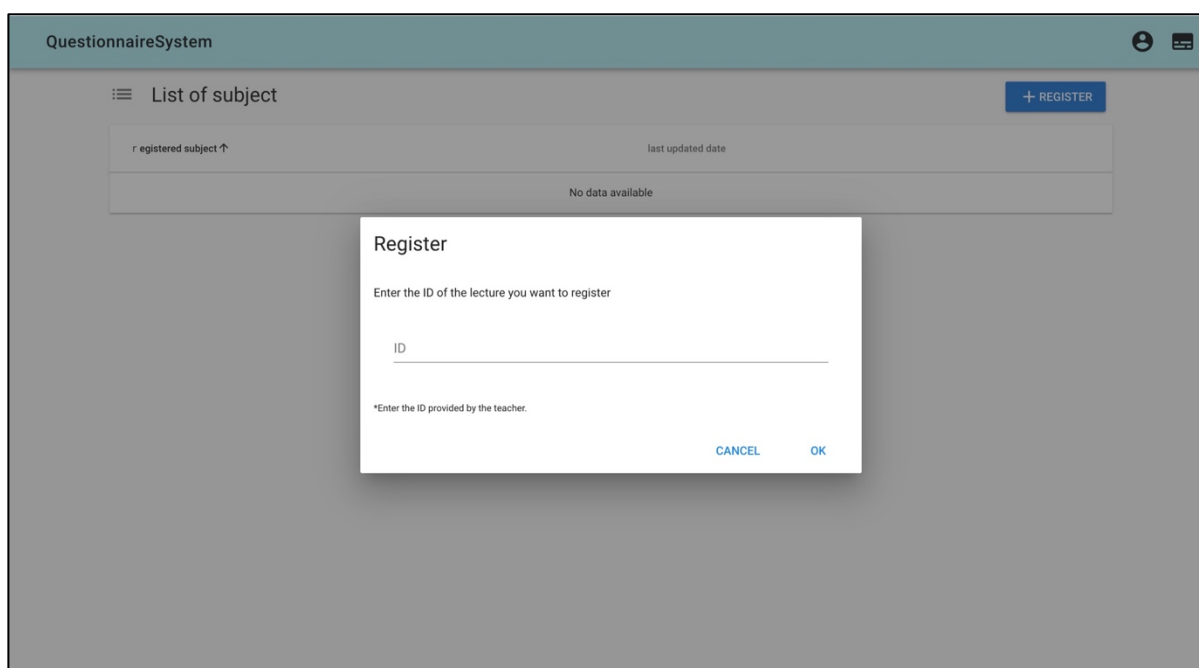
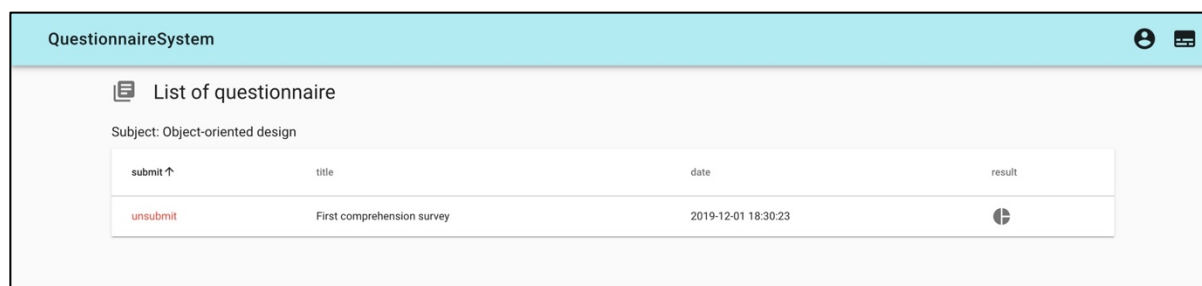


Figure 6: Subject registration on a student's side

Questionnaires are shown per subject (See Figure 7). Questionnaires in the figure are multiple-questioned ones created by an instructor. Only questionnaires created by a client on an instructor's side will appear.

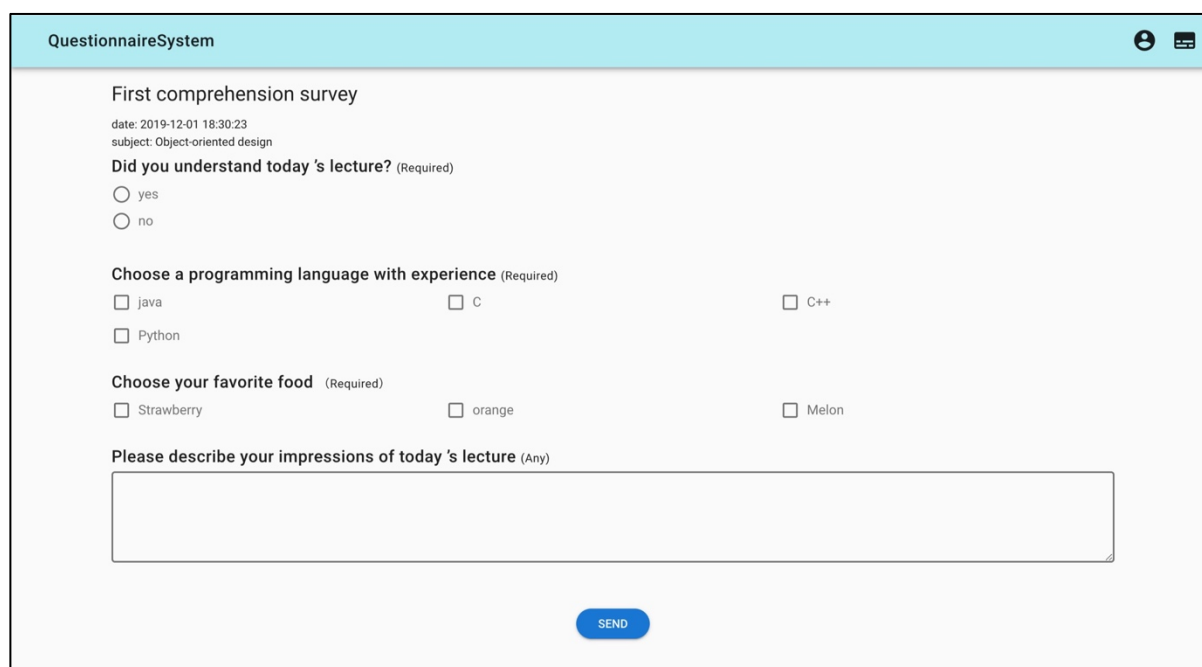


The screenshot shows a web interface titled "QuestionnaireSystem". Below the title bar, there is a section titled "List of questionnaire" with a sub-header "Subject: Object-oriented design". A table lists the questionnaires:

submit ↑	title	date	result
unsubmit	First comprehension survey	2019-12-01 18:30:23	🔄

Figure 7: List of questionnaires on a student's side

By choosing one of the multiple-questioned questionnaires listed, a student can answer it (See Figure 8). How to answer varies according to the format of the question such as selection and description. This system confirms that items which are toggled to be answered absolutely before sending the results so it may return feedback to force a student to fill them if there are unanswered ones (See Figure.9). This system sends the results and completes if all the questions that must be answered are finished.



The screenshot shows a web interface titled "QuestionnaireSystem" displaying a questionnaire titled "First comprehension survey". The date is "2019-12-01 18:30:23" and the subject is "Object-oriented design". The questionnaire contains the following questions:

- Did you understand today's lecture? (Required)**  
 yes  
 no
- Choose a programming language with experience (Required)**  
 java       C       C++  
 Python
- Choose your favorite food (Required)**  
 Strawberry       orange       Melon
- Please describe your impressions of today's lecture (Any)**

A blue "SEND" button is located at the bottom of the form.

Figure 8: Screen to answer a multiple-questioned questionnaire

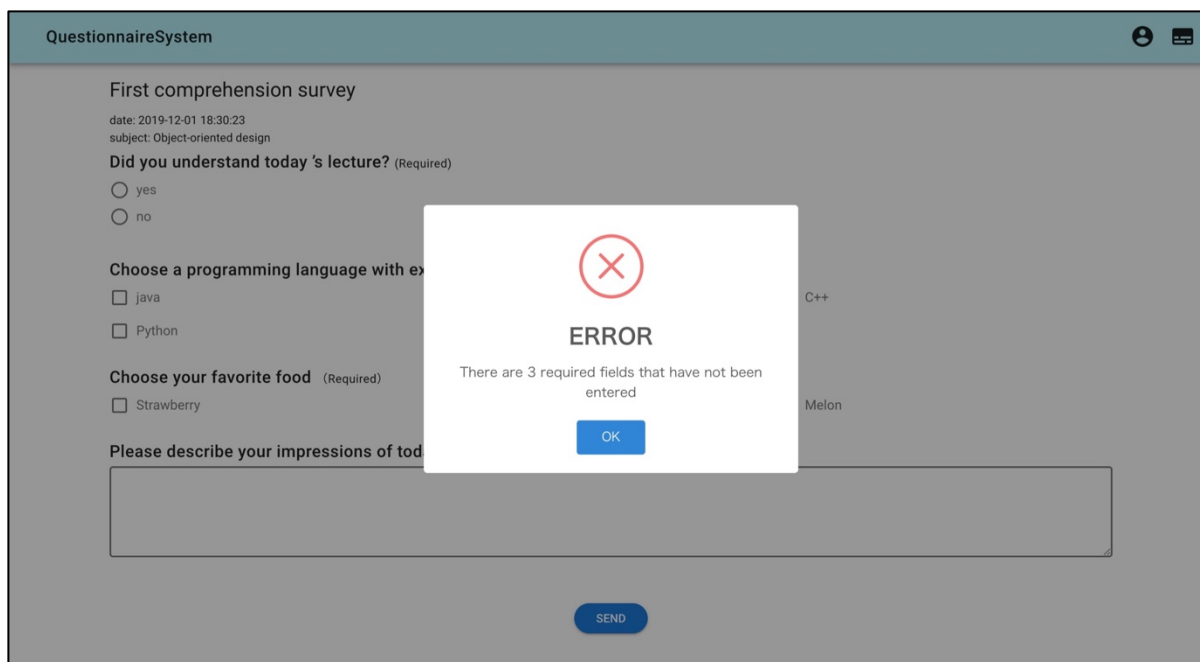


Figure 9: Feedback when questions that must be answered are unanswered

The results of a questionnaire will appear by selecting the pie chart on the right-hand side (See Figure 10). On the results screen, all the results for each question will be shown based on ratios in pie chart.

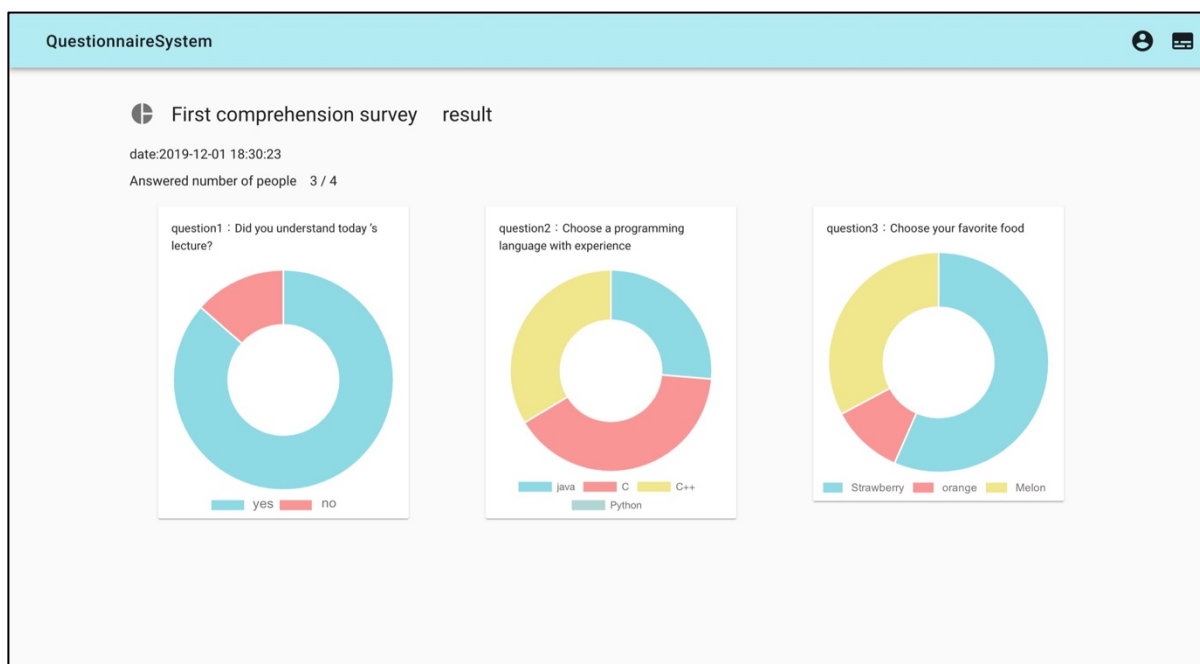


Figure 10: The results of a questionnaire on a student's side

When an instructor of a subject creates a simple questionnaire, all the students who take the subject will see a dialog to answer (See Figure 11). This dialog will never disappear unless a student answers it.

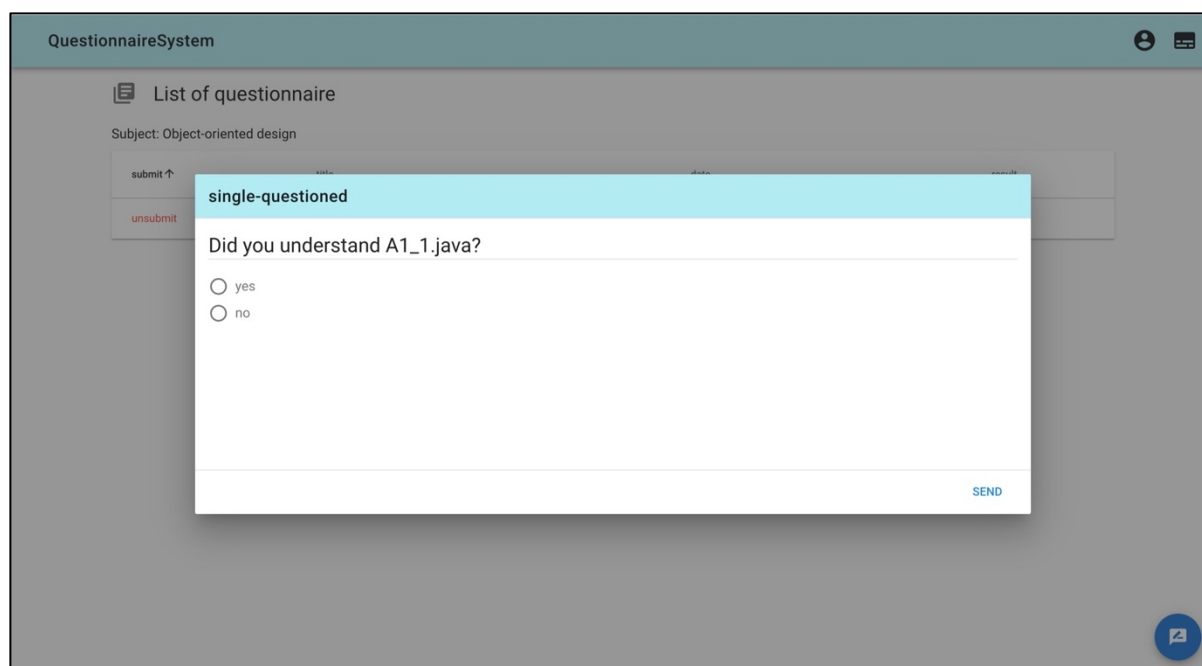


Figure 11: Screen to answer a simple questionnaire

### **Multidevice Supported**

The number of users who use smartphones and/or tablets has been increasing recently. With this trend, it also has been increasing that the number of accesses to the same Web sites from a lot of devices with different screen sizes. To support the multidevice trend, there are demands to show Web sites in a proper screen size by introducing the responsive design even if a variety of devices access to the same one. Using the design, the usability of a device with a small screen will be improved.

By considering the spread of smartphones and classes without PCs, this system has adopted the responsive design for being accessed by a variety of devices. Supported screen sizes are for smartphones, tablets, and laptops. One example of differences of UIs among them is an icon button on a header part (See Figure 12). When you view this system using your laptop, the contents of functionality will be displayed while the cursor is hovering over the icon. But no cursors exist in a smartphone so you do not know what functionalities lie. Because of this, this system's UI for smartphones does not have the icon but have texts to show functionality to be chosen.

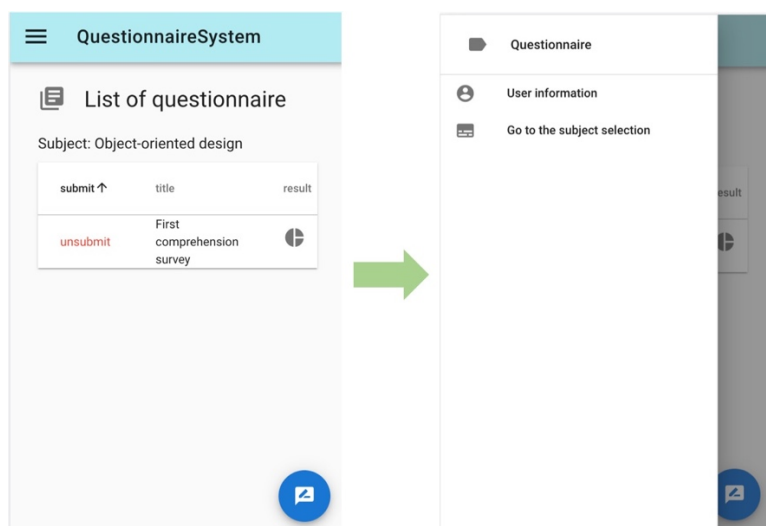


Figure 12: UIs of different devices

## Server

This system's server has adopted REST API, and sends/receives information about a questionnaire using it. Data format is JSON. The server keeps data submitted by a client with time and ID. A client can receive necessary data from the server by calling the API.

There are two types of APIs: for an instructor and for a student. Instructors can create a questionnaire and delete it and students can answer it. The APIs vary according to the usage. And both of instructors and students can receive questionnaires, but instructors can see student's information on it whereas students cannot. Because of this, returned information varies according to the usage even if the same API is called. A client designates API based on a user and a usage to get necessary data.

## Conclusion

In this study, a questionnaire system with a response analyzer has been developed by considering the device-independence. Using this system, instructors can grab students' situation instantly, and improve their lectures according to the demands. Students are free from limitation of devices to be able to answer the questionnaires. So instructors can improve their lectures more easily and teach more properly. Students also receive a setting where they can ask questions more freely and understand lectures well.



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*Analysis of Visuals in Political Science Textbooks to Identify its Role in Encouraging Higher Order Thinking in Students*

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The Asian Conference on Education 2019  
Official Conference Proceedings

**Abstract**

Visuals, including photographs, sketches, and schematic diagrams, are a valuable aspect of textbooks. Visuals in the textbook attract attention and help in the retention of information. It also enhances understanding and creates a context for learning. Schools are also emphasizing ‘higher-order thinking (HOT)’, rather than memorization of a cannon of topics. HOT occurs when a person takes new information and interrelates and/or rearranges and extends this information to achieve a purpose. This study identifies and analyses the role of visuals in political science textbooks in encouraging HOT in students. This study is based on the textbooks of the National Council of Educational Research and Training (NCERT) for classes 6–10. On the basis of their relationship with the content, visuals were categorized as Interactive (physical interaction with the visual), Promptive (thought-provoking questions asked on the visual), Representative (visuals supporting text), Antecedent (visuals explained in text), Nested (layers of information in one visual), Intersecting (no explicit relation between visual and text). Of these categories, Interactive, Promptive, Antecedent, and Intersecting visuals are tools for HOT with different levels of complexity. The overall percentage of visuals that encourage HOT is 48.37% (39.3% photos; 54.9% illustrations). The highest percentage of HOT encouraging visuals were found in class 7th (70.73%). Interactive visuals were found to be higher in class 6th and 7th. Promptive visuals were highest in class 8. Antecedent and Intersecting visuals, though their level of complexity is high, were found to be higher in class 6th and 7th as compared to 9th and 10th.

Keywords: School textbooks, higher order thinking, visuals, political science, NCERT

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## **Introduction**

Visuals are one of the most important part of the textbooks. Visuals in the textbook are known to attract attention, to help in the retention of information, to enhance understanding and to create a context for learning (Vinisha, K., & Ramadas, J. (2013)). Visual representations, including photographs, sketches and schematic diagrams, are a valuable yet often neglected aspect of textbooks. Visual means of communication are particularly helpful in introducing abstract concepts in science. For effective communication, visuals and text need to be appropriately integrated within the textbook (Vinisha, K., & Ramadas, J. (2013)).

Visuals have been categorized in various ways. The work of Carney and Levin (2002) focused on five functions of visuals: decorative, representational, organisational, interpretational and transformational. Similarly, the linkage between pictures and text has been emphasised by Kearsey and Turner (1999). Romney and Bell (2012) conducted a picture analysis on Business English textbooks where they categorized pictures as either instructional or decorative.

The concept of higher order thinking (HOT) is derived from the Bloom taxonomy of cognitive domain introduced in 1956 (Forehand, 2010). Stein and Lane (1996) describe HOT as “the use of complex, nonalgorithmic thinking to solve a task in which there is not a predictable, well-rehearsed approach or pathway explicitly suggested by the task, task instruction, or a worked out example. “Higher-order thinking basically means thinking that is taking place in the higher-levels of the hierarchy of cognitive processing. The most widely accepted hierarchical arrangement of this sort in education is Bloom’s Taxonomy (Ramos, J. L. S., Dolipas, B. B., & Villamor, B. B. (2013)).

## **Method**

### **Purpose of study**

The purpose of the study was to identify if the visuals in textbooks could help enable higher order thinking in students and if so, are there specific types of images that are better at it?

### **Data Collection**

This study is based on the textbooks of the National Council of Educational Research and Training (NCERT) for classes 6–10.

Most of the larger states in India produce their own textbooks, often with reference to the NCERT textbooks (Vinisha, K., & Ramadas, J. (2013)). The images in the textbooks were analysed on the basis of their relationship with the text and the level of complexity of the relationship was identified. The levels of complexity were identified from the revised version (2001) of Bloom’s taxonomy of learning. The stages of the framework are Remember, Understand, Apply, Analyze, Evaluate and Create.

## Findings and Discussions

### Categories of visuals

Six different types of visuals were identified in the political science textbooks throughout classes 6 to 10 with varying degrees of presence of that visual in the textbook for different classes. The visual types were defined with respect to their relationship to the corresponding text. The following were the identified categories of visuals:

#### Interactive

Visuals that require the reader to physically interact with the visual in order to understand a concept or the information are called Interactive visuals. These are mostly illustration or sketches. Such a visual has clear instructions about the activity to be performed by the reader with the given visual. The information to be understood is not explicitly mentioned in the text.



Circle the reference to caste in the matrimonial advertisements given above.

Figure 1: Example of Interactive Visual.

#### Promptive

Visuals which are accompanied by leading question/s are called Promptive. The accompanying questions are based on the visual given. The answers to the questions are not explicitly mentioned in the text.

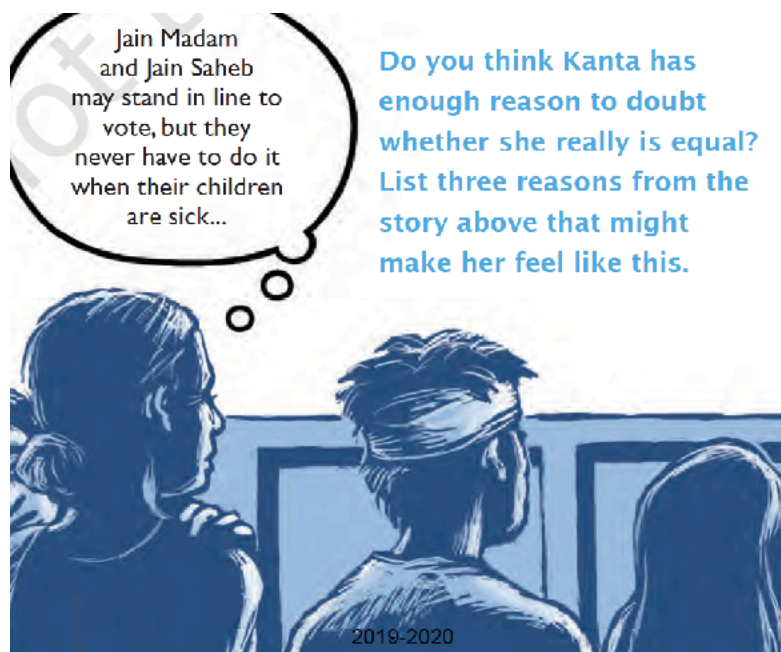


Figure 2: Example of Promptive Visual

**Nested**

The visuals which has a complex concept represent through an abstract visual which has layers of information is called Nested visual. These visuals contain a lot of labels and small descriptions explaining the abstract visual. These are usually illustration or sketches.

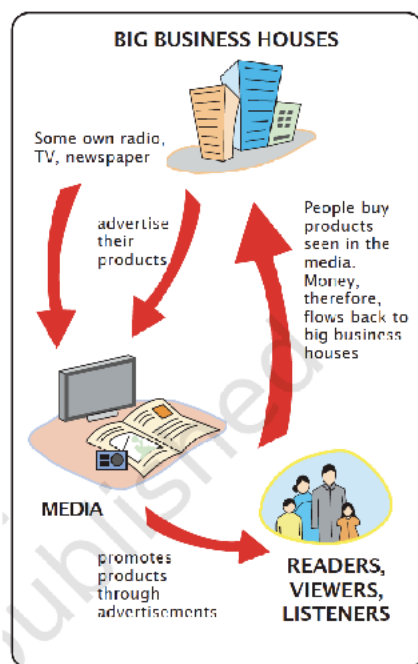


Figure 3: Example of Nested Visual

## Representative

Visuals which act as a support to the corresponding text are called Representative. The information represented by these visuals are subset of the corresponding text. The purpose of these visuals is to help understand the given text better.



The above map of India shows the state of Kerala in pink.

### The Kerala experience

In 1996, the Kerala government made some major changes in the state. Forty per cent of the entire state budget was given to panchayats. They could plan and provide for their requirements. This made it possible for a village to make sure that proper planning was done for water, food, women's development and education. This meant that water supply schemes were checked, the working of schools and *anganwadis* was ensured and specific problems of the village were taken up. Health centres were also improved. All of this helped to improve the situation. Despite these efforts, however, some problems – such as shortage of medicines, insufficient hospital beds, not enough doctors – remained, and these needed to be addressed.

For more details, visit <http://lsqkerala.gov.in/en>

Let us look at an example of another country and its approach to issues of health.

Figure 4: Example of Representative Visual

## Antecedent

Visuals that are explained through the corresponding text are called Antecedent. The information by these visuals are explained by the corresponding text.



In rural areas, water is needed both for human use and for use by the cattle. The sources of water are wells, handpumps, ponds and sometimes overhead tanks. Much of these are privately owned. Compared to the urban areas, there is an even greater shortage of public water supply in rural areas.

Figure 5: Example of Antecedent Visual

## Intersecting

The visuals which are abstract in nature and the information represented through the visual has no explicit relation to the corresponding text are called Intersecting visuals. These are called Intersecting because the information represented through the visual and the information presented through the corresponding text has a part of the information coinciding. The visual represents the text and the text represents the visual but both in an abstract manner.



Figure 6: Example of Intersecting Visual

## Visuals and their position in Bloom's taxonomy

The 6 types of visuals have been mapped to different levels the Bloom's taxonomy according to the definition of the visual type.

### Promptive

The questions related to the visuals are such that the reader needs to question what has been taught to them till then. The reader not only needs to understand, apply and analyze the situation presented to them through visuals but also evaluate the situation, the correctness or the wrongness or the situation, according to whatever information that has been provided to them.

### Nested

Nested visuals breakdown the concept into easy to digest visual representation of the concept and hence these visuals aid the reader to remember and understand the given complex concept.



## Representative

Since Representative visuals act as a support to the text and doesn't require the reader to look for information other than that has already been mentioned in the text, it could be said that these visuals would fall under the category of remember and understanding.

## Antecedent

The text corresponding the visual is a support to the information represented by the visual. This results in requiring the reader to analyze the visual and supplement previous knowledge that the reader might already have, in order to gain the complete information that the visual holds.

## Intersecting

The text corresponding to the visual has very little explicit information about the visual. The reader not only needs to analyse the visual but also question and create new information of the basis of their understanding of the abstract visual in order to establish a relationship between the visual and the corresponding text.

## Interactive

The Interactive visual requires the reader to have understood the information provided previous to the activity to be done with the visual and now apply that information for the activity. The visuals are usually an applicative representation of the information given to the reader before in the same section, usually.

According to definitions stated above, the categories could be said to lie in the different levels of the Bloom's taxonomy as below:

Type of visual	<b>Representative</b>	<b>Nested</b>	<b>Interactive</b>	<b>Promptive</b>	<b>Antecedent</b>	<b>Intersecting</b>
Level of Bloom's taxonomy	Remember, Understand	Remember, Understand	Apply	Evaluate	Analyze	Create

## Defining Higher Order Thinking Visual

Higher Order Thinking Visuals (HOTV) are defined as the visuals that enable higher order thinking in students.

Though Bloom's taxonomy doesn't define the exact level of differentiation between lower and higher order thinking but rather a progressive chart from lower to higher order thinking, for the purpose of identifying HOTVs, the categories **Interactive**, **Promptive**, **Antecedent** and **Intersecting** have been considered as Higher order thinking visuals. This is because these are the categories which go beyond just remembering and recalling the facts.

## Results

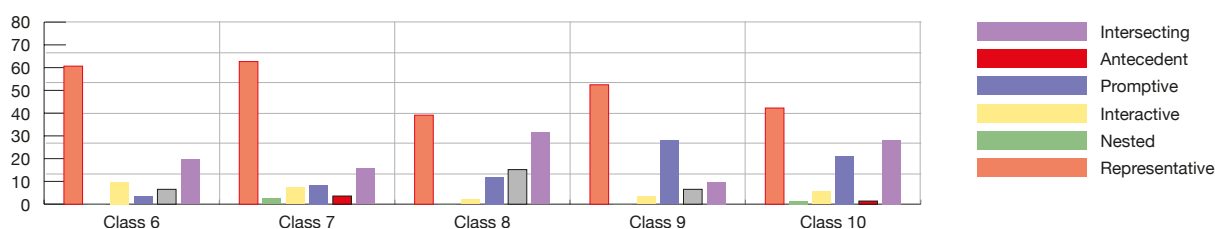


Figure 6: Percentage of visuals across classes

1. The overall percentage of visuals that encourage HOT is 48.37% (39.3% photos; 54.9% illustrations).
2. The highest percentage of HOT encouraging visuals were found in class 7th (70.73%).
3. Interactive visuals were found to be higher in class 6th and 7th.
4. Promptive visuals were highest in class 8.
5. Antecedent and Intersecting visuals, though their level of complexity is high, were found to be higher in class 6th and 7th as compared to 9th and 10th.

## Conclusions

Visuals play a big role in learning and development of a child and hence it is necessary that the design of the tools of learning is done in a way suitable to the growth of a child's mindset. Books are an important tool for development of higher order thinking and visuals cannot be separated from that process. The visuals should be presented in the books in a manner which allows students to grow at different stages of their lives progressively. Therefore, it is necessary that the complexity of understanding and interacting with the visuals be kept in mind. The quantity and complexity of the visuals shall increment according to the stage of life the student is at.

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## *A New Self-adaptive Separate Grammar Test for Online Young L2 Learners*

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### **Abstract**

Grammar, a core component of the language system, is usually tested through writing and speaking in major language tests for young second language (L2) learners, such as Cambridge Young Learners English Tests. This, however, can not be aligned with students' learning needs in the later stages of acquisition. Moreover, the form of grammar, which is a better reflection of learners' explicit knowledge of grammar, should deserve more attention in language tests. Taken together, a proposal that grammar should be tested separately arises. Thus, this paper introduces a new self-adaptive grammar test for online young L2 learners. As mentioned above, using the correct form of grammar is vital for L2 young learners. Assessing grammar through four skills are too vague and inaccurate to provide comprehensive diagnosis of grammar knowledge and skills. Hence, the speaker decides to test grammar separately. Meanwhile, considering the methods and purposes of online assessment, the question type we choose in this new test is multiple-choice, through which we can know students' specific weaknesses and strengths. Furthermore, many tests used to assess students' English level is unified. Few tests can test students' actual level. This new grammar test is self-adaptive which can provide students with different questions based on students' last question's performance. It can assess students' performance more accurately. Besides, this self-adaptive test also can save a lot of testing time. Therefore, students' grammar performance can be accurately and effectively tested.

Keywords: separate grammar test, self-adaptive, L2 young learners

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## Introduction

This paper introduces a new grammar test, which aims to test students' knowledge of form of grammar which is vital for English Language Learners(ELLs) who do not have an English speaking environment to reinforce their awareness of form implicitly and aims to make other testing service know the importance of testing form of grammar separately. This test also provides a way to know the specific knowledge whether students have acquired or not by labeling each choice with specific grammar knowledge. Besides, this new grammar test is self-adaptive, which provides students with tasks aligned to their knowledge level, making the test time-saving and reliable.

## Body

Grammar, the structural glue, the “code” of language, is arguably at the heart of language use, whether this involves speaking, listening, reading ,or writing (Purpura, 2004). Grammar was used to mean the analysis of a language system, and the study of grammar was not just considered an essential feature of language learning, but was thought to be sufficient for learners to actually acquire another language (Rutherford, 1988). The grammar itself is essential not only in the language and but in students’ learning paths, which needs to be tested in the students’ learning process.

We can see that there are many mainstream tests for ELLs around the world, such as Cambridge Young Learners English Tests, Aptis, TOFEL Junior, Key English Test (KET) ,and the like. To know the nature and test items, we can try to analyze these tests. The test items in Cambridge Young Learners English Tests are listening, reading and writing, speaking. The test items in Aptis are grammar and vocabulary, reading, listening, writing, speaking. The test items in TOFEL Junior are listening, language form and meaning, practice, reading. And the last one, KET includes listening, reading and writing, speaking. From the test items in these tests, we can find that grammar is seldom tested or tested through four skills (reading, speaking, writing ,and listening). We may have a question about whether these tests can check students’ grammar abilities or not.

Then, I will cite some writings written by primary school students in Shanghai. This writing task requires students to write a composition named “A birthday party” with no less than 40 words and at least three kinds of sentence structure. Here are the writings.

1. *“Today is my birthday. I invited a lot of my friends to my birthday. At first, we sang a song, than we eat a birthday cake. It taste so good. At last, we whatched a film. We all had a great time.”*

2. *“Today is my birthday. It’s on the seventh of July. I have a green party. My friends comes to my party. My friends have Alice, Dinny, Peter, Kitty and Jill. We are very happy. We like a green party.”*

3. *“My birthday is July of seven. My birthday party am vray happy. I can playing pame. I like birthday party.”*

From these writings, we can find a lot of mistakes, including spelling and grammar. Most of these problems are grammatical structure problems. In fact, students know what they want to express, but they can’t write it in correct form. We may say that it is quite easy for native speakers to write about this topic ,or we can say, to combine

different words in a particular rule, but for second language young learners, it seems that it is not as easy as native speakers. Native speakers pick up grammar as they learn to speak. They use grammatically correct sentences because the speakers surrounding them speak grammatically correct sentences. While for second language young learners, they feel confused when they should deal with sentence structures because they do not understand or even do not know the form used in English.

Therefore, in order to know the exact grammatical structure problems, I advocate using the discrete-point test to test grammar separately. Discrete point tests respond to the underlying assumption that language can be broken down into its component parts and that those parts can be tested successfully (Lado, 1961). These components are the four skills (listening, speaking, reading, writing) and the different linguistic components (morphology, graphology, spelling, grammar, syntax, and vocabulary) together with subcategories within these units. Accordingly, tests are devised in order to assess just one of these components. From these, the discrete-point test can be used to test grammar separately to know the specific knowledge that students know or don't know.

Discrete point test refers to the testing of one element at a time, item by item. This might involve, for example, a series of items each testing a particular grammatical structure (Hughes, 2003). From the analysis of some mainstream tests, we find that the grammar is often tested through listening, speaking, reading, and writing. We should test students' certain grammar knowledge at one time.

In terms of these theories, we can conclude that the discrete-point test may be a better choice to know students' specific knowledge of grammar. Such an approach demands a decontextualization that often confused the test-takers. So we can test students' grammatical structure separately and objectively.

Based not only on the requirements of Common European Framework of Reference for Languages (CEFR) and China's Standards of English Language Ability (CSE) and other standards, but on the analysis of the data from more than two hundred thousand young English learners in China, we design a grammar table that includes useful grammar points for second language young learners. We conclude 91 grammar points that can be divided into seven levels and eleven parts.

Linguistic Points	Level					
	AC2	AC3	AC4	AC5	AC6	AC7
<b>Noun</b>	regular form	irregular form	uncountable noun and quantifier	possessive case	noun phrase	/
<b>pronoun</b>	adjectival possessive pronoun	nominal possessive pronoun	reflexive pronoun	reciprocal pronoun	indefinite pronoun: neither, either, both, all, none	indefinite pronoun: the other, another, others
<b>preposition</b>	Preposition of location: in/at/on/under/behind/ in front of/next to/between	Preposition of location: from/to/around/ inside/outside Prepositions of manner: with	Preposition of location: at Prepositions of manner: by, in Prepositions of Time: at	Preposition of time: before/after/about/round/a quarter to	Preposition of time: near, next Preposition of time: during/since/until/for	/
<b>article/quantifier</b>	indefinite article	definite article	zero article	any/some/many	a little/a few/little/a lo	
<b>adjective</b>	single adjective	/	regular form of comparative adjectives & superlative adjectives	irregular form of comparative adjectives & superlative adjectives	adjective as post-modifier	sequence of adjectives
<b>adverb</b>	single adverb: now, here, home	adverb of degree	adverbs of frequency	adverb of manner	adverb of time	/
<b>modal verb</b>	can	would	shall/should	must/have to	may/might	/
<b>non-finite verb</b>	simple gerund	infinitive as object	gerund	infinitive as object complement	infinitive without "to"	set phrase
<b>tense</b>	present simple tense	present continuous tense	past simple tense	future simple tense	present perfect tense	past continuous tense
<b>voice</b>	/	/	/	simple passive voice	passive voice	/
<b>sentence</b>	special question	exclamatory sentence	dual object sentence	object clause	adverbial clause	attributive clause

Every grammatical point at a certain level is easier than the previous one or more difficult than the next one, such as the uncountable nouns and quantifiers are easier than irregular form nouns and more difficult than the possessive case. Therefore, if a student makes a mistake of a particular grammar point at a certain level, he will go to the previous question, the easier one. And if he solves the issue correctly, he will go to the next question, the harder one. All these operations can be achieved on computers.

The question type of discrete-point test is the multiple-choice type which has been proven to be a better way to test students' grammar performance in discrete-point tests effectively and efficiently. Here I will list some examples from many linguists, such as Rea, Canale and Swain, Bloor et al. They all use the multiple-choice type in their assessments.

1. *How....milk have you got?* (Rea, 1985)  
(a) a lot; (b) much of; (c) much; (d) many
2. *We went....the store by car.* (Canale and Swain, 1980)  
(a) at; (b) on; (c) for; (d) to
3. *My friend always goes home....foot.* (Bloor, 1970)  
(a) by; (b) with; (c) on a; (d) on

The first question focuses only on testing whether students know the usage of uncountable nouns and quantifiers. The second question tests whether students know the collocation of "go". Besides, the third question tests whether students know how to use the preposition. From these three examples, the linguists only examine a particular grammatical structure at one time, which is achieved by the multiple-choice type. Then, I will list some typical examples from this grammar test our team designed.

1. *I see three \_\_\_\_\_.*  
A. leaf      B. leafs      C. leafes      D. leaves
2. *There \_\_\_\_\_ a meeting tomorrow afternoon.*  
A. will be going to      B. will going to be  
C. is going to be      D. will have



3. *In the past ten years, many good movies \_\_\_\_\_ in our country.*  
A. *were made of*                      B. *have been made*  
C. *had made of*                      D. *have made*

Through the answer to the first question, we will know whether students acquire the grammar knowledge of the irregular form of nouns or not. Also, through the answer to the second question, we will know whether students acquire the knowledge of the form of future tense or not. Likewise, through the answer to the third question, we will know whether students know how to use the passive voice and present perfect tense.

Besides, we also label every choice with certain grammar knowledge. Take the third question as an example, the option A is labeled by the knowledge of knowing the passive voice, but not knowing the present perfect tense, the option B is labeled by the knowledge of knowing both the passive voice and the present perfect tense, the option C is labeled by the knowledge of knowing the present perfect tense but not the passive voice, the option D is labeled by the knowledge of not knowing both the passive voice and present perfect tense. This can tell us whether students know the specific grammar knowledge through a certain question or even the choice.

### **Conclusion**

The purpose of our test is to gather information about the knowledge level of the test-takers which in turn aids the testers in making intelligent decisions about how to further proceed with teaching. In other words, we use tests to determine the learners' current knowledge level and what should be improved. From this, we believe our test is objective, accurate, time-saving, and user-friendly. It can be said that the test is objective, it is easy to score and achieving reliable scores. Besides, we can know students' specific weaknesses and strengths from this test. So we can say that the test is accurate. Being time-saving, this test is self-adaptive by providing students with tasks aligned to their knowledge level. Being user-friendly, it will give students individual feedback reports.

### **Acknowledgments**

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## *A Language Proficiency Test that Works*

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### **Abstract**

Either out of inadequate technology or for the sake of convenience, most language proficiency tests tend to oversimplify students' diverse needs and provide one size fits all reports. Take the Oxford Young Learners Placement Test, for example. This test includes two sections, namely listening and language use. The latter combines grammar, vocabulary, and language function. A student gets a final score and a corresponding Common European Framework of Reference (CEFR) level at the end of the test. However, such a generic result cannot provide any insight into individualized learning solutions. Consequently, it is of no use for young English language learners (ELLs) in non-English speaking environments. To address this gap, we believe a language proficiency test that truly works should be solution-based, which provides personalized guidance in the service of learning improvement.

Keywords: personalized, efficient, accurate

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## **Introduction**

As one of the fast-developing online language education startups in China, we found that current language proficiency tests do not work in guiding learning. As is known, China now has the most significant number of ELLs in the world, who have to take English language proficiency tests to access higher or privileged education. However, current language proficiency tests oversimplify students' diverse needs and provide one-size-fits-all reports. Take Cambridge Test, for example. Each student will get a final score and a corresponding CEFR level at the end of the test. Similar examples are the APTIS and the TOFEL junior test, which also fail to provide diagnoses in detail. Although test-takers receive scores and corresponding CEFR levels in each skill domain, those judgments and descriptions are still one-size-fits-all. In other words, test-takers with similar skill levels do not know what exactly the differences in their language capacities are, and they do not know what learning solutions to come next either. Current language proficiency tests, as we see, also fails to provide learning solutions.

On the meanwhile, for many years, it is the curriculum designers that are providing learning solutions for test-takers. However, most learning solutions provided by curriculum designers are also one-size-fits-all. Over 90% of students of different language proficiency levels in China are taking the same curricula. We think it is time to change.

The change starts with standards. In the past and now, language proficiency tests are designed based on language standards, such as CEFR, CSE (Chinese Standards of English), test-takers get reports that indicate levels and descriptions without learning solutions. Meanwhile, curriculum designers are busy with providing one-size-fits-all learning solutions based on the standards on which the tests are based. The problem is that the solutions provided by curriculum designers do not always meet the diverse demands of test-takers. The effective learning solutions should meet the diverse demands of test-takers and target learners' strengths and weaknesses. To achieve this goal, it is test-developers' responsibility to bridge the gap and provide individualized learning solutions that target at test-takers' strengths and weaknesses.

## **Main Body**

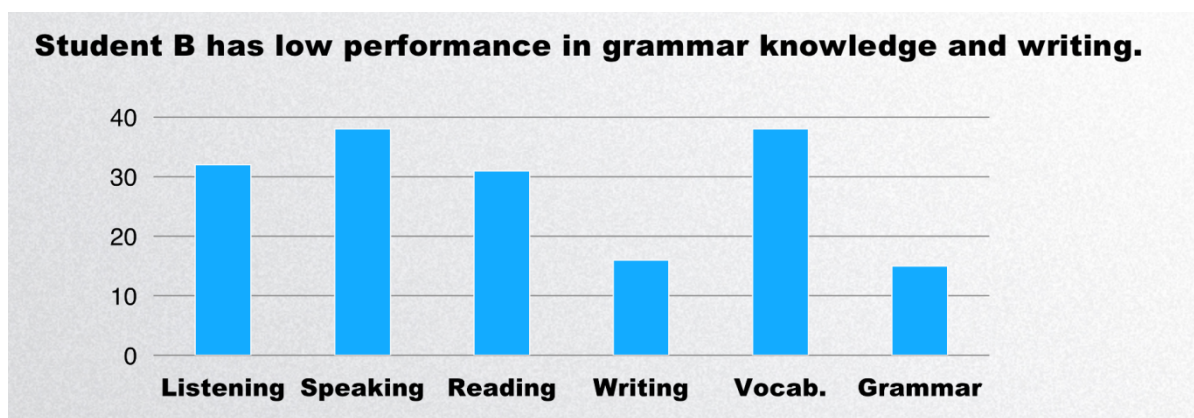
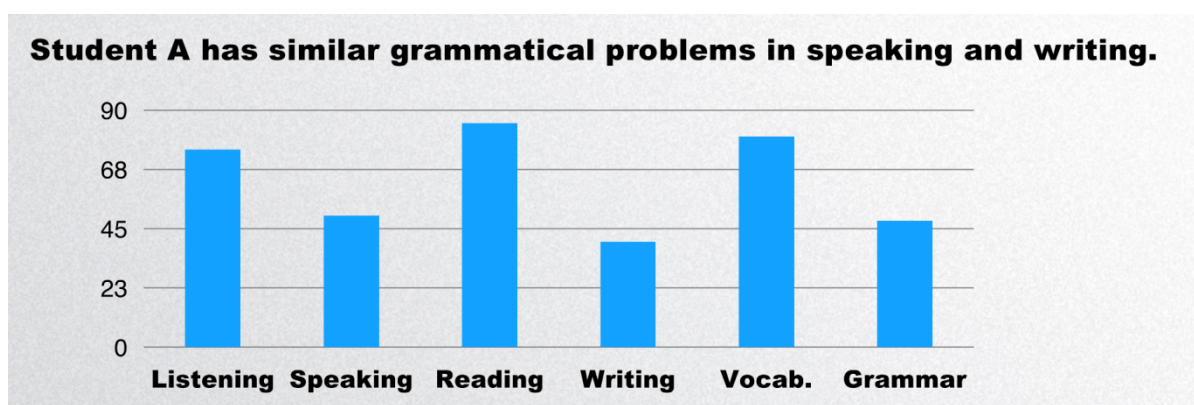
To design a proficiency test that provides individualized learning solutions, we set up standards including language knowledge and language skills based on CEFR and CSE, and we are also designing a computer-adaptive test based on this standards. Tailored learning solutions that target at test-takers' weaknesses are provided at the end of the test.

### **The Standards**

Based on CEFR and CSE, we select the most frequent words and grammar knowledge in daily use and in language tests such as the Cambridge Tests for Young English Learners and the TOFEL Primary Tests. We also establish standards for reading, listening, writing and speaking, which specifically target at Chinese young ELLs' demands for academic or communicative purpose.

### The Test

First, a solution-based language proficiency test provides comprehensive diagnoses. In contrast, language knowledge is underrepresented in reports of current language proficiency tests. In these reports, vocabulary and grammar knowledge is always absent. We believe a solution-based language proficiency test provides specific and constructive diagnoses all around. There has been already much research proving the disadvantages of not testing grammar separately. As Purpura (2004) says, we have no way of knowing what grammatical difficulties learners might experience and providing feedbacks if we test grammar within the reading, speaking, writing, or listening tests. Although whether testing grammar separately yet remains a controversial issue, as an education start-up that has over 20 million strings of learning data, we found the advantages of testing grammar and vocabulary separately from language skills. Based on several pilot tests on a sample of 156,221 young English learners aged from 4 to 12, we find young ELLs have various language acquisition paths both in language knowledge (vocabulary and grammar) and skills (listening, speaking, reading and writing). For instance, learners' grammar knowledge is not always in sync with their lexical range. For any individual, each aspect of the test results may fall into different categories, sometimes with an enormous gap. Two cases are shown below:

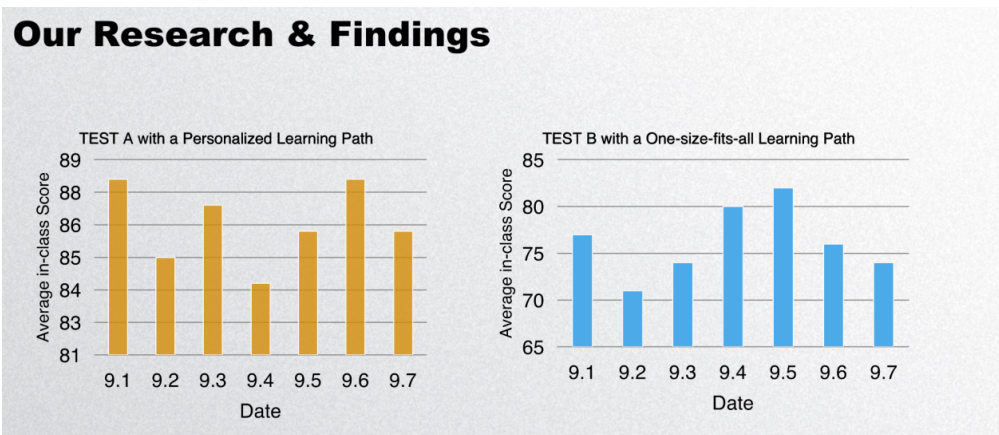
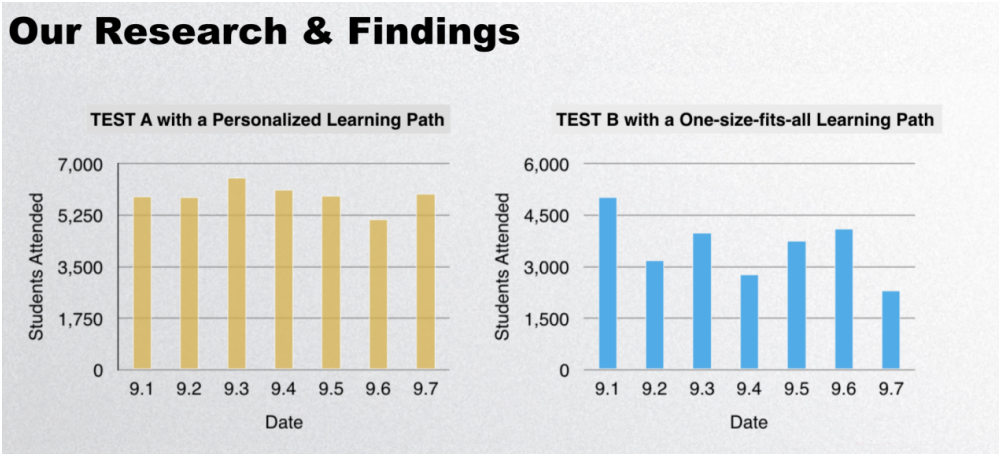


In case one, students A has similar grammatical problems in speaking and writing. These repeated problems are third-person singular, running-on sentences, and sentence fragments. In case two, student B has low performance in grammar knowledge and writing.

We found out it is always the similar problems that impede student A’s performance in speaking and writing; it is a lack of grammatical knowledge, not vocabulary, that leads to student B's low performance in writing. We have a considerable amount of data that makes us believe testing grammar and vocabulary separately helps us know exact difficulties ELLs may experience in reading, writing, speaking, and listening, and provide detailed feedback. The data also indicates that solutions provided by many test developers might be either too general or unreliable because learners' vocabulary and grammar levels are usually underrepresented or assumed identical to their four skills.

Second, a solution-based language proficiency test provides tailored learning paths. Current language proficiency tests are judgment-oriented. As said before, a learner cannot get any learning insight from a CEFR level or a score, or any general level descriptions. We believe a solution-based language proficiency test is learning-oriented and provides learners with the exact daily or monthly plans, including what they still have to learn. For example, on our platform, our students, after test, are expected to be provided with a personalized learning solution per day based on their weaknesses and interests.

In the meanwhile, we are always trying to find out how a personalized learning path impacts students' learning behavior and results. From our A/B tests, we found with a personalized learning path, student attendance rate is more stable, while in-class performance (exercise scores and engagement) is better than those with a one-size-fits-all learning path.



Third, A solution-based language proficiency test predicts what to learn next. Current language proficiency tests roughly report what learners are already capable of. As we see from a TOFEL Primary test report, students only get a list of *can do*. *Can do* is not the start point for learning. Instead, *cannot do* is. Therefore, we believe a solution-based proficiency test predicts what to learn next. For example, a test-taker, after the test, is immediately provided a report which indicates the 497 words, 22 grammar, 20 reading skills, and 13 writing skills he or she has to learn next.

Take vocabulary test, for example, based on 156,221 students' performing data on 1300 most frequent words for young ELLs, we analyze and calculate the correlation between words. The result helps us find "Benchmark Words" (BMWs), which can represent a group of words thematically or semantically related. For example, students who know the word elephant always also know words such as cat, dog, pig, to name a few. Our research and findings tell us, benchmark words enable efficient predictions of learners' strengths and weaknesses in lexical resources. The finding of BMWs shortens test time by 91.23% within a maximum deviation rate of 14.78%, which means the accuracy rate is expected to be 85.22% or even higher. Learners' strengths and weaknesses are reported in vocabulary volume, and themes within just 5 minutes.

### The Solution

Test-takers are going to receive their overall language proficiency levels based on the standards we set. They are also going to receive detailed reports which indicate what to do next in terms of vocabulary, grammar, reading, listening, speaking, and writing. For example, how many vocabulary words to learn and how many skills they still need to improve in reading, listening, writing, or speaking.

### Conclusion

Based on the fact that current language proficiency tests for ELLs are either lack of solution or too time-consuming. We believe each ELL deserves an efficient while accurate language proficiency test. Each ELL also deserves a tailored learning solution rather than an oversimplified skill level. It is test-developers' responsibility to design a solution-based language proficiency test.

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Appendix A

ACademy English Standards for Young English Learners

	AC1	AC2	AC3	AC4	AC5	AC6	AC7		
GSE	Pre-starters	GSE 1	GSE 1-2	GSE 2	GSE 2-3	GSE 3	GSE 3-4		
CEFR	Pre-A1	Pre-A1	Pre-A1-A1	A1	A1-A2	A2	A2-A1ET		
YLE	Starters	Starters	Starters-Movers	Movers	Movers-Elementary	Elementary	Elementary-B1ET		
参考对应公立年級	n/a	1-2	2-3	4-5	5-6	6-7	7-8		
新課程		一級	二級	三級	四級	五級	五級(初中2-3年級)		
CCSS	PK-K	1	1-2	2	2-3	3	3-4		
Listening 28	<b>Overall</b>	<b>Basic listening</b> Candidates will be able to understand letters, simple words and basic greetings. Have basic phonemic awareness.	<b>Listening for communication</b> Candidates will be able to understand limited words and phrases with visual/gesture support and repetition.	<b>Listening for daily information</b> Candidates will be able to extract main/detailed information from simple statements and daily conversations with visual/gesture support and repetition.	<b>Listening for daily information</b> Candidates will be able to extract main/detailed information from simple statements and daily conversations, directions, and short stories with visual support. Speech is very slow.	<b>Listening for knowledge</b> Candidates will be able to extract information from a variety of familiar context (e.g. conversations, directions, descriptions, stories, and speeches) and make inferences. Speech is very slow.	<b>Listening for knowledge</b> Candidates will be able to extract information from a variety of daily and formal context (e.g. conversations, directions, descriptions, stories, and speeches) with less help visual support and make inferences. Speech is slow.		
	<b>Key Words</b>	letter simple words	words/phrases visual support slow speech repetition detail	simple sentence visual support slow speech repetition detail	sentences/conversations visual support slow speech Main idea/detail	sentences/paragraphs less visual support main idea/detail/inference Slow speech	paragraphs/presentation less visual support natural speech logic purpose/inference/main idea formal speech	more paragraphs/presentation less visual support natural speech purpose/inference/main idea more formal speech	
	<b>Instruction</b>	L1.1 CAN recognize letters and most simple words/sentences that they've learned.	L2.1 CAN understand face-to-face instructions in classes or games (e.g. "Say "Stop").	L3.1 CAN understand simple instructions in daily life (e.g. clean rooms, open the door)	L4.1 CAN understand simple instructions in situations (e.g. navigational directions).	L5.1 CAN understand instructions with more contexts. (e.g. handicraft making/regulation)	L6.1 CAN understand instructions from notice, broadcast or simple product introduction.	L7.1 CAN follow multi-step instructions and procedures for simple activities (e.g. handicrafts, recipe, sports).	
	<b>Description/Narration</b>	L1.2 CAN understand basic greetings and courtesies.	L2.2 CAN follow oral descriptions or simple statements of common objects and persons and identify information (e.g. family member, age, name, colors, numbers, size, location).	L3.2 CAN follow oral descriptions or simple statements of objects and persons and identify specific information (e.g. look, hobby, action, price, days of the week).	L4.2 CAN follow simple oral descriptions of people, places, objects, schedules and obtain related information (e.g. nationality, mood, dates, directions, weather, phone numbers).	L5.2 CAN follow oral descriptions of people, places, objects and events; grasp main idea and obtain related information (e.g. career, hometown, profession).	L6.2 CAN follow oral descriptions of daily life, countries, regions, products; grasp main idea and obtain specific information (e.g. health, diet).	L7.2 CAN understand main and specific information of monologues, announcement, radio broadcast, formal conversations, and stories (e.g. safety knowledge, biographies, regions, scenic spots).	
	<b>Argumentation</b>	No descriptors available	L2.3 CAN understand main ideas of cartoons or picture books and match the words with pictures.	L3.3 CAN understand main ideas of simple narratives about daily life and specific information of daily life.	L4.3 CAN understand main idea and specific information of daily life.	L5.3 CAN understand simple stories and narratives about daily life (e.g. recent experience/plan); infer sequence and causal relationships among events.	L6.3 CAN understand stories or accounts of personal experience; infer logical relationships among characters and events.	L7.3 CAN understand narratives of events or people; infer logical relationships among characters and events with more natural speed.	
	<b>Conversation</b> 参考 TOEFL P, TOEIC, 附 Cambridge Test	No descriptors available	L2.3 CAN understand and respond to high-frequency YES/NO questions (e.g. Are you a student? Yes, I am.)	L3.4 CAN understand and respond to simple questions and request in daily conversation. (e.g. what do you like to drink? Juice, please.)	L4.4 CAN understand and respond to statements in daily conversation. (e.g. I don't like her boyfriend. Me, either.)	L5.4 CAN understand the main idea of short speeches or talks that is carefully articulated and paused for young learners to assimilate meaning.	L6.4 CAN obtain key information from speeches or talks articulated clearly and understand speaker's basic intentions.	L7.4 CAN obtain key information and main ideas from formal speeches or talks and make inference about speakers' intentions.	
Speaking 28	<b>Overall</b>	<b>Phonic Awareness</b> Candidates will hardly be able to speak or communicate; can speak 26 letters; spell words and use the most basic terms for greetings with the help of pictures.	<b>Simple conversation</b> Candidates will be able to express simple phrases and sentences for common daily themes with the help of pictures and scenes.	<b>Extended communication</b> Candidates will be able to use slightly complete phrases and sentences to describe people and objects, and express his/her likes and dislikes with the help of pictures and scenes.	<b>Extended communication</b> Candidates will be able to use simple sentences to instruct, describe, communicate, narrate and express his/her agreements or disagreements in different situations.	<b>Free Speech</b> Candidates will be able to use more various sentences to describe, narrate, instruct and use examples to support his/her viewpoints for daily life themes.	<b>Free Speech</b> Candidates will be able to vividly use a variety of rich sentences to describe, narrate, instruct and use examples to support his/her viewpoints for themes of humanities, social sciences and science.		
	<b>Key Words</b>	letter/sound simple words	words/phrases/limited sentence visual support	phrases/simple sentence visual support	simple sentences limited words visual support	Compound/complex sentences stories/events with some details less visual support	Compound/complex sentences almost complete stories/events less visual support		
	<b>Instruction</b>	S1.1 CAN recite letters of the alphabet and spell basic words that have learned.	No descriptors available	No descriptors available	S4.1 CAN provide some oral instructions, such as "Open the door", "Stand up", "Pass me...".	S5.1 CAN provide information about routes and directions in familiar communication situations. e.g. Go along this road.	S6.1 CAN provide simple instructions in daily communications.	S7.1 CAN provide simple instructions in teamwork.	
	<b>Description/Narration</b>	S1.2 CAN orally provide basic personal information (e.g. name) and respond to basic questions or greetings (e.g. hello, hi).	S2.1 CAN use simple statement while given questions or pictures (e.g. It's a box. This is a cat.)	S3.1 CAN describe time, objects, animals (actions) and people (appearance, doing) with simple phrases and sentences.	S4.2 CAN describe familiar persons, time, objects and personal feelings in simple terms (e.g. clothes, occupation, character, weight, shape, weather).	S5.2 CAN describe, after preparation, people's dreams, and familiar places in simple terms.	S6.2 CAN describe countries and regions experiences prompted by a picture or text, e.g. I went to HZ this summer.	S7.2 CAN describe festivals and activities in different countries and places. e.g. The best month at school is ...	
	<b>Argumentation</b>	No descriptors available	S2.2 CAN give very basic descriptions of people (age, address) and objects (how many, colour, size or location)	S3.2 CAN use simple short sentences to express his/her likes and dislikes based on cues (e.g. I like apples).	S4.3 CAN, with preparation, tell simple and limited short stories based on prompts and cues.	S5.3 CAN, with preparation, tell simple short stories and personal experiences based on cues.	S6.3 CAN briefly describe an almost complete or coherent story or a past event based on cues, although some details are left out.	S7.3 CAN retell complete and coherent stories in sequence about self/others with details.	
	<b>Conversation</b> 参考 TOEFL P, TOEIC, 附 Cambridge Test	No descriptors available	S2.3 CAN give greetings based on situations (e.g. Good morning)	S3.3 CAN ask and answer simple questions about people, number/price, age, size.	S4.4 CAN express agreement or disagreement with someone using short, simple phrases, e.g. No, it's not a cat.	S5.4 CAN use simple language to express his/her own opinions, based on the provided verbal cues. e.g. I think it's good to eat apples.	S6.4 CAN cite examples from everyday occurrences as evidence to support his/her viewpoint on daily life. e.g. I think going sport is good because it makes me happy.	S7.4 CAN cite examples from everyday occurrences as evidence to support his/her viewpoint on social events/people. e.g. I think Steve Jobs is great because he is creative.	
Reading 27	<b>Overall</b>	<b>Phonics</b>	<b>Reading for communication</b>	<b>Reading for information</b>	<b>Reading for information</b>	<b>Reading for knowledge</b>	<b>Reading for knowledge</b>		
	<b>Material Types</b>		CAN extract basic information from simple language.	CAN extract main ideas and some details from a simple story.	CAN extract main ideas and specific details, and analyze author's purpose of writing from a short passage.	CAN extract main ideas, analyze relationships between characters and infer solutions in stories or short passages.	CAN extract outline and detailed information, analyze text features and infer solutions in stories or short passages.	CAN extract outline and essential information, infer unknown words and intent of writing, and analyze author's point of view and characters' personalities in stories or events.	
	<b>Materials</b>		Description Narration	Description Narration	Description Narration Exposition	Description Narration Exposition	Description Narration Exposition Argumentation	Description Narration Exposition Argumentation	
	<b>Text Length</b>		words phrases short sentences(simple)	words phrases short sentences(simple)	words phrases sentences(some complex sentences)	words sentences(some complex sentences) small paragraphs	words sentences(complex sentences) paragraphs	words sentences(complex sentences) paragraphs	
	<b>藍思閱讀能力對照表</b>								
	Lexile	AA-B	BR120L - 295L	170L - 545L	410L - 700L	635L - 950L	770L - 1080L	890L - 1190L	
RAZ	PK-K	B-E	E-K	G-N	M-U	P-Z	10-12		
CCSS		1	2	3	4	5	6		
AC Lexile			AC2 - AC3	AC4 - AC5	AC6 - AC7				
Writing 19	<b>Overall</b>	<b>Basic Writing</b>	<b>Basic Writing</b>	<b>Extended Writing</b>	<b>Extended Writing</b>	<b>Creative Writing</b>	<b>Creative Writing</b>		
	<b>Instruction</b>	Write 26 letters.	Spell words with cues.	Spell words with limited cues or in context. Complete short sentences	Can write isolated phrases and sentences in a given sentence or context.	Can write short sentences with connectors in a given context.	Can write more sentences with connectors in a given context.	Write a short paragraphs with connectors/complex sentences.	
	<b>Description/Narration</b>	No descriptors available	No descriptors available	No descriptors available	W4.1 CAN write simple cues/instructions	W5.1 CAN write simple activity instructions given by teachers.	W6.1 CAN write simple directions (e.g. How to go to the library).	W7.1 CAN write simple instructions, e.g. how to grow plants.	
	<b>Argumentation</b>	No descriptors available	No descriptors available	W2.1 CAN write simple words about basic personal information (name, age, place, favorite food/animals) and objects information (color/number)	W3.1 CAN complete a short sentence to describe or narrate daily activities, figures, habit, hobby, transportation.	W4.2 CAN write phrases about salient feature of familiar people, objects, feature of weather or climate. (e.g. mood, clothes, occupation, nationality)	W5.2 CAN write 1-2 short sentences to describe people's dreams and experiences.	W6.2 CAN write sentences with connectors to clearly tell/describe events/stories/people's experiences (e.g. first or next).	W7.2 CAN write a short complete paragraph with connectors to clearly tell an event/story (first, second, third, because, so, then, it, however)
		No descriptors available	No descriptors available	W2.2 CAN write simple words with cues to describe people and objects (e.g. food; fruit; animals (color, size, quantity))	W3.2 CAN write about simple greetings for a particular day (e.g. Children's Day; Mother's Day)	W4.3 CAN use phrases to complete short stories/schedules with cues.	W5.3 CAN use short sentences to complete short stories/event with cues.	W6.3 CAN cite examples from everyday occurrences as evidence to support his/her viewpoint on daily life.	W7.3 CAN cite examples from everyday occurrences as evidence to support his/her viewpoint on social events/people.
		No descriptors available	No descriptors available	W3.3 CAN write likes/dislikes	W4.4 CAN write simple reasons to express likes or dislikes.	W5.4 CAN express agreement or disagreement using short, simple reasons.	W6.4 CAN obtain key information and main ideas from formal speeches or talks and make inference about speakers' intentions.	W7.4 CAN obtain key information and main ideas from formal speeches or talks and make inference about speakers' intentions.	



*A Study of the Mutual Phonetic Resemblance Between Japanese and Chinese:  
Quantification of the Difficulty of Phonetic Cross-Comprehension*

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**Abstract**

This study investigated the mutual phonetic resemblance of Chinese ideograms between Japanese and Chinese by using a database of 1078 *kanji* (Chinese ideograms in Japanese) extracted from the two volumes of the Japanese grammar textbook (Second Edition, 2013 and 2015) used in the department of East Asian Studies at University of Geneva. The initial aim of this analysis is to help learners from non-*kanji* backgrounds to study simultaneously these two languages. Firstly, since most of *kanji* have multiple readings (*on'yomi* [Chinese reading] and *kun'yomi* [Japanese reading]), the rate of use of *on'yomi* in each 1078 *kanji* was calculated :59.72% [1], by taking into account the factor of frequency of all words (total 9233 words) who contain these *kanji* and are classified in the JLPT word list. Secondly, the basic phonetic resemblance has be figured out at 19.6% [2] according to the result of survey of twelve<sup>1</sup> Chinese native speakers, who teach Chinese to Japanese people, nine of which passed N1 and three of which, N2 level of Japanese-Language Proficiency Test (JLPT). In comparison with the shape resemblance (71%), semantic resemblance (about 90 %) in the same database, analyzed in my former two studies (OBATAYA 2018a, 2018b), this relative low rate of phonetic similarity (12.4 %, judging from these values [1] and [2]) visualize significantly a gap between the “interdependence” of the shape and the meaning aspects and the “independence” of the phonetic aspect, and emphasize the importance of phonetic cross-comprehension for learners of these two East Asian languages.

Keywords: Asian languages, Japanese, Chinese, phonetic, logographic, cross-comprehension, simultaneous learning

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<sup>1</sup> I should add that when I wrote the abstract, the number of respondents to the survey was 9, but 3 joined after that. In the end, the survey in the current study was completed by 12 respondents.

## Introduction

This study investigates the mutual phonetic resemblance in Chinese ideograms between Japanese and Chinese by using a database of 1,078 *kanji* (Chinese ideograms in Japanese) extracted from the two volumes of the Japanese grammar textbook, *Minna no Nihongo* (Second Edition, 2013 and 2015) used in the department of East Asian Studies at University of Geneva.

The initial aim of this analysis was to help the students of Japanese (or learners of Chinese, or both simultaneously) at University of Geneva to learn how to read Chinese characters and pronounce them correctly. It is hoped that this study may be useful not only for the students at University of Geneva but also for simultaneous Japanese and Chinese learners in non-*kanji* areas. For instance, it can be effective for beginner Chinese learners who have prior knowledge of Japanese.

For this purpose, my previous research studies were based on the characters required to pass each language's proficiency test: the Japanese-Language Proficiency Test (JLPT) for Japanese and the *Hanyu Shuiping Kaoshi* (HSK) Chinese Proficiency Test for Chinese.<sup>2</sup> Figure 1 illustrates the approximate correspondence of the proficiency levels between the JLPT and the HSK.



Figure 1: Correlative table between JLPT and HSK proficiency levels.

The increasing number of candidates for both the JLPT and the HSK reflects the global interest in these two East Asian languages; in 2013, a total of 571,075 examinees took the JLPT, while in 2017, that number rose to 887,380. For the HSK, a total of 189,691 examinees took the test in 2013, while in 2017, 470,807 took it.<sup>3</sup>

<sup>2</sup> For the purpose of these studies, I took the HSK exams and passed with a proficiency level of HSK 6—the highest level—in 2014.

<sup>3</sup> In comparison, the number of people who participated in the DELF / DALF exams was 389,120 in 2015.

	2012	2013	2014	2015	2016	2017
JLPT	572169	571075	594682	652519	755802	887380
HSK	166313	189691	236403	365409	407479	470807
Total	738482	760766	831085	1017928	1163281	1358187

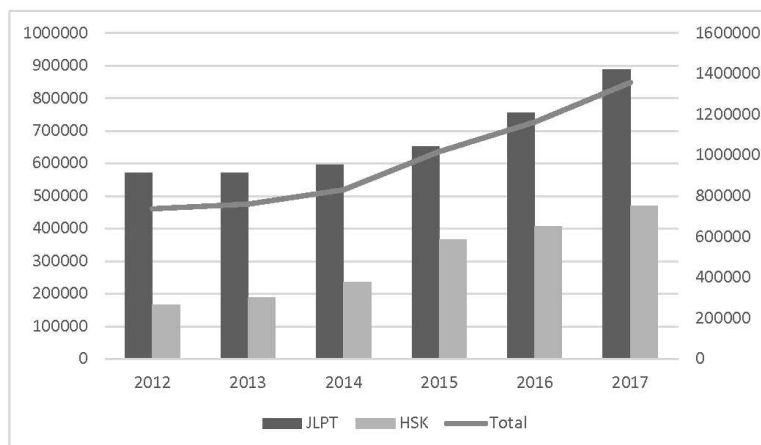


Figure 2: Number of candidates for JLPT and HSK<sup>4</sup>

The increased interest has encouraged approximately 20% of students at department of East Asian Studies at University of Geneva to select them as their two majors required to complete their bachelor's degree, even though a survey<sup>5</sup> has revealed that learners from non-*kanji* backgrounds find learning Japanese and Chinese simultaneously to be a heavy burden.

### The Difficulties in Learning Japanese and Chinese Simultaneously and the Introduction of Chinese Characters to the Japanese Writing System

One of the difficulties that students face in learning these two languages at the same time is the complexity of the Chinese ideograms used in both Japanese and Chinese. For example, the simplified form of Chinese ideograms used in Japanese—called *kanji*—sometimes differ in shape, meaning, and pronunciation from the simplified Chinese characters as used in the People's Republic of China (Yoshida, 2014, p.19).<sup>6</sup>

Contemporary Japanese has three main graphic systems: *kanji*, Chinese ideographs used in Japanese, and two syllabaries (hiragana and katakana).<sup>7</sup> In order to better understand the relationship between Japanese *kanji* and Chinese characters, it is necessary to review the history of the three graphic systems of Japanese.

The Japanese, having no writing system of their own, imported Chinese characters, or '*kanji*', as early as the 4<sup>th</sup> or 5<sup>th</sup> century. Some three centuries later, a cursive and simplified form of *kanji* appeared, chosen for its phonetic value: the *manyōgana*, the name of which was derived

<sup>4</sup> The JLPT's numbers are quoted from the JLPT's homepage (<https://www.jlpt.jp/e/statistics/archive.html>). The HSK's numbers were taught by the Confucius Institute of Geneva University (2018.07.11).

<sup>5</sup> Berger C., & Obataya Y (2014), pp.150-152.

<sup>6</sup> This paragraph is taken from Obataya Y. (2018a), p.2.

<sup>7</sup> This does not take into account the romaji, or Latin alphabet.

from the title of an anthology of poetry written using this simplified script during the Nara era (710–794), ‘Collection of Ten Thousand Leaves’, or *Manyôshû*. Manyôgana would give rise to the 9<sup>th</sup> century hiragana syllabary, as well as to the katakana syllabary, which was also created in the 9<sup>th</sup> century. Its current form, however, became fixed in the 12<sup>th</sup> century. Figures 3 and 4 show examples of the three writing systems as well as their proportion of use in Japanese.

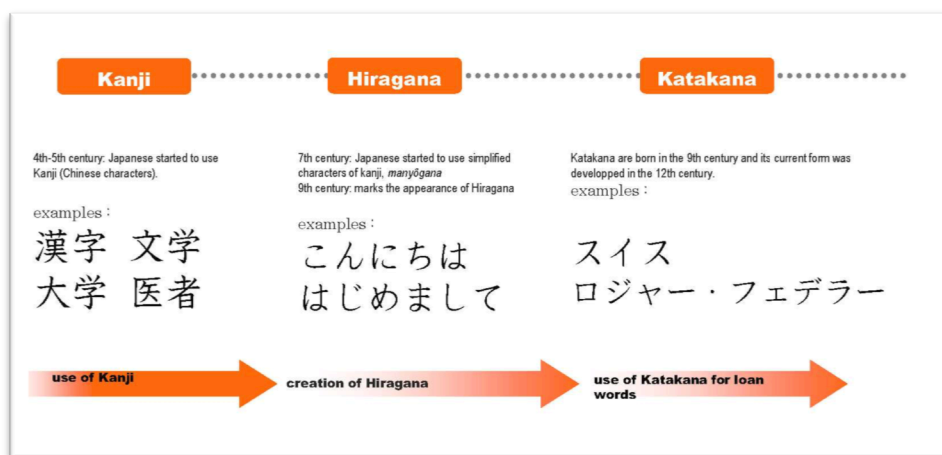


Figure 3: Three writing systems in Japan<sup>8</sup>

Chinese Chinese characters 汉字		
Kanji 漢字 30 %	Hiragana ひらがな 40 %	Katakana カタカナ 30 %

Figure 4: Approximate proportion of the use of the three systems in contemporary Japanese

Japanese continued to borrow Chinese characters according to their meaning; however, since the pronunciation differed between Japanese and Chinese, Japanese *kanji* could be read by Japanese speakers in the Japanese way (*‘kun’yomi’*, henceforth *kun*-reading) as well as in the (original) Chinese way (*‘on’yomi’*, henceforth *on*-reading). Furthermore, a *kanji* sometimes has two, or three or more types of *on*-reading (*go-on*-reading, *kan-on*-reading, and *tô-on*-reading, among others<sup>9</sup>), because *kanji*’s phonetics have evolved in various ways over the centuries in the different eras and regions from China.<sup>10</sup>

<sup>8</sup> Document used for the annual “open campus” session at Geneva University for high school student

<sup>9</sup> These different *on*-reading are indicated in my database for the analysis of the graphic field (Obataya, 2018a, 9<sup>th</sup> note).

<sup>10</sup> ‘Phonetic value of *kanji*’ (...) *Go-on* is considered to be the oldest *kanji* sound from China. *Go* is the name of the old State of *Wu*, which is the current area of Jiangsu Province (Nanjing). It broadly includes the Yangtze River area in South China and refers to the sounds that were used in that region. Japan traded in the 5th and 6th centuries, before the Nara era, with the

	呉音 <i>Go-on</i>	漢音 <i>Kan-on</i>	唐音 <i>Tô-on</i>
京	きょう kyô (東京)	けい kei (京城)	きん kin (南京)
経	きょう kyô (読経)	けい kei (経済)	きん kin (看経)
行	ぎょう gyô (行列)	こう kô (行動)	あん an (行宮)
外	げ ge (外科)	がい gai (外交)	うい ui (外郎)
頭	ず zu (頭痛)	とう tô (没頭)	じゅう jû (饅頭)
明	みょう myô (明年)	めい mei (名月)	みん min (明朝)

Figure 5: Examples of *kanji* that have different *on*-reading types (Yano, 2012, p.42)

In addition, a simplification of the Chinese characters of the People's Republic of China took place in the 1950s, following the Japanese government's simplification of *kanji* in 1926. These simplifications resulted in the lists of *Tôyô kanji* in 1946 and *Jôyô kanji* in 1981.

These different points may cause great confusion for simultaneous learners, especially complete beginners, and are likely to disturb their learning of ideograms. Therefore, this study aims to support such students' effective learning by building a database that identifies the commonalities and differences between *kanji* and Chinese characters. The database comprises all 1,078 *kanji* that appear in the two volumes of the Japanese grammar textbook that the department of East Asian Studies at University of Geneva has adopted for instruction.

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South of China and was also in a close relationship with the southern part of the Korean Peninsula. (...)

**Kan-on** is generally referred to as the sound of the region of Shenyang and Chang'an. From the Nara period to the beginning of the Heian period, exchanges with China became more and more active, and many foreign students were sent with the Japanese missions to Sui China or Tang China. These people learned the Shenyang and Chang'an pronunciation, both the capitals of China at the time, and brought it back to Japan. In the Heian period, *kan-on* was considered as the official pronunciation. (...)

"*Tô* (*Tang* in current Chinese pronunciation)" in the word **Tô-on** indicate China (not only the *Tang* dynasty). From the 11th century until the Edo period, especially during the Kamakura and Muromachi period, it was a collective term for *kanji* sounds. These sounds were brought back from the Chinese mainland by Zen Buddhist monks, merchants and private diplomats. (...)" Yano (2012), pp. 40-42, translated by Obataya.

## Previous Studies on the Graphic and Semantic Resemblance Between *Kanji* and Chinese Characters

The analysis of the graphic aspect and the semantic aspect of this database has been effectuated in Obataya (2018a) and Obataya (2018b), respectively.

	I+II		
JLPT N5	79	/179	100%
JLPT N4	166	/166	100%
JLPT N3	321	/367	90%
JLPT N2	241	/367	66%
JLPT N1	248	/1232	20%
More	23		
	1078		

	I+II		
HSK1	120	/171	70%
HSK2	122	/168	73%
HSK3	176	/296	60%
HSK4	243		
More	433		

Table 1: The number of *kanji* covered in the textbooks (I and II)<sup>11</sup>

The first study demonstrated that the textbook not only covers 100% of the *kanji* of the JLPT N5 (the lowest level) and the N4 but also approximately 70% of the Chinese characters of the HSK1 (the lowest level) and HSK2, as well as 60% of the HSK3.

In addition, the results of an analysis of the degree of mutual similarity in the list indicated that 71% of Chinese characters are identical (or have only a slight difference) in the two languages.

After this analysis of graphical resemblance, we effectuated the analysis of semantic resemblance, with the results revealing that 89% of the characters are identical or have only a slight difference.

The current study aims to quantify this final field—namely, phonetic resemblance—by using the same database.

### Previous Studies on Phonetic Resemblance

Several studies exist on the phonetic resemblance between Japanese and Chinese words and characters: Kayamoto (1995), Matsushita (2009), and Gi (2017). While the current study highlights ‘parallel characters’ in terms of phonetic resemblance, Matsushita (2009)<sup>12</sup> and Gi (2017) focused mainly on ‘parallel words’.

<sup>11</sup> This is the ‘Table 1’ in Obataya (2018a) that was modified and some images were added.

<sup>12</sup> This study on the phonetic resemblance of Matsushita (2009) is based on the data provided by Kayamoto (1995).



## Analytical Approach

In the current study, the scores calculated by the multiplication of two values are considered to be the real phonetic resemblance of Chinese ideograms utilised in both Japanese and Chinese. These two values are (1) the frequency of a *kanji* in *on*-reading and (2) the rate of the phonetic resemblance of a *kanji* between *on*-reading and the pronunciation in Chinese. In order to calculate the latter value, I applied the method of Kayamoto (1995) by distributing questionnaires concerning the 1,078 *kanji* of my database to Chinese native speakers who have considerable knowledge of the Japanese language and calculating the mean values. In our study, we did not use audio recordings of Japanese or Chinese pronunciation (unlike Gi's study, which used audio recordings of both languages' pronunciation) by pointing to a website that contains the sound sources of Japanese pronunciation.

## Calculation of the Frequency of *On*-Reading Usage

No previous study has taken into consideration the frequency of the *on*-reading usage of a *kanji*, which is one of the most important criteria in this work. A *kanji* is pronounced in various ways, including *on*-reading, *kun*-reading, and other ways of reading, such as an idiomatic way of pronunciation. In this research, the values that signify the usages of *on*-reading in the target *kanji* data are identified.

First, the usage of each *kanji* in words was investigated. Here, 9,233 words in the list of the previous JLPT<sup>13</sup> were categorised into 'on-reading', 'kun-reading', and 'other', according to their pronunciation.

In order to reflect the frequency of *on*-reading usage according to the levels of difficulty designated in JLPT, all five levels were counted differently. For example, a *kanji* in N1, the highest proficiency level in JLPT, was calculated as one point, whereas a *kanji* in N5, the easiest in JLPT level, was calculated as five points. It was considered that the easier a *kanji* is, the more frequently it is used.

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<sup>13</sup> In the previous JLPT (= Old Japanese Language Proficiency Test Levels 1 to 4), before the renewal of the current JLPT (= Levels N1 to N5) in 2010, 'Test Content Specifications' was published for helping the candidates. This book contained a word list, a *kanji* list, and grammar list, respectively classified in four levels. The current JLPT does not publish such a book, so for comparing the new JLPT levels to current work, I reference the Jisho.org website, and Jonathan Waller's JLPT Resources page. According to Waller, New JLPT N1 is equivalent to the old JLPT 1; JLPT N2, to the old JLPT2; JLPT N3, to halfway between the old JLPT 2 and JLPT 3; JLPT N4, to the old JLPT 3; JLPT N5, to the old JLPT4.

[d]	[e]	[f]	[g]	[i]	[j]	[k]
JP Kyokashot ai font	Kun-reading	JLPT Word list	JLPT Word list (lecture)	Calculation of points (JLPT levels)	Proportion of On- reading (%)	On-reading
社	やしろ <b>yashiro</b>				97	シャ <b>sha</b>
1	<b>kaisha</b>	会社	かいしゃ	5		
2	<b>shakai</b>	社会	しゃかい	4		
3	<b>shachō</b>	社長	しゃちょう	4		
4	<b>jinja [jin+sha]</b>	神社	じんじゃ	4		
5	<b>shinbunsha</b>	新聞社	しんぶんしゃ	4		
6	<b>shakaikagaku</b>	社会科学	しゃかいかがく	2		
7	<b>shasetsu</b>	社説	しゃせつ	2		
8	<b>shōsha</b>	商社	しょうしゃ	2		
9	<b>nyūsha</b>	入社	にゅうしゃ	2		
10	<b>shakō</b>	社交	しゃこう	1		
11	<b>shataku</b>	社宅	しゃたく	1		
12	<b>shussha</b>	出社	しゅつしゃ	1		
13				32		
14	<b>yashiro</b>	社	やしろ	1		
15				1		

Figure 6: Example of calculation of the on-reading usage

For example, with a *kanji*, 社, there are 12 words that use this *kanji* with the /sha/ pronunciation. All of the scores for these words were counted according to the levels of difficulty and added to be the total score. There is only one word that uses the *kun*-reading: /yashiro/, categorised as N1. Therefore, the score of *kun*-reading for this *kanji* was 1. This means that the frequency of *on*-reading for this *kanji* was designated as 97%.

The *kanji* that tend to be written in hiragana at present were not counted. Instead, they were listed in the section of Figure 7 emphasised in red. For example, a *kanji*, 何, was not included in the JLPT list with the pronunciation of /ka/. Therefore, ‘Not on the JLPT list for *on*-reading’ was indicated (see Figure 7).

何	なに, なん <b>nani, nan</b>			0	か <b>ka</b>
1	何	なに	5		
2	何の	なんの	5		
3	何か	なんにか	3		
4	何も	なんにも	3		
	何で	なんで			
	何でも	なんでも			
	何と	なんと			
	何となく	なんとなく			
	何とも	なんとも			
	何気ない	なにげない	1		
	何卒	なにぞ	1		
	何より	なにより	1		
	何だか	なんだか	1		
	何だかんだ	なんだかんだ	1		
	何て	なんて	1		
19	何と	なんと	1		
20	何なり	なんなり	1		
			43		

如何(いかに)、如何に(いかに)、如何にも(いかに)、何れ(いずれ)、何時(いつ)、何時か(いつか)、何時でも(いつでも)、何時の間にか(いつのまにか)、何時までも(いつまでも)、何時も(いつも)、如何にして(いかにして)、如何にしても(いかにしても)、何処(どこ)、何処か(どこか)、何方(どなた)、何れ(いずれ)、何故(なぜ)、何故なら(なぜなら)

Not on the JLPT list for on-reading

Figure 7: Cases of the *kanji* that tend to be written in hiragana at present

## Questionnaires Concerning Phonetic Resemblance Between Japanese and Chinese

Another important criterion for this study is the value of a rather psychological aspect of the phonetic resemblance of each *kanji*, as evaluated by the questionnaires (see Figure 8).

The survey method introduced by Kayamoto (1995) was applied in this study.<sup>14</sup> However, there are several differences in the data collection methods between Kayamoto (1995) and this research.

Firstly, the number of points for the rating scale was reduced to five in order to allow the respondents to easily answer the questions, whereas a seven-point scale was employed in Kayamoto (1995). Another advantage of the application of a five-point scale was that it enabled us to calculate the rate of phonetic resemblance quickly.

Secondly, most of the survey respondents (a total of 12 people) in the current work had not only acquired N1 of JLPT but had also been teaching Chinese to Japanese students,<sup>15</sup> although in Kayamoto (1995), the 11 respondents were postgraduate students and research students (*kenkyū-sei*) whose mother tongue was Chinese.

Thirdly, the target databases of *kanji* differ. In Kayamoto (1995), the database included 996 *kanji* that had been previously designated for instruction by the Ministry of Education from 1977 to 1989, whereas we analysed 1,078 *kanji* from the two volumes of the Japanese grammar textbook, *Minna no Nihongo*, the first volume of which was printed in 2013 and the second in 2015.

My database contains 72% of the *kanji* analysed in Kayamoto (1995) and 74% of the *kanji* currently designated for instruction since 1989 (a total of 1,006 *kanji*).

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<sup>14</sup> Like Kayamoto's research, because the four tones in Chinese are not clearly differentiated in Japanese, respondents were formerly informed not to care too much about them before evaluating each case.

<sup>15</sup> All 12 respondents were Chinese native speakers who are teaching Chinese to Japanese students; 9 respondents have acquired JLPT N1 and 3 have passed N2.



## Evaluation of 1,095 Pairs of *Kanji* for Phonetic Resemblance

The number of characters in the database is 1,078, but the number evaluated in this questionnaire was 1,095. This is because, in the case of multiple *on*-readings or Chinese pronunciations existing in one *kanji*, respondents evaluated them separately. As shown in Figure 9, a *kanji*, 人, has two ways of *on*-reading, /jin/ and /nin/, and one Chinese pronunciation, /ren2/. In this case, two comparative evaluations between (1) /jin/ and /ren2/ and (2) /nin/ and /ren2/ were conducted. Another example is 行, which has two ways of *on*-reading, /kou/ and /gyou/, and two Chinese pronunciations, /hang2/ and /xing2/. In this case, the respondents must have assessed the phonetic similarity in four pairs independently.

### Findings of the Two Statistical Analyses

#### (1) Findings from the Frequency of the *On*-Reading Usage

- The rate of the frequency was 59.7%.
- 294 *kanji* (27% of the total number of the data) only have *on*-reading pronunciations.
- 152 *kanji* only have *kun*-reading pronunciations.

#### (2) Findings from the Survey on Phonetic Resemblance by Means of Questionnaires

- The mean value for the phonetic resemblance from the survey was 19.6%. Compared with the average of the survey outcome from Kayamoto (1995), the result was slightly lower (Kayamoto's mean value was 34%, 2.38/7<sup>16</sup>).
- Very few *kanji* had complete correspondence between Japanese and Chinese (only n = 9 *kanji*: 医, 伊, 信, 衣, 敷, 因, 他, 愛, and 膚). The rate of the ones with more than 90% resemblance was only 4% (n = 42)<sup>17</sup>.
- Most of the *kanji* with perfect correspondence were first and fourth tones.
- Nine per cent of *kanji* (n = 208) were considered to have no resemblance between Japanese and Chinese. Furthermore, the ones whose resemblance was less than 10% comprised more than half of the data (n = 572).

<sup>16</sup> As a result, the average of the overall rating was 2.38 (SD: 1.32) (Gi, 2017, p.63). The average of 2.38 (/7) is 34% when converted to a percentage.

<sup>17</sup> These 42 *kanji* are 医伊信衣敷因他愛膚付利理辛心痢意部離来父富引府民打那符新印婦負頼夫林苦腐流麻飲太里隠.

Chart 1 shows the mean and standard deviation.

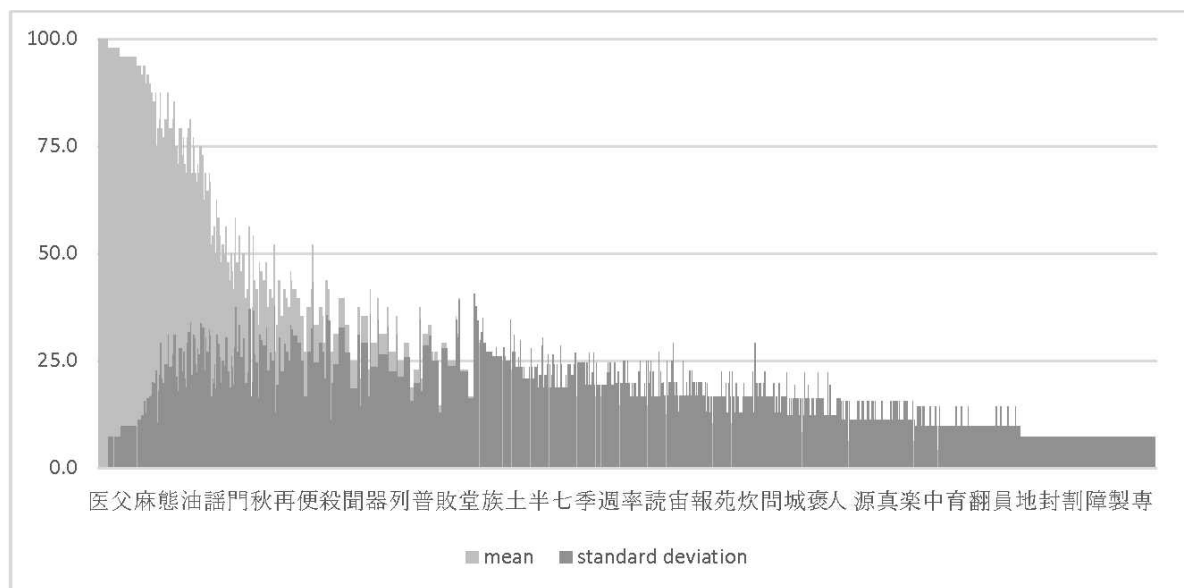


Chart 1: Distribution of the mean value of the questionnaires for the phonetic resemblance of 1078 *kanji* and standard deviation<sup>18</sup>

Chart 2 shows the distribution of the number of *kanji* in the range of the mean value, presenting the number of *kanji* on the vertical axis and the range of the mean value on the horizontal axis.

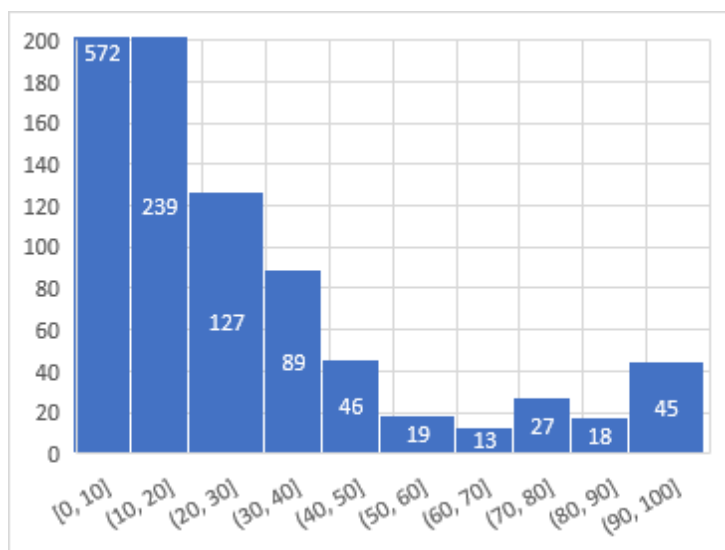


Chart 2: Distribution of the number of averages

As illustrated in this chart, the majority of dissimilarity is distributed on the left and the similarity on the right part of the chart.

<sup>18</sup> The *kanji* at the bottom is representative of each stage.

### Findings from the Total Scores by Multiplying the Values of (1) and (2)

- The score obtained by multiplying the values from the analysis of (1) and (2) was 12.4%.
- Only five *kanji* (医, 伊, 信, 愛, and 膚) have 100% frequency of usage in *on*-reading as well as 100% phonetic similarity.

The distribution graph (Chart 3) indicates a high rate of dissimilarity between Japanese and Chinese.

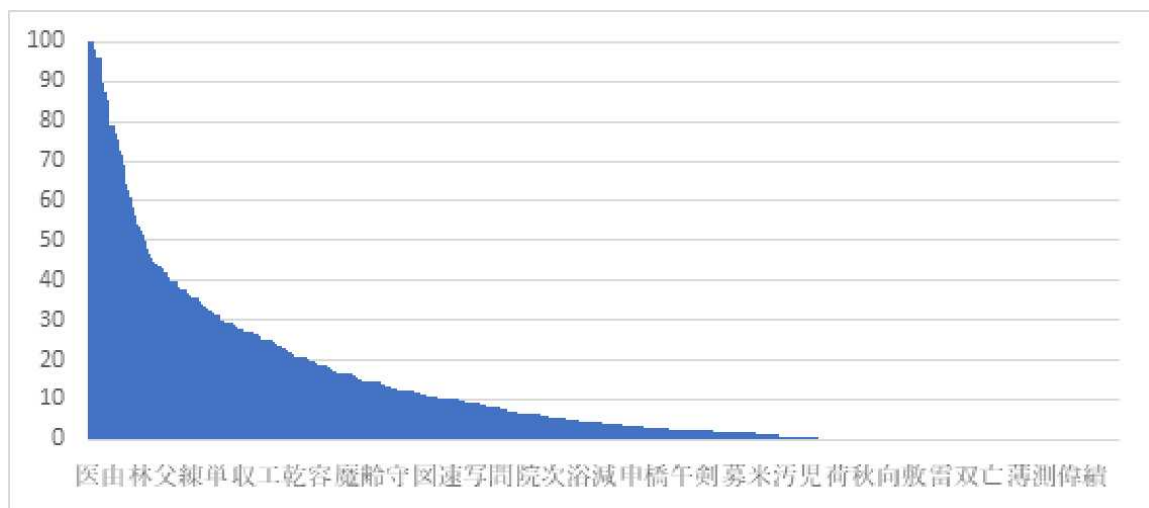


Chart 3: ‘Real’ phonetic resemblance degree: (1) × (2)<sup>19</sup>

Chart 4, which clarifies this dissimilarity, shows the distribution of the number of *kanji* in the range of the mean value, presenting the number of *kanji* on the vertical axis and the range of the mean value on the horizontal axis. The number of *kanji* in the range of 0–10% is 697, whereas the number of *kanji* in the range of 0–50% are the majority (95%). This means that most of the pronunciations of *kanji* used in both languages differ drastically.

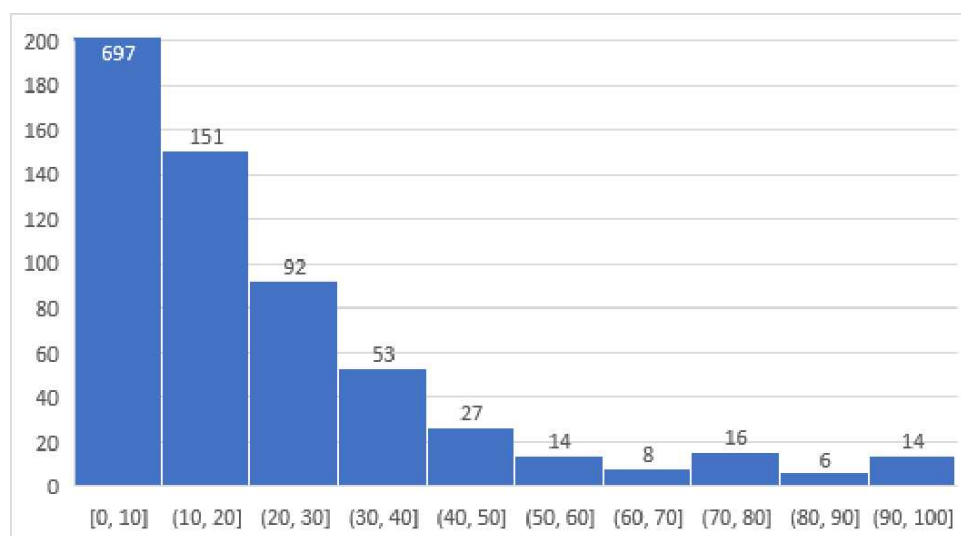


Chart 4: ‘Real’ phonetic resemblance degree: the number of averages

<sup>19</sup> The *kanji* at the bottom is representative of each stage.

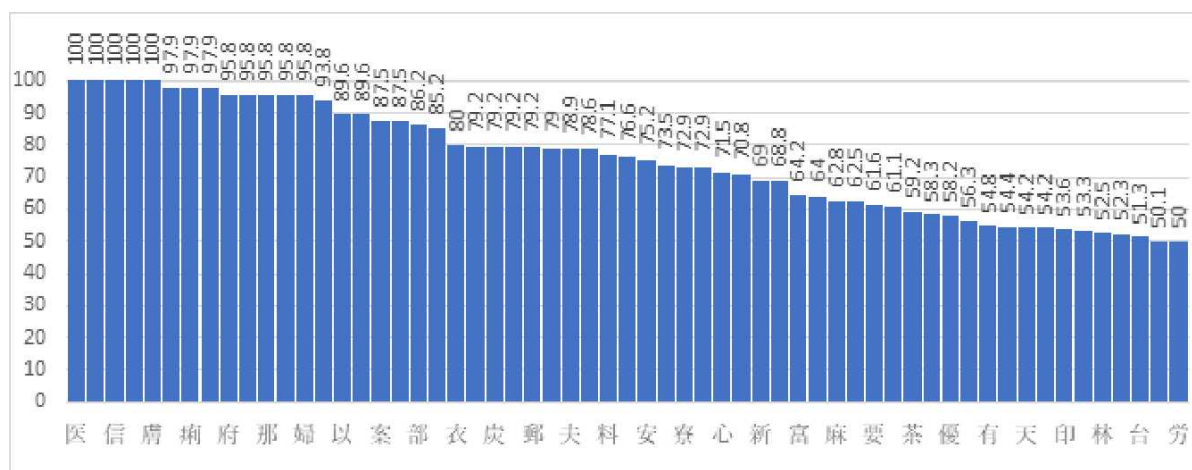


Chart 5: The number of averages from 50% to 100%

Chart 5 shows a zoomed-in view, from 50% to 100%, of the range of the mean values in the Chart 4, showing the minority group of *kanji* that phonetically resemble each other. Figure 10 shows the final results for the three fields.

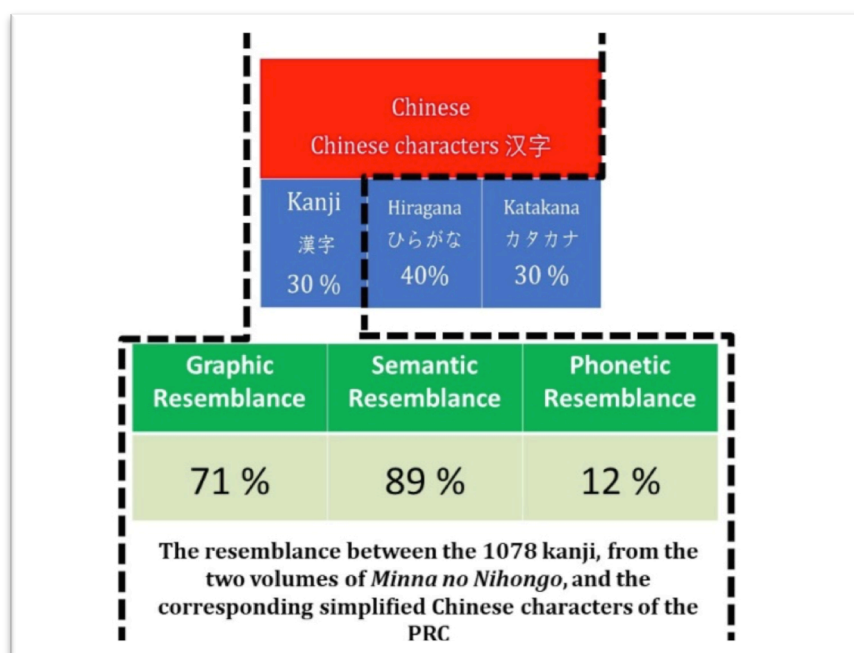


Figure 10: The final results for the three fields



## Conclusion

To conclude, after quantifying the phonetic resemblance of 1,078 *kanji* between Japanese and Chinese, it was found that this resemblance was very low compared to the high resemblance in shape and meaning. Such clarification of the three values of shape, semantic, and phonetic resemblance will allow us to explain the ‘*kanji* paradox’, whose notion was applied in one of our previous works to explain that the simultaneous acquisition of Chinese and Japanese is, in fact, difficult, despite the image of easy cross-comprehension due to the common usage of Chinese ideograms (Berger, C., & Obataya, Y. (2014), pp.162-163).

Despite the findings of this study, it is not necessary to fully deny the attempt of simultaneous learning or cross-comprehension of Japanese and Chinese. In fact, there are considerable advantages and incentives in the resemblance of forms and meanings in the common *kanji* for motivating learners to study two languages simultaneously. By making students aware of the imbalanced rates of resemblance among the three components, sounds, forms, and meanings at the beginner’s stage of learning, it may be possible to make their studying process more effective.

This means that it is important for students to develop special learning strategies to study *kanji* for acquiring listening and speaking skills, which should differ from the strategies for developing reading and writing skills in learning Chinese and Japanese simultaneously.

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***Initial Invention of Therapy Table for Autism to Avoid the Table Being Pushed or Flipped by Autistic Children***

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**Abstract**

In individual therapy for autism, a problem occurs in which autistic children often push the therapy table. Further, in children with large posture, they can even flip the table upside down during tantrums because their energy can no longer be held by the therapists. This behavior disrupts the course of the therapy. This research was conducted through observations on 12 autistic children (9 boys, 3 girls) using video recordings, each in one duration of individual therapy session. Interviews were carried out with 20 therapists and parents of children with autism to determine the sitting habits of the autistic children, and find out how the children push the table. The results showed that 25% of children with autism pushed the therapy table, causing the table to flip upside down, while the rest of the children only displaced the table. The study identified the sitting habits of autistic children so that alternative table design recommendation using addition of bottom mat was formulated. The mat addition attached at the bottom of the table can be used more effectively during therapy. The results of this study can be taken into consideration when designing therapy tables for autistic children.

Keywords: Autism, ABA Table, Alternative Autism Therapeutic Table

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## Introduction

Autism was discovered by a Swiss psychiatrist, Eugen Bleuler in 1991, Bleuler conducted a study on adolescent suffering from schizophrenia (Yuwono, 2012). Over time, autism disorder increases in number. Census in the US reports that in 2014, there were 475,000 children with the indication of ASD (Dewi, 2018). The increase does not only occur in Indonesia but also around the globe. WHO reports that one of 160 children have ASD, and about one of 68 children in the US has ASD. Following data from UNESCO in 2011, there were approximately 35 million peoples with autism, meaning that 6 of 1000 people had autism (Santoso, 2019). Autism is a developmental disorder, not a disease. Children with autism are categorized into three, based on their social interaction: 1) Secluded autistic children, 2) Passive Autistic Children, and 3) Active autistic children. Self-secluded autistic children tend to like doing anything on their own, spending their time alone. A child with this type of autism likes to do an activity repeatedly. They could get angry easily. They break their own toys often, they assault their friends and highly avoid physical contact with their environment. A child with this type of autism lacks the ability to use words; they have limited vocabulary (Handojo, 2009). An autistic child has 'particular amusement' in themselves (Tilton, 2004). Autism is indicated by primary characteristics as follow: 1) Ignorance toward the surrounding. 2) Inability to make good social interaction. 3) Abnormal development, usually indicated by speech difficulty and abnormal language. 4) Limited, repeated reaction/ observation of the surroundings (Faisal Yatim ,2003).

There are various types of therapy that can be conducted for children with autism. One of the therapies with high rate of success is Applied Behavioral Analysis (ABA). It was reported that applying ABA to two-years-old children intensively for forty hours per week exhibits 89% of improvement. 47% of them exhibit total recovery, while 42% obtain a various level of environmental adjustment (Mulyadi & Sutadi, 2014). ABA is a well-organized method with the easy-to-assess outcome. Accordingly, the ABA method can be applied easily applied to children with autism. It is a clear, stress-free method. In addition for autism, this method can be used for children with other behavioral disorders. The principle of this method is warmth, clarity, stress-free, anger-free, clear, gentle prompt, and appreciation toward the child (Yuwono,2012). The principle of ABA method is freedom, emphasizing each child's need. ABA method in One on One therapy, between therapist and autistic child. The principle which emphasizes freedom in learning or accommodating child behavior.

ABA uses special table, in Indonesia, it is called meja ABA (ABA table). It has one incurved side. ABA table has been used in some schools and therapy centers in Indonesia, the incurved side aims to improve eye contact between the autistic child and the therapist (Sari, 2010). For autistic children who often get tantrums, it is suggested to use this table to prevent them from escaping (Handojo, 2009). However, the result of the study conducted with Autism Services Center Surakarta revealed a problem, that the autistic children often pushed the table during the therapy, making the therapist hold the table using their feet. Children with big posture even can flip the table, where the therapist does not seem able to hold it.

The present study was aimed at investigating the hindrances when using the ABA table in order to make an alternative table to solve the problem. It is expected that this study can improve the effectiveness of autism therapy using alternative ABA table design.

## **Research Method**

### **Participant**

The participants were 12 children with autism aged 6-12 years (3 girls and 9 boys). Mean  $\pm$  SD anthropometric data of all participants includes as follows: age:  $7.8 \pm 2.4$  years; height:  $129.9 \pm 5.7$  cm; weight:  $29 \pm 5.6$  kg which was included in this study. The condition that has been examined are whenever they can be calm and whenever they have not been able to sit quietly while paying attention to the therapist's direction.

### **Research Instruments**

In this study, the table was only used to compare the effect of the curvature of the table and the conditions at which child therapy pushed the table. This experiment uses ABA table, ABA table (p: 66, l: 60, t: 55 r: 24.5) with an oval hole on one side (Figure 1).

### **Research Tools**

Sony Handycam HDR-CX220E, mini Yuntfng XH-228 tripod, Sony EOS M3 Camera

### **Experimental Tasks, Conditions, Procedures**

The observation was conducted in Pusat Layanan Autis (Autism Services Center) Surakarta, Indonesia. The discussion was also conducted with the therapists. In addition to observing autism room, this study observes the individual classroom usually used for therapy, with comfortable artificial airing. The participants sat down and were observed using video. It was done by installing cameras in the room. The recorder was placed within the room, 180 cm above the floor, allowing for capturing the entire room. With this placement, it was expected that the students did not lose their focus. The recording was done in Ruang Individu (Individual Room) using a video camera. The camera was turned on before the child entered the room. The recording was started when the therapy began. The duration of the recording was approximately 30 minutes for each children in individual room. To record the therapy in detail, the video camera was mounted on mini tripod that can monitor every single motion of the autistic children. The video was taken when they use ABA table. During the observation, the therapist give the material as usual, without any change. The therapist was also informed about the camera installed in the room. If the child's focus was distracted toward camera during the therapy, the therapist was asked to direct the children not to watch the camera. The video observation considered success if the children managed to follow the whole therapy session. When a technical error occurs, or late in installing the camera, the video should be recored in the next meeting.

## Measurement

The motion when they participated in the therapy, and movements of pushing the table. The motion was observed based on some criteria, namely, the autistic child pushing the table, moving the table without instructed, slamming the table, taking tools without therapist's instruction, and tilted body position. The data of video observation was calculated using 8/10.( Handojo, 2009). It was calculated by observing the eye contact and motion they made as follow:

Value =  $Rp/Op$

Description:

Rp= total of positive response

Op = total of negative and positive responses.

The final score was obtained by calculating the positive and negative responses shown by the children with autism during therapy The total of positive responses (+) is divided by all (+) and (-) responses without calculating therapist's prompt result in the final sore of the therapy. The autistic children's eye contact and motion were considered good when they follows the therapy and gained a score of 80% or more. Based on the result of the evaluation of video observation.

## Results

Based on the result of interview, the individual therapy room utilize both artificial and natural lightings. The former was obtained from downlight. Each individual room only used one downlight. Natural lighting was used more often because the therapy started in the morning at 8 AM until 3 PM. Natural lighting came from the permanent window, providing adequate light. The room utilized airing from the air conditioner. This artificial airing was used considering that children with autism tended to be more sensitive toward excessive dirt exposure. White paint was applied to the room ceiling.



Figure 1. Individual therapy room for Autism in PLA Surakarta Indonesia



The therapy was done using ABA method. This therapy utilize two chairs and one ABA table. When being used, the incurved side of the table faces the wall. The individual room was about 2x3 meter square. There were two chairs. One chair for child with autism and another chair is for the therapist. There was 1 ABA table, 1 cupboard, and 1 storage. The cupboard and the storage were used to store therapeutic tools for children with autism.



Figure 2. Autistic children's sitting position using ABA table in Individual Room

Autistic children's sitting position using ABA table, resting on the wall before the therapist. When being used, the table's incurved side is moved up to the wall. The therapist sits before the autistic child while giving instruction. The therapist's feet are in the table's leg to hold the table.

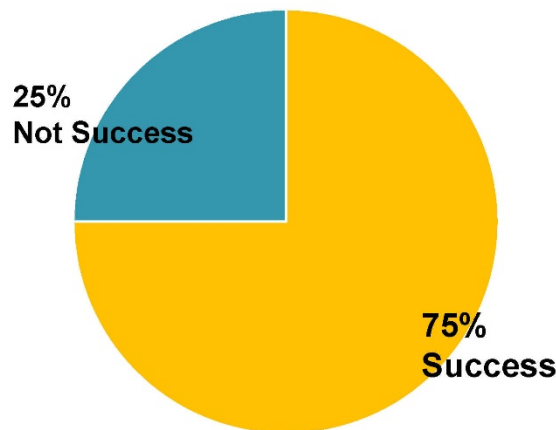


Figure 3. Success Therapy motion observation 8/10

The result of video observation on eleven autistic children who used ABA table with motion observation based on the criteria of autistic children pushing the table, moving the table without therapist's instruction, slamming the table, taking tools without therapist's

instruction, and tilt body was considered failed. The motion observation was considered success when the autistic child follow the therapist's instruction. The observation found that 25% of the autistic children cannot follow the therapy well. They pushed the table and attempted to get out of the table, refusing to follow the therapist's instruction. The therapist should hold the table when the child attempt to escape the therapy room. Whereas 75% of the autistic children managed to follow the therapy well. They were able to sit calmly. The therapist also did not need to hold the table because they did not attempt to get out of the table.

## **Discussion**

Based on the result of the observation, it was found that the problems that often occurred during the therapy process is that the child with autism pushed and moved the table. The therapist goes to pick up a toy and autistic child pushing to the table. When child with autism push, and therapist sit, table needs to be held by the therapist by putting pressure on the therapist's feet. In children who have a large body posture and still have tantrum, the urge on the table makes the table upside down because of the amount of child power that the therapist cannot hold. Low results table ABA is influenced by the length of time an autistic child gets therapy and the table that is easily pushed causing the child who has tantrum can easily get out of the table. When a child starts to get bored, he or she tries to get out of the table and no longer pays attention to the therapist. From the interview and observation made design table for autism children, remove oval hole and adding a pedestal or a base table and removing the curve on the therapy table because the oval hole on one side of the ABA table feels like confine a child to move away. With the addition of the pedestal, the therapy table cannot be pushed because it is restrained by the bodyweight of the child. The removal of the oval hole on the edge of the table is replaced with a pedestal. However, it still refers to the principle that the construction will be easier. When use a pedestal table cannot be held therapist and child not push again, the therapist's feet can not pressure. Because base it is restrained by the bodyweight of the child.

## **Limitation of the study**

This study is done with limited time and number of participants. According to the results of interviews with Surakarta Autism Service Center therapists, autism therapy has a long-time principle and evaluating recommended the previous design.

## **Conclusion**

Based on the observation of twelve children with autism who used ABA table in individual room in Autism Services Center, it was found that 75% of them followed the therapy well, while 25% of them did not. In therapy especially in Indonesia autistic children push the table, and escape from table during therapy. So that discourage to the therapy process. redesign for autistic child with addition of permanent base on the ABA table is recommended.

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***Design of an Interactive Tangible Sensory Toy for Autistic Children to Improve Their Learning Ability***

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**Abstract**

Autism spectrum disorders (ASDs) are highly prevalent and the number of children diagnosed with it is increasing alarmingly every year. The child's learning is majorly hindered due to poor social interaction, communication, fine motor skills, and attention span. Building these skills in them is a demanding job and interactive toys can come to teacher's and parent's rescue. Although interactive toys can play a vital role and provide a therapeutic effect on children, it is found that there is a lack of such toys in the commercial market. An attempt is made to build such a toy that is specially designed for the learning needs of autistic children aged 4-7 years. It helps in building fine motor skills, developing speech and language, and improving their attention span. This product named Giffo is based on a cause-effect principle and designed by using primary and secondary research data and observation session insights. It gives the multisensory experience that engages their tactile, visual and auditory senses. Moreover, different sensory rewards have been introduced in the form of light and sound which helps in captivating their interest and improves their attention span. It was observed significantly through usability testing that cause-effect play motivates autistic children to play for a longer time and managed to capture and increase their attention span from 1-3 minutes to around 5-8 minutes. Moreover, this product gives them a sense of control by providing a structured situation all the time which makes their learning process efficient.

Keywords: Autism Spectrum Disorder, fine motor skills, sensory toy, attention span, learning ability

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## Introduction

Autism is a developmental disorder characterized by impaired social interaction, verbal and nonverbal communication. According to Piaget, cognitive development was a continuous reorganization of mental processes resulting from biological maturation and environmental experience[7]. He believed that children construct an understanding of the world around them; experience differences between what they are already aware of and what they find in their environment, then adjust their ideas accordingly[8]. Autism affects the nervous system and overall cognitive, emotional, social and physical health. Due to a wide range of symptoms, this condition is also called as Autism spectrum Disorder. Common symptoms include difficulty with communication, social interactions, obsessive interests, and repetitive behaviors. People with autism range from having severe impairments to high functioning individuals with mild deficits [1]. They also find difficulties in play and are unresponsive to interactions. According to a recent survey by The Centers of Disease Control and Prevention, there is an autistic child in every 59 children in the United States of America.

Play is a medium through which children express themselves and feel a sense of control. Playing is literally synonymous with childhood. It helps them to overcome fears, anxieties, and aids in social, emotional, cognitive and physical development. But autistic children have repetitive and unusual playing behavior. They do not respond to cuddling, shy away from people, don't make eye contact or smile, doesn't respond to their names or acknowledge their toys. Their inability to get the non-verbal cues of communication makes it difficult for them to gel with people and thus appear to be aloof and distant. They indulge themselves in self and solitary play which restricts them from exploring the world around them. Freeman & Kasari (2013) explain that "it can be very difficult for parents to engage the child in reciprocal, symbolic, turn-taking play episodes without intervention"[1]. The cause of autism is still unsure but many studies say playing is considered to be remedial and therapeutic for autistic children and can aid in their development to a large extent. Many theories and studies are present about how social and physical interaction aspects like turn-taking, eye contact, expressing and recognizing emotions, shared gaze, etc. can be achieved through toys. Broadhead in one of his papers writes that early play develops nonreciprocal interaction to more reciprocal one[2]. Wainer and Barakova and Lourens also talks about the positive impact of interactive products on autistic children and describes how it stimulates social engagement among them [3].

Surveillance Year	Birth Year	Number of ADDM Sites Reporting	Prevalence per 1,000 Children (Range)	This is about 1 in X children...
2000	1992	6	6.7 (4.5-9.9)	1 in 150
2002	1994	14	6.6 (3.3-10.6)	1 in 150
2004	1996	8	8.0 (4.6-9.8)	1 in 125
2006	1998	11	9.0 (4.2-12.1)	1 in 110
2008	2000	14	11.3 (4.8-21.2)	1 in 88
2010	2002	11	14.7 (5.7-21.9)	1 in 68
2012	2004	11	14.6 (8.2-24.6)	1 in 68
2014	2006	11	16.8 (13.1-29.3)	1 in 59

Figure 1: Identified Prevalence of Autism Spectrum Disorder (2000-2014),  
<<https://www.cdc.gov/ncbddd/autism/data.html>>

### Significance

The alarming figures about the prevalence of autism in the survey by CDC [5] suggest how the spectrum is taking the form of an epidemic year after year. According to a study, there is a prevalence of 0.15 percent among every 43 children out of a total of 28,070 children in rural, urban, and tribal areas in the age group of 1–10 years in India [3]. Chawarska, Klin, and Volkmar (2008) in their paper mention that the signs of autism tend to appear in the early years of a child's life. However, parents do not take the necessary steps in the initial years due to which a large number of children remain undiagnosed or do not get proper interventions. There is a lack of commercial therapeutic toys that can play a vital role in early intervention of autistic children.

Fred Rogers rightly said “Play is often talked about as if it were a relief from serious learning. But for children, play is serious learning. Play is really the work of childhood.” Every child learns through play but some play differently. The right toys designed for the right needs can contribute to a large extent in building the skills and help in early intervention. [4]

## Methodology



Figure 2: The Spastics Centre, Kanpur

In order to understand and empathize with children with autism, authors carried out research in a special school named ‘The Spastic Centre’. The Spastics Centre is a school for differently-abled children of different age groups and disabilities. It is a non-governmental organization that has been working for 20 years in the field of rehabilitation. There is a physiotherapy department, counseling department for parents and early intervention sessions.

The initial few months were spent building a reputation with the children, observe and understand them. It helped both children and author to build a comfortable and emotional relationship.

## Observations

The autistic children of age group between 4-7 years were chosen for observation sessions. These children study in classrooms and have an activity area for play and other physical activities. They were observed for several sessions, pictures were clicked and videos were taken for future references. Children were observed without disturbing or interfering with them. The author interacted with teachers to clear doubts after the observation session completed. Observation sessions helped in knowing the target audience better and empathize with them to the fullest. The interactive sessions aided in collecting demographic data and other details about the childlike types of sensory challenges they face, things they enjoy doing, etc.

The activity session used to happen for **30 minutes** every day. Each session had about 7 children. Each child was observed for 15 minutes in these sessions. It was observed that Children were always accompanied and assisted by their parents. They were provided with toys like a ball, puzzle block, abacus, trampoline to jump, stairs to climb.



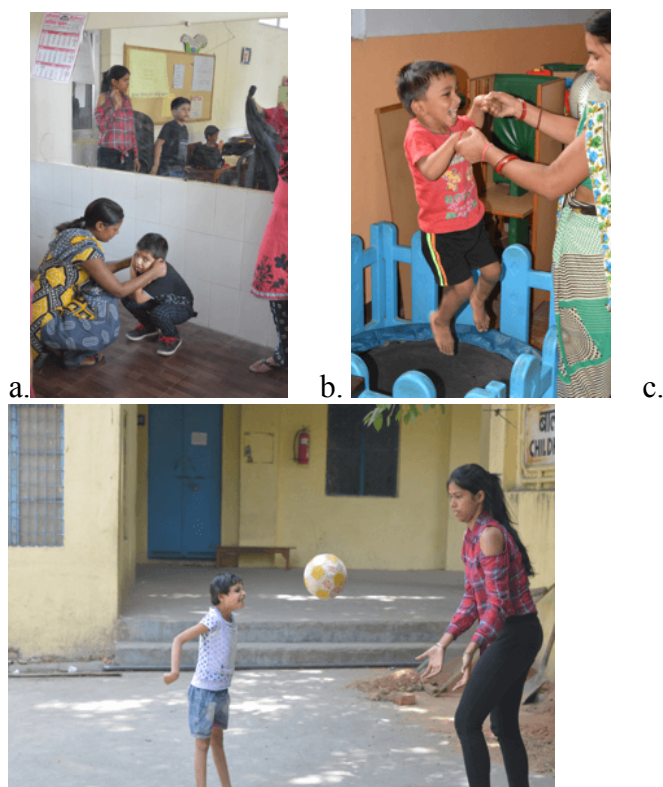


Figure 3: a.) Physical activities like sit ups are done during Activity period, b.) A child jumping on trampoline to build motor skills c.) Child is made to catch and throw the ball

Each toy or equipment is meant for building some particular skill e.g. Jumping trampoline is for building balance and motor skills; swing is for working on their vestibular senses, motor skills and for sensory stimulation.

Insights from observation sessions during playing session:

- Most of them involved in solitary play: We found 6 out of 7 children played on their own without interacting with their peers and were absorbed in their world. They generally did not understand how to take turns while playing.
- Had issues with fine and motor skills: they had difficulty in grabbing and throwing ball, holding pencil, etc.
- 5 out of 7 children were active. They ran around and threw ball with the help of assistance. But two children didn't respond much to instructions. They stood idle and got frustrated when asked to do sit-ups or other exercises.
- Displays poor joint attention skills: More likely to respond to joint attention rather than initiating it. They rarely made eye contact with teachers or parents or respond/follow actively to what teachers were sayings.
- Teachers had to repeat the instructions several times to make them understand.
- Loves sensory rewards like lights and sound[6]: One of the interesting insights that we gathered was that each child had unique set of interests. They enjoyed a specific sensory rewards like light, music, vibrations, pressures etc. which also implied they enjoyed cause-effect toys.
- Rewards and appreciation: Encouragement and appreciation seemed to work best with them. It made them happy and motivated them to do a given task again and again

- 4 out of 7 children indulged in imitation. When teacher gave them instructions, some of them repeated her gestures with their hands.
- All seven children had difficulty in verbal and non-verbal language and some engaged in echolalic speech.

### **In classroom:**

Four participants of age between 4-7 years were chosen. They were diagnosed with some form of autism. Each participant was observed for 15 minutes every day without disturbing them and the observations were noted.

Participant 1, 5 years old



Figure 4: Participant 1

Participant 1 is an active child. She smiles and always has a happy face. She is diagnosed with severe autism. She would be reluctant to sit and whenever she gets a chance she would get up from her seat and run. She gets distracted easily and has a low attention span. She makes eye-contact sometimes and has no speech. She often produces unusual noises and shows exaggerated emotions like smiling for longer times, staring at something for a long time. But with repetitive gestures and assistance, she understands and does the task. On completion of the task, she claps on her own and smiles back for the appreciation. She struggles to walk in a straight line and has a poor handgrip as she finds difficulty in holding a pencil and write with it. She took part actively in physical activities like running, picking the colored bottle and coming back. She was a bit reluctant in doing sit-ups and didn't interact with children around. She liked to play on her own. One child was playing with a ball, she also wanted it so she went to him and snatched from him which suggests that she lacks social skills.

## b. Participant 2, 4 years old



Figure 5: Participant 2

Participant 2 stays in his world and does not speak much. In the 15-minute observation session, he spent 10 minutes playing with the given toy and hardly noticed anyone around him. He doesn't respond to his name. After sometime he lost interest in the toy and started to stare into space. He blabbers a few words or murmurs poems/ songs as he is sensitive to music. His mother told him he likes to listen to music often and then starts humming the song. A peer friend was playing with a sound-producing toy and it caught his attention. He also wanted to play with it but refrained from asking for it. With constant assistance and imitations, he often imitates the actions. He has moderate gross and fine motor skills. He is shy and doesn't make eye contact and has poor social skills. He lacks a social smile, hesitates in reaching out to people and remains aloof. Even after being called 5-6 times by his name, he doesn't respond.

## c. Participant 3, 7 years old



Figure 6: Participant 3

Participant 3 is a smart child. She loves to write and do coloring. She loves crayons and painting activities. In 15 minutes session, 80 percent of the time she was indulged in writing that her teacher asked her to do. She likes to sit in one place, unlike other peers. She carefully fills colors into the shape that her teacher drew in her notebook. She has not acquired speech yet and makes sounds to communicate. She cannot speak words and engages in echolalia speech. When her teacher instructs her something, she tries to repeat the sentences by making sounds. When she is alone, she stims with her hands and makes repetitive actions and gestures while looking at the ceiling. She

doesn't like loud noise and becomes restless and screams to resist it. She cries when she cannot answer her teacher or doesn't understand what her teacher wants to say. She doesn't make eye contact, shy away when someone tries to speak to her and hardly interacts with people around her. She doesn't like to move around much and prefer sitting. She keeps standing at one place and observes things around her. Her mother continuously assists her with different exercises and play

d. Participant 4, 4 years old



Figure 7: Participant 4

Participant 4 is a happy child. He has a fair set of social skills like eye contact, smiling at others and recognizing the emotions but has poor language-speech skills. He hardly speaks anything and prefers solitary play. In 15 minutes session, he was completely indulged with his block and sorting game, very few times he looked at his mom for assistance. His mother hands him the blocks and points at the places to fit them, he follows her instructions and carefully places them. When he is not able to place it properly, he rotates the block and tries to fit it. But during play, he loses his interest and starts to stare here and there. During the activity period, he is quite active. He follows instructions with the help of his mother's assistance.



Figure 8: Affinity mapping for insight gathering

Insights from interviews taken with parents and teachers

1. Parents have to look after their children all the time. They cannot leave their autistic child alone otherwise he/she might get into trouble and maybe unable to help himself/herself.
2. Many of them do not understand that their child's needs are different. They expect their child to behave in the same manner as normal children do. Due to

this thinking, many times parents think punishing the child is the right way to handle them but instead of positive reinforcement it turns out to be a negative one.

3. Parents have to deal with sensory overload almost all time of the day. This is due to the restlessness and anxiety that they face.
4. Parents find it difficult to make the autistic child sleep.
5. Structured and consistent routines help autistic children to maintain stability in their lives. Naturally, they love to follow routines. When routines break, they become restless and frustrated.
6. Teachers have to do things repeatedly daily for long time to teach them. Some children might take weeks and some even several months depending upon their skill. Gradually, they learn to greet people
7. Every autistic child is different from the other and has unique characteristics because autism has a wide variation in symptoms and its severity.
8. Other peers and children do not accept and play with their child. Making him/her socially isolated.

### Concepts and Ideation

After research, conducting interviews, observation sessions and insight gathering, Authors ideated and brainstormed on ideas and possible solutions that could work for these children. Then created some fast and dirty prototypes of few selected concepts. These prototypes were taken to children for testing and an observation session was conducted.

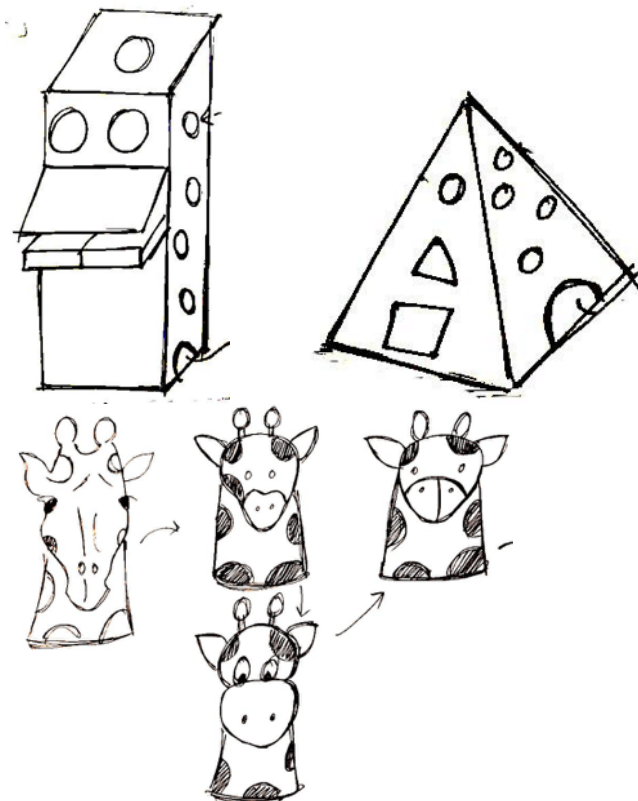


Figure 9: a.) Prototype b.) Testing



Figure 10: Prototype and its testing

After the testing of prototypes and fixing the final concept, the next crucial step was to decide the form of the toy. Number of shapes and forms were explored to best suit the needs. Initially, geometric shapes like cylinders, pyramids, cuboids and spheres were experimented.



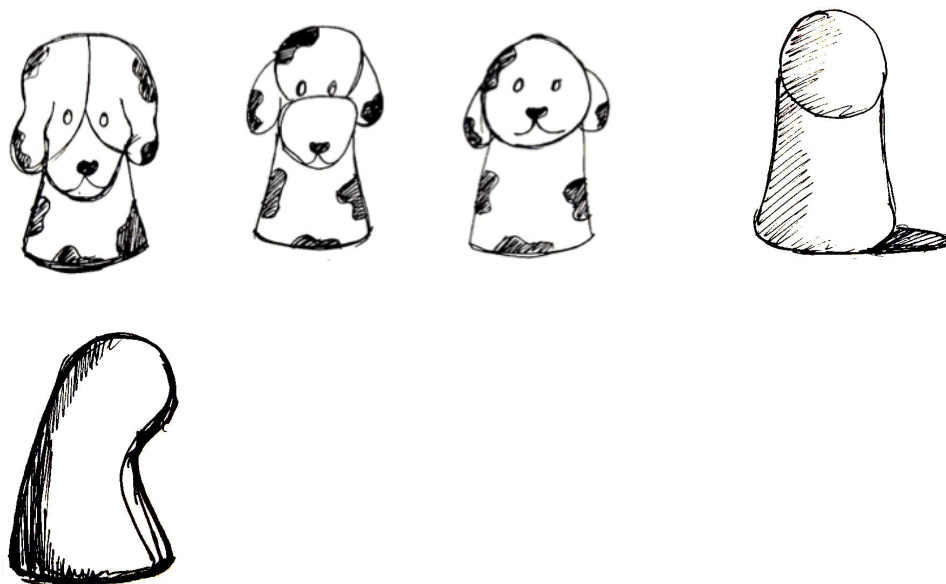


Figure 11: Form exploration from animal shapes

### Designing for autistic children

Designing toys for autistic children is a bit tricky because each child is different in terms of sensitivity and skills. In order to give them unforgettable and engaging experience designers have to study deeply about their lives, behaviors and feelings. Designers need to look into different aspects like how do children play, what senses they use most while playing, what attracts their attention, what things make their play interesting. Most of the toys involve three of our most used senses: sight, sound, and touch. Some toys have colorful graphics or images on them and some has light and sound which helps children to interact with it in more interesting way. Many toys have come up in market which uses these senses to teach children about letters, colors, and sound of the animals, numbers and much more.

The involvement of senses is essential to make play a bit more engaging. It acts as a positive reinforcement. The action becomes almost natural and super intuitive with very low effort. Besides these, it is really important to make toys simple yet absorbing which can help children to engage for longer time. Embedding technology into toys aids children in their development and their play.[9]

Earlier efforts were made to study autism and find ways to cure it, but since few years focus has shifted. Researchers and designers have started to study and realize the positive impact of technology on impairments of autistic children[10][11],and even came up with few guidelines on how to design toys for autistic children[8].

### Final concept:

Giffo is an interactive tabletop plush toy specially designed for autistic children and can be used by normal children as well. The physical design of Giffo is very simple and universal. Its shape is inspired by animal form. It has one main body which consists of three elements. Giffo being a tabletop toy enables children to sit around it and interact with it. This arrangement motivates children to interact and communicate

with their peers and builds social interaction skills like turn taking, maintaining eye-contact and understand cause-effect relationship. Children can be creative and make their own games as well while playing with Giffo. Children can take turns around Giffo when they are in a large group or a classroom.

- The outline shape of Giffo is curvy which makes it approachable, child-friendly and playful for children.
- Giffo doesn't depict any particular animal. Child can imagine it to be any animal he/she wants it to be.
- It is an engaging and novel product that aids in building social engagement skills, fine motor skills and sensory skills through principles of cause and effect play in autistic children.
- Every aspect of Giffo has been designed for a purpose. Each element focuses on some particular domain and helps in building that particular skill in the child.
- Understanding that each child is different and has unique needs, Giffo has been designed in such a manner that it caters to almost every child. It has textures and unique interactive outputs. Some playing element has a light as an output and some has sound.
- It has a round shape at the edges to ensure ultimate safety for the children. Parents can set their children free without any worries.
- The entire surface has faux fur to give it a look of a soft toy and provide tactile sensory experience to the children at the same time.
- Since it has a compact shape, it can be placed anywhere in the room. Children can even place it on table
- Moreover, this toy can be played by all children and not just autistic children. Thus, breaking the stigma of relating it with special need toys.

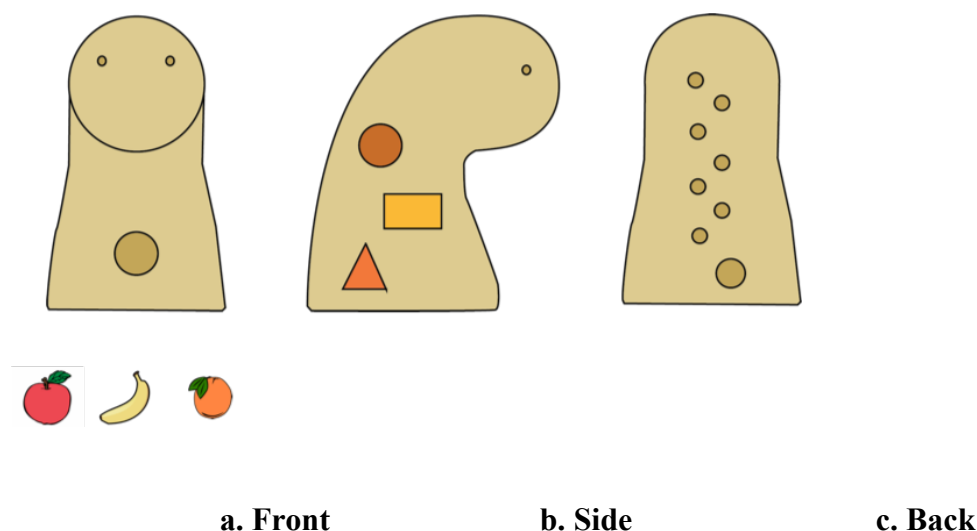


Figure 12: a.) Front side of Giffo, b.) Side of Giffo, c.) Rear side of Giffo

- Front side (For Speech Language Development and Social Skill Development): the front part of Giffo is meant for building social skills and speech-language skills in children. It teaches social words like “Thank you”, “Hello” etc. which are required in daily conversations. There is a feeding compartment in the front. The Giffo kit will have food blocks. When the child feeds Giffo with different foods like fish, carrot, orange etc, it says “Thank



you” as a feedback. The feeding compartment has an infrared sensor at the base. So whenever any object is placed, it senses it and provides audio feedback. Since an autistic child engages themselves in echolalia speech, such repetitive feedback of a word helps them to retain it in their memory and make use of them in their speech. Besides, language they also learn names of different fruits and food items interestingly. Teacher and parents can teach different words to the child as audio feedback can be easily customized according to child’s requirement and pace. It is great way to teach children social behavior like sharing.

- b. Rear side (For eye-hand coordination and fine motor skill development): The rear side of the Giffo has holes. The child has to put ball into one of the holes and as a result gets a visual feedback. The rear side starts to glow with light. This feature aids child to build eye-hand coordination by targeting ball at the hole. This feature involves child in cause and effect play. This type of play brings sense of control in child and makes him/her aware about one’s actions.
- c. Sides (For fine motor skills and eye-hand coordination): The walls have 3 led lights on each side of Giffo and each LED has a switch on the side. When Giffo is powered on, one of the LED light glows randomly. The child has to switch it off using the switch. When child switches it off another LED starts to glow randomly on that side. This way child has to coordinate with the LEDs and act accordingly. This helps in building eye-hand coordination skills.

### Testing with autistic participants:

The testing was done with participants who were diagnosed with some form of autism. Each session was conducted for 20 minutes.



Figure 13: Usability testing with autistic children

1. Giffo successfully grabbed the attention of children. They came close to have a look and wanted to play with it but didn't say it directly.
2. Their behavior was passive initially but when one of the children was asked to play with the toy others got interested into it. They gathered around the toy.
3. Once the child was given instructions on how to play with it, she managed to play with the toy.
4. When the child put the ball at rear side, it starts to glow. The child started to clap and gave a big smile indicating she enjoyed the feature. It engaged her finger and hands well while putting and fetching the ball.
5. The child also enjoyed the first module where Giffo says "Thank you". She tried feeding the toy again and again.
6. They showed less exploratory behavior compared to normal children.
7. They showed less cooperation in turn taking.
8. Overall, the child seemed to be engaged and the toy managed to capture her attention and interest with help of sensory rewards like light and sound.
9. The toy was usable enough as she didn't need any assistance while she was playing

The toy was effective enough because children were able to play with each feature without any assistance or problem. It managed to capture their attention for more than 5 minutes. Design was justified as product was easy to play and increased their average attention span.

## Result and Conclusion

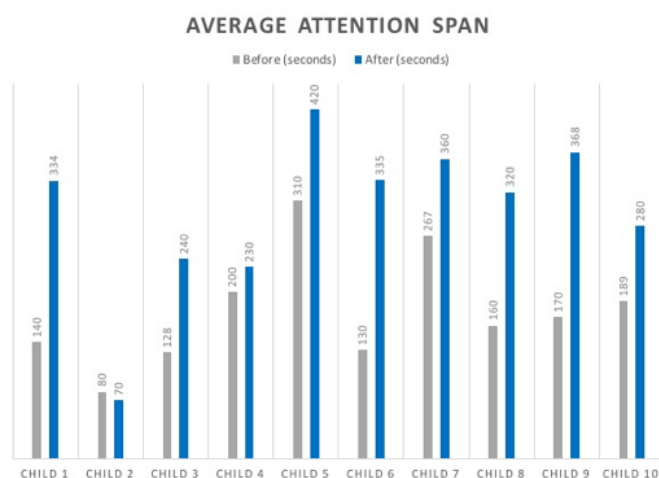


Figure 14: Average attention span

It was observed that autistic children had an average attention span of 1-3 minutes while playing with typical toys whereas average attention span increased to 5-8 minutes when they played with Giffo.

Interactive tangible toys and technologies have proven to be imperative for the intervention and treatment of individuals diagnosed with autism. It was observed significantly through usability testing that cause-effect play motivates children with autism to play for longer time. They truly enjoy sensory rewards like sound and light which is one of the important factors in increasing their attention span. Moreover, the product makes use of their special interests and gives them the sense of control by

providing a structured situation all the time for example fixed color of LED and fixed auditory feedbacks from the Giffo. The research aimed to design an interactive toy which can help autistic children. It gives multisensory experience that engages their tactile, visual and auditory senses and Giffo truly manages to fulfill the mentioned target.

The usability testing helped in measuring how usable our product is but effectiveness of Giffo in improving social, motor and language skills would be tested in future with bigger sample size. The testing would be done based on parameters like how many times they indulged in speech or language, how many times they imitated the words spoken by the toy, how many times they responded to turn-taking, how many times they made eye contact with their peers etc. Author also plans to refine the form to make it more compact and add more features like introducing easy to difficult levels to keep the toy interesting for the child. Also, many manufacturing processes need to be considered for large scale manufacturing so that it can be introduced in the commercial market and maximum number of autistic children can get benefit out of it.

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***Table with a Half-oval Hole as Individual Treatment Table of ABA Therapy for Autistic Children in Indonesian Autism Therapy Center as an Effective Design to Overcome Behavior***

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**Abstract**

ABA (Applied behavior analysis) therapy introduced by Ivar Lovaas is a widely used method for autism therapy in the world due to its success rate. In this therapy, a table is used during individual treatment as a medium for giving instruction and performing tasks between a therapist and an autistic child. In general, this table is similar to ordinary tables that have rectangular or circular top surfaces and dimensions appropriate for children. However, in Indonesia, the table used is usually modified with a half-oval hole at the side that faces the child. This study discusses the effects of such a table for autism therapy and its effective use for autism therapy. FGD (focus group discussion) was conducted with eight experts in autism therapy in Surakarta. They were therapists, psychologists, head of autism therapy center, and a professor in autism. Almost all agreed that it is necessary to make a half-oval hole on one side of the table to overcome problems such as children's minimum involvement during therapy, intention to leave the table, lack of concentration, and even pushing away the table. This kind of table encourages children to be more engaged in therapy activities. Using the table, the closer distance between the therapist and the student/patient was useful for therapist to instruct and manage the child's behavior. However, it is necessary to maintain the children's relaxing and non-depressing condition, given that basic principle of behavior therapy is to provide children a space to explore and develop.

Keywords: Table, ABA (Applied behavior analysis), therapy, autism

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## Introduction

Since ABA (Applied behavior analysis) therapy method introduced by Ivar Lovaas successfully treats ASD (Autism syndrome disorder), this approach became popular in that field. This approach is considered more comprehensive, efficient, effective, and flexible, having positive reinforcement, and helpful for facilitator to teach and understand behavior (Walsh, 2011; Barbaresi et al., 2006; Motiwala et al., 2006; Larsson, 2013). In this therapy, a table is sometimes used during individual treatment as a medium for giving instruction and performing tasks between a therapist and autistic students or patient. Since the individual assessment is an important factor in the ABA approach, it is necessary to provide a proper table design to encourage the achievement of the treatment goal.

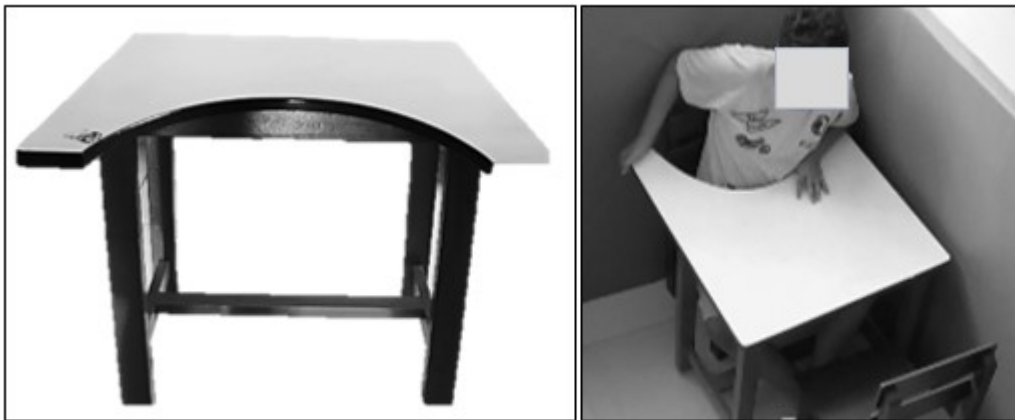


Figure 1. Table with oval hole

Generally, a table of individual treatment is similar to ordinary tables that have rectangular or circular top surface. However, in Indonesia, the table is usually modified with a half-oval hole at the side that faces a student/patient (Figure 1). This design aims to keep the student/patient sitting on the chair while his/her body is confined table hole. This also allows better eye contact between a student/patient and the therapist (Sari, 2011). The therapist can push the table to the wall while the student/patient will be forced in that position. This may not be in line with the principle of ABA, i.e., to provide freedom to the student/patient. However, this practice can overcome autistic student/patient's behavioral outburst and help the therapist doing her/his work easier. Therefore, the goal of assessment would be reached smoothly by using the table with oval hole.

To obtain better understanding of this table design issue, a preliminary observation was conducted in an individual therapy room. In that room, a table with oval hole was used as a medium to treat twelve autistic children in Autism care center (PLA) Surakarta. It took place in a classroom that applied ABA method. Each child involved in 30-minutes therapy. Type of the room was ordinarily used in autism service centers in Indonesia. It was found that children tend to escape from the table or push the table during therapy.

The child would try to get out of the table and no longer pay attention to the therapist when he or she started to get bored. Thus, the patients' behavior still hampers the goal achievement.

Table with oval hole has advantages and disadvantages. Therefore, it is necessary to elaborate the opinion from the user for developing this product (Caplan, 1990; Langford & McDonagh, 2003). The present study conducted focus group discussion to understand how the table affects autism therapy, and its effectiveness for autism therapy. Additional mat under the table feed was proposed and discussed as an alternative design to prevent a student/patient from pushing the table.

## **Methods**

Focus group discussion (FGD) was conducted with eight professionals of autism in Surakarta to elaborate opinions about the effects of the table with oval hole on autistic children during therapy and its effectiveness for therapy. This method was appropriate to develop a product according to user preferences and evaluations (Caplan, 1990; Langford & McDonagh, 2003). They were two teachers and a special school principal; two directors and a psychologist of autism care center; a professor of autism therapy; and a director of autism clinic. Special schools, care centers, and clinics were represented places to accommodate problems of children with autism. According to Caplan (1990), the participants were selected based on represented population with a similar background of the product user.

The first author acted as the moderator of the discussion in order to achieve the objective of the discussion. The tables and chairs were arranged in circle. This model provides effective communication among all participants and the moderator. Before the discussion, all participants introduced themselves. Moderator explained the objectives of the study, the previous study (Purnamasari, 2018), and preliminary findings. During the discussion, participants should answer a questionnaire. These questions were used as the guideline for discussion. The questions were as follows:

- Please mention the type of autism that is handled by your school/clinic.
- Does your school/clinic use the ABA method for autism therapy?
- Does your school/clinic use ABA table with oval hole during individual therapy? If not, what is the shape of the table used? Please explain the reason?
- What are the advantages and disadvantages of the ABA table with oval hole?
- What advice do you have for ABA table with oval hole for optimum autism assessment?
- What is your opinion on our proposal of redesigning ABA table with oval hole (oval hole will be removed and additional mat will be placed)? (Figure 2)

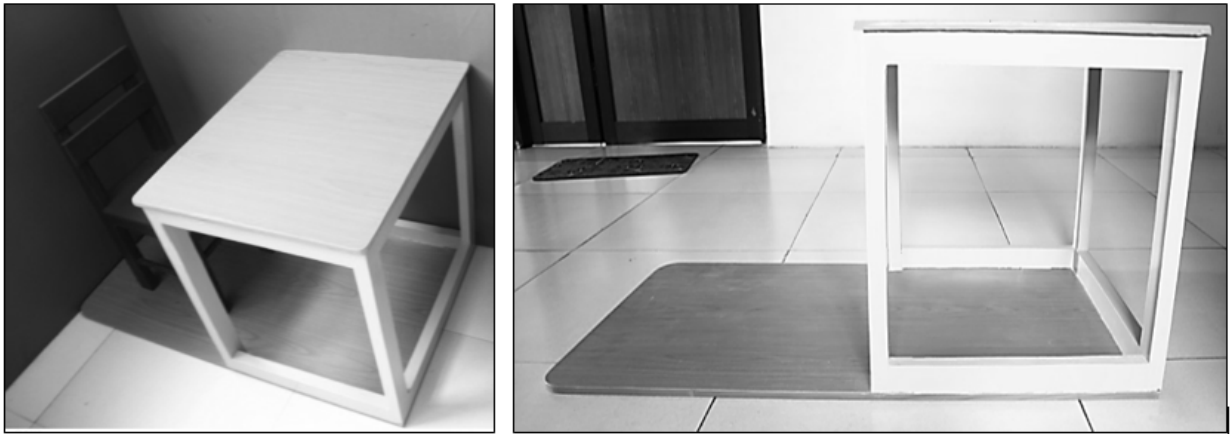


Figure 2. Table with additional mat under feet of table

The discussion was transcribed into notes directly by officer. The transcript would be confirmed by questionnaire that was filled in by participants during discussion. In the analysis process, the questionnaire answer was used to validate the interpretation of the transcript. Mapping and interpretation were applied to analyze data. Krueger's (2014) tools, i.e., words; context; internal consistency; frequency and extensiveness of comments; specificity of comments; the intensity of comments; big ideas, were taken into consideration to interpret the data.

### **Results and discussions**

Six themes mentioned in the questionnaire sheet was discussed.

#### **Type of autism that was handled in the schools/clinics**

All symptoms of Autism Spectrum Disorder (ASD) (DSM 5, 2013) were diagnosed in the patient or students. They were deficits in social communication and interaction; and restricted a repetitive patterns in behavior (DSM 5, 2013). Their responses to stimuli (lights, taste, sound, touch, etc.) include hyper- or hypo-reactivity, and unusual interests. The level of autism that was handled consist of level 1-3. According to DSM 5 (2013), each level requires different types of support. Level 3, 2, and 1 require very substantial support, substantial support, and support, respectively.

#### **ABA method and the use of table with oval hole for autistic therapy**

75% of schools or clinics applied ABA method to assess their students/patients. 25% of them used this method, especially to level 2-3 autism.

All schools or clinics utilized table with oval hole in particular conditions. Special school, or 10% of them, modified table by locking with a chair. This design is used to control very severe autism behavior in a class with various student's conditions. The class



consisted not only students with autism but also students with other special needs such as sensory impaired disorder, physical disorder, other developmental disorder.

80% of them used table with oval hole only for level 3 autism and at the beginning of the treatment in order to overcome communication difficulties. The teacher or facilitator supported students/patients fully in level 1-2. One of them applied an oval hole to big square table for group. It means that in the big table, there is one oval hole. 10 % of them used table with oval hole for level 2-3 autism. In other words, only in the best conditions or in level 1 that table was not really necessary to use. Since level 1 is a transitional period from treatment to normal conditions, an ordinary table (without oval hole) will be recommended.

### **Advantages and disadvantages of ABA table with oval hole**

Table with oval hole could decrease students'/patients' counterproductive behaviors such as minimum involvement during therapy, leave the table quickly, lack concentration and push the table. In other words, this table encouraged students/patients to be more engaged with the therapy activities. The closer distance between the therapist and the student/patient is helpful for the therapist to instruct and manage the student's behavior.

However, one participant did not agree with this table since it seems to confine the students/patients in a disadvantageous position. This does not meet the principle of ABA intervention i.e, to provide freedom for children and make them enjoy the therapy. As a human being, they need freedom. They may be bored, moreover, their conditions need move more active than ordinary people. This table was not for children's needs but for therapists to ease their job. Even though the table would encourage children to sit quietly during learning, ABA intervention can be done anywhere – without table and chair. Therapist should create many creative strategies to solve the problem.

### **Design recommendation to modify table with oval hole for optimal autism assessment**

To optimize autism therapy process, the size or dimension of the table and also chair should be designed appropriately to each student/patient dimension. The edge of the table should be round. Moreover, soft material can be applied to the top of table and chair. The color should be soft to accommodate students/patients that sensitive to texture stimulation.

### **The opinion on the proposal to redesigning ABA table with oval hole (the oval hole will be removed and an additional mat under the table feet will be placed)**

All participants were interested in table without oval hole and additional mat. However, this type only discourages students/patients, making them pushing or leaving the table. They still could move away from individual treatment. And this is counterproductive to achieve a goal of assessment in each session. The treatment may take more than 30 minutes if students/patients move away many times during the therapy. Therefore, 90% of the participants recommended table with oval hole but in proper design for ASD.

## **Conclusions**

Table with oval hole is necessary to overcome autistic students'/ patient's behavioral outburst and to optimize the therapy session. However, it is necessary to maintain the children's relaxed and non-depressing condition since it is the basic principle of ABA. A space to explore and develop must be provided in an education process. Therefore, modified table with oval hole and additional mat need to be developed in a more friendly design to make autistic students/ patients enjoy the therapy.

## **Acknowledgments**

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***Design of a Digital Application to Aid Hindi Alphabet Recognition/Formation for Children With Learning Disability***

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**Abstract**

Dyslexia is the most common learning disability that majorly affects language development and reading. In India, dyslexic children despite being moderately intelligent and good with English alphabetic knowledge perform poorly in Hindi. These children find it very difficult to recognize and remember the shapes of the Hindi alphabets because of its complex features such as the curves, matras (dependent-forms), halants (half-form), etc. The importance of learning Hindi cannot be ignored especially in India where all the major day to day activities are carried out in the Hindi language. After knowing the problem, the authors revisit the Hindi Alphabets (Varnmala) and tries to find out how the complex features of the Hindi alphabets can be taught efficiently. The data and insights were gathered through observation sessions, video recordings and behavioral studies of 5 dyslexic children aged 8-12 years. Open-ended interviews with teachers and parents helped to understand the problem better. A deeper analysis of the Hindi language led the authors to reconstruct all the 48 alphabets of the script (36 Consonants and 12 Vowels) using combinations of just 10 basic shapes. Findings from these sessions helped authors to design and develop an interactive touch-based digital application that helps these children to recognize and form Hindi alphabets efficiently and also provides audio-visual feedback to the children which makes learning fun. Testing the application with 12 dyslexic children revealed that the average time to learn a new Hindi alphabet got reduced from 2-3 weeks to one week.

Keywords: Dyslexia, Learning Disability, Mobile Application, Hindi, Drag and drop

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## Introduction

Academics is one of the most vital part of any child's life but not all children excel in it. There is a significant number of children facing difficulties in various areas of academics like counting, reading, memorizing, learning, writing, etc. in spite of being really good at other things. A person who has difficulty learning in a typical manner, usually caused by an unknown factor or factors are classified as having a "learning difference"[1]. Physicians like Hinshelwood and Orton were the first ones to observe and document about the children who have specific problems in learning to read. These children go through many problems such as very slow reading speed, skipping lines while reading aloud, making spelling mistakes repeatedly, inability to solve simple mathematical problems, very illegible handwriting which leads to very poor grades in academics[2][3][4]. Besides academic problems, these children have problems with non-academics as well like visuomotor issues, memory problems, perceptual problems, language difficulty and problem in phonological processing. According to Wong(1996)[5], 60 percent of the children who are diagnosed with a learning disability have some or the other form of reading disability.

In India, 5-15% [6] of the school-going children are affected by specific learning disability(SpLD) such as dyslexia, dysgraphia, dyscalculia[4]. SpLD can be defined as a combination of neurodevelopmental disorders in which a person despite being intelligent find it difficult to learn reading, writing or performing mathematical calculations. SpLD is believed to be caused due to functional disruption in neural systems rather than an anatomic problem and is generally inherited[2][6][7]. 80% of the SpLD inflicted children suffer from dyslexia[3]. Dyslexic children suffer from "phonological awareness" and "poor visual perceptual skills". As per the "phonologic-deficit hypothesis," dyslexic children find difficulty in connecting the sound of the language with the written letters. Visuo-perceptual deficiencies have been linked with dyslexia for many decades which suggests that visual system impairment is one of the major causes [8].

## Significance

Dyslexia is the most common learning disability and nearly 70% - 80% of students diagnosed with a learning disability have reading problems. The worldwide incidence of dyslexia is 5-20% whereas in India the incidence is believed to be around 15%. The number of dyslexic children in India is nearly 35 million and the count is continuously increasing[9].

In India, Hindi is the most spoken language and is one of the 22 official languages of India. Hindi is also the official language of 10 Indian states including Union Territory state Delhi. Hindi is also the prime medium of teaching in these 10 states along with English[10]. Under Sarva Shiksha Abhiyan, all the government primary schools have Hindi as the only medium of teaching. So, learning to read and write in Hindi is an essential part of these children's life. Hindi is a direct descendant of Sanskrit and is written using Devanagari script which is very logical and straightforward hence easy to learn. Unlike English, this script has no capital letters and also the pronunciation is done in the exact way as it is written[11]. Learning Hindi becomes even more important as language and culture are inseparably connected from the very beginning.

Any clear demarcation of language and culture is not possible as they both compliment each other to a significant extent[12].

This research is focused on helping the children with special learning needs aged between 7-12 years to learn Hindi letter formation/recognition. Hindi is the major language for communication in this part of India, the significance of having knowledge in Hindi can never be ignored.

### Learning Disability and Learning Hindi

The level of children in reading Hindi is very low in these below states, and since Hindi is the only medium of teaching in the government primary schools the children find difficulty in learning other subjects as well. The below chart shows statistics of children who are only able to read letters and not words. Madhya Pradesh has the highest percentage 25.9% of students being able to read letters and Himachal Pradesh has the lowest percentage 11.2% of students being able to read letters[13].

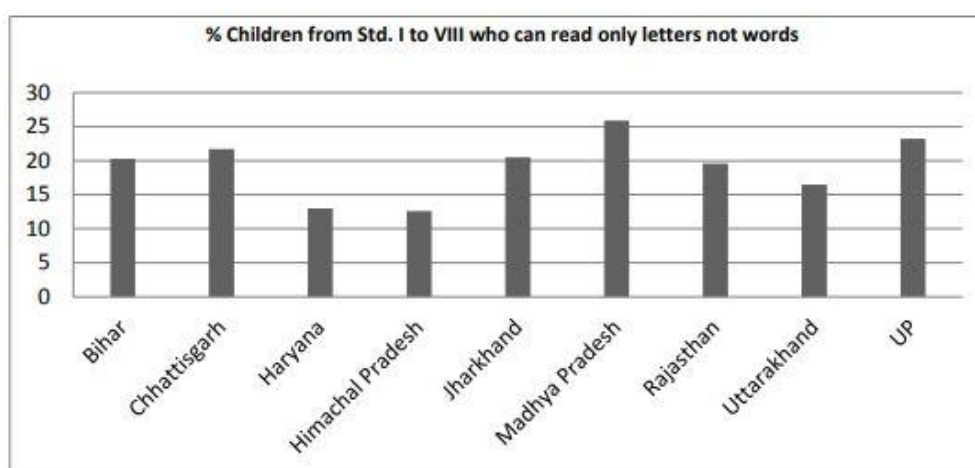


Figure 1: ASER 2013 Data - State-wise percentage of children who can read only letters

On one side we see that the status of Hindi learning is very poor, but studies show that Hindi is a very logical language and is easy to learn. Hindi is a direct descendant of Sanskrit and is written using the Devanagari script which is extremely logical. In Hindi pronunciation is comparatively easier as compared to English because Hindi letters are pronounced in exactly the same way as they are written. As there are no capital letters in the script it's easier to remember the rules for writing in Hindi [11]. It is important to know if alphabetic orthographic transparency has an effect on the way children learn to read. Studies have revealed that acquiring reading knowledge depends heavily on the nature of orthography[14]. According to Wimmer and Goswami[15], orthographic transparency and reading development are directly related. So, it can be concluded that letter to sound mapping is more consistent in transparent orthographic system i.e. letter to sound mapping of Hindi is more consistent than that of English.

Further studies revealed that though Hindi is a very transparent language where the mapping from grapheme to phoneme is consistent, readers find Hindi difficult to learn due to its complex graphemic features. Hindi alphabet arrangement is strictly phonetic

and letters are categorized by place of articulation: first, come vowels and diphthongs, and then comes the consonants with intrinsic schwa vowel, where the independent graphemic form is absent[16]. The cluster of consonants is generally written one above the other or by introducing a special sign to indicate that the schwa is absent. Vowels can appear in either of the two ways, at initial position in a full form word or as diacritical signs (as matras) in the middle-word or word-final position[17]. In order to learn Hindi, a child has to remember the specific features of the script. For example, the odds of occurrence of consonant clusters at the word-initial or word-medial position is not fixed. A Gupta in her studies shows that dyslexic Hindi readers face trouble in achieving high-quality phonological representations of words. It has also been observed that word blending skills of dyslexic Hindi readers are poor.

So, we can say that although Hindi is easy to learn as a language, most dyslexic Hindi readers find it difficult to learn due to the complex geometry of Hindi alphabets such as the curves, matras, halants, etc.

### **Process of learning Hindi**

Frith [18] postulated three main stages of reading any alphabetic systems as Logographic, Alphabetic and Orthographic.

1. Logographic Stage: In this stage, a child sees words as visual objects or symbols. For example, a child learns the basic units of the Hindi alphabet by memorizing, repeating and writing.
2. Alphabetic Stage: In this stage, a child represents letters in ordered sequences. For example, in Hindi there is a concept of vowel(matra). This is a very challenging stage for learning Hindi. Without understanding the concept of matra learning word formation is not possible.
3. Orthographic Stage: In this stage, a child learns to remember the whole-word grapheme sequence on repeated exposure. The child learns to combine alphabets and form words. This is also a time taking process.

According to Ehri [19], there are four phases in the development of word recognition. Similar to Frith's model is the first three phases of Ehri's model. Those phases are pre-alphabetic, partial alphabetic and full alphabetic. The fourth phase or the consolidated alphabetic phase suggests that a reader consolidates their knowledge by memorizing the recurring pattern of multi-letter sequences such as -ight sequence in bright, light, flight or -ock in clock, dock, rock.



## Field Research



Figure 2: Spastics Centre Kanpur

The Spastic Center is a non-governmental organization for children which is working in the field of rehabilitation for over 20 years. The spastic center provides special education to children aged between 6-12 years.

### Behavior study of dyslexic children

For a better understanding of the target audience's needs, the authors conducted observation sessions in the classroom. Each child was observed for 20 minutes. The authors used the initial few sessions in building rapport with the children so that they become comfortable with their presence during the classes. Pictures and videos were also taken for future references.

Participant 1, Age: 11 years



Figure 3: Participant 1

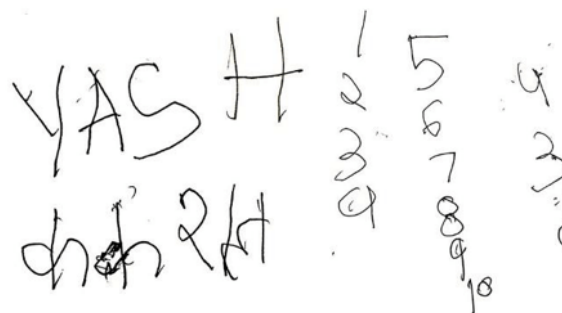


Figure 4: Handwriting sample of participant 1

Participant 1 is a very interactive child. He has fairly good fine-motor skills and hand-eye coordination. His attention span is very good and he can concentrate on things that he is doing for more than 5 minutes. He has poor handwriting. When he was asked to write some simple words in Hindi, he performed very poorly. He needs some

reference to write in Hindi, as he finds Hindi letters very difficult to remember. He is very good at handling smartphones.

Participant 2, Age: 12 years

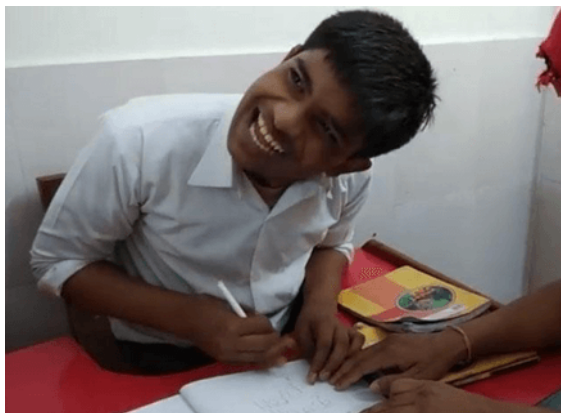


Figure 5: Participant 2

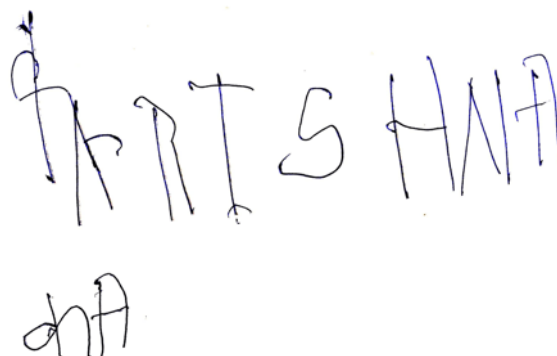


Figure 6: Handwriting sample of participant 2

Participant 2 actively performs all the activities like studies, sports, and music. He has a habit of repeating words continuously. For example, if he greets someone saying ‘namaste’ he will continue repeating ‘namaste’ for a minute. His attention span is fair but he gets easily distracted. He is very good in English and mathematics and can solve simple mathematical problems. He is not able to recall the shapes of the Hindi alphabets and has a tendency to mix up Hindi and English alphabets. He enjoys learning from a smartphone. He is delighted by the audio-visual feedback of the device.

1. Participant 3, Age: 8 years



Figure 7: Participant 3

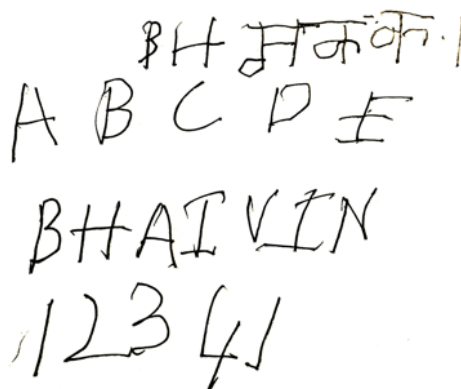


Figure 8: Handwriting sample of participant 3

Participant 3 is a very interactive and fun-loving girl. She has very good communication skills. Although she has severe speech problems she can explain anything by gestures. She loves to interact with her peers. She can read and write English. She can write Hindi alphabets very slowly but she cannot read Hindi. She can use a smartphone with ease and enjoys listening to music on smartphones. She doesn't hesitate to explore new applications on the smartphone.

Participant 4, Age: 11 years



Figure 9: Participant 4

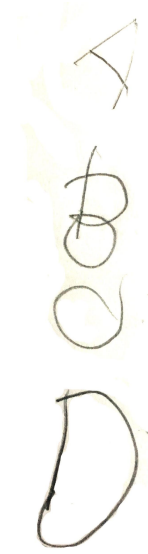


Figure 10: Handwriting sample of participant 4

Participant 4 is a very calm and composed boy. He speaks very less and his pronunciation is not clear. He has a very good attention span and his connection with the subject of matter is very strong. He can write simple words in English but finds difficulty in writing Hindi. He knows how to operate smartphones, but he cannot use the device efficiently as he always touches the screen at multiple points due to his poor fine-motor skills.

Participant 5, Age: 10 years



Figure 11: Participant 5

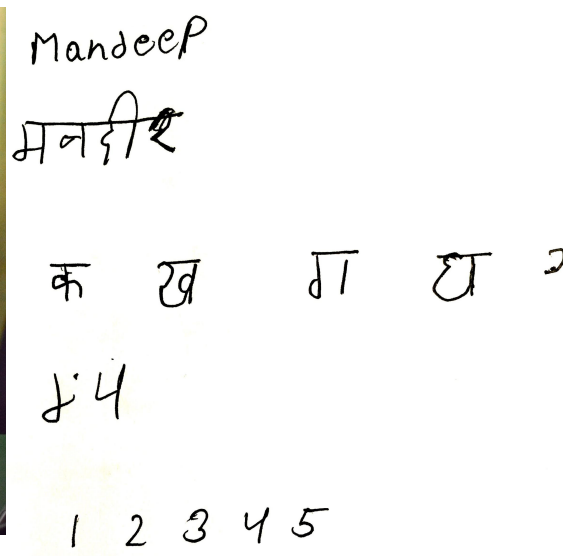


Figure 12: Handwriting sample of participant 5

Participant 5 is a very intelligent boy. He has severe speech complication and he cannot speak. But his fine motor skills are fairly developed. He is good at English and mathematics. He has fairly good handwriting. However, he writes at a slow speed. He finds difficulty in recalling the names of the Hindi alphabets. Sitting in one place is difficult for him, and he likes to move around the classroom all the time. He is very confident in using digital devices. He can play games on a mobile interface with ease. He is very responsive to the audio-visual feedback from the smartphone.

### **Insights**

1. They are fairly good at English in comparison to Hindi. Almost all the children were able to write English letters properly and but failed miserably when asked to write anything in Hindi.
2. Most of the children are unable to remember the shape of Hindi letters due to their complex features such as curves, matras, halant, etc.
3. Most of the children are not able to write Hindi alphabets on their own, they always need a reference.
4. Due to poorly developed fine-motor skills, they find it very difficult to hold pencils, erasers, notebooks, etc.
5. They are very much interested in digital devices such as smartphones, tablets, etc.
6. Using smartphones is easier for them as they just had to use their fingers.
7. The children were responding well to the audio-visual feedback of the digital devices.
8. Their attention span is higher (4-5 minutes) when they are playing games on smartphones and tablets.
9. It's easier for the children to read and learn when the text and images are larger.

### **Design criteria for developing applications for Dyslexic users**

When we are designing something for dyslexic users we have to keep in mind that there is no single solution that works for all. Every dyslexic user is different and their severity of problems is also unique. The following things should be kept in mind:

1. Typography
  - a. Usage of Sans-serif font is recommended. The issue with serif fonts is that the projections of serif font distorts the shape of the letters and makes it difficult for the dyslexic reader to read.
  - b. Italics should be strictly avoided.
  - c. Usage of the under-lined font is not recommended.
  - d. It is suggested to reduce the letter spacing while increasing the word spacing.
2. The digital layout of a screen
  - a. Dyslexic readers find it difficult to read wider text spans, so its recommended to keep the column width narrow.
  - b. There should be a limit of 80 characters per line for adults and for children the limit is 45 characters per line.

- c. Leading between lines should be 18pt for dyslexic readers.
- d. All the columns should be left-justified.
- e. Asking the user to type should be avoided wherever possible.
- f. All caps letters should be avoided, as it makes dyslexic readers slower.
- g. Too many movements on the screen should be avoided as it can distract the users.
- h. Clear and simplified graphics should be used.
- i. Auto-fill features should be provided wherever possible in order to avoid typing.
- j. Consistency of white space is expected because uneven spacing disrupts pattern recognition and slows down dyslexic readers.
- k. Justified text alignment should be avoided.
- l. High contrasting colors should be avoided for background and foreground.
- m. Black text on a white background creates a blurred effect so it should be strictly avoided.

### 3. Utility Tools

- a. Features to change font size and font type should be provided. Sometimes it's difficult for them to read smaller text.
- b. Certain fonts like OpenDyslexic, Lexia Readable, Dyslexie are specially designed to help dyslexic people in reading. An option to use these fonts can be provided.
- c. A masking tool can be provided so that the reader can mask unwanted areas of the screen and concentrate only on what he/she is reading.
- d. Text to audio conversion and vice-versa feature is very handy for dyslexic users as typing is a very difficult task for them. It takes a lot of effort for them to type on the small screen of smartphones.
- e. Features like auto-suggest words and spell checkers help dyslexic readers in many ways.

## The Concept

The concept of the solution came when it was observed that most of the children faced difficulty in recognizing the Hindi alphabets. Although the children were intelligent enough to read and write in English but they were unable to remember the shapes of the Hindi alphabets. So, the author deduced that these children cannot be taught Hindi in the same way they are being taught English. The author dug deeper and finally came to understand that these children find the Hindi alphabets to be very complex due to its features like curves, matras, etc. So, the author focused on how Hindi can be taught efficiently to these children.

The author did a very detailed study of the Hindi fonts. The author focused mainly on the formation of the Hindi fonts and its features such as curves, lines, and dots. It was found that most of the Hindi alphabets have a common 'T' shaped structure. The 'T' shape was very much defined in 33 out of 48 alphabets and all these 33 alphabets were constructed around the 'T' shape. And the remaining 15 alphabets could be formed with a similar 'T' shape but with a reduced stem as shown in the below figure.

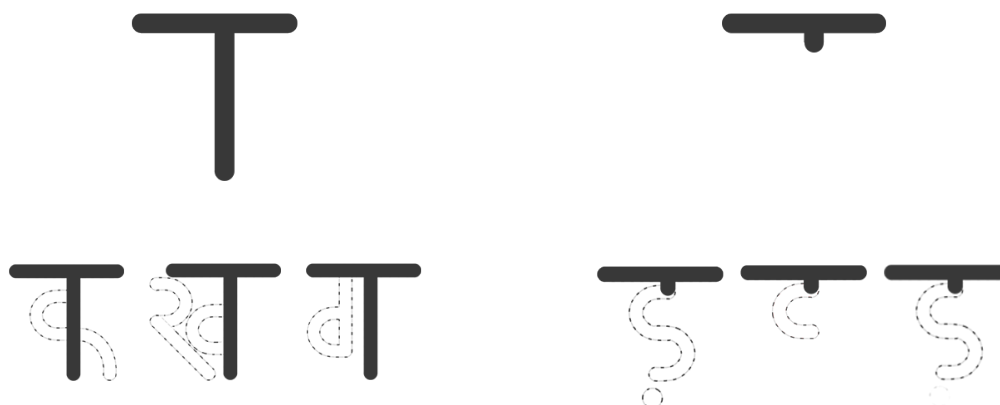


Figure 13: Alphabets constructed around 'T' shape      Figure 14: Alphabets constructed around 'T with reduced stem' shape

Next, the author also observed the repeating patterns of curves, for example, the curve on the left side in 'क' is similar to the curve in 'व'. Also, the same curve is present in 'ख' although it is a little smaller as compared to 'क' and 'व'. Based on the idea of similarity the author grouped all the shapes which repeat itself in some or the other way across the Hindi Varnmala.

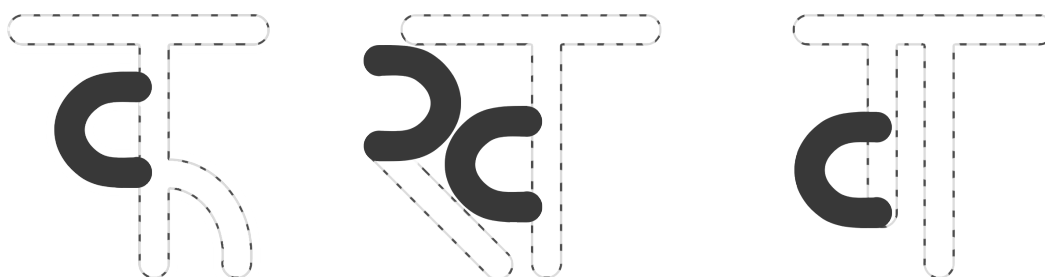


Figure 15: Alphabets that consists of the same curve

In the same way, the author split all the alphabets of Hindi Varnmala into parts constituting only simple lines, curves and dots. In Hindi, there are 36 Vyanjan(consonants) and 12 Swar(vowels). The author recreated the whole Hindi Varnmala by just using 10 simple shapes. Below are the 10 shapes which can be combined in different ways to create the alphabets of Hindi Varnmala.

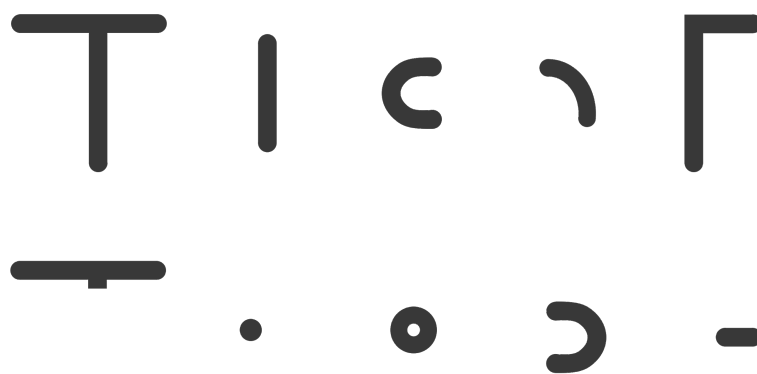


Figure 16: The 10 simple shapes for Hindi alphabet formation

For example, the first alphabet of Hindi Varnmala 'क' can be formed in this way.

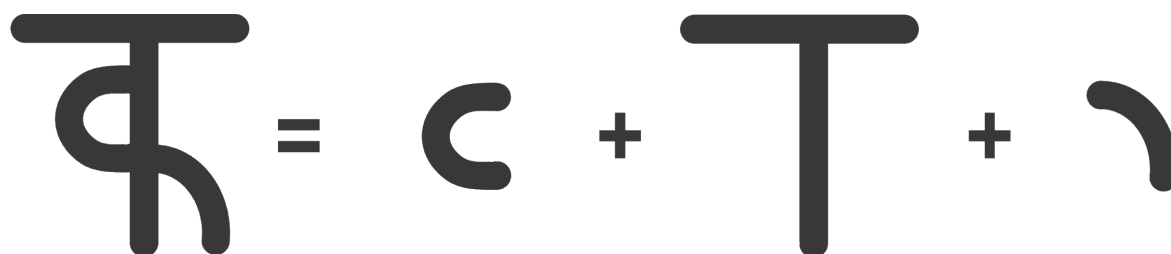


Figure 17: Formation of 'क'

Using the combinations of the shapes in Figure 21, all the 48 Hindi alphabets can be formed. Hence, the child has to remember these basic shapes in the first place and then they need to select the appropriate combination of the pieces to construct the alphabet. Figures 23 and 24 show the vyanjans and swars as formed by the combination of the shapes.

क ख ग घ ङ  
 च छ ज झ ञ  
 ट ठ ड ढ ण  
 त थ द ध न  
 प फ ब भ म  
 य र ल व श  
 स ष ह क्ष त्र ज्ञ

Figure 18: List of Vyanjans as formed by the shape combinations

अ आ इ ई  
 उ ऊ ए ऐ  
 ओ औ अं अः  
 ऋ

Figure 19: List of Swars as formed by the shape combinations

### Low fidelity prototypes

1. Cardboard prototype: The cardboard prototype consisted of sheets and shapes (lines, curves, dots). The outline of the Hindi alphabets was printed in a dotted format on the sheets, which can also be referred to as the alphabet puzzle. One sheet contained only one alphabet puzzle. There was also a set of shapes like lines, curves, and dots.

Next, the child was given this sheet of paper which had an alphabet puzzle and the child was asked to complete the puzzle with the shapes he had. The child's task was to select the appropriate shape from the set of shapes and complete the puzzle.



The children were able to relate that the given Hindi alphabet was made out of these few shapes. This prototype was tangible and it was made out of cardboard cutouts. Small magnets were inserted into the cardboard shapes and the puzzle part of the sheets was also magnetic. As a result, when the correct shape was placed accurately over the puzzle the shape would stick to the paper.

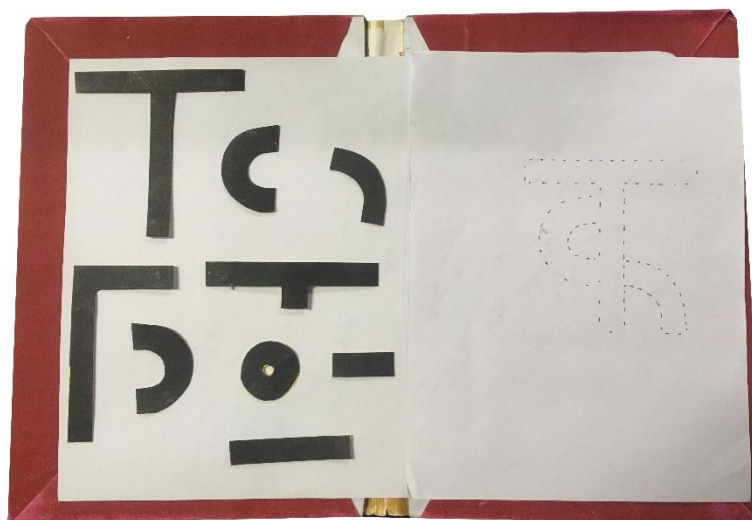


Figure 20: The cardboard prototype

2. Digital prototype: The author also used a digital prototype in the form of a smartphone application to accomplish the task of teaching Hindi alphabets to these children. The application contains an alphabet puzzle in the form of a dotted outline of the Hindi alphabets at the center of the screen and the parts of the alphabets were on the top of the screen. The task for the child was to drag and drop the parts of the alphabets at the correct position over the dotted puzzle. Once the child drops the alphabet part at the correct position the application greets the child with a success sound. This feedback encourages the child to accomplish the task correctly and, in the process, learn Hindi alphabet formation and recognition. If the child drops the alphabet part at the wrong position of the puzzle the application gives proper feedback to the child and dropped alphabet part goes back to its original position.

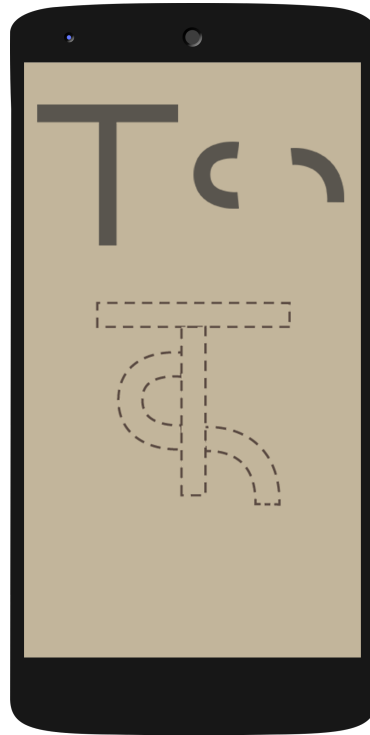


Figure 21: The digital prototype

### Insights from testing

- Cardboard prototype:
  1. The concept of completing the alphabet puzzle was understood by the child and it was considered in the form of a game.
  2. The shapes were not sticking properly at the desired place on the page and were easily removed if touched by mistake.
  3. As the motor skills of the children are very poor the shapes should stick properly at the place otherwise they might be easily removed by touch.
  4. As the shapes are made out of cardboard and chances of getting folded was high.
  5. This prototype lacked in providing proper feedback to the child which should be one of the main features any games designed especially for children.



Figure 22: The cardboard prototype being tested 1



Figure 23: The cardboard prototype being tested 2

- Digital prototype
  1. The child was able to drag and drop the alphabet parts at the desired location.
  2. When the shapes were dropped at the appropriate location they would just stick. This was an important feature of the digital medium that the shapes could not be dislocated once placed in the correct position.
  3. On a successful drop the application would provide a music feedback hence encouraging the child.
  4. If the shapes were not dropped at appropriate position then they would go back to the original position on their own.
  5. On an unsuccessful drop, the application would provide feedback in the form of music.
  6. As the children were poor in motor skills they had poor control of their fingers. So in the app, it was desired that only one item would be responsive to touch at a time.
  7. The next shape should become responsive to touch only when the first shape was dropped successfully.
  8. The children had a habit of resting their palms on the screen on the smartphone, hence it was decided that the application would run only in landscape format to avoid the unnecessary touch.



Figure 24: The digital prototype being tested 1



Figure 25: The digital prototype being tested 2

### Final prototype

The application has been designed to be very simple and self-sufficient so that the child does not need any assistance in operating the app. Proper care has been taken while deciding the color palette of the app and it is custom made to suit the requirements of children with various learning disabilities. To aid better concentration of the children, a rhythmic music is being played at the background which can be switched on or off very easily from the home page using the sound icon. For better visibility and accessibility, all the app icons have been designed to be larger than usual. This app is very interactive and always aims to keep the child focused through various audio-visual feedback. Below are the wireframes of the smartphone application:



Figure 26: Home screen of the application

This is the landing screen of the application. The vyanjans are arranged in form of blocks and in sets of 5 just the way they appear in the Hindi Varnmala. This screen is scrollable and the affordance of scrolling is justified by partial visibility of the top part of the blocks that are below the page fold. The various icons on this screen are the home icon, trophy icon, idea icon and the sound icon. In this page the home icon is highlighted which denotes that the user is in the current page. The trophy icon takes the user to the awards and achievement page where all the badges and awards unlocked by the user are stored. The idea icon is the module where the user can take

quizzes and puzzle tests. On successful completion of each test, points or badges are awarded to the user to motivate them. The sound icon is used to control the rhythmic background music that plays when the app is started. Using this icon, the user can choose to enable or disable the background music. Tapping on any of the vyanjan block will take the user to that specific activity page.

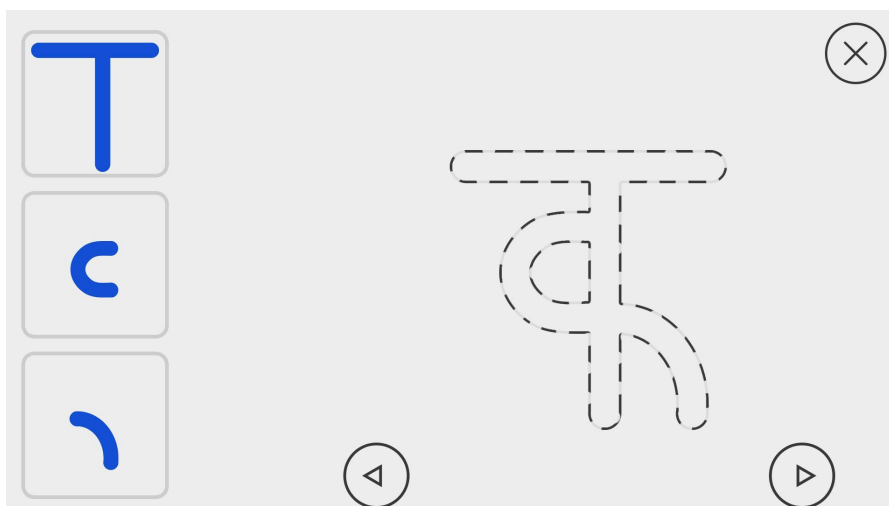


Figure 27: Activity page

This is the activity page. When a user comes to this page the first piece of the alphabet flickers and tries to catch the attention of the user. In this page the aim of the user should be to successfully drag and drop the pieces of the alphabets over the appropriate part of the center alphabet. If the user successfully drops the piece over the appropriate area then the application congratulates the user with music. On completion of the whole alphabet, the application appreciates the users and plays an interesting animation. In this screen, only a single piece of the alphabet is active at a time. The next piece becomes active only when the first piece is dropped successfully. If the user fails to drop the alphabet piece at the appropriate position then the piece goes back to its original position inside the block. The user can use the next and previous buttons to linearly traverse to the next and previous pages.

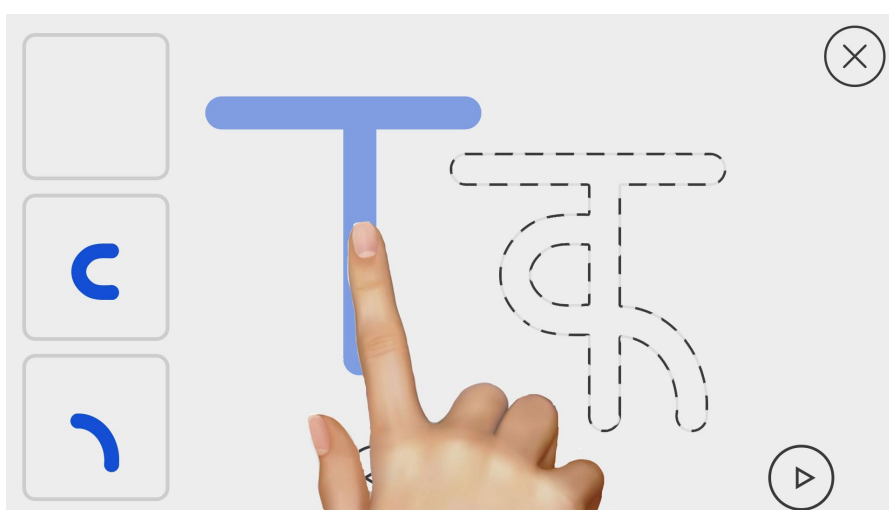


Figure 28: Shape being dragged to solve the alphabet puzzle

This figure shows the user dragging the first piece of the alphabet over the center alphabet.



Figure 29: First piece of the alphabet dropped successfully

If the user is able to drop the piece at the correct place then the application greets the user and activates the next piece. When the next piece of the alphabet is activated it flickers a few times to catch the user's attention.



Figure 30: Second piece of the alphabet dropped successfully

This image shows that the second piece of the alphabet has been dropped successfully.



Figure 31: Alphabet puzzle is complete

When the puzzle is complete the application greets the user by playing a success music and also plays an animation image in reference to the alphabet in focus.

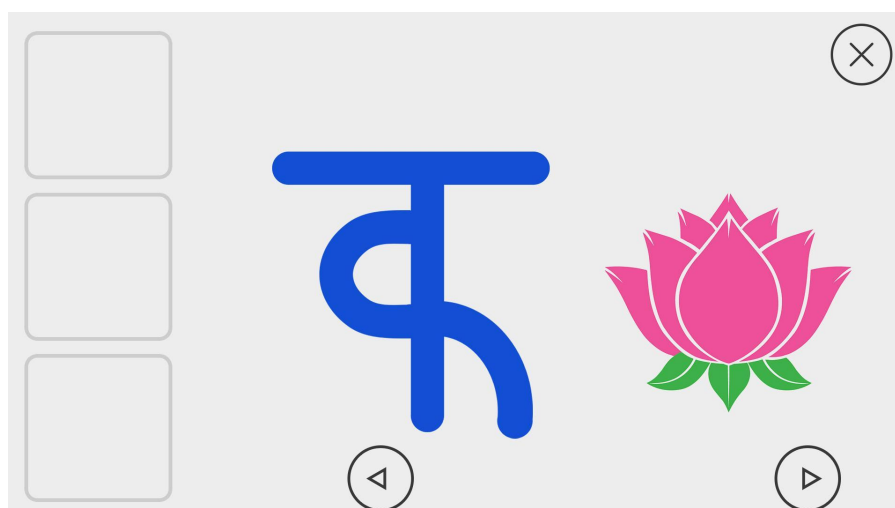


Figure 32: The app gives audio-visual feedback along with an appropriate image

This image shows an animation of an appropriate image along with audio which says 'क से कमल' (in this case). Hence the user can relate the alphabet to the image.

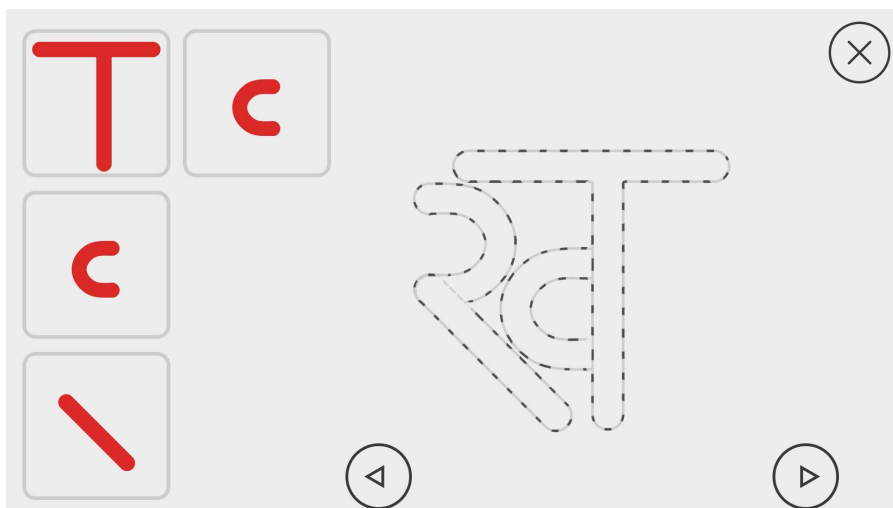


Figure 33: Next page is displayed on tapping the next button

This image shows the next alphabet puzzle, this page is displayed when the user taps on the next button. Similarly, all the following alphabets puzzles will be loaded onto the screen one by one as the user taps on the next or previous button. Once the user leaves the page the page is reset and all the alphabet pieces go back to their original positions i.e. inside the blocks. Users can also use the cross button to dismiss the current screen to go to the home page.

**Conclusion**

In today’s society, there is a very high rise in the demand for literacy. But it becomes very challenging for children with learning disabilities. Thus, we need to design an effective educational and learning tool that is specially designed for them.

The application has been tested for usability and has yielded promising results. The children were able to accomplish the task of completing the puzzle. The application was tested with 12 children with a learning disability. The average time to learn a new alphabet got reduced from 2-3 weeks to one week.

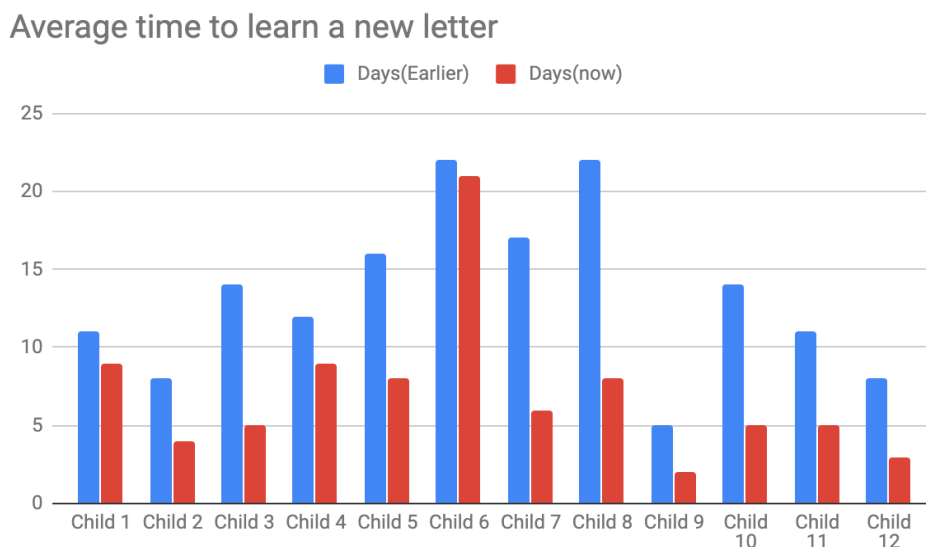


Figure 34: Second piece of the alphabet dropped successfully



## **Future Scope**

In the future, many features can be included such as

1. Points: The child can achieve points on the successful completion of an alphabet puzzle.
2. Awards and badges: The child can unlock new stages and win awards or badges on performing the given task under certain time limits. On successful completion of learning of a certain group of alphabets, the child can unlock badges.
3. Tests and quizzes: The app can also have a feature to conduct tests and quizzes for the child and reward the child with a certain point on passing successfully.
4. The application can be tested for its efficiency by conducting eye-tracking tests on its users.

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## ***Design of English Conversation Edutainment Game for Japanese University Students***

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### **Abstract**

Japan is a country where most of its people cannot communicate in English despite having English education in schools until the university level. This is because Japanese English education mostly focuses on grammar and reading with very little oral practices in class. Moreover, the environment in Japan is not conducive to the improvement of English skills. This situation burdens and bores the students, resulting in students giving up learning English. Thus, in this study, we have developed an English conversation simulation game with an edutainment approach, aimed to help the Japanese improve their English conversational skills. Users can practice speaking in English with Artificial Intelligence (AI) chatbots available in the system. The system implements game elements such as survival and quests to keep the users engaged and entertained while practicing speaking in English at the same time. We have integrated free and open-source libraries to develop the graphics, voice-recognition, AI chatbots, and the text-to-speech system of the game. The English contents of the conversation available are common topics such as hobbies, food, and family. To ensure that the design and contents of the game are suitable for our target group, we did a test-play with Japanese university students as the participants. Then, a questionnaire was distributed. It was found that the sound recognition system needs to be improved. Improvements are made to the game based on the results.

**Keywords:** edutainment, foreign language learning system, English as a second language

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## Introduction

Japan is a country where most of its people cannot communicate in English despite having English education in schools until the university level. According to an international company that specialized in language training, Education First (EF), Japan's English proficiency ranks 53 out of 100 countries and regions (Education First, 2019). Japanese students in Japan struggle to learn English because there is very minimal usage of English in their daily lives. This is because Japanese English education mostly focuses on grammar and reading with very little oral practices in class. This situation burdens and bores the students, resulting in students giving up learning English. The Ministry of Education, Culture, Sports, Science, and Technology Japan (MEXT) realized this and made reformations on English language education (2014a, 2014b) so that more discussions and English oral usage are promoted in the classroom. However, these improvements only focus on elementary students up to upper secondary students. No improvements are targeting the university students even though this group is the one going to face the hardships caused by globalization in the nearest future. This group needs support to improve their English proficiency.

Thus, we have developed a game which aims to provide the Japanese students with an environment that enables the Japanese to practice English conversation and also give support to help the improvement of English conversation skill. We chose to develop a game because digital games can achieve a combination of motivation, engagement, adaptation, and simulation (Mcclarty et al., 2012).

## A Game with Edutainment Concept

Edutainment is a term comprising of two words, "education" and "entertainment". According to the *Longman Advanced American dictionary*, the word edutainment means "movies, television programs, or computer software that educate and entertain at the same time" (2000). Edutainment content aims to improve the learning process by making it entertaining and motivates the learner. A previous study done by Fallata (2012) showed that students who used edutainment software to learn English improved better than those who took conservative classes. Thus, in this study, we developed a game with an edutainment concept to provide students with interesting educational content in hopes to improve their English proficiency.

## English Conversation Simulation Game

Figure 1 shows an overview of the game. To provide the Japanese students an environment that enables them to practice English conversation, the game developed in this study simulates real English conversation. A player can talk into the microphone and his voice will be dictated by the voice recognition system. The dictated sentence will then be passed as an input to the system. Artificial Intelligence (AI) in the form of chatbots will then respond accordingly to the player's sentence.

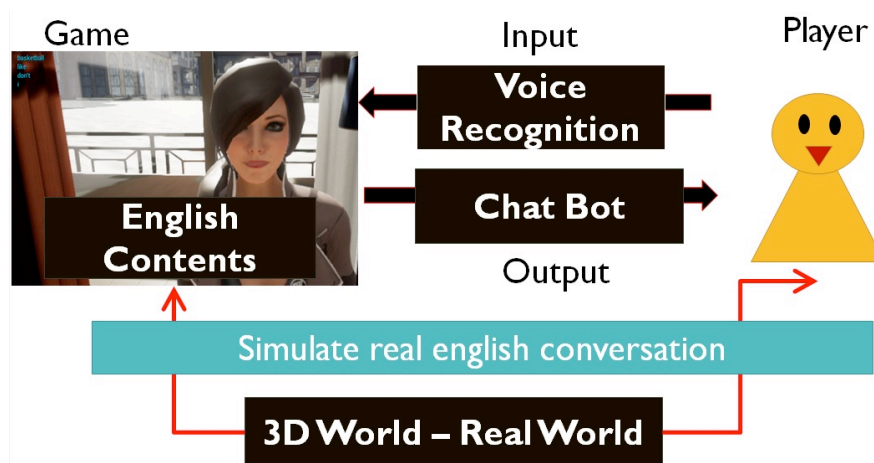


Figure 1: Game Overview

### Development Tools

Free tools and open-source libraries were used to develop the graphics, chatbots, voice recognition and text-to-speech functions of the game. Table 1 shows the tools and open-sources that were used to develop the game.

Graphics	Chat Bot (AI)	Voice Recognition	Text-to-Speech	Plugins	Coding
Unreal Engine Game Engine Tool	Bruce Wilcox's ChatScript	Carnegie Mellon University's Open Source PocketSphinx	Carnegie Mellon University's Open Source Flite	Shane Colby - Speech Recognition Plugin Skeskinen - Unreal Mimic Text-to-Speech Plugin	Visual Studio C++

Table 1: Free tools and open-source libraries used for development

### Acoustic Models

The game provides two Pocket Sphinx acoustic models for the recognition process. The first one is the original American English model and the second one is an adapted acoustic model. This adapted model was created in hopes to cater to the low recognition rate of the original American model when dictating English spoken by Japanese speakers. The Japanese have a unique accent when speaking in English where they pronounce "L" as "R". This hinders the recognition of the system and lowers the success rate of dictation. Thus, in effort to increase the success of recognition of the system, we have made an adaptation of the original American acoustic model using the data from Speech Resources Consortium database of Japanese speaking in English consisting of English sentences (806 different sentences) read by 10 Japanese University students (5 men and 5 women). The player can change the acoustic model during run-time according to their needs.

## Player Support Elements

There is an assistant bot named Yuu in the game that functions to give support to the player. Yuu can define a word from the dictionary. It also can give information from Wikipedia on a subject requested by the player.

## Educational Elements

The educational elements available in the game are Conversation, Shopping, and Sentence List.

### Conversation

The player can talk to the characters available in the game about daily life topics such as family, food, and hobbies. There are a total of 7 characters in the game each with unique topics for the player to engage in a conversation with. Figure 2 shows the player in a conversation with a character, Alicia.

### Shopping

The player can buy things from the characters in the game. The player should say sentences containing either the word “buy” or “shop” to start shopping mode. For example, a player can say “I’ve come to shop” or “I’ve come to buy something” to open up the shopping window as shown in Figure 3. The player can then ask the character for certain items by saying sentences such as “Please give me a sandwich.” Items available on sale include coffee, sandwich cakes, and cookies.



Figure 2: Conversation with a bot

### Sentence List

At the end of a day inside the game, before the player goes to sleep, a list of sentences said by the player on that day will be shown (Figure 4). This allows the player to look back at their sentences and see where their weaknesses are and what they should improve.

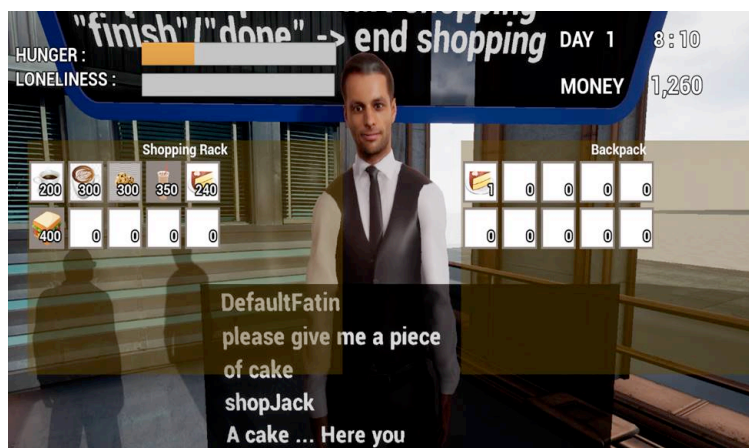


Figure 3: Shopping window

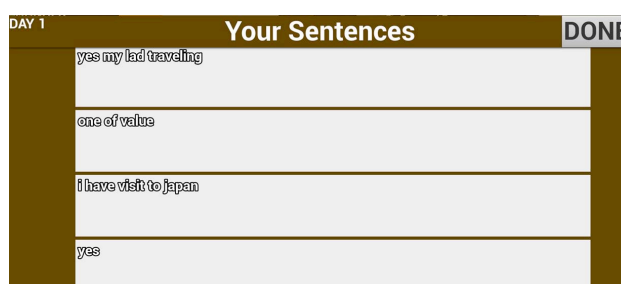


Figure 4: List of the player's sentences

### Entertainment Elements

The entertainment elements of the game are survival, quiz, and quests.

### Survival

In the game, the player has two status bars. The hunger bar will slowly fill up as time passes. The player has to survive in the game by making sure that their hunger bar does not fill up to its max (Figure 5). This can be done by eating food that can be bought from the characters in the game. The loneliness bar fills up when the player does not interact with other characters. Once the loneliness gauge fills up, the hunger gauge will fill up 3 times faster. This feature was added to make sure that the player has to engage in conversation with the characters in the game in order to survive.

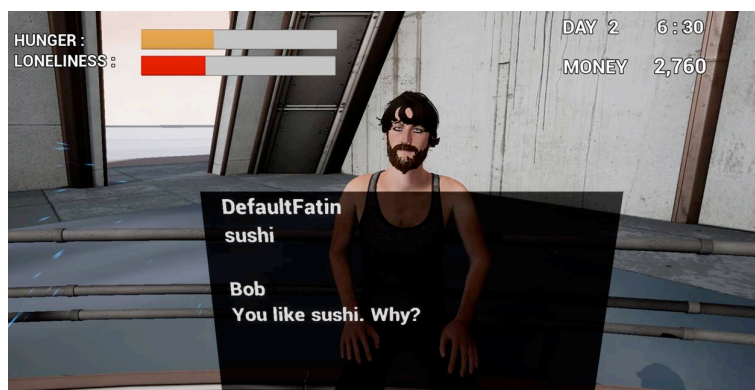


Figure 5: Hunger and loneliness bars

## Quiz

The player can play a quiz with Yuu, the assistant robot. Yuu will ask the player the present, or the past tense of a verb. If the player answers correctly, his score will increase (Figure 6).

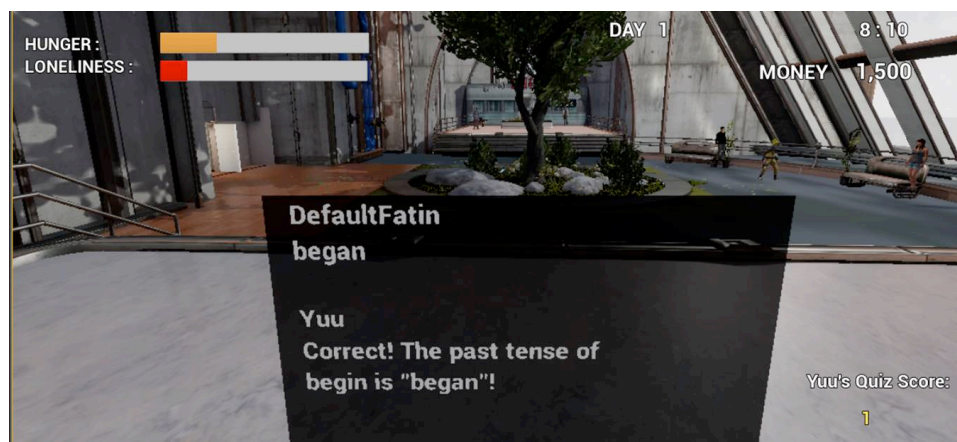


Figure 6: Quiz with Yuu

## Quests

There are several quests available for the player to complete (Figure 7). There are relationship type quests, shopping type quests, and conversation topic type quests.

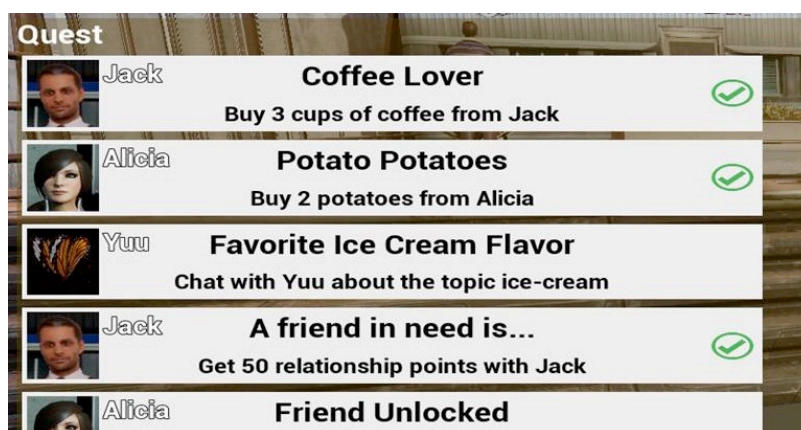


Figure 7: A part of the quests available

## Experiments

To assess the word accuracy of the adapted acoustic model for the Japanese English speaker and to test the suitability of the game developed, two different experiments were conducted.

### Experiment 1: Word Accuracy

This experiment was carried out to test the word accuracy of the acoustic models; the original American English model and the adapted model for the Japanese.



## Participants

The subjects that participated in this experiment were 19 Japanese students of the University of Toyama from different courses and departments.

## Procedure

- (1) Subjects were asked to have a pre-decided conversation with a character in the game using the adapted acoustic model.
- (2) The sentences said by the subjects were dictated by the recognition system
- (3) Subjects' sentences were logged
- (4) Word accuracy is calculated by referring to the log
- (5) Steps (1) to (4) were repeated using the original American English acoustic model.

## Results and Discussion

Figure 8 shows the word accuracy (WA) comparison of both acoustic models.

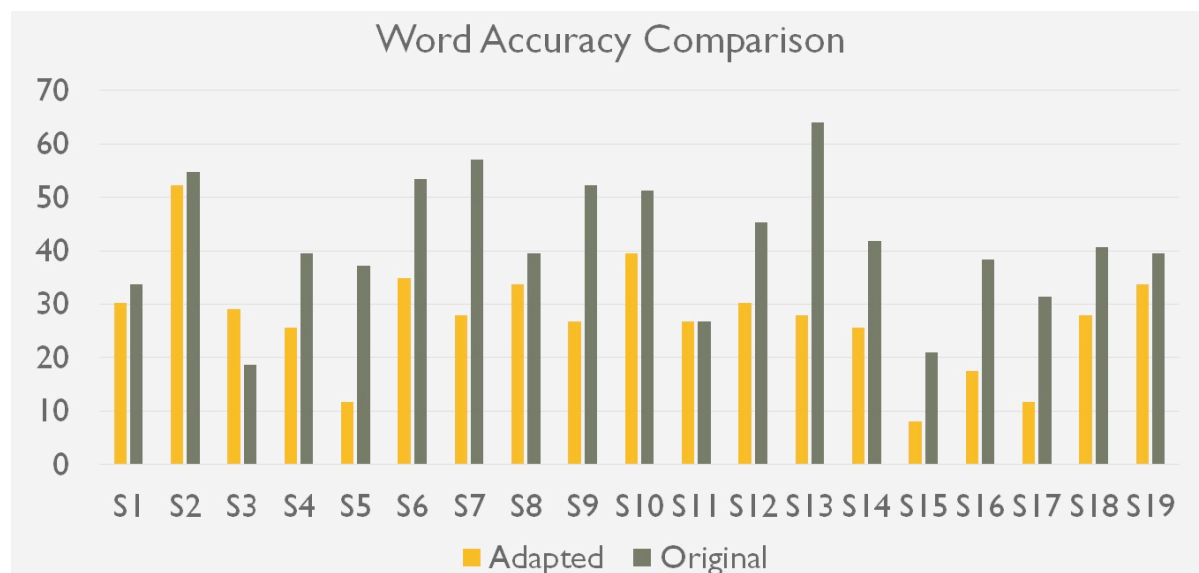


Figure 8: Word Accuracy comparison of the acoustic models

From the result, it is clear that the original American English acoustic model has better WA than the adapted acoustic model. The adapted model failed to improve the recognition rate of English spoken by Japanese speakers. We think that the method of adapting an original acoustic model with data of Japanese speaking in English is not efficient. In our next step, we plan to create a new acoustic model from scratch by gathering the data of 200 Japanese reading English sentences for a minimum of 20 minutes. A major improvement needs to be done to provide a voice recognition system that is able to dictate the sentences spoken by Japanese speakers with a strong accent. Failing to provide such a voice recognition system means that the system will not be able to cater to the needs of the target group.

## Experiment 2: Game Suitability

This experiment aims to see whether the game developed in this study is suitable to be played by the target group which is Japanese university students.

### Participants

8 Japanese students of the University of Toyama participated as subjects in this experiment.

### Procedures

- (1) Subjects were asked to play the game for 30 minutes for 7 times on different days
- (2) A questionnaire was distributed on the last day

### Results and Discussion

All 8 participants were asked to choose the statements that best described their feelings. Figure 9 shows the response of the subjects to Q1, “Do you think the game is interesting?” and we can see that more than 50% of the subjects think that the game was interesting. Only 1 subject responded negatively with “boring” to the question. After the questionnaire, we confirmed the answer with the subject and he stated that he felt the game was boring because the system failed to recognize almost everything that he said. This resulted in him could not enjoy the game well. This fact calls for the need to provide a recognition system with a better success rate.

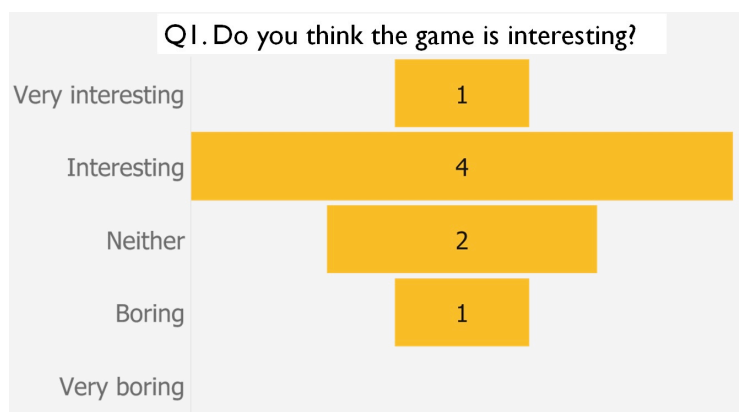


Figure 9: Result for Q1

Q2, shown in Figure 10, questioned the subjects as to whether they felt 30 minutes to play the game as long. From the result, 7 out of 8 (87.5%) of the subjects did not feel that the 30 minutes as long when they played the game. This proves that the game was interesting for most of the subjects so they could enjoy 30 minutes of gameplay without becoming bored. The remaining 1 subject was the person whose pronunciation could not be recognized by the system so he could not play the game well thus the response.

Shown in Figure 11 is the result of Q3, “Do you think the game is difficult?” with all of the participants responded that the game was difficult to play. After the questionnaire, we confirmed with the subjects about this and most of them said that it was hard to trigger the conversation or the shopping mode with the bots. Referring to this feedback, we have made the requirement to start the conversation and shopping mode with the bots easier for the Japanese. For example, we added the word “arrow” as another requirement to start a conversation alongside the only requirement “hello”.

A few of them said that they wanted more support such as hints on what possible sentences they can make or meaning of the bot’s sentences in Japanese. This signals to us that the support functions of the game are not enough to enable the players to enjoy the game to the fullest. More support should be included in the game in future work. One of the subjects gave some ideas to add rewards for quests completed and more mini-games to make the game more interesting. We plan to add these to the future development of the game.

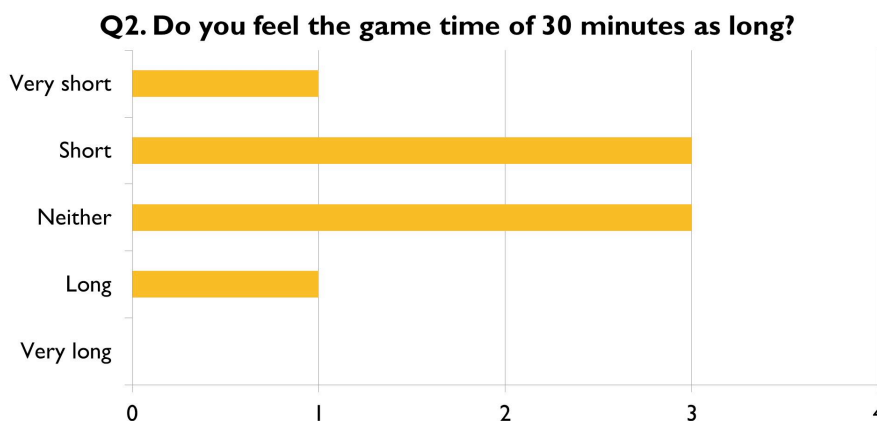


Figure 10: Result for Q2

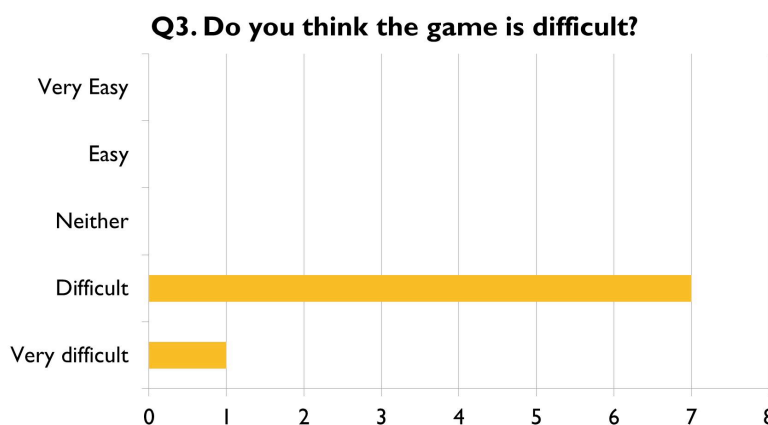


Figure 11: Result for Q3

**Conclusion**

Japanese university students need support to improve their English proficiency level. In this study, we developed an edutainment game that simulates English conversation by using chatbots. To test the voice recognition system of the game and the suitability of the game for the target group, 2 experiments were conducted. As a result, it was

found that the word voice recognition system of the game needs major improvement to enable Japanese with a strong accent to be able to play the game. It was also found that the game is interesting and playable for Japanese university students but still lacks ample support to help them improve their English skills. Based on the feedback gotten from the questionnaire, improvements were made to the game.

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***Integrating Reflections on Scriptural Text in Language Classes: The Southern Philippines and Bangkok Experience***

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**Abstract**

Scriptural Text Integration employed in some Catholic educational institutions throughout the world has become the core pedagogy that promises relevant and meaningful education for today's learner. This study investigated the experiences of the teachers and students in integrating Scriptural texts in English language classes. It utilized a transcendental phenomenological research design. The study involved ten students and ten teachers in both Catholic schools in Southern Philippines and in Bangkok, Thailand. Focus Group Discussion and interviews were employed. Findings reveal that teachers used strategies such as careful choice of Scriptural texts; using Scriptural texts to broaden the topic; connecting Scriptures to life experiences; and use of Scriptural text as a platform for values formation. In terms of challenges, they expressed difficulty in having ample time for meaningful integration; Lack of skill in integrating Scriptural text; passivity of some students; and difficulty in word choice considering Thai students' spiritual background. In terms of effects on teachers, they have improved teaching effectiveness; empowered in shaping students' values; In-depth understanding of the lesson; self-fulfillment; and improved devotion to God. For students, this enabled them to gain deeper understanding of the lesson; evaluate their actions; make them more reflective; build closer relationship to God; and learn to share. From the findings, it can be inferred that such integration enabled teachers to experience a deep sense of fulfilment. Students too, developed the skill of discernment in their actions. Thus, it is recommended that teachers be trained and encouraged to continually integrate scriptures in their instructional processes.

Keywords: Scriptural text, reflections, integration, approaches, impact, experiences

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## Introduction

Pedagogical innovations in teaching English language expand pathways for developing the next generation of learners and creative thinkers. The goal of the educational curriculum is to equip students with the critical competencies essential for the global competitiveness. A myriad of skills and competencies need to be addressed to develop holistic 21st century learners. One of these important competencies is the affective domain of the learners. In the desire of producing globally competent graduates, combining the cognitive and affective domains of the students is a demand in the curriculum.

Bator (2014) stressed that Catholic education exists to deliver a holistic development of students as living witnesses of faith. You Jung Jang (2012) emphasized that integration of scripture and learning must be vibrant and evident in the teaching and learning process. Thus, most educators agree that scriptures play a central role in Catholic education. The scripture is significant not only to the student's personal life and struggles, but also significant to the subject being studied. This teaching pedagogy does not only deal in evangelization but also in the development of the students' values and godly character. In other words, Scriptural teachings embedded in the lesson facilitate authentic learning and instil into the students a Catholic perspective on all aspect of life.

Catholic schools in South East Asia are committed to provide their graduates the Catholic orientation through this teaching pedagogy. They envisioned in providing integral development of the students as human persons in a dynamic process of growth in the spiritual, intellectual, psychological and social aspects. A Catholic school in Southern Philippines mandated its curriculum to integrate the Four-Pronged Ignacian pedagogy in the students' learning experience . This Ignacian Pedagogy paradigm focuses on the inclusion of Scriptural text, Ignacian Values, Social Orientation and Other Disciplines in the lesson as proposed by S Ma. Rufina Guillano, RVM.

This Ignacian Pedagogy provides the development of the spiritual and intellectual domain of the learners. This teaching pedagogy helps the students not only to understand and remember details, facts, examples and reasons but it guides them in the evaluation of their actions. It provides enough space for learners to comment, justify and mirror themselves. It also revives the consciousness of the students on the significance of scripture in every classroom. By using Scriptural text, the class can turn out to be meditative and motivating. It can also make the class more reflective which will obviously improve the affective competence of the learners.

Some Catholic teachers understand the essence of this teaching pedagogy that makes Catholic education unique and their teaching meaningful. Teachers view the scriptural integration as the lifeblood of their teaching, an essential aspect of their mission. However, despite the emphasis on the integration of the Ignacian Pedagogy in the classroom, a number of teachers are still confronted with problems on how to integrate the bible passages especially in the language classes. Such difficulty manifested in the result of the Student Assessment of the Teachers Performance wherein the lowest rating of the students went to the scriptural text integration.



As a result, the researcher was motivated in conducting a phenomenological investigation of the experiences of these teachers on how Scriptures are effectively integrated in the lesson. This work seeks to illuminate and understand the approaches in integrating scriptural text and the challenges of the language teachers in their class. Also, the purpose of the study is not to simply explain the integration of the scripture in the class, but to gain insights from the teachers who are currently experiencing the phenomena in their classrooms.

This study is hinged on the assumption that scriptural integration in language classes does not only promote evangelization and value formation but also promotes meaningful and relevant academic learning experience. This integration increases students' interest and awareness not only on the language lessons being taught but also greater understanding of the world they live. This means that, the teaching of English language does not focus only in learning its structure, syntax, morphology, semantics and pragmatics but focuses on how these ideas applied in the students' life and experiences. This integration will not only give the students the opportunity to acquire the English language but also use language meaningfully.

Teaching English as a second and foreign language has been a challenging endeavour to many teachers in South East Asia like Philippines and Thailand. Anyiendah (2017). validated the notion that teachers are the most relevant contributors in an educational reform, particularly in one that touches on what goes on in the classrooms. However, their training and innovative skills is indispensable but not sufficient for effective transfer of learning. There are more prevalent circumstances which pose a challenge to the teachers hence impeding effective learning. Undeniably, teachers need more pedagogical strategies and innovations in teaching English language. Thus, this study likewise assumes that the language teachers' strategies and experiences play an essential role to the effectiveness of the scriptural integration in the lesson.

This study is basically anchored on the John Dewey's theory of Connected Experience. It is a learning theory which emphasizes the relevance of personal experience in the learning process. Dewey argued that students passively assimilated information that had been designed and pre-digested by teachers and textbooks. Schools do not provide genuine learning experiences but only feed students with an endless amassing of facts where they tend to forget. Combining the classroom concepts with other disciplines or areas will create a positive learning environment. Moreover, examining the language teachers' perceptions of their integration of scriptural components with the lesson is essential. The teachers wishing to integrate scriptural concepts into their class may be able to see the "what" and "how" of implementation. Thus, this theory urged the schools to provide quality experience during the learning process rather than focusing on the information being presented.

This study is also supported by Jerome Bruner's Theory of Constructivism. This theory perceives learning as a dynamic process in which learners construct or create new ideas or concepts based upon their current and past knowledge. Constructivist learning desires the educators to implement the idea that each learner constructs, acquires, and understands his or her own knowledge differently. Thus, in the scriptural integration, learners are encouraged to relate and construct academic ideas into a more meaningful learning experience.

Wilhoit (2007) cited that for many years the strongest philosophical argument on teaching pedagogy is the scriptural integration. It has been the common topic of discussion in many Catholic schools. Many Catholic educators believe that scriptural principles are much more effective employing the methods of scripture and teach the application of its truth to subject content.

Moreover, employing scriptural text is a way of helping students learn to see God's hand at work all around us. It is not just a lesson or objective of including scriptural concepts in the class but connecting these scriptural reflections to the students' day to day experiences.

Burton and Nwosu (2003) emphasized that Integration is also a process of relating faith and the relevant subject matter at hand. This encourages the students not just to reflect and evaluate their actions but also promotes the development of their critical thinking. In the integration, the students' intellectual and spiritual aspects work hand in hand. The integration does not only help the students understand and remember details and details of the lesson but also guide them in the evaluation of their faith and action along the way.

This phenomenological study examined the scriptural text integrated in the language classroom and the strategies used by the language teachers in the scriptural text integration in the language classroom. Specifically, this study sought to answer the following questions.

1. What are the strategies used by the language teachers in integrating reflections on scriptural text in their classes?
2. What are the challenges of the language teachers in integrating the scriptural text in the language classroom?
3. What are the effects of this integration in the instructional process to the teachers and the students' lives?

The findings of this phenomenological research would provide an effective feedback and substantial information in the following areas or to the following persons: a) the results of the research work may be beneficial to the administrator in the implementation of the Ignacian Pedagogy for the enhancement of the students' social and spiritual aspect; b) the findings of the study may provide input to the Language teachers which may result in the design of activities, teaching techniques and strategies in integrating, promoting and enhancing the scriptural text integration in the classroom; and c) the study may give awareness to the students of the relevance of the scriptural text in their values formation.

The scope of the study is focused on the experiences of the language teachers in integrating the Scriptural text in their classes. This phenomenological study is limited to the transcendental approach used in the study which attempts to provide a description of the experiences of the participants.

## **Research Method**

This study utilized the transcendental phenomenological research design developed by Husserl, which is a philosophical approach to qualitative research methodology in

the pursue of understanding human experience (Moustakas, 1994). This qualitative approach was used to completely explore into the variations and complexity of integrating scriptural text into the language classroom. Chambers (2013) defined phenomenology as a qualitative approach of research which focuses on the similarity of the existing experience within a particular group. He further said that usually in this approach, an interview is conducted with a group of participants who have first-hand knowledge of an event, situation or experience. The fundamental goal of the approach is to arrive at a description of the nature of the particular phenomenon (Creswell, 2013).

The transcendental approach investigated the phenomenon of scriptural text integrated into the language classes and the teachers' approaches by delving into the nuances of their experiences. It will also provide a description of the experiences of the participants with emphasis on discovery and meaning, thus, the approach is deemed suitable to be used in this study.

This study was conducted in one of the schools in Southern Philippines and Bangkok Thailand. Both are catholic schools in South East Asia. Ten junior high school students and ten teachers from both schools were involved in the study.

In order to gather data of this study, the researcher sought the approval of the principal to conduct an in-depth conversation and interview with the students and teachers. Parents' consent was then requested and gathered. After the focus group discussion and interview, the data were collected, read, reread and culled for like ideas and themes. Relevant statements were highlighted to determine the similarities among the response of the participants. Clusters of meaning were established from the significant statements into themes.

Through this process the researcher created the common meaning of the event, situation or experience and attain at a more profound understanding of the phenomenon. The researcher described the different elements and gain further insights into the meaning and essence of scriptural integration into the language classroom.

## **Results and Discussion**

This section presents the analyses and interpretation of data obtained from the participants of the study. The researcher presented the information in themes with interpretation and implication. The presentation is organized based on the order of the stated problems in the introduction.

## 1. Approaches in Integrating Reflections of Scriptural Text

### Themes

*Careful choice of Scriptural texts  
Using Scriptural texts to broaden the topic  
Connecting Scriptures to life experiences;  
Use of Scriptural text as a platform for values formation*

From the data, the approaches in integrating reflections of scriptural text mentioned by the teachers were categorized into four themes namely: careful choice of Scriptural texts; using Scriptural texts to broaden the topic; connecting Scriptures to life experiences; and use of Scriptural text as a platform for values formation.

#### 1.1 Careful Choice of Scriptural texts

Majority of participants' responses were categorized as *Careful Choice of Scriptural texts* as the main approach in the integrating Scriptural text during the interview. The following are the samples of the transcription showing the participants' approach in integrating scriptural text in the class.

*P2(Phil): I carefully choose relevant scriptural texts in integrating into my lessons to help the students understand and see connection of the scriptural text to the lesson and their life experiences*

*P5 (Thai): I choose scriptural texts for me to formulate higher order thinking questions that would really able the students to think.*

*P2: Scriptural text needs thorough analysis beforehand so it needs ample time in preparing. Besides, the relevance of the text and the lesson or topic should always dwell together.*

*P6:(Phil) I made sure that the scriptural text I use is related to the topic I discuss in the class.*

*P2(Phil): I look for appropriate scriptural text that can be connected to one of my lesson objectives.*

Most of the teachers carefully choose the scriptural text to be integrated in the lesson for the students' reflection. Scriptural texts that are relevant to the lesson and the students must be carefully reflected and integrated. Daniel and Wade (2007) emphasized that teachers should make careful choices on what Scriptural text that is most meaningful to the class. Burns and Drake (2019) reiterated that integration is something that is planned and can and should be carried out throughout the academic day. Thus, teachers should make careful choices on what Scriptural text that is most meaningful to the class. (Daniel and Wade, 2007)

### *1.2 Using Scriptural texts to broaden the topic*

Another relevant strategy emerged in the response of the teachers in the integration is using scriptural texts to broaden the topic. The following are the samples of transcription:

*T3: (Thai): Students can openly express their thoughts, feelings and ideas allowing them to master English language proficiency.*

*T1 (Thai)Z: I use scriptural text in enhancing the reading comprehension skills of the students. They learn not only to comprehend the story but also values through their reflection essay.*

*T2 (Phil): the pedagogy delivers what is being communicated rather than the grammar itself.*

*T5 (Thai): Deepen the students' understanding of poetry through psalms and proverbs.*

Most of the time academic subjects are taught as separate entities, outside of the scriptural or spiritual understanding or framework. However, in this integration, the lesson and scriptural is taught as connected entities. Teachers use scripture to broaden the topic discussed in the class so students are able to explore learning not limited in the four walls of the classroom. Subjects are not taught in mere isolation, but taught in such a way as to reveal the character, nature, or handiwork of God.

Harville (2019) acknowledged the relevance of bible as great authentic resource to use along with other authentic resources in a language class. He further illustrated that learning English with the scripture is a great way to improve one's knowledge on reading and vocabulary skills. Cooney (2007) cited that English grammar instruction integrated with the scriptural text provides instruction with meaningful examples for lifelong learning. Thus, scriptural integration provides parallels and opportunities for broader associations of the topics discussed.

### *1.3 Connecting Scriptures to life experiences*

*Connecting Scriptures to life experiences* was also used by the teachers as a strategy in scriptural text integration. These are some examples of transcription:

*T10: (Phil): I allow the students to see the connection of the scriptural text context not just in the lesson but also to their day-to-day activities.*

*T8(Phil) During integration, I see to it that students somehow relate the scripture as basis of their way of living*

*T5 (Phil): What makes our learning plan unique from other school's pedagogy is the integration of scriptural text. During the teaching, learning process, I see to it that students would see connection of our lesson to their real experiences*

*T9 (Thai). This provides the students an opportunity to reflect scriptural text relating to their everyday life.*

The most challenging strategy employed by the teachers in this integration is relating the scripture to the life experiences of the students. Teachers carefully prepared questions that lead to the connection of scripture to the life experiences of the students. With this, student openly expressed their feelings, emotions, thoughts and life experiences. The reflections of the scripture may also serves as guide and light to the students in dealing their daily life experiences. Emlet (2009) mentioned that students think of a contemporary life situation to which they could apply the given passage.

Moreover, Evangelisti (2001) recognized the relevance of scripture as true help and guidance into the lives of students. In God's Word, students may find comfort in times of sorrow, encouragement when they want to give up, and correction and instruction when finding my way through thoughts and situations to God's will. The verses of the scripture bring peace and comfort in the midst of confusing thoughts and uncertain situations. This integration bridge the gap between an ancient scriptural text and a present-day life situation.

#### *1.4 Use of Scriptural text as a platform for values formation*

One relevant strategy employed by the teachers is the *Use of Scriptural text as a platform for values formation*. The following are samples of the teachers responses:

*T2: (Phil): I did not teach only the students with the academic learnings. But also I was able to touch the spiritual being of the students.*

*T5 (Phil): Through the use of scriptural text, the students are now have more refined behavior inside the classroom as they have more realization during the discussion.*

*T9 (Thai): Every time I introduce scriptural texts my students would switch behavior. They become more attentive and cooperative. Their interest arises.*

Today, Christian values have been taken for granted. Schools are often expected to function in lieu of the family, and it leads to the sad reality that the teaching of fundamental values is often lacking. This integration can be an aid in teaching values and Christian beliefs. Groenendyk (2007) emphasized that texts in the scripture leaves a meaningful learning to the students in a brief amount of time and space and often with lasting effect. He further said that this integration reinforces and develops an appreciation for the values the teachers want to convey and instil in the hearts and

minds of the learners. He strongly recommended the use and worth of proverbs, psalms and other scriptural text in teaching moral values in the classroom.

In general, the different themes showed the different approaches of the participants in integrating scriptural texts in their language classes. Their responses were corroborated with some research findings as mentioned in the discussion.

## 2. Challenges on the Integration

### Themes

*Difficulty in having ample time for meaningful integration*  
*Lack of skill in integrating Scriptural text*  
*Passivity of some students*  
*Difficulty in word choice considering Thai students' spiritual background*

Catholic colleges and universities are faced with numerous challenges as they strive to prepare students to pursue scriptural truth in integrating reflections of scriptural text. The data revealed the following challenge categorized into four themes namely: *difficulty in having ample time for meaningful integration; Lack of skill in integrating Scriptural text; passivity of some students; and difficulty in word choice considering Thai students' spiritual background.* The following are the sample responses of the teachers.

*P1 (Phil): Scriptural text needs thorough analysis beforehand so it needs ample of time in preparing*

*P5 ( Thai) : Students' individual background is a challenge for me since I don't have an idea on how religiously trained the students are at their house. So I have to make sure that the way I integrate scriptural text would meet the needs of the students who are familiar with biblical texts and those who are not.*

*P8 (Phil): Scriptural text needs thorough analysis beforehand so it needs ample of time in preparing*

*P4( Phil) : The lack of time in deepening the connection to my lesson especially that I am teaching English. It needs more time to deepen the connection.*

The findings are in consonance with the findings revealed in the study of Peshkin (2009). Teachers had the difficulty in the integration due to lack of skill. Teachers struggle in showing students the relevance of the scripture to the subjects taught. They failed to find significant connections of learning the scripture and connecting it to their educational experience. Thus, teachers need ample time and relevant skills in the integration.

The findings implied that Catholic schools and universities should help teachers by providing classes, training, or seminars on scriptural text integration. (You Jung Jang, 2012)

### 3. Effects of the Integration to the teachers and students

#### 3.1. Effects to the teachers

##### Themes

*Improved teaching effectiveness*  
*Empowered in shaping students' values*  
*In-depth understanding of the lesson*  
*Self-fulfillment*  
*Improved devotion to God*

As to the effect of the integration to the teachers, this study revealed the following themes: *improved teaching effectiveness; empowered in shaping students' values; In-depth understanding of the lesson; self-fulfillment; and improved devotion to God.* The transcriptions below are the responses of the teachers:

*P1 (Phil): It has empowered me as a teacher by being reflective to my students. It gave me more grace to teach the knowledge and wisdom to my students. I am now an evangelizer with in my capability as an English teacher.*

*P5 (Phil) : Integrating scriptural texts and concepts in my classroom makes my teaching become more meaningful. I perceive it as an essential tool to allow my students closer to God as they journey their life in the academe,*

*P9 (Phil) : Students' priceless reaction made me feel the fulfilment and satisfaction in this noble task*



### 3.2. Effects to the Students

#### Themes

*Gain deeper understanding of the lesson*  
*Evaluate their actions*  
*Make them more reflective*  
*Build closer relationship to God*  
*Learn to share*

For the students, scriptural text integration had greatly contributed to their total human development. Five themes emerged from the responses such as *gain deeper understanding of the lesson; evaluate their actions; make them more reflective; build closer relationship to God; and learn to share*. Responses of the participants related to these findings include the following:

*P3: (Thai): When study the bible it helps us to be more good at English even in listening, speaking and even writing because it develops us in using English in the sentence when we share.*

*P1 (Thai): yes, this integration helps me in my personal relationship with God because through these verses I will be closer to God.*

*P9 (Thai): This help me know what is good and bad and help me think if my action is wrong*

*P6 (Phil): For me, this integration helps me personally in my relationship with God*

Findings revealed that integrating reflections of the scripture promote positive effects not only to the students but also the teachers. This study also showed how this integration encourages students to be reflective of their actions and build a closer relationship with God. Teachers too are becoming empowered as an agent of change in the lives of the students. The study of Theron (2013) has similar findings that scriptural text integration brings transformation to the lives of the students and teachers.

#### Conclusion

The central emphasis of a Catholic education is the integration of scripture with learning and living in its teaching and scholarship. Faith, heart, soul, and intellect must function harmoniously to achieve student and teacher empowerment. Scriptural teachings embedded in the lesson especially in Language class facilitate authentic learning and instil into the students a Catholic perspective on all aspect of life. From the findings, it can be inferred that such integration has empowered and enlightened teachers in becoming more worthy of emulation and enable them to experience a deep sense of fulfilment. Students too, developed the skill of discernment in their actions. Thus, it is recommended that teachers be trained and encouraged to continually integrate scriptures in their instructional processes.

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**Maribeth M. Cabrejas and Jan Rey E. Cabrejas**

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***Reflection on the Curricular Reform with an Emphasis on Preschool Education in the Czech Republic***

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**Abstract**

Since 1990, preschool education in the Czech Republic has undergone significant qualitative changes. The main focus has been on personality-oriented education of the child. In accordance with this concept, a two-tier preschool curriculum was established in 2001 including the school and the state level. After a period of verification, the curriculum was enacted in 2007. Teachers began to design the curriculum of their own school, reflecting its conditions and respecting an individualized approach to education. The curricular reform represents an important process, which is the focus of the present qualitative survey. The objective of the research was to use a holistic approach to identify the constitutive elements of the curricular reform in the context of everyday life in kindergartens, but with a deeper understanding. The aim of the study is to answer the following questions: Is the implementation of the preschool curriculum in accordance with the objectives of the curricular reform? What are the causes of the drawbacks identified? What are the prospects of the implementation of the curriculum? The basic research method was a document analysis involving research results, reports of the Czech School Inspectorate, and analyses of school educational programmes. The method of document analysis was supplemented with a semi-structured interview with kindergarten teachers and university professionals involved in the education of future teachers. Using a suspenseful procedure the authors present important knowledge relating to the curricular reform in the context of preschool education. The paper describes the effect of crucial conditions on the implementation of the reform.

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## Introduction

Curricular reforms are an integral part of education policy. Their success depends on the actual conditions and the preparedness of all participants. The aim of the paper is to present the results of a long-term research study on preschool curriculum in Czech kindergartens based on an analysis of relevant documents, professional texts, and reports. The results of the research should inform about the success of the implementation of the new preschool curriculum as a natural part of the curricular reform in the Czech Republic. *The curricular reform* is an officially organised and implemented modification of the system of education (Prokop, 2099, p. 564). In this context, the following should be explained at the very beginning: *What is our understanding of the term curriculum?* In the context of preschool education, this term is understood in the sense of the Latin *currere* – *heading, promoting child development* in accordance with the child's capabilities, needs and interests.

The present research is based on the concept by Hesse and Manz (1974), according to whom curricular research should include both explicit and implicit curriculum and thus contribute to a revision of learning plans. Therefore, its purpose is to define the objectives and content of education. Traditional content of education is revised, its consistency improved, and it is checked whether it corresponds to the current state of knowledge. The objectives and content of education are discussed, as well as the arrangement and context of the learning content.

The improvement of education is considered in a broader context and is defined by the term *curriculum*. Curricular issues are addressed in the context of the following questions: *why education should take place, who should be educated, in what, how, when and under what conditions.*

The term curriculum was defined as an umbrella term by UNESCO as follows: *“Educational project that determines the plans, goals and specific objectives of educational activity; methods, means and activities to achieve the objectives; techniques and tools required for the assessment of the educational process”* (Seguin, 1991, p. 9).

After the turn of the millennium, a new school concept became the creative principle of the development and review of the curriculum: *“The school should be the place where children learn to solve problems that they encounter in everyday life, and where they are prepared for life under constant changes and for coping with changes”* (Walterová, E. et. al. 2004, p. 32).

## Key competences in a European perspective

At the turn of the 21st century, a term that came to the forefront was *key competences*, which until then had been used inconsistently in educational sciences. In 1997 the Council of Europe defined five sets of key competences which schools should equip their learners with:

- Political and social competences such as the capacity to accept responsibilities, to participate in group decisions, to resolve conflicts in a non-violent manner, and to play a part in running and improving democratic institutions.

- Competences relating to life in a multicultural society. In order to check the resurgence of racism and xenophobia and the development of a climate of intolerance, education must equip young people with intercultural competences such as accepting differences, respecting others and the capacity to live with people of other cultures, languages and religions.
- Competences relating to the mastery of oral and written communication, which are essential for work and social life to the point that those who lack them are henceforward threatened with social exclusion. In this same register of communication, the mastery of more than one language is taking on growing importance.
- Competences associated with the emergence of the information society. The mastery of these technologies, the understanding of their applications, strengths and weaknesses, and the capacity for critical judgement with regard to information disseminated by the mass media and advertisers.
- The capacity to learn throughout life as the basis of lifelong learning in both occupational contexts and individual and social life ([www.vuppraha.cz](http://www.vuppraha.cz)).

In 2000, the requirements for the development of key competences were incorporated in the strategic objectives of the development of the European Community as part of the Lisbon process.

*At its meeting in Lisbon on 23 and 24 March 2000, the European Council concluded that the key measure of Europe's response to globalization and transition to knowledge-based economies should be a European framework defining new basic skills acquired through lifelong learning, and emphasized that Europe's main asset are human resources. Since then, these conclusions have been regularly reformulated, for example at the meeting of the European Council in Brussels on 20 and 21 March 2003 and 22 and 23 March 2005, and in the renewed Lisbon Strategy approved in 2005.*

The Commission Communication "Making a European Area of Lifelong Learning a Reality" and the subsequent Council Resolution of 27 June 2002 on lifelong learning identified the provision of *'the new basic skills'* as a priority, and stressed that *lifelong learning must cover learning from pre-school age to post-retirement age.* (Recommendation of the European Parliament and of the Council of 18 December 2006 on key competences for lifelong learning)

The basic precondition for cooperation between all European stakeholders is to:

- Identify a specific number of precisely determined areas of general and specialised knowledge (mathematics, information science, languages, accounting, financing, management, etc.);
- Establish an assessment system for each area;
- Introduce new and more flexible methods of their recognition ([www.vuppraha.cz](http://www.vuppraha.cz)).

In the context of the preschool curriculum, key competences are understood as *"a set of educational requirements including essential knowledge, skills and abilities universally applicable in common work and life situations; as a target category the competences present a substantial basis for determining the educational content and the educational conditions in educational documents."*

(Framework Educational Programme for Preschool Education, referred to as FEP PE, 2018, p. 48)

As the concept of education changes, the role of the teacher also changes. His savings are no longer preliminary information, but develop competence. The so-called mobile access to education is a support for these goals. Changing the tasks of a teacher who has a different way of managing can lead to chaos, indiscipline or division of direct action. One of the components that supports the success of an interactive perspective is collaboration (earlier than the more common competitions). It is a specific kind of interaction. Create habits that accept common goals, accept the uniqueness of individuals for their chance, and build a sense of responsibility for results. (Provázková Stolinská, D., 2015)

### **Curricular reform in the Czech Republic – Framework educational programmes**

The most important strategic document relating to curricular reform is the National Programme for the Development of Education in the Czech Republic. The document is based on *Resolution of the Government of the Czech Republic No. 277 of 7 April 1999*, following the policy statement of July 1998, which approved the main objectives of education policy. The adopted objectives became the basis for the *Conception of education and the development of the educational system in the Czech Republic*. Through this Conception, the Ministry of Education adhered to the principle that the development of education and all educational institutions and activities improving the level of national education should in the future be derived from the generally accepted education policy framework and clearly defined medium-term and long-term plans publicly announced in the form of a binding governmental document.

This strategic document is conceived as **a system project that formulates ideological bases, general plans, and developmental programmes that should be decisive for the development of the education system in a medium-term perspective**. The document was drafted on the basis of policy documents including analyses and assessment of Czech education during the previous five years performed by domestic as well as foreign professionals. The issues concerned with the development of the stages of the educational system were also commented on by social partners, representatives of civil society and various interest associations addressing the areas of education.

The following strategic educational objectives were formulated:

- Meet and induce educational needs of children, young people and adults.
- Achieve higher quality and functionality of education.
- Finish the system of activity evaluation.
- Develop the autonomy, innovative potential and facilities.
- In the context of tertiary education, support cooperation between educational institutions and other research and development organizations, and involvement in regional development.
- Support the transformation of the concept and performance of the teaching activity in all educational institutions, strengthen the social and professional position of educational and academic staff.
- Introduce the system of decentralized management of the educational sphere (White Paper, 2000, p. 19).



**System of curricular documents** In accordance with the principles of curricular policy formulated in the National Programme for the Development of Education in the Czech Republic (the White Paper) and stipulated in Act No. 561/2004 Coll., as last amended (the Education Act), a new system of curricular documents for the education of children, pupils and students usually from 2 to 19 years of age has been introduced in the educational system. The curricular documents are implemented on two levels, i.e. the **state and school level**.

In the system of curricular documents, the **state level** is represented by **Framework educational programmes** (referred to as FEP), which define the binding frameworks of education for individual stages of education. **The school level** is represented by **school educational programmes** (referred to as SEP), which govern education in schools.

Before we analyse in detail the current preschool curriculum and its implementation in education, its development will be outlined in the context of the process of institutionalization of preschool education in Czech kindergartens.

### **Overview of the development of the preschool curriculum – theoretical proposals to reform the objectives, content, methods and, forms of preschool care**

Provázková Stolinská, D., Berčíková, A., Rašková, M. (2015)

The introduction of mandatory school attendance and the definition of the content of education for primary schools determined, albeit vaguely, the requirements for voluntary preschool establishments. The objective was preparation for compulsory school attendance in the sense of general child capability. Children were educated in terms of their physical, sensory, and mental fitness by appropriate means including play and controlled occupation. The legislative ministerial amendment of 1872 revised the preschool content and removed the trivium and especially “*school*” working methods, and introduced the first curriculum for pre-school establishments. The task of kindergartens was to provide child care and support and complement family upbringing in order to prepare the child for compulsory education in terms of mental, physical, and sensory fitness. Therefore, after 1927 the *Kindergarten educational programme* was prepared as a systematic document addressing preschool education. From a theoretical, practical, and methodological perspective, this was a developing idea that resembles today’s preschool curriculum. The aim was not to give kindergarten teachers a precise description of how they should work with children but to make them think about the principles and objectives, and the teachers themselves were supposed to devise their own activities in favour of children.

In 1930s **Jarníková** issued *Kindergarten educational programme: summary of educational resources and their use in child care* (1927). At that time, educational theory did not address questions concerning the learning content and programmes in kindergartens. Work in kindergartens was random, which caused considerable differences in quality. In 1938 **Educational guidelines for kindergartens in the capital city of Prague** were issued and also adopted by kindergartens outside Prague. Although this was only an eight-page document, it was a significant effort to develop a curriculum respecting the needs of kindergarten. The educational guidelines reflected the spirit of reform ideas of the First Czechoslovak Republic.

1945 was the start of intensive development of preschool education. In 1945 the *Provisional work programme for kindergartens* was published in an effort to follow the programme of 1938 developed under the influence of the reform pre-war period. In fact, this was the first national directive for kindergartens.

In 1948 the Act on unified schools was published that defined the tasks and objectives of preschool education. All preschool institutions were nationalized and kindergartens were the first stage and at the same time an organic part of the unified educational system. Preschool education was unified not only in terms of objectives but also the educational content and organization.

*The work programme for kindergartens* issued in 1948 was based on the requirements for unified education. In 1953, the *Provisional educational guidelines for kindergartens* were issued with an emphasis on moral, physical, music and art education, cooperation with the family, and playful methods and forms of work. The educational guidelines were the first binding standard for all Czechoslovak kindergartens. The educational guidelines defined the scope of knowledge, skills, and habits for two age groups: younger and older children. These were strictly defined educational requirements. The content of educational work was divided into several educational components. The didactic function was strengthened, which had a negative effect on the work of kindergartens.

In 1955, after two years of testing in practice and subsequent minor adjustments the document was issued as mandatory unified *Educational guidelines for kindergartens*. Subsequently, methodological guidelines were added, the purpose of which was to help plan and achieve the objectives and facilitate daily activities. In 1958, *Experimental guidelines for kindergartens* were issued. In 1960, the final version of *Educational work guidelines for kindergartens* were issued. The guidelines generally defined the objectives and content of educational work. The guidelines were provided separately for two age groups (younger children 3-5 years, older children 5-6 years). Kindergarten teachers were supposed to work on the tasks defined in the guidelines throughout the whole day. Moreover, the tasks were supposed to be linked to each other. The educational content was structured into educational components. These included physical education, intellectual education, moral education, work education, and aesthetic education.

In 1963, *Educational work guidelines for crèches and kindergartens* were issued. This document was based on guidelines of 1958 and 1960. The educational content for kindergartens was traditionally structured into educational components and two age groups including children aged 3-5 years and 5-6 years. In 1967, *Programme of educational work in crèches and kindergartens* came into force. These were new directives governing the education of children from birth to six years of age. The core of the programme was the division into two groups: children until three years of age and children aged three to six years of age. The introduction of each section specified the respective age peculiarities and the relevant requirements for the given age group. The content was structured according to educational components. In an effort to provide a detailed guideline, the programme was overfilled with learning content. Kindergarten teachers had a document that tied them down and did not provide any conditions for creative work. In 1978, *Programme of educational work for crèches and kindergartens* was issued. Prior to its issue, the curriculum underwent a process

of preparation and verification between 1973 and 1976. The so-called preparatory sections were established in kindergartens as a form of preparation of 5 to 6-year-old children for school enrolment. Their objective was to prepare children who did not attend kindergarten. However, practical application suggested that some adjustments were required. In 1984, *Programme of educational work for crèches and kindergartens* was issued. Until 1988, ten new methodologies were incorporated in the programme (*Physical education in kindergarten, Cognitive development in kindergarten, Language education in kindergarten I, Language education in kindergarten II, Development of basic mathematical concepts, Moral education in kindergarten, Work education in kindergarten, Music education in kindergarten, Art education in an kindergarten, Literary education in kindergarten*).

Kindergarten teachers developed plans based on a detailed description of the learning content in the programme of educational work. The daily plans included detailed analyses of activities for the whole day. These plans usually specified ten or more specific tasks that kindergarten teachers had to accomplish. Kindergarten activities started to resemble school work. Methods used in kindergartens were predominantly passive and did not lead to sufficient child activation. All work was constantly affected by time pressure. Kindergartens began to lose space for child play. The above suggests that the kindergarten curriculum was subject to a number of amendments and changes.

### **1989 as the beginning of educational transformation – searching for new approaches**

In 1989, the totalitarian regime collapsed, which brought freedom to the whole society, including freedom in education. The main strategic objectives included the following: depoliticization of education, acknowledgement of the civil right of children, pupils and students and their parents to a choice of educational path according to individual capabilities and interests, and the right to a selection of an appropriate school, abolition of the state monopoly on education and establishment of private and church kindergartens, increase in the number of public schools and qualitative diversity of educational opportunities, and establishment of a competitive environment in the area of education.

Right after 1989 kindergarten teachers refused to work according to the Programme of educational work for crèches and kindergartens (1984), because they felt that the programme had not provided adequate conditions for optimum development of preschool children. This programme was no longer a binding directive. Kindergartens started to follow their own educational programmes. And searched for inspiration in foreign countries. Kindergartens with traditional alternative programmes were established, for example those that followed the concept of Montessori or Waldorf education, but also some innovative programmes such as Step by Step or Health promoting curriculum.

### **Framework educational programme for preschool education**

Between 1990 and 2001, there was no binding educational programme for kindergartens. Kindergartens only had guidelines that they followed. In 2001 the first version of the Framework educational programme for preschool education was

drafted. This was a preschool curriculum that completely differed from the document of 1983 (see Table 1).

Since 2007, this two-tier curriculum has been mandatory. The curriculum requires new competences from kindergarten teachers, relating especially to their ability to design educational work with respect to individual peculiarities of children and their interests and needs. However, this requires thorough knowledge and skills in the area of preschool education, educational diagnostics, and developmental psychology. This fact is currently emphasised by the legal requirement that defines compulsory preschool education (2018) for children one year prior to their school enrolment.

In the past, kindergarten teachers used to develop their plans according to precisely determined objectives and content. Today, only a framework is available according to which schools develop their school educational programmes; these are used by kindergarten teachers for the development of classroom plans with respect to specific children. (Provázková Stolinská, D., Berčíková, A., Rašková, M., 2015)

### **What research shows in the area of practical implementation of the preschool curriculum**

The curricular research conducted by the authors of the present paper was inspired by Posner

Structural approaches that provide a perspective of the curriculum in terms of its internal arrangement;

1. Functional approaches that address the context of the curriculum and analyse what preceded the current curriculum and what followed.

Ad1/ At the time of verification of the new curriculum (2001-2007) only minor adjustments took place. After the enactment of the preschool curriculum (RVP PV) as the basic curricular document, it was subject to further analyses, which however did not respond sufficiently to the problems suggested by educational practice. The curriculum was said to be too “academic”. At present, there is a need for a deeper analysis of the curriculum that would reflect not only current educational trends but also practical needs.

Ad2/ The implementation of the curriculum has been monitored by means of research studies since its introduction. Some of the initial problems were related especially to a general understanding of the new concept in terms of its consistency including the state – school – classroom level. This especially affected the process of defining objectives. Another problematic area was the educational content, which needs to be designed and implemented according to children’s ordinary lives without artificial units. Currently, there are persistent problems with defining objectives on the classroom level. This issue is related to inadequate application of the methods of educational diagnostics. Universities try to respond in the context of training programmes aimed at this professional group but also cooperation with kindergartens on various projects.

It should be noted however that there are no comprehensive research studies focusing on the Czech preschool curriculum. Existing research studies addresses partial

problems relating rather to the *implemented and achieved curriculum* (Opravilová, Kropáčková, Šmelová, Syslová, Hornáčková, Burkovičová, Kořátková, etc.) Their contribution is significant because they represent a framework for kindergartens and a platform for further studies that can help revise the curriculum. However, there is no research on the *intended curriculum* in terms of its internal and external structure with an emphasis on the continuity in relation to FEP EE including a thorough analysis in the area of *coherence, structuring, and progression*.

## **Conclusion**

The Ministry of Education, Youth and Sports of the Czech Republic defined the priority objectives for 2019-2023, including the following: improving the quality of preschool education and elimination of postponement of school attendance, supporting maximum development of the potential of all children including the development of their creativity, which is directly related to a necessary review of the preschool curriculum. The intended curriculum will have to be subjected to a thorough analysis, which will result in adjustments in the context of educational trends reflecting the requirements of educational practice and especially the child personality. Healthy development of the child can only be supported by education in which the child is accepted, respecting the child's capabilities and needs and trying to understand the child's internal and external world, which is often for the child mysterious and at the same time full of surprises and expectations. The child requires not only the adult's attention and care, but especially love and understanding. Becoming familiar with all mysterious recesses of the child's soul will help us better understand the child and understand that this is the only way of developing a free personality (Šmelová, 2016).

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***Disciplinary Training and Professional Practices Effects on Soft Skills  
Development***

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**Abstract**

At present, the development of soft skills or transversal skills has become a relevant issue for higher education institutions. The purpose of this research is to evaluate the discipline training and professional practices effect on the soft skills development of the UNIMINUTO Vicerectoria Regional Sur (VRBS) students. This research will be develop under a pragmatic paradigm and a quantitative model design based on an exploratory investigation. The participants will be 144 undergraduate students of UNIMINUTO Vicerectoria Regional Sur (VRBS) of the programs: social work, social communication, and psychology. For the analysis of the results, the results of the compeTEA test and the observations made were taken, which, when compared, showed the need to do a longitudinal investigation and allowed to identify the skills that should be developed by each program.

Keywords: Soft skills, Disciplinary Training and Professional Practices

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## Introduction

At present, higher education institutions face a fundamental challenge that is the integral formation of society, which requires a more holistic view of pedagogical processes, which transcends the teaching of technical skills. Singer, Guzmán and Donoso (2009) highlight that technical competencies or “hard skills” are necessary for the development of a profession and in most cases, they are the central interest of university institutions, given that the evaluation strategies of learnings acquired in higher education nationally and internationally usually measure this type of competencies. Additionally, it has been considered that the development of hard skills largely guarantees good employment and professional success (Bassi, Busso, Urzua & Vargas, 2012).

However, numerous studies show that the development of hard skills is not enough to obtain job success, since it has been found that the results of the tests that measure these competencies and the academic reports that focus on them are not necessarily predictors of professional success (Singer et al., 2009). That is why; university centers should also encourage the development of other types of skills such as soft skills that are complementary to hard skills.

In this regard, Raciti (2015) expresses that soft skills are related to personal well-being, social adjustment and adaptation to the work context. Which is very important in a globalized world that is constantly changing, in which very often hostile situations must be assumed, before people feel vulnerable or incapable, to others, of demanding a permanent adjustment and constant adaptation to the medium (De la Fuente, 2012). Therefore, it is to be considered that the analysis and training of soft skills in university contexts, has the purpose that the newly graduated student is trained to solve everyday problems, lead groups, be proactive and have the ability to generate and undertake ideas facing adversities for employability (Agudelo, 2015).

However, and despite the need and importance of their development, research in the area is limited, some of the most representative exploratory studies in this regard are those conducted by John (2009), Singer et al., (2009), Fernández and Tapia (2012), Albarrán and González (2015) and Gómez, Manrique-Lozada and Gasca-Hurtado (2015). In the documentary review carried out, it was found that in the Latin American context research on the topic of soft skills is very recent. However, institutions such as the World Bank (2014), the Inter-American Development Bank (Bassi, Busso, Urzúa and Vargas, 2012), the American Association of Colleges and Universities (2015), the University of Angus in Scotland (Kechagias, 2011) and the OECD (Miyamoto, Huerta, Kubacka, Ikesako, and Oliveira, 2015). They have been interested in identifying, evaluation, training and impact of soft skills in diverse populations and in other contexts than North American, which is where the soft skills have been most developed research on the subject since the 70s.

In relation to the previously documentary review described and based on the experience of the authors of this article as teachers, it was proposed to develop a research on soft skills in students of the Corporación Universitaria Minuto de Dios - UNIMINUTO. This institution contemplates in the profiles of applicants and graduates, which not only have the capacity to analyze in a given discipline, but also have a high degree of human sense and willingness for social service. It will be

represent in an interest in working with individuals, groups and organizations those results in professional training interested in leading and seeking integral solutions from a solid humanistic formation (Corporación Universitaria Minuto de Dios, 2014). That is, the institution recognizes the importance of training students in life skills such as soft skills. However, even if the interest and curricular placement of UNIMINUTO are direct to the development of soft skills, it has not been sufficient, since these demand more time and demand, as indicated by Singer et al. (2009), hard skills in general tend to train quickly, but soft skills training can take years and require explicit training.

As teachers, we have identified in the interaction with UNIMINUTO students that some of them present certain difficulties in interpersonal relationships, mainly due to problems in communication, negotiation and empathy, as well as, lack of strategies to solve problems, make decisions, think critically, and anticipate consequences of acts and modulate emotional reactions. Thus, it is necessary to reflect on the educational role of the institution, through its different programs, in these skills, as these turn out to be a fundamental pillar in the formation of the UNIMINUTO student. However, there is no objective evaluation of the soft skills acquired by university students through their professional training and much less evaluate the effect of different pedagogical practices in the training of these skills. Therefore, the following question arises: What is the effect of disciplinary training and professional practices in the development of soft skills in the students of the humanities programs (social work, psychology and social communication) of the UNIMINUTO Vicerrectoría Regional Sur?

With the development of the research, we expected to benefit the participating student community, through the identification of priority needs for training in personal skills that can have an important impact on the work area and professional development, which will allow generating institutional actions to strengthen the profile of UNIMINUTO graduates. Faced with this, it is important to note that the results obtained will allow considering whether pedagogical adjustments are necessary both to the curricular component and to the professional practices in order to train professionals with the capacity to do and the skills necessary for be.

### **Theoretical approach**

In the theoretical approaches made to soft skills, it is evident that there are several ways to name them in the scientific literature: non-cognitive skills (Cunha & Heckman, 2008), socio-emotional skills (Ayrton Senna Institute, 2014), transversal competences ( Beneitone, P; Esquetini, C; González, J; Marty, M; Siufi, G & Wagenaar, R, 2007; Raciti, 2015)., Life skills (World Health Organization, 2003), among others. In addition, different conceptualizations and classifications of these skills have been develop.

Within the framework of this project, two definitions that guided the development of the research were resume. The first is that of the World Health Organization (2003), which defines soft skills as the set of skills of a socio-affective nature necessary for interaction with others, which allow them to face daily challenging demands. The second, is from the Ayrton Senna Institute (2014), which states that these skills are necessary to interact with others and with oneself, since they involve managing

emotions, setting-achieving goals, making decisions autonomously and responsible, face adverse situations in a creative and constructive way.

Next, some of the most relevant classifications of soft skills in the research background are highlight. Among them, the proposal made by Mangrulkar, Whitman and Posner (2001) stands out, in which three categories suggested: interpersonal skills, which include assertive communication, negotiation, trust, cooperation and empathy. Cognitive skills, which involve skills for problem solving, decision making, critical thinking, self-assessment, analysis and understanding of consequences. Finally, there are the emotional control skills, which correspond to the skills necessary for emotional management and recognition in situations of stress and intense feelings, such as anger, sadness and frustration.

On the other hand, Singer et al. (2009) create the classification of soft skills from three categories: *Generic or behavioral*, which are required for the execution of any type of work, which include interpersonal skills, integrity, proactivity and initiative, reliability and predisposition to learn. *Basic or Essential*: which are those that adapt to the type of position or industry, such as assertive communication, teamwork, adaptability, flexibility, service orientation and creativity. *Technical or Functional*, which are specific to the position to perform, such as conflict management, team building, training and mentoring of supervised, motivation, support for supervised, entrepreneurship and development of social networks.

Shakir (2009), meanwhile, classifies soft skills into personal attributes, interpersonal skills and problem solving and decision-making, which are represent in the following seven traits: leadership, communication, teamwork, critical thinking and problem solving, lifelong learning and information management, entrepreneurship, professional ethics and morals.

## **Methodology**

This research was develop based on a pragmatic paradigm and a mixed methodology. A simultaneous type VII model design was used, proposed by Rocco, Bliss, Gallagher and Pérez-Prado (2003), in which the qualitative and quantitative application and analysis is carried out simultaneously. Likewise, a concurrent nest strategy was use, proposed by Creswell (2014), in which different groups or levels are study to obtain a broader perspective of the phenomenon to be study.

The student population of the social work, psychology and social communication programs of the UNIMINUTO Vicerrectoría Bogotá Sur is composite with 1864 students. For the selection of the participants, a non-probabilistic sampling was carry out for convenience, from which the information of 144 undergraduate participants from the previously mentioned humanities programs was collect. These were select for the characteristics they share, as they respond to the social sector, and were distribute in three samples: the first, composed of students who are starting their academic program, the second, by students who are close to starting their professional practice and the third, made up of students who are already finishing their academic program.

The instruments used to gather information were the compeTEA test, a questionnaire designed by Arribas and Pereña (2015), which aims to evaluate 20 competences at a personal and occupational level, through a test with 170 items. In addition, a guide for the measurement of soft skills from interactive exercises, based on the work of McKenzie (2014), in which an observation list was made with 10 items that evaluated active listening, empathy, assertiveness, self-confidence, influence, leadership, initiative, organization and teamwork.

The investigation was executed in four phases. In phase one, the theoretical conceptualization and design of tools for data collection was carried out. In phase two, the characterization of professional practice and the measurement of soft skills in sample 1, 2 and 3 were performed. In phase three, the systematization and analysis of the data collected was performed. In phase four, the results report was prepared.

During the completion of phase I, in the review of various databases, few documents were found in Spanish on soft skills, most of them were published recently, from 2009 onwards, and likewise, many of them are not free access. However, when the search on the subject is carried out in English, a greater volume of literature appears from the 70s onwards. Another aspect to highlight, which was previously mentioned, is that literature on soft skills in Latin America is scarce.

For phase II, characteristics were evidence in the participants of the samples that may affect their differentiation, since, due to the flexibility of the curriculum of the programs, since there are no prerequisites of some academic spaces, students could be taking subjects from different semesters, and so for future research the type of sampling should be modified. In addition to this, in the interactive exercises, the problem situation was changed, since in the first applications a role was assigned to each participant, which was confusing and could limit their participation.

In phase III, tabulation of the results of the compeTEA test is performed, according to the level of competence that is thrown in the proofreading profiles of the test. In addition to this, tabulation of the observation list that was taken from the McKenzie interactive exercises (2014) is performed, in which it is scored with a 1 (if it complies) or with a 0 (does not comply) according to the observation made. Subsequently, the qualitative analysis of the observations reported by the researchers of the interactive exercises was performed.

## Conclusions

### Findings

For the analysis of the results, the levels zero (0) to four (4) were taken by the compeTEA test, in the competencies Self-control, Confidence and self-confidence, Communication, Influence, Teamwork, Initiative, Leadership, Planning and organization, which relate to the criteria observed in the interactive exercise: Active listening, Empathy, Orality, Self-confidence, Influence, Leadership, Cooperation, Initiative, Organization and Teamwork.

Comparisons of the test results were made from cross tables or contingency tables of each of the competitions, it was found that the competitions in which the highest level is scored in sample 1, that is, students who are at the beginning of professional training, are influence and teamwork.

In sample 2 is also find that a level 3 in teamwork and leadership was reached, while in sample 3, which corresponds to the students who are finishing their professional training, only the influence competition is in a level 3 and present a level 1 in the initiative competition.

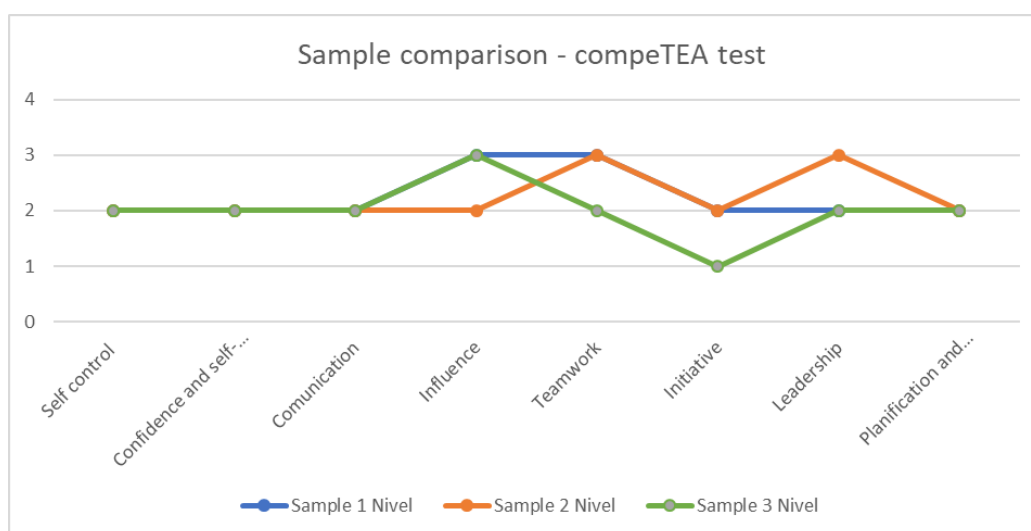


Figure 1: Sample comparison - compeTEA test

In the comparison of the observations by samples, the means of each observed criterion were taken it is found that in all the samples the criterion of active listening is the one that scores highest, however, sample 1 is at a high level of teamwork, unlike samples 2 and 3, which report a higher average in the oral criteria. In all samples, a low score is observe in the organizational criteria.

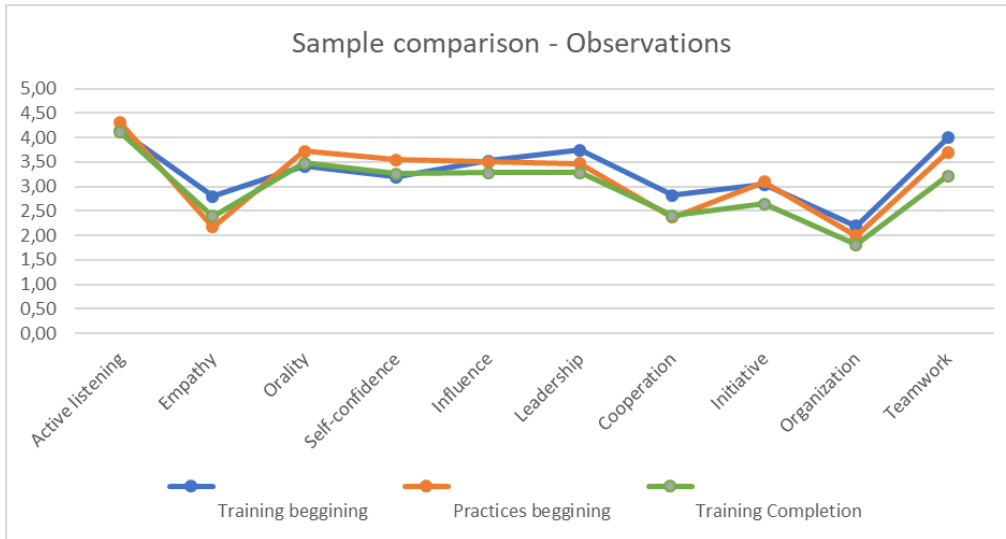


Figure 2: Sample comparison – Observations

In the program comparison, it is evident that in the compeTEA test the social communication program has a level 3 in the Communication, Influence, Work in and Leadership competences. While the psychology program presents a high level in teamwork and a level of one (the lowest level evaluated) in initiative; while the sample of the social work program only presents level 3 in influence.

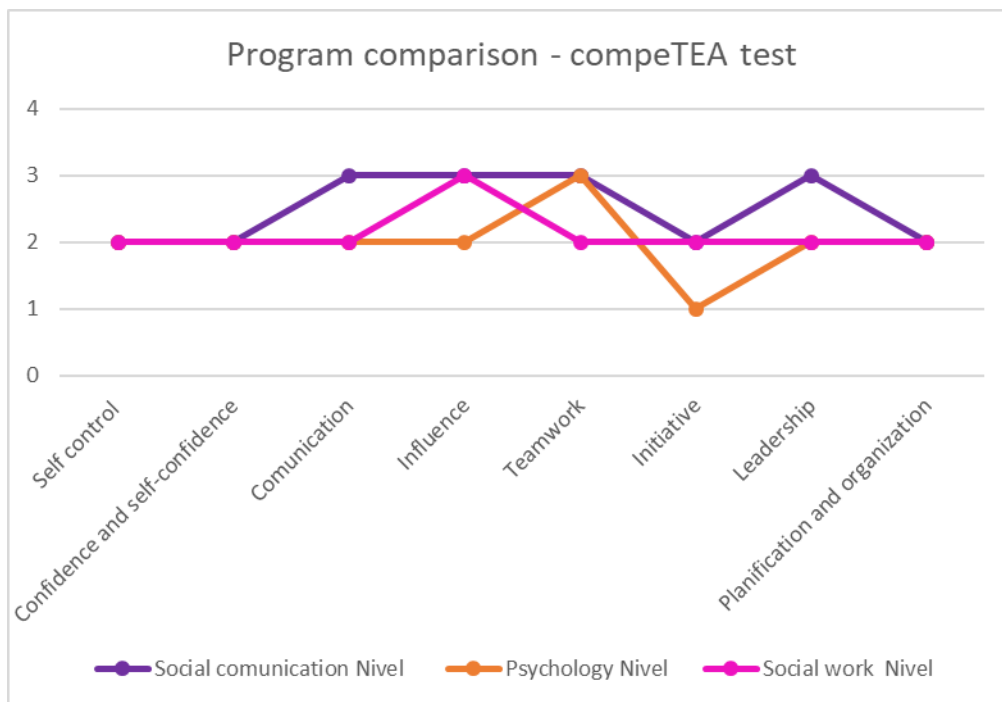


Figure 3: Program comparison - compeTEA test

As evidenced in graph 4, in the sample the observation criterion that had the highest average was active listening. In accordance with the test, the comparison of the observation by programs is that the criteria that have a higher average in the communication program are influence and leadership. While presenting a low average in empathy.

In the psychology program, it is again evident that there is a high score in teamwork, while the organization should be develop as in the social work program, where it was also score under this item, these groups should be considered to have a greater number of students, which can affect the results in this competition. The criterion that scored the highest participants in the social work program is that of orality.

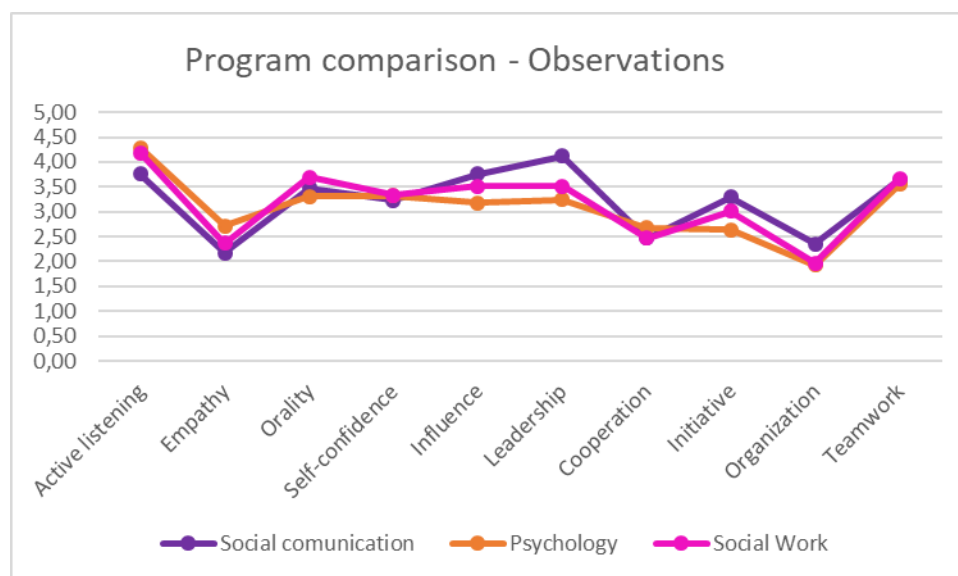


Figure 4: Program comparison – Observations

### Implications and limitations

The results do not show a clear effect of the disciplinary training in the development of soft skills, since the results behave similarly in the measurements of the sample data and, on the contrary, a lower score is shown in the sample 3, corresponding to students who are finishing their professional training, which must be improved.

It is recommend to review the strategies used by the social communication program, which shows greater measures in communication, influence and leadership, and can serve as a guide for the other programs in the training of skills and to potentiate those competencies in which they are evidence weaknesses like empathy.

Longitudinal studies are recommend for having an accurate measurement of the effect of training on the development of skills, taking into account the difficulties in measuring these competencies, as well as randomized probabilistic sampling so that the distribution of data is smaller.



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***Balinese Young Organization as Building of National Character to Counter  
Asymmetric Warfare in Indonesia***

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**Abstract**

Bali is an Island that has a diversity of cultures and traditions which is the reason for the rapid development of tourism on the Island. However, one of the negative impacts was the penetration of foreign culture into Bali. In an effort to ward off foreign penetration in Bali, the community uses a youth organization called "Sekaa Teruna". This study aims to analysis how youth organizations build the character of young people through regional culture to counter asymmetric warfare through foreign penetration that can change the ideology of the nation. The data analysis technique used in this study is descriptive qualitative. This study was examined using the theory of organizational culture, concept of national character, and asymmetric warfare. The results of the study explain that youth organizations in Bali are able to create a national character to counter asymmetric warfare in Indonesia through conducting art training; training in Balinese and Indonesian languages; Ngayah and community service; Sangkep; and carry out socialization to Primary Schools regarding the importance of tolerance and Tri Hita Karana in community life. For the government of Bali and the Government of Indonesia, the existence of youth organizations in Bali has a positive impact to stem the foreign penetration that has occurred.

Keywords: Sekaa Teruna, Balinese Young Organization, Asymmetric Warfare, National Character, Defense, Indonesia

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## **Introduction**

Bali is an island that has a diversity of cultures and traditions which is the reason for the rapid development of tourism on the island. According to data from the Central Statistics Agency of Bali, arrivals of local and foreign tourists to Bali Province in October 2018 were recorded at 517,889 tourists (Badan Pusat Statistik, 2018). Tourism has an impact on socio-cultural changes in society both positive and negative impacts. The positive impact is the increased economic income of the community because of the opening of many new jobs, the population is able to master foreign languages, opening access for local communities to a wider network, and Bali can improve Indonesia's image in the international world through its natural and cultural beauty.

Meanwhile, the negative impact caused by one of them is the penetration of foreign culture into Bali. Cultural penetration is the entry of the influence of one culture into another culture. There are two ways of cultural penetration, namely passivity penetration and violent penetration. passivity penetration is the entry of a culture without causing conflict. This type of penetration enriches the culture of the local community and does not eliminate the original elements of the community's culture. This type of penetration will result in acculturation (the formation of new cultures without eliminating the element of native culture), and assimilation (the formation of new cultures that are different from the original culture). While violation penetration is the inclusion of a culture by force and damage to native culture which causes instability and imbalance in society.

In an effort to ward off foreign penetration in Bali, people use a youth organization called "Sekaa Teruna". Based on the definition, Sekaa Teruna comes from two words namely Sekaa and Teruna. Sekaa is an organization that is formed voluntarily based on certain professions and goals, both permanent and temporary. Then, Teruna comes from the word Taruna which means youth. So Sekaa Teruna means a container or collection of social development organizations for young people who grow and develop on the basis of social awareness and responsibility from the community, especially the young generation in rural or urban areas (Sutama, 2015).

According to Sukarma (2013), Collectivism, togetherness, kinship, and mutual cooperation that characterize Balinese traditions that have been transformed by Western culture are identified as constructs of modern culture. Modern culture stands on the principles of ratio, subject, identity, ego, totality, absolute ideas, and objectivity. Without the deep culture possessed by the Balinese, modernization will only wash the nation away from dependence on the outside world. Therefore, Balinese culture which is flexible, dynamic, adoptive and creative should be the foundation in facing foreign cultural penetration and modernization (Mantra, 1996).

## **Methodology**

This research is included in the type of descriptive qualitative research. In qualitative research methods, researchers submit research questions to be answered through understanding, not by hypothesis, because the essence of qualitative research is understanding a phenomenon, not proving a phenomenon (Herdiansyah, 2010). The source of the data used in this study, namely secondary data sources. Sugiyono (2007)

explains, secondary data sources do not provide information directly to researchers. Secondary data is processed from primary data presented from other people. By using secondary data sources, this research uses literature study, namely by obtaining data from the literature that supports research.

Meanwhile, according to Miles and Huberman (1994) there are several general stages that are usually carried out in analysing qualitative research data, namely, data reduction, data presentation, and drawing conclusions. The data reduction phase is carried out by exploring the data that requires researchers to be familiar with and master the data as a whole by repeatedly reading the research findings data, then simplifying the data until the data can be clearly detailed. The data that has been obtained will then be presented with narrative techniques and will usually be divided into specific chapters so that the explanation is more structured. After going through these stages, the author can then draw conclusions. The stages of drawing conclusions are carried out to find a match between the problem and the purpose of the study with the data obtained and the concepts or theories used during the study.

### **Theoretical Review**

In discussing the Balinese Young Organization as Building of National Character to Counter Asymmetric Warfare in Indonesia, there are three concepts used, namely the Organizational Culture Theory, the National Character concept, and the asymmetric warfare concept.

### **Organizational Culture Theory**

Yvan Allaire and Mihaela E. Firsirotu in *Organization Studies* (1984) define organizational culture theory is the idea that organizations may have a certain culture is found scattered in various publications about business strategy and policy, about organizational behaviour and theory. There are three elements of organizational culture:

- a. Sociostructurally system consisting of working on formal structures, strategies, policies and management processes, and all supporting components of the reality and function of the organization (formal goals and objectives, authority and power structures, control mechanisms, rewards and motivations, recruitment processes, selection and education, sundry management processes).
- b. Cultural systems that embody the expressive and affective dimensions of the organization in a system of shared and meaningful symbols manifested in myths, ideologies and values and in various cultural artefacts (rites, rituals and customs, metaphors, glossaries, acronyms, lexicons) and slogans: story, story, legend and organizational knowledge, logo, design, architecture). This cultural system is formed by the surrounding community, the history of the organization and certain contingency factors that afflict it, it changes and develops under the influence of contemporary dominant actors and dynamic interactions between cultural and structural elements. The construction of myths, ideologies, and values each produces extensive literature that contains explanations and definitions that are contradictory and confusing.
- c. Individual actors, the third component of our model, with their special abilities, experiences and personalities, are not only passive recipients of the 'reality' made

before: depending on their leadership status and role, they become contributors and makers of meaning. However, all actors try to build a coherent picture to direct them to progress in the organization. However, because all actors fabricate "their meanings from the same cultural raw material, a sizable level of meaning sharing will tend to develop among actors who interact in the same social context for long periods of time.

### **National Character**

The building of the nation's character formed the great founding of the nation's founders because the nation consisted of various ethnic groups with a strong regionalism, the Indonesian nation needed a holistic view of culture and character as a nation. This is very important because it involves the approval, views and actions to realize the welfare and prosperity of all Indonesian people. The nation's character is a national characteristic in behaving, thinking and acting that distinguishes it from other nations. The Character of the Indonesian Nation was compiled based on Pancasila, the 1945 Constitution, Indonesia, a sense of love and willingness to sacrifice for the sake of the country and the country. Pancasila is a critical and rational reflection as the basis of the state and the challenges of the nation's culture, with the aim of getting its basics. Pancasila is a sublimation of cultural values that unites Indonesian people of diverse ethnicities, races, languages, religions, islands, into a single nation.

### **Asymmetric Warfare**

According to Ryamizard Ryacudu (2018), asymmetric warfare carried out with non-military approaches from developed countries to destroy, dominate, and conquer or control energy and natural resources from targets through several sectors such as ideology, politics, socio-culture, and defence and security. Asymmetrical warfare certainly provides threats that are multidimensional, namely the emergence of new threats such as terrorism, anarchism, rebellion, the development of SARA issues, penetration of foreign cultures to the emergence of cyberwarfare.

Buffaloe (2006) identified asymmetric warfare as a war that must contain four things, namely threats, operations, culture or habits and costs. Furthermore, these four things are described in a formula  $AW = AT + AO + CA + AC$ . Asymmetric Threat (AT), Asymmetric Operation (AO), Cultural Asymmetric (CA), and Asymmetric Cost (AC).

According to Payne (2002), asymmetric warfare prefers political methods (soft power) as carried out in the name of an identity (ethnic, religious, ideological, or tribal) in order to gain access to certain countries to achieve the objectives of the war state. The complexity of threats is classified into multidimensional patterns and types of threats in the form of military, non-military and hybrid threats which are categorized as real and unreal threats.

### **Foreign Penetration as Asymmetric Warfare**

The development of the dynamic environment and strategic context always brings changes to the spectrum of threats that are complex and have implications for national defense (Buku Putih Pertahanan, 2015). The complexity of the threat is classified into a multidimensional pattern and type of threat in the form of military, non-military and

hybrid threats that can be categorized as real and unreal threats. Real threats that are and are likely to be experienced by the state include terrorism, radicalism, separatism, natural disasters, cyberattacks and espionage and drug abuse. Meanwhile, the threat is not yet real, namely open conflict or conventional war.

Culture is the whole communication system that is binding, maintained and preserved by the community. In addition to the communication system, culture contains knowledge, beliefs, arts, morals, laws, customs and other abilities that characterize a society (Sidi, 1983). The relationship of cultural penetration that occurs due to tourism is encouraged because tourism involves the movement of individuals who are in different areas from one another, and causes social relations between tourists and the local community. This relationship then gave rise to penetration caused by differences in culture, ethnicity, lifestyle, language, beliefs and welfare level between the two.

For various reasons, local people tend to be weak groups when dealing with the interests of tourists and tour operators. These impacts arise when tourism begins to influence the value system and behavior of local people. Furthermore, these changes tend to occur in the structure of society, relationships between families, traditional collective life patterns, traditional ceremonies and so on. Especially in Bali, foreign penetration can cause the formation of national character and the defense of the State well in the younger generation. Meanwhile, the role of youth is very important in changing the nation. Youth are always expected to be agents of change and have the ability to develop villages.

For example, the presentation of traditional sacred traditional dances or religious ceremonies changes the sacred value of the procession of religious ceremonies to the value of the spectacle. In 1980, the supposedly sacred Barong Dance was actually shown to tourists on a tourist wedding stage. Even before the event began, offerings were made to request permission from Sang Hyang Widhi (Nurdin, 2018). On the other hand, tourists tend to leave negative perceptions with behaviors such as minimal dressing habits, kissing in public or drinking alcohol which young people can emulate.

Foreign penetration gives effect to the erosion of the ideology of the younger generation in Bali. This is one example of asymmetrical warfare. Ideology and socio-culture are part of the focus of the national strategic environment, whose development will determine how national defense strategies are made. Penetration by foreigners can cause the practice of Pancasila to degrade. The loss of Pancasila values emphasizing multiculturalism, diversity, and the value of justice with a narrow tendency of primordialism is an indication of a decreased understanding of the values of Pancasila ideology (Strategi Pertahanan Negara, 2015). Meanwhile in the socio-cultural field, foreign penetration causes changes in mindset, attitude patterns, and action patterns of the nation's next generation to become indifferent in responding to various national problems.

Foreign penetration as a threat that comes from abroad against the State ideology can result in disruption of various aspects of social, national and state life that have implications for the existence of sovereignty, territorial integrity, and national safety. The power of state ideology is directed to shape thought patterns, attitudes, and

patterns of action in the translation of community values. Pancasila as a national ideology is used to unite, guard the stability and the continuation of the nation.

### **Nation Character and Bela Negara**

The nation's character is a national characteristic in behaving, thinking and acting that distinguishes it from other nations. The character of the Indonesian people was formed based on Pancasila, the 1945 Constitution, NKRI, a sense of love and willingness to sacrifice for the sake of the country and the motherland (Rachmah, 2018). Pancasila is a critical and rational reflection as the basis of the state and the reality of the nation's culture, with the aim of obtaining the main points of understanding in a fundamental and comprehensive manner. Pancasila is a sublimation of cultural values that unites Indonesian people of diverse ethnicities, races, languages, religions, islands, into a single nation.

The development of national character can only be done through developing one's individual character. That is, the development of national culture and character can only be done in an educational process that does not release students from the social environment, community culture, and national culture. Culture and national character education are carried out through the education of values or virtues which are the basic values of the nation's culture and character. Therefore, cultural education and national character is basically the development of values derived from the outlook on life or ideology of the Indonesian people, religion, culture, and values formulated in the goals of national education.

While Bela Negara is the rights and obligations of citizens. Based on Indonesia Constitution 1945 article 27 paragraph 3 of the 1945 Constitution (Lembaga Administrasi Negara). At present, defending the country can be adjusted in its application to programs through values that are adaptive to the present. Adjustments are made so that they are more attractive and can foster a state defense attitude for the younger generation.

According to Primayanti (2019), there are five basic values of Bela Negara, which are:

1. Love the motherland.
2. Willing to sacrifice for the nation and state.
3. National and state awareness.
4. Pancasila as the ideology of the State. Pancasila must be practiced by protecting it from foreign threats that want to replace Pancasila.
5. Has the initial ability to defend the country.

Bela Negara is needed in national defense. In the implementation of universal national defense, there are three components of national defense, namely the main component, the reserve component, and supporting components. The main component is the Indonesian National Army which is ready to be used to carry out defense tasks. The reserve component consists of national resources that have been prepared to be mobilized through mobilization to enlarge and strengthen the strength and capability of the main components. While the supporting components are national resources that can be used to increase the strength and capability of reserves. Support and reserve components need to be fostered using state defense education.



## **Sekaa Teruna as Forming Nation Character and Defending the State in counteracting Asymmetrical Warfare**

Understanding of the younger generation in Bali related to the values contained in Pancasila, the 1945 Constitution, Archipelago Insight, and Unity in Diversity will increasingly experience degradation due to heavy foreign penetration that brings new values that are not in accordance with national identity. According to Strategi Pertahanan Negara (2015) this degradation inhibits the spirit and awareness of the defense of the State in Balinese society, especially the younger generation. As for the values influenced by the nature of nationalism, patriotism, and the love of the motherland which is the basic capital in strengthening unity and unity within the Indonesia frame.

The Balinese association of life is guided by awig - awig (regulations) made and approved by the village. Likewise, the Sekuna who carry out their functions is based on the principles set out in the Statutes or By-Laws, the results of meetings and awig awig. Almost every village in Indonesia has a Youth Organization as a youth organization at the village or kelurahan level. Similar to Karang Taruna, villages in Bali have a place specifically as a youth organization based on local wisdom, namely Sekaa Teruna. Sekaa Teruna's membership starts at 16 years old or high school level, students, and also young people who are already working but not married. In its development, the function of Sekuna Teraa has always been in formal and informal education environments. The function of the Sekuna Teruna, which is a medium of learning for the younger generation, enables the provision of learning in the formation of national character and the defense of the State.

According to organizational culture theory, the implementation of Sekaa Teruna included three aspect which are sociostructurally system, cultural system and individual actors. The implementation of Sekaa Teruna is based on the Minister of Social Affairs Regulation (PERMENSOS) Number 83 / HUK / 2005 concerning Youth Organization. Youth organization is a youth organization in every province in Indonesia. But in Bali, Karang Taruna is a youth organization at the village official level. while sekaa teruna is a youth organization that applies in traditional villages.

In carrying out its functions, the cadet group continues to be guided by (PERMENSOS) Number 83 / HUK / 2005, so it has the same function as the youth group. Article 2 states that Youth Organization aims to (a) The realization of growth and development of social responsibility awareness of every young generation of Karang Taruna residents in preventing, preventing, overcoming and anticipating various social problems. (b) The formation of the soul and spirit of the struggle of the younger generation of skilled and knowledgeable Karang Taruna residents. (c) Growing the potential and ability of the young generation in order to develop the empowerment of Karang Taruna citizens (Peraturan Menteri Sosial Nomor 83/HUK/2005 tentang Karang Taruna).

The thing that distinguishes the sekaa teruna from the youth cadets is that it uses the principle of Tri Hita Karana which is the basis for making special awig - awig Sekaa Teruna. Tri Hita Karana, which provides a basis for human understanding of the importance of honesty to God (parhyangan), to others (pawongan), and to the environment (palemahan). These elements flow strongly within the local Sekaa

Teruna organization so that it strengthens its existence. The work programs that must be carried out by the cadet group which support the formation of national character and defending the State in counteracting foreign penetration in Bali are as follows.

1. First, carry out art training. The intended art training is training in traditional dances, gamelan instruments, and singing including national songs. It aims to continue to preserve local culture in particular and the pride of the Indonesian nation in general. The training was also held to support the young generation to take part in national and international competitions. The trainers who train are from the local residents of each area of the teruna teruna in order to further develop a sense of kinship for the creation of national unity.
2. Second, conduct Balinese and Indonesian language training. Language is a communication tool which is a national identity. With the presence of foreign penetration, the mastery of regional languages and even national languages began to fade away with the mastery of foreign languages. Language training at Sekuna is carried out in collaboration with educational institutions, especially in the lending of teaching staff. Some sekaa teruna also make a folklore competition program using Balinese and Indonesian to increase the enthusiasm of the younger generation to learn and preserve language.
3. Third, implement Ngayah and Community Service. Ngayah is a social obligation of the Balinese that is carried out in mutual cooperation with sincere sincerity. Carrying out ngayah and community service is important in practicing the philosophy of Pancasila. Ngayah is often carried out in holy places either to clean or make offerings (prayer facilities). While community service is often done by young people not only in the neighborhood but also on the beach to preserve the environment.
4. Fourth, implement Sangkep. Sangkep is a method used by the community to discuss problems and find solutions. Through sangkep, young people are taught good and right speech methods in public. In addition, the decision-making process in sangkep is by deliberation and consensus in accordance with the observance of the fourth principle of Pancasila. the other important thing is, the younger generation learns how to shape and enhance their leadership.
5. Fifth, carry out socialization to elementary schools about the importance of tolerance and Tri Hita Karana in social life. This activity is a form of community service performed. Teaching can give young people the opportunity to share their knowledge and experiences. This activity can provide young people with space to be sensitive to the surrounding environment and open up their horizons.

## **Conclusion**

Tourism causes foreign penetration which gives not only positive impacts but also negative impacts for the younger generation. Specifically, in Bali, tourists tend to behave like minimal dressing habits, kissing in public or drinking liquor which young people can emulate. Youth organization, which is Sekaa Teruna, is a good place for learning to build national character and defend the State in counteracting foreign penetration as asymmetric warfare. The national character build through conducting art training; training in Balinese and Indonesian languages; Ngayah and community service; Sangkep; and carry out socialization to Primary Schools regarding the importance of tolerance and Tri Hita Karana in community life.

Even though it has been implemented well, the cadet group also needs help from the regional and central governments. The need for socialization and training on the formation of the nation's character and the defence of the State to the members of the cadet group so that they get the true essence of defending the State and can re-socialize it to the surrounding community and school students. Sekaa Truna as a youth organization under the customary village giving influence in counteracting foreign penetration in Bali tourism. This was successful because in its implementation Sekaa Teruna used the Tri Hita Karana concept.

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***Policy Implementation: Basic Education 9 Years Indonesian School Abroad in Malaysia***

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**Abstract**

In Government Regulation Number 64 Year 2016 it is stated, what is meant by Low-Income Communities (MBR) is people who have limited purchasing power. The 9-year compulsory education problem does not only belong to rural areas, urban areas are not immune to the problem of completing 9-year compulsory education, especially for Low-Income Community Settlement Areas. The theory used is using Policy Implementation Theory from Van Meter and Van Horn, using descriptive qualitative research methods. Research results show in aspects of: 1) In Malaysia's Kotakinabalu and in the Bandung Regency of Indonesia, the implementation of 9-year basic education has been more widely regulated in the Act. No 20 of 2003 concerning the National Education System; 2) In Malaysia's Kotakinabalu, SIKK still lacks teachers. In Bandung Regency, remote and isolated areas, educational facilities and infrastructure are still very limited; 3) In Malaysia's Kotakinabalu, egocentricity is a problem among teachers. In the Bandung Regency of Indonesia, learning methods between teachers and students that have not been implemented to the fullest illustrate that the implementation of 9-year basic education in the Bandung Regency of Indonesia is still lacking in its implementation. Recommendations from the results of the research analysis are as follows: 1) increasing the stages of the HR development program; 2) In the Implementation of the 9-Year Compulsory Basic Education Policy for Indonesian Citizens (WNI) in the Low-Income Community Settlement Area (MBR) in Kotakinabalu, Malaysia is given special treatment in terms of implementing the 9-year compulsory basic education.

Keywords : Implementation, Policy, Education, Kinabalu, Bandung Regency

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## 1. Introduction

Residential area is part of the environment outside the protected area, both in the form of urban and rural areas, which functions as a residential or residential environment and a place of activity that supports life and livelihood. (Article 1 (3) of Law No. 1/2011). In Government Regulation Number 64 Year 2016 it is mentioned, what is meant by MBR is people who have limited purchasing power so they need to get government support to get a house. The 9-year compulsory education problem does not only belong to rural areas, urban areas are not immune to the problem of completing 9-year compulsory education, especially for Low-Income Community Settlement Areas.

The NPM Editorial Team (2009: 145) revealed that the completion of a quality 9-year compulsory basic education program aimed at: 1) increasing the equivalent gross enrollment rate of SMP / MTs to a minimum of 95%. 2) reduce the number of junior high school dropouts from 2.83% to 2%. 3) improve the quality of graduates with an indicator of 70% of participants in the National Examination achieving grades above 6.00 4) completing educational facilities so that 75% of SMPs meet National Education Standards, including: at least 80% of SMPs have libraries, 50% of SMPs have Science Laboratories, 50% of junior high schools have language laboratories, and 80% of junior high schools have adequate skills. 5) organize at least one international standard SMP pilot in each district / city. 6) the formation and functioning of the education information system network in every province throughout Indonesia properly. 7) improvement in the quality of SMP management with 70% of SMPs Running School Based Management (SBM) well. 8) increase awareness of community participation in the administration of education. Compulsory education serves to strive for the expansion and equitable distribution of opportunities for quality education for Indonesian citizens. The aim of the 9-year compulsory education program is to provide a minimum educational opportunity for every Indonesian citizen in order to develop the potential that exists in him and be able to live independently in the community. Minimum education in question is that people aged 7-15 years are required to attend the 9-year compulsory education program, namely 6 years at the SD / MI / equivalent level and 3 years at the SMP / MTs / equivalent level.

The mandate stated in the opening of the 1945 Constitution which one of its aims is to say "to educate the nation's life". Accordingly, when viewed from the achievements of the Indonesian State's Human Development Index (HDI) in 2015 based on Wikipedia data, Indonesia ranks 113 out of 180 countries measured. Measurements from the United Nations Development Program (UNDP), one of the measurements used is the length of time at school and the number of people who are literate. This indicator is also used by the Central Bureau of Statistics (BPS) to measure the Human Development Index (HDI). Education becomes one of the benchmarks of human development in addition to health and income. From the results obtained by Indonesia, it can be illustrated that this is an achievement that is not to be proud of.

As a comparison, Singapore as one of the small countries in ASEAN with limited natural resources but proves that the quality of its human resources (secondary education APK 107% and higher education APK 72%) is one of the developed countries in the world ranked second out of 144 countries, with income per capita



reached US \$ 49,261 (2011), far above Indonesia which only reached US \$ 3,509. (Source: Global Competitiveness Index (CGI), 2015).

Education services in Indonesia are divided into 3 major parts, namely basic education, secondary education and higher education. (Ihsan, 2005) All of these levels are intended to be a complete development of Indonesian people and to develop the whole of Indonesian society. The delivery of basic education should be more a concern of the government because it acts as a foundation. This is stated in the 1945 Constitution Article 31 paragraphs 1 and 2, which states that every citizen has the right to receive education and every citizen is obliged to attend basic education and the government is obliged to finance it.

Equitable distribution and expansion of access to education is directed at efforts to expand the capacity of the education unit and provide equal opportunities for all students from different social groups both socially, economically, gender, location of residence and level of intellectual ability and physical condition. Based on these provisions, all school-age children, regardless of their background, must obtain basic education services, including school-age children who are abroad. It is an undeniable fact that not a few Indonesian citizens of school age who live and are abroad must receive the same educational services as school-age children who are in the country. The same educational services means that adequate infrastructure is available, provided by qualified management and educators, given school management training for managers and has the same opportunity to develop the curriculum, there is no difference with the schools and staff provided for schools within country.

Until 2010 there were 14 SILN (Indonesian Foreign Schools) active schools, with varying conditions and typologies. With reference to its management in the Joint Decree of the Minister of Foreign Affairs of the Republic of Indonesia and the Minister of Education and Culture of the Republic of Indonesia Number 191/81/01 and Number 951 / U / 198 of 1981, which was revised with the second joint regulation No. 7 of 2015 and No. 1 of 2015 concerning management and implementation of education in Indonesia abroad.

One of them was through the establishment of the Kota Kinabalu Indonesian School (SIKK). This commitment to provide educational services for children of Indonesian school-aged citizens in Sabah, was demonstrated through the agreement of the President of Indonesia with the Prime Minister of Malaysia, the Vice President of the Republic of Indonesia with the Deputy Prime Minister of Malaysia and the Minister of National Education of the Republic of Indonesia with the Minister of Malaysian Studies on July 6-8, 2008 concerning permit to establish SIKK.

An interesting fact is from the organization of Indonesian Overseas Schools in Kota Kinabalu, Sabah, Malaysia. This school has 141 branches or Community Learning Centers (CLC), spread across Sabah and Sarawak (Data as of January 2017). Serving approximately 20,000 children from around 45,000 children Indonesian citizens (mostly migrant workers) who are in Sabah are school-age children. Data as of November 2016 shows that in the Indonesian School of Overseas Cities in Kota Kinabalu (Sabah, Malaysia) the number of Indonesian School-Age Children per Level has not been served by formal education for Elementary School levels of around 8,473 students and Junior High Schools around 2,118 students. While the number of

children who have received education services for elementary school is around 9,386 students and junior high school is around 3,898 students. Meanwhile the children served by the NGO (Non Government Organization) Humana amounted to 12,784 school age at the elementary school level. (Source: Consulate General of the Republic of Indonesia, 2017).

These children are the children of Indonesian workers seeking fortune in overseas countries. In this Sabah country, their existence can be said to be alienated, as foreigners, they do not have the same rights as the rights of Malaysian citizens. Included in the right to education, the Malaysian government cannot facilitate Indonesian children to study at Malaysian schools due to incomplete documents they have and other problems. Practically, tens of thousands of Indonesian children are in this area while they are not in school. The Kota Kinabalu Indonesian School has the responsibility to facilitate the education of the children of Indonesian workers in Sabah. After the establishment of SIKK, Indonesian children in the country of Sabah are entitled to education as other Indonesian children.

Kota Kinabalu Indonesia School with an area of 15,823 m<sup>2</sup> located at No.6 Jl. 3B Kota Kinabalu Industrial Park (KKIP) South Dua, Sepanggar, Kota Kinabalu, Sabah, Malaysia is recognized as a private school with recognition of the registration of educational institutions No. XVSF01 and needs to be renewed every five years by the Malaysian Government. From the Government of Indonesia, this school is based on the Minister of Education's Decree Number 094 / O / 2008. Considering the function of SIKK as the center point for Indonesian children's education in Sabah, Malaysia, in addition to organizing formal education, SIKK also serves as the parent school / coordinator for educational services in the Community Learning Center (CLC) which is spread and encompasses 3 Indonesian Representatives, namely the Indonesian Consulate General Kota Kinabalu, KRI Tawau, and KJRI Kuching, or covering two states namely Sabah and Sarawak, Malaysia. New CLC-CLC development programs continue to be needed to accommodate existing school-age children.

In order to carry out its operational activities, the funds received and managed by SIKK to provide educational services in Sabah and Sarawak are quite large, more than 20 billion rupiah per year. The majority of the allotment of these funds is used to finance existing CLC operations. These funds come entirely from the Ministry of Education and Culture budget. In 2015 and 2016, the Ministry of Education and Culture distributed Rp. 21,638,639,363 and Rp. 22,846,595,919. This much funding requires good planning, use and reporting. SIKK has the responsibility for managing the funds.

The above description is the current situation at the Kota Kinabalu Indonesian School. The management of the SIKK organization is no longer intended only for one existing school, but does accommodate all existing branches of the school (CLC). Indonesian Schools Kota Kinabalu Sabah Malaysia is required to be able to provide services and develop access to 9-year compulsory education for all school-age children in Sabah and Sarawak. SIKK acts not only as a school, more like a government organization. When compared with in Indonesia, it can be said that this school is an education service at the district or city level.

Meanwhile, in Bandung regency around 13,000 children graduating from elementary /

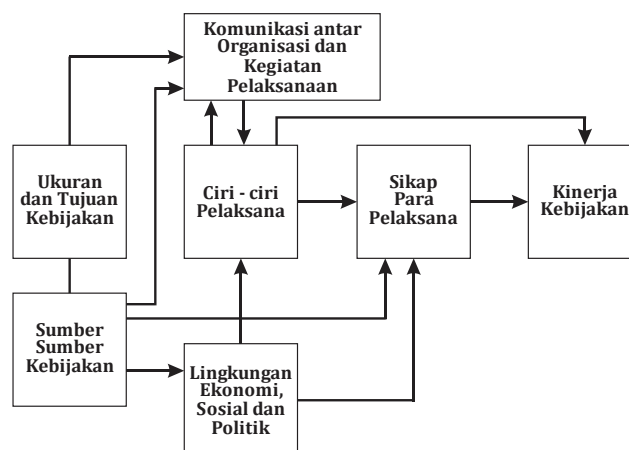
MI did not continue their education to SMP / MTs. The high number of children aged 13-15 years who are not in school requires the government and the community to make various efforts to improve education services for children aged 13-15 who are currently not in school for various reasons. From the background description above, it can be raised the following research questions "How is the Policy Implementation: 9-Year Compulsory Education for Indonesian Citizens (WNI) in Low-Income Community Settlements (MBR) (Study in Kotakinabalu, Malaysia and Bandung Regency, Indonesia) ?"

## 2. Literature

According to Van Meter and Van Horn (1975), there are several factors that are believed to influence policy implementation. Some of these factors are as follows :

1. *Policy standard and objective, which 'elaborate on the overall goals of the policy decision..... to provide concrete and more specific standard for assessing performance';*
2. *the resources and incentive made available;*
3. *the quality of inter-organizational relationships (we find in their discussion of this, as in so much of the American literature on implementation, an extensive discussion of aspects of federalism);*
4. *the characteristics of the implementation agencies, including issues like organizational control but also, going back surely to inter organizational issues, 'the agency's formal and informal linkages with the "policy-making" or "policy-enforcing" body';*
5. *the economic, social and political environment; dan*
6. *the disposition or response oh the implementers, involving three elements: 'their cognition (comprehension, understanding) of the policy, the direction of their response to it (acceptance, neutrality, rejection) and the iuntensity of that response'.*

Regarding the relationship between variables in the Van Meter and Van Horn models, schematically the Van Meter and Van Horn models can be seen from the figure below:



Picture 2.1

*Model of Policy Implementation Process (Model Proses Implementasi Kebijakan)*

Source : Van Meter dan Van Horn, *The Implementation Process: A Conceptual Framework, Administration and Society* (1975: Page. 445-448).

### 3. Research Method

This research is intended to find out "How is Policy Implementation: 9-Year Compulsory Education for Indonesian Citizens (WNI) in Low-Income Community Settlement Areas (Study in Kotakinabalu, Malaysia and Bandung Regency, Indonesia)". Therefore, the research method used is a qualitative method. The qualitative research method was chosen by the researcher with the consideration that: first, the belief that truth can be more achieved by using qualitative methods, this is in line with the opinion of Bogdan and Taylor (1992: 18-22) that : "... Through qualitative methods we can get to know people (subjects) personally and see them develop their own definition of this world, we can feel what they experience in their daily struggles, study groups and experiences that we may not know at all. And finally, qualitative methods allow us to investigate concepts that in other research approaches, the essence will be lost.

### 4. Discussion

The Implementation of the 9-Year Compulsory Basic Education Policy for Indonesian Citizens (WNI) in Low-Income Community Settlements (MBR) (Study in Kotakinabalu, Malaysia and Bandung Regency, Indonesia) is regulated in Law of the Republic of Indonesia No. 20 of 2003 concerning the National Education System and Government Regulation of the Republic of Indonesia Number 47 of 2008 concerning Compulsory Education. According to Van Meter and Van Horn, there are several factors that are believed to influence the implementation of policies. Some of these factors are as follows: 1) Policy standards and objectives; 2) the resources and ancentive made available; 3) the quality of inter-organizational relationships; 4) the characteristics of the implementation agencies, including issues such as organizational control but also, going back surely to inter organizational issues, 'the agency's formal and informal linksages with the' policy-making 'or' policy-enforcing 'body'; 5) the economic, social and political environment; and 6) the disposition or response oh the

implementers, involving three elements: 'their cognition (comprehension, understanding) of the policy, the direction of their response to it (acceptance, neutrality, rejection) and the efficiency of that response'.

### ***Policy Standard and Objective***

Policy standards and objectives are basically what the program or policy wants to achieve, whether tangible or not, short, medium, or long term. Clarity and policy objectives must be seen specifically so that at the end of the program the success or failure of the policy or program being carried out can be known. Regarding the Variable Policy Standards and Objectives, Van Meter and Van Horn (1975: 464) explain: "Given our primary interest in the factors that determine the performance of policy, the identification of performance indicators is a crucial stage in the analysis. Essentially, the performance indicators assess the extent to which the policy's standards and objectives are realized. Standards and objectives elaborate on the overall goals. Of the policy decision. They move beyond the generalities of the legislative document to provide concrete and more specific standards for assessing program performance. These standards and objectives are self-evident and easily measurable in some cases. To ascertain whether the implementation has been successful, one must determine the number of jobs that have been created, the identity of those who have been hired, and the progress on related public works projects. In the view of Van Meter and Van Horn, identification of performance indicators is an important stage in the analysis. Basically, performance indicators assess the extent to which policy standards and objectives are realized. Complex goal variables on the overall objectives of policy decisions.

Implementation will be effective if the measures and objectives of the policy are understood by the individuals responsible for achieving the policy objectives. Clarity in the size and objectives of such policies needs to be communicated appropriately with implementers. The consistency or uniformity of basic measures and objectives needs to be communicated so that the implementor knows precisely the size and objectives of the policy.

The performance of policy implementation can be measured by the level of success of the size and objectives of policies that are realistic with the socio-culture at the policy implementation level. When the size and policy targets are too ideal (utopian), it will be difficult to realize (Agustino, 2006). Van Meter and Van Horn suggest that to measure the performance of policy implementation, of course, confirms certain standards and targets that must be achieved by policy implementers, policy performance is basically an assessment of the level of achievement of these standards and targets. Understanding the general purpose of a standard and policy objective is important. Successful policy implementation, can be frustrated when officials (officials), are not fully aware of the standards and objectives of the policy.

Policy standards and objectives have a close relationship with the disposition of implementers. The direction of the disposition of implementers (implementors) to the standards and policy objectives is also a "crucial" thing. Implementors may fail in implementing policies, because they refuse or do not understand what the objectives of a policy are (Van Mater and Van Horn, 1974).

Based on an analysis of the discussion on Policy Standards and Objectives in the aspects of Implementing the 9-Year Compulsory Education Basic Education Policy for Indonesian Citizens (WNI) in Low-Income Community Settlement Areas (Study in Kotakinabalu, Malaysia and Bandung District, Indonesia): In Kotakinabalu Malaysia and In Bandung regency, Indonesia, the implementation of 9-year basic education has been regulated more broadly in the Law. No 20 of 2003 concerning the National Education System. The national education system gives every citizen the right to provide equal opportunities for education. as stated in Article 34 as follows: a) Every citizen aged 6 years old can participate in the compulsory education program; b) The Government and regional governments guarantee the implementation of compulsory education at the minimum level of basic education without charging fees; c) Compulsory education is the responsibility of the state organized by educational institutions. Government, local government and society. Referring to Article 34, in the implementation of education that is free and free for the people of Indonesia, it becomes the responsibility and obligation of the state. In the context of national development, 9-year basic education is an effort that must be made, to improve the quality of Indonesian human resources so that they have the ability to maintain their world, be able to adapt to changes, be able to improve their quality of life and dignity. In addition, basic education is defined as providing the broadest learning opportunities for school age groups to attend the education. In Kotakinabalu Malaysia, the existence of SIKK to manage basic education in Sabah for fostering the improvement of the quality of learning is in the Directorate of PKLK, plantation children, unable to get access, because there are regulations of the Malaysian Act, which eventually children become illegal; The implementation of the curriculum went smoothly, which was an obstacle CLC lacked in understanding the basis for implementing the curriculum; What students need in the fields is a residence permit, the Indonesian government, so far it is strict to issue permits for migrant workers in Sabah. In Bandung regency, Indonesia, for schools that have not carried out 9-year basic education, it can be seen that not yet implemented 9-year basic education because schools are not sufficient to finance the needs in the implementation of education in these schools. The need for facilities and infrastructure as well as the salaries of employees and honorary teachers is very large, becoming one of the obstacles for some schools, to implement a 9-year basic education program.

### ***The Resources and Ancentive made available***

The resource component includes the number of staff, the expertise of the implementers, relevant and sufficient information to implement the policy and the fulfillment of relevant resources in the implementation of the policy, the existence of an authority that the policy can be directed to as expected, and the existence of supporting facilities that can used to carry out policy activities such as funds and infrastructure.

The success of policy implementation depends on the ability to utilize available resources. Humans are the most important resource in determining the success of a policy implementation. Each stage of implementation requires quality human resources in accordance with the work required by apolitically determined policies. In addition to human resources, financial and time resources become important calculations in the successful implementation of policies. As stated by Derthicks (in

Van Mater and Van Horn, 1974) that: "New town studies suggest that the limited supply of federal incentives was a major contributor to the failure of the program".

Based on an analysis of the discussion about The Resources and Anecdive made available in aspects of the Implementation of the 9-Year Compulsory Education Basic Education Policy for Indonesian Citizens (WNI) in Low-Income Community Settlements (MBR) (Study in Kotakinabalu, Malaysia and Bandung Regency, Indonesia): In In Malaysia, SIKK still lacks teachers. If seen, the number of students is 60,000, it can be seen when the parents of the TKI take care of the documents, the number of children. There are 56,000 students, and only 24,000 children have been served, 355 teachers from SIKK, 400 local teachers have a total of 700 teachers. The school age that gets educated is around 24,000, there is 1 compared to 35 to 40 students, if served in total 56,000 students compared to 30, there is a shortage of teachers of almost 900 teachers. Teacher productivity in SIKK has not been optimal in terms of the implementation of the 9-year compulsory basic education policy, demonstrating the lack of creativity of teachers in Teaching and Learning Activities. Data shows that SIKK does not yet have a financial management system and is still limited to Block Grant not being included in the DIPA, School principals have a large financial management burden not supported by team members, financial management staff, even though they use the principle of accountability. Infrastructure for SIKK clearly exists, however to regulate CLC requires special arrangements, minimum standards that must exist, but whose reality is not optimal. Curriculum, face-to-face meetings in one week, duration of learning time, and required infrastructure. Levels with existing standards in Indonesia or more, are quite difficult to implement because of the existence of SIKK abroad, at least close to minimum service standards, the minimum is reached is extraordinary, for example classes, maybe each class has its own class name, although it is not appropriate with a minimum standard, two to four teachers with a number of students up to two hundreds, so teachers not only take care of finances, but also dapodik and so forth. In Bandung regency, remote and isolated areas of education facilities and infrastructure are still very limited. The school building is still inadequate, not yet supported by adequate learning facilities. As a result, some school-age children have not received educational services or received adequate quality education services.

### ***The Quality of Inter-Organizational Relationships***

Communication activities between organizations need attention. In terms of this Interorganizational Communication and Enforcement Activities, Van Meter and Van Horn (1975: 466) explain: "Effective implementation requires that a program's standards and objectives be understood by those individuals responsible for their achievement. Hence, it is vital that we concern ourselves with the clarity of standards and objectives, the accuracy of their communication to implementers, and the consistency (or uniformity): with which they are communicated by various sources of information. Standards and objectives cannot be carried out unless they are stated with sufficient clarity so that implementers can know what is expected of them. Communication within and between organizations is a complex and difficult process. In transmitting messages downward in an organization, or from one organization to another, communicators inevitably distort them-both intentionally and unintentionally (Downs, 1967: 133-136). Furthermore, if different sources of communication provide inconsistent interpretations of standards and objectives or if the same source provides

conflicting interpretations over time, implementers will find it even more difficult to carry out the intentions of policy. Therefore, the prospects of effective implementation will be enhanced by the clarity with which standards and objectives are stated and by the accuracy and consistency with which they are communicated. According to Van Meter and Van Horn, effective policy implementation requires that program standards and objectives need to be understood by the people responsible for achieving these goals. Therefore, it is important that clarity of standards and objectives, accuracy of policy communication for implementers, and consistency (or uniformity) are communicated through various information. Standards and objectives cannot be carried out unless the policy is stated with sufficient clarity so that the implementer can know what is expected from the policy.

Based on the analysis of the discussion about The quality of inter-organizational relationships in the aspects of Implementing the 9-Year Compulsory Education Basic Education Policy for Indonesian Citizens (WNI) in Low-Income Community Settlements (MBR) (Study in Kotakinabalu, Malaysia and Bandung Regency, Indonesia): In Malaysia's Kotakinabalu, the cooperation between the Indonesian government and Malaysia was marked by the issuance of a Joint Regulation, a Joint Regulation that was implemented, which had not been implemented yet, and made technical guidelines, and then established interactions with the Malaysian government. Relationships are already good, sports friendship programs, mobility programs in Malaysian schools, good relationships, interacting and interconnected, so that the Malaysian government sees the existence of important Indonesian schools. The movement of the Indonesian government for non-farmers has not received permission from the Malaysian government, in the agreement with the CLC only CLC was built in the cultivation area, not in the city in general, so that if it has not been regulated, it has no legality. In Bandung Indonesia Regency, the formation of a coordination team at the sub-district level is a form of bureaucratic approach. Bureaucracy is adopted because with this approach it is easier to obtain various supporting factors, both energy, facilities and funds. However, this approach will be more successful if combined with other approaches.

### ***The Characteristics of The Implementation Agencies***

Regional Apparatus or Regional Apparatus Organization (OPD) is an organization or institution in the Regional Government which is responsible to the Regional Head in the context of administering the government in the region. Regional apparatus is formed by each Region based on consideration of the characteristics, potential, and needs of the Region. The main basis for the organization of regional apparatuses in the form of an organization is the existence of government affairs which become the authority of the region, which consists of compulsory and optional affairs, but does not mean that every handling of government affairs must be formed into a separate organization. The formation of regional apparatus is solely based on rational considerations to carry out government affairs which become the authority of the region effectively and efficiently.

The performance of policy implementation will be greatly influenced by the right characteristics and matches with the implementing agencies. This relates to the policy context that will be implemented in several policies that are required to implement strict and disciplined policies. In other contexts a democratic and persuasive



implementing agent is needed. In addition, the area coverage is an important consideration in determining the policy implementing agent.

According to Van Meter and Van Horn, many factors are included in the model components. Many characteristics of administrative institutions have been identified that affect policy performance. Ripley et al. (1973), for example, speak of bureaucratic structures as people with "recurring characteristics, norms, and patterns of relationships that have either potential or actual relationships for what policy is doing." Like Ripley, we see this component as consisting of both features formal organizational structuring and informal attributes of personnel, characteristics that might be related to the capacity of the organization to implement policies, namely the competence and number of staff of an agency; the level of hierarchical control of subunit decisions and processes within implementing agencies; political resources of an institution; organizational vitality; degree of "openness" of communication in an organization; the relationship between formal and informal institutions with policy making.

Based on an analysis of the discussion of the characteristics of the implementation agencies, in the aspects of Implementing the 9-Year Compulsory Education for Indonesian Citizenship (WNI) Policy in Low-Income Community Settlement Areas (MBR) (Study in Kotakinabalu, Malaysia and Bandung Regency, Indonesia): In Kotakinabalu Malaysia, the structure in terms of government structure and operational structure, the organizational structure of SIKK has shown formal legal and relationships between individuals and groups / organizational units to achieve overall organizational goals. However, although legally there are no formal problems, there is no synchronization between sections within the structure in implementing the 9-Year Compulsory Education Policy for Indonesian Citizens (WNI) in the Low-Income Community Settlement Area (MBR) in Kota Kinabalu. The implementation of the curriculum went smoothly, which was an obstacle CLC lacked in understanding the basis for implementing the curriculum. In Bandung Regency Indonesia, 9-year basic education is required to involve all schools in the success of this program. In realizing the compulsory education program, every child is required to attend basic education, in addition to that all costs relating to basic education are borne by the government. This has become one form of implementation of basic education that is compulsory for every child. Admission of new students as part of the implementation of 9-year basic education involving elementary schools (SD) and junior high schools (SMP), often becomes discriminatory practices by unscrupulous parties towards the prospective new student school. There are still levies in accepting new students for some students who are less able, difficult to reach economically. This of course is one form of discrimination for poor students in accessing compulsory and free basic education.

### ***The Economic, Social and Political Environment***

The thing that needs to be considered in evaluating the performance of policy implementation is the extent to which the external environment has contributed to the success of public policy. Non-conducive social, economic and political environment can be a source of problems from the failure of policy implementation performance. Therefore, efforts to implement policies require conducive external environmental conditions. Public support for a policy. Policies that provide incentives are usually

easy to get public support. Conversely, policies that are dis-incentive lack public support.

Based on an analysis of the discussion about The economic, social and political environment in the aspects of Implementing the 9-Year Compulsory Education Basic Education Policy for Indonesian Citizens (WNI) in Low-Income Community Settlements (MBR) (Study in Kotakinabalu, Malaysia and Bandung Regency, Indonesia): In Malaysia's Kotakinabalu there is a sarcastic, even more concerned, infrastructure built by the community, made of plywood; schools do not yet have four-wheeled vehicles for operations; CLC Hanim has moved six times, during its establishment, CLC Hanim stood alone, did not have a permit, while the students were already busy, CLC Hanim used the house for teaching and learning activities; CLC must not own Malaysian government-owned land, managers in the fields only provide. In Bandung Regency of Indonesia, the Government has not been optimal in carrying out its obligations in the development of education properly. This can be seen, among others: the low allocation of the regional budget and the attention of the bureaucrats in the education sector. The main cause of the low participation is the lack of optimal understanding of the duties and responsibilities in the administration of education, so many tasks and responsibilities have not been carried out properly.

### ***The Disposition or Response of The Implementers***

One of the factors that influence the effectiveness of policy implementation is the attitude of the implementor. If the implementor agrees with the contents of the policy, the implementor will do it happily, but if their views differ from the policy makers, the implementation process will experience many problems. Implementers may understand the aims and objectives of the program but often fail to implement the program correctly because they reject the goals contained therein so that it stealthily diverts and avoids policy implementation. In addition, the support of implementing officials is needed in achieving the policy objectives.

The attitude of acceptance or rejection of policy implementing agencies greatly influences the success or failure of public policy implementation. This is very possible because the policy implemented is not the result of a formulation that is very familiar with the problems and perceived problems. But public policy is usually the very nature of decision makers not knowing even unable to touch the needs, desires or problems that must be resolved. The attitude of the implementers will cause real obstacles to policy implementation if the existing personnel do not implement the policies desired by high-ranking officials. Therefore, the selection and appointment of policy implementation personnel must be people who are dedicated to the policies that have been set.

Tendencies or dispositions are one of the factors that have important consequences for effective policy implementation. If the implementers have a positive tendency or attitude or support for the implementation of the policy, there is a high possibility that the policy implementation will be carried out in accordance with the initial decision. And vice versa, if the implementers are negative or reject the implementation of the policy due to conflicts of interest, the implementation of the policy will face serious obstacles.

Based on the analysis of the discussion about the disposition or response of the implementers in aspects of the Implementation of the 9-Year Compulsory Education Basic Education Policy for Indonesian Citizens (WNI) in Low-Income Community Settlement Areas (MBR) (Study in Kotakinabalu, Malaysia and Bandung Regency, Indonesia): In Malaysia's Kotakinabalu, teacher builders and local teachers are recruited by GTK with the majority of local teachers still having high school graduates, there are some undergraduate graduates, but have never been given basic potential knowledge about teacher training; Among Bina Teachers, Local Teachers, Pamong Teachers, there are also classes, occurring from representatives, who have already made reports, because some teachers, teachers are not like those sent by Jakarta, there are still ego-centric, with the style of teaching at the hit system, come the teacher Bina from Jakarta has left that style, conveying that it is not good, differences in salary and egocentricity are a problem among teachers. In Bandung regency, Indonesia, the fulfillment of the right to basic education, where in terms of the quality of education that cannot be separated from the implementation of basic education for children, where indicators of the fulfillment of the right to education are learning methods between teachers and students that have not been implemented optimally illustrating that the implementation of 9-year basic education in Bandung Indonesia there are still shortcomings in its implementation.

## **5. Conclusion**

Based on the results of the analysis, that there are six primary factors that determine the Implementation of the 9-Year Compulsory Education for Indonesian Citizenship (WNI) Policy in Low-Income Community Settlements (MBR) (Study in Kotakinabalu, Malaysia and Bandung Regency, Indonesia), namely: 1) Policy standards and objectives, 2) The resources and threats made available, 3) The quality of inter-organizational relationships, 4) The characteristics of the implementation agencies, 5) The economic, social and political environment and 6) The disposition or response of the implementers.

Recommendations from the results of the research analysis are as follows: 1) increasing the stages of the HR development program by adding the stages of Technical Guidance, so that it will be more beneficial for increasing the capacity of HR in Implementing the 9-Year Compulsory Basic Education Policy for Indonesian Citizens (WNI) in Community Settlement Areas Low-income (MBR) both in Kotakinabalu, Malaysia and Bandung Regency, Indonesia; 2) In the Implementation of the 9-Year Compulsory Basic Education Policy for Indonesian Citizens (WNI) in the Low-Income Community Settlement Area (MBR) in Kotakinabalu, Malaysia is given special treatment in terms of implementing the 9-year compulsory basic education.

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***Level of Content Knowledge and Critical Thinking Skills of Senior High School STEM Students in Disaster Readiness and Risk Reduction***

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**Abstract**

Disasters are sudden disruptive event which affect the functioning of a community in utilizing its own resources. This make disaster readiness and risk reduction a current trend in science teaching to match the needs to the fast-paced advancements which will provide many social benefits. This descriptive research study determined the level of content knowledge and critical thinking skills of Senior High School STEM students in Disaster Readiness and Risk Reduction (DRRR), their notable experiences, values and attitudes developed among the schools in Albay, Philippines based from their political subdivisions and topographical locations. It was concluded that the level of content knowledge of the students in DRRR before the lessons were in low mastery level while urban lowland schools were in near mastery level. For the level of critical thinking skills, all schools were in low mastery level. After the lessons, the level of content knowledge of the students from all schools significantly increased wherein, they were already in the mastery level except the urban lowland schools with full mastery level. The level of critical thinking skills of all the schools significantly increased from low mastery to mastery level. Students developed a sense of awareness with regards to the DRRR concepts which could be associated to the student's experiences. Positive values and attitudes were also developed after the conduct of the lessons. All of these were supported with percentage scores in the tests, ANOVA, tukey test, paired T-test, student journals, teachers' observations and documentations.

Keywords: Biology Education, Content Knowledge and Critical Thinking Skills of Senior High School STEM Students, Disaster Readiness and Risk Reduction, Descriptive Research, Philippines/Asia

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## **Introduction**

There is an increasing knowledge that due to human activities, environmental factors such as volcanoes, natural processes and natural hazards are becoming disastrous events (DepEd, 2015). The needs of the people from the affected area such as relief operations, evacuation centers, proper sanitation, water supply, health assistance, a permanent monitory and warning systems to assess natural disasters in real time, 24 hours a day were established by both concerned government and non-government offices. Aside from those basic needs, according to the Volcanic Disaster Assistant Program (VDAP) established by the United States Agency for International Development (USAID) in partnership with the US Geological Survey (USGS); the Disaster Readiness and Risk Reduction (DRRR) education maybe the most feasible way to reduce the hazard. According to the DepEd K-12 curriculum, the Philippines is frequently cited as among the top countries most at risk to disasters. While disasters can arise from manmade sources, the most inevitable ones come from natural phenomena, even without scientific scrutiny. Every Filipino is familiar with the impact of typhoons, earthquakes, volcanic eruptions and fires to everyday life and to national development. This makes learning about disaster development aligned with everyone's interests. This will serve as an opportunity to make DRRR as a subject matter relevant to the lives of the people especially to the students even if studying disasters are part of learning the Sciences.

This study focused on determining the level of content knowledge and critical thinking skills of Senior High School STEM students in DRRR. It utilized researcher-made pre-test and posttest, evaluation instrument, observation guide and students' journals with guide questions to extrapolate the needed themes. Through the development of content knowledge, critical thinking skills, values and attitudes of students towards DRRR, students become more aware, prepared and resilient to the different natural hazards. This may also help teachers to improve and develop more teaching strategies to effectively impart the objectives and principles in teaching the subject matter such as reducing the damage caused by natural hazards, guiding and motivating students to seek answers or solutions from the given problem or contextual situation and simplifying knowledge or ideas about disaster readiness and risk reduction, allowing students to work with others and learn on their own, combining prior knowledge with new, and encouraging them to connect with the real world. Common scenarios become the basis for new information and encourage the learners to extend what they know.

This study will be beneficial to public high schools in Albay province both in urban and rural areas who offer DRRR as a core subject for Senior High School STEM students in order for them to learn how to be prepared in natural catastrophic events such as earthquake and volcanic eruption and realize the importance of the environment as a source of living.

## **Research Method**

This study is a descriptive research which focused on determining the level of content knowledge and critical thinking skills of Senior High School STEM students in Disaster Readiness and Risk Reduction (DRRR). Both qualitative and quantitative methods were both utilized in descriptive research to generate information on the

status of a phenomenon to describe “what exists” with respect to the variables or conditions in a situation (Asaad et.al 2004). The goal of this type of research is to cast light on current issues or problems through a process of data collection that enables them to describe the situation more completely (Fox et.al, 2007). This method was also utilized to determine the notable experiences of the students during the lessons and the values and attitudes developed after the conduct of the lessons in DRRR.

The primary sources of data for this study were the results of the pretest/posttest of content knowledge test and critical thinking test from the 156 students from Rural-Coastal School, Rural-Upland 1 School, Rural-Upland 2 School, Urban-Coastal School, Urban-Lowland 1 School and Urban-Lowland 2 School as the respondent schools. Likewise, observation of teacher-observers, activity outputs, videos, photos and reflective journals of students were taken account for the notable experiences and developed values and attitudes.

Upon completing the research proposal, the teacher-researcher sent communication letters to the offices of the Schools Division Superintendents in the four division offices in Albay Province namely Tabaco Schools Division Office, Ligao Schools Division Office, Albay Schools Division Offices and Legazpi Schools Division Offices to access the lists of public high schools including the name of its school heads and principals in order to identify the possible respondent schools in which the researcher will implement the study (See Appendix F). There were 16 possible respondent schools identified in the said divisions. Based from the scope and delimitation of the researcher’s study, only six schools were selected based on the political subdivisions (urban or rural), the land elevations (upland, lowland and coastal area) in which the data came from the Municipal or City Planning and Development Office where the schools from the different divisions offering STEM strands are located. There were three Rural-Upland Schools coming from Buga, Libon Albay, Banquerohan, Legazpi City and San Antonio, Tabaco City, one Rural-Lowland School coming from Salvacion, Daraga and one Rural-Coastal School coming from Malilipot, Albay. There was no Urban-Upland school offering STEM strand identified but there were nine schools identified coming from Daraga, Albay, Polangui, Albay, Sto. Domingo Albay, Guinobatan, Albay, Oro Site-Magallanes, Legazpi City, Rawis, Legazpi City, Bitano, Legazpi City, Guilid, Ligao City and Tuburan, Ligao City.

The selected respondent schools are: (1) Rural-Coastal School (RC) with 15 Grade 11 STEM Students coming from Albay Division situated at approximately 11 meters or 36 feet above mean sea level (2) Rural-Upland School 1 (RU1) with 20 Grade 11 STEM Students coming from Tabaco City Division situated at approximately 400 meters or 1312 feet above sea level. (3) Rural-Upland School 2 (RU2) with 19 Grade 11 STEM Students coming from Legazpi City Division situated at approximately 76 meters or 249 feet above sea level (4) Urban-Coastal School (UC) with 30 Grade 11 STEM Students coming from Tabaco City Division situated at approximately below 10 meters or 32 feet above sea level (5) Urban-Lowland School 1 (UL1) with 37 Grade 11 STEM Students from Legazpi City Division situated at 4.8 meters or 15.7 feet above mean sea level and (6) Urban-Lowland School 2 (UL2) with 35 Grade 11 STEM Students coming from Ligao City Division situated at

approximately 48.2 meters or 158.1 feet above sea level. Complete enumeration or one intact Grade 11- STEM classes per school were selected as respondents.

According to the data collected from the Albay Provincial Disaster Risk Reduction Management Council (PDRRMC), to assist the local government's strategic decision making, the Philippine Institute of Volcanology and Seismology (PHIVOLCS) published updated hazard maps to help understand the risks related to the eruption. Malilipot, Ligao City, Tabaco City, and Legazpi City were considered at the six-km danger zone. Monsoon rains can exacerbate the danger to residents by causing flooding, landslides and lahar (mudflows), adding to the concerns of communities surrounding the volcano. Particularly the location of the respondent schools are considered to be prone to volcanic hazards (lahar, ash fall, lava flow and pyroclastic flow) floods and landslides. The two schools located in Coastal Area were considered to be prone to tsunami hazard but there was no record of occurrence yet.

Since 14 January 2018, Mayon Volcano had continued to show high levels of unrest resulting from repeated hazardous eruptions that displaced thousands of residents from the danger zones which implied that the people from Malilipot, Ligao, Tabaco and Legazpi City were involved. Through determining the level of content knowledge and critical thinking skills of the students, the researcher could assess how will the students be part of the community, could mitigate and minimize the loss of lives and properties associated with this event.

After the consolidation of the prior data, the researcher immediately sent letters of request to conduct the study in all the schools addressed to their respective principals (See Appendix G).

The teacher-researcher utilized the K to 12 curriculum guide for Disaster Readiness and Risk Reduction to develop the pre/posttest relevant to the learning competencies applicable for measuring the level of content knowledge and critical thinking skills of SHS-STEM students before and after the conduct of the lessons.

A request letter was sent to the experts who evaluated and validated the researcher-made pre/posttest, observation guide/checklist and students' journal. There were five validators per instruments and were provided by the instruments and validation forms with the corresponding content area which were the content knowledge and critical thinking skills. After the submission of the accomplished instruments, the raw data were transformed into weighted means with adjectival rating which was the basis for making the statistical tables for analysis and interpretation. After the validation of the instruments, all comments and suggestions that were made by the evaluators were used by the researcher for the instruments' validity and reliability. All experts taught DRRR or assigned as DRRR Coordinator in their respective schools.



Weighted Mean was used to determine the average views of experts on the test items and further interpreted using the scale below:

Description	Scale
Needs Improvement	- 1.00-1.49
Moderately Satisfactory	- 1.50 to 2.49
Satisfactory	- 2.50 to 3.49
Very Satisfactory	- 3.50 to 4.49
Outstanding	- 4.50 to 5.00

After the approval of the request to the Schools Division Superintendent in the Schools Division Offices of Albay, Tabaco City, Legazpi City and Ligao City and respective principals, the researcher administered a pre-test, conducted the observation and gave the posttest. Before the conduct of the study upon approval, the researcher ensures that there were parents' consent form given (See Appendix H) to the respondents of the study which states that they allow their children to participate in the research study and if they are willing that their child will be taken pictures and videos during their DRRR classes.

The three observer-teachers (a principal or an assistant principal, a master teacher or a subject group head and a head teacher in Science) among the schools observed the one intact Grade 11 STEM classes all throughout their DRRR subject for the third quarter. The observation among the schools started from November 2018 until January 2019 and the DRRR teachers discussed the lessons or topics: (1) Introduction to Disaster Concepts (2) Concepts of Exposure and Vulnerability (3) Identifying Exposed elements (4) Introduction to different types of Hazards (5) Potential Earthquake hazards (6) Tsunami Signs (7) Earthquake Hazard Maps (8) Precautionary and Safety Measures for Earthquakes (9) Different Types of Volcanic Hazards (10) Volcano hazard Maps (11) Precautionary and safety Measures for Volcanic Eruption. The lessons presented by the teachers addressed the content standards identified by in DRRR curriculum guide as a subject matter which helped the students apply ideal responses to prevent disasters towards the end of the subject and will focus on the applications of which to the community and the Philippine society.

The students wrote to their journals as their task right after every lesson. This became the basis of the researcher in identifying the effect of the lessons in the content knowledge, critical thinking skills, notable experiences and values and attitudes which does not affect their grades. The gathered data in the students' written reflections on their journal serve as qualitative data to support the findings on the effect of the inquiry-based lessons on the students' content knowledge, critical thinking skills, notable experiences values and attitudes.

### **Statistical Treatment of Data**

To provide reliable answers to the problems cited, the data gathered were subjected to statistical treatment.

Weighted Mean was used to average the five-point scale ratings of experts in evaluating the content knowledge pre/posttest, critical thinking skills pre/posttest, observation guide and students' writing journal as instruments in the study.

One-way ANOVA was used to determine the level of content knowledge and critical thinking skills among the students before the conduct of lessons.

Two- way ANOVA was used to determine the level of content knowledge and critical thinking skills among the students after the conduct of lessons.

Tukey test was used to determine the significant differences among the schools in terms of the level of content knowledge and critical thinking skills before and after the conduct of lessons.

Paired t-test was used to determine the significant differences of pre-test and post test results of content knowledge and critical thinking skills of the class.

Kuder-Richardson Formula 21 was used to test the reliability of the pre-test. This can be thought of as a measure of the extent to which the items on a test provide consistent information about students' level of knowledge of the content assessed by the test.

Percentage scores were used in profiling the scores of the students in the multiple choice for content knowledge. General percentage was also utilized to determine the grades of the pretest and posttest.

## **Conclusions**

Based on the analysis of data gathered in the study, the following findings are derived:

1. The level of content knowledge of senior high school students before the conduct of lessons in Rural and Urban schools had a general percentage of 49.99 which indicated a low mastery level in all the content or topics and with a p-value of 0.01 which means that there was a significant difference among the schools at alpha level 0.05. Using the Tukey test, it was found out that there were significant differences among the schools particularly in Rural-Coastal School and Urban-Lowland School 2, Rural-Upland School 2 and Urban-Lowland School 2 , Urban-Coastal School and Urban-Lowland School 2 and through paired t-test it was significantly noted that Urban-Lowland School 2 had the highest percentage scores with regards to the twelve (12) contents: (1) Introduction to Disaster Concepts, (2) Concepts of Exposure and Vulnerability (3)Identifying Exposed elements (4) Introduction to different types of Hazards (5) Potential Earthquake hazards 1 (6)Tsunami Signs (7)Potential Earthquake hazards 2 (8) Earthquake Hazard Maps (9) Precautionary and Safety Measures for Earthquakes (10)Different Types of Volcanic Hazards (11) Volcano hazard Maps and (12) Precautionary and safety Measures for Volcanic Eruption with corresponding learning competencies.

The level critical thinking skills of senior high school students in Rural and Urban schools had a general percentage of 31.81 which indicated a low mastery level in all the content or topics and with a p-value of 0.00 which means that there was a significant difference among the school at alpha level 0.05. Using the Tukey test, it was found out that there were significant differences among the schools in urban and rural schools particularly in rural-coastal school to urban-coastal school, rural-coastal

school to urban-lowland school 1, rural-coastal school to urban-lowland school 2, rural-upland school 1 to urban-coastal school, rural-upland school 1 to urban-lowland school 1, rural-upland school 1 to urban-lowland school 2, rural-upland school 2 to urban-coastal school, rural-upland school 2 to urban-lowland schools. It was significantly noted that the urban schools had higher percentage scores than rural schools.

2. In terms of the notable experiences of the students, the raising of interest, awareness and mostly the positive behavior among students with regards to the DRRR Concepts were significantly noted, specifically: (1) The students' understanding from rural-coastal school were enhanced through asking questions regarding the key concepts connected to the lessons and appeared to understand the lesson resulting them to become aware with the concepts presented on the lessons and collaboratively work together to solve specific problems that was associated to the lessons, (2) Students rural-upland school 1 were also observed as engaged throughout the lessons and appeared to understand the concepts presented. It was also shown the students acted with honesty, transparency and responsibility towards the lessons and reviewed their own opinions and beliefs. (3) The students from rural-upland school 2 appeared to rely on their own thinking and gained interest on the lessons being discussed by the teacher (4) The students from urban-coastal school related the concept of DRRR into real life situations and shared the knowledge gained based from the discussions in DRRR class. They solved problems by sharing information to their classmates. They performed different classroom activities which increased their participation to classroom lessons. (5) The students from the urban-lowland school 1 became more aware with DRRR concepts and created new set of ideas based from the lessons through creative thinking; and (6) Students from urban-lowland school 2 planned, acted and responded to the lessons with an eye to the future and become more active into classroom discussion.

3. The level of content knowledge of the students after the lesson in the content knowledge test was 84.15 which shows that the students already had near full mastery level of the content. To test the significant difference of this percentage gain, an alpha of 0.05 was used, lower p value than alpha means that the performance had significant difference while higher p value than alpha indicates no significant difference. The p value computed from pretest and posttest is 0.00. This implied that there was a significant difference between the pretest and posttest or the location of the schools which showed that the students' mastery level in content knowledge raised from low mastery level to near full mastery level but it was significantly noted also that there was no significant difference among the interaction of pre and posttest and the locations of the schools. Using the Tukey test, it was found out that rural-coastal school was significantly different to the urban-lowland Schools wherein it was noted using the paired t-test that the urban -lowland schools gained higher average percentage scores compared to other schools while the rural schools gained the lowest average percentage scores after the lessons but all the rural and urban schools had significant increases on the level of content knowledge after the conduct of the lessons.

The level of critical thinking skills after the lesson showed that the students already had near to mastery level of the critical thinking skills. To test the significant difference of this percentage gain, an alpha of 0.05 was used, the p value computed

from pretest and posttest is 0.00. This implied that there was a significant difference between the pretest and posttest or the location of the schools which showed that the students' mastery level in content knowledge raised from low mastery level to near full mastery level. Using the Tukey test, it was found out that all the rural schools had significant differences among all the urban schools. Using the paired t-test, it was noted that the urban schools gained higher average percentage scores compared to rural schools but all of the schools had significant increases in the level of critical thinking skills after the lesson.

4. The values and attitudes developed after the lessons of the students among the schools were the students gained awareness towards the importance of DRRR concepts and they do not think only about themselves but the students showed empathy to other people, manifested determination in doing appropriate precautionary measures when a disaster strikes, showed positive attitude such as determined, became responsible and prepared citizens in facing disasters. They loved also to have knowledge with regards to DRRR concepts. Students became hopeful and confident to apply their learned DRRR concepts into real life situations.

Based on the findings, the following conclusions were made:

1. The level of content knowledge among the students in DRRR before the lessons from rural schools and urban coastal school were in low mastery level but urban lowland schools were already in near mastery level and it was significantly noted that the urban lowland 2 school had the highest average percentage score among the schools. For the level of critical thinking skills before the conduct of the lessons that all the rural and urban schools were in low mastery level and it was significantly noted that the urban lowland 2 school had the highest average percentage score among the schools.

2. Students developed sense of awareness with regards to the DRRR concepts which can be associated based from the student's experiences.

3. The level of content knowledge and critical thinking skills of the students after the lesson from rural and upland schools gained significant increases wherein all the schools were already in the mastery level except with the urban-lowland 1 school with near full mastery level and urban-lowland 2 school with full mastery level.

4. Positive values and attitudes were developed after the conduct of the lessons

Based on the conclusions, the following recommendations were made:

1. Seminars, workshops and trainings, related to DRRR may be proposed to help the students enhance their level of content knowledge and critical thinking skills.

2. Teachers may incorporate technology with active learning approach to further improve the level of content knowledge and critical thinking of students in DRRR.

3. Further studies may be conducted to increase the level of content knowledge among the students from the rural schools, improve their critical thinking skills and values and attitudes towards DRRR concepts.

4. Similar study may be conducted to determine if the level of content knowledge and critical thinking skills of the students will affect their performance in the different field of Science and other subjects.

5. Teachers may develop lessons and interventions with active learning approach to further improve effective learning behaviors towards learning DRRR Concepts.

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