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Stories on Youtube: Can this Be an Effective Learning Tool to Improve Listening and Transfer of Skills?

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Abstract
Use of online learning opportunities among language teachers and learners has become one of the commonly utilized tools as they provide effective means (convenient, accessible, authentic and sometimes free) to learn a foreign language. Research shows that online learning opportunities, particularly YouTube – a popular video sharing and viewing platform creates more meaningful and independent learning environment (e.g. Alhamami, 2013; Benson, 2015; Lacy, 2008), compared to other conventional way of learning a foreign language. This research reports on how two English language lecturers at a Mongolian University used stories available free of charge on YouTube to help students improve their listening and transfer of skills such as pronunciation, reading comprehension, note taking and speaking. This research project was initiated because of an increased interest to utilize YouTube in learning English from students studying at the University. The two lecturers took the students' desire on board and developed learning tasks for students to do independently outside the classroom (hereinafter self-independent work) using stories on YouTube. The fact that students were already using YouTube to learn English outside the curriculum was a positive start to the research project. The research project was implemented for a period of one year among first year English as a foreign language (EFL) students. The study results show that when learning content is easily accessible (ability to listen outside the classroom, on their phones, when travelling and walking etc.) and when there is a genuine desire to listen to an interesting story of their choice, students are more likely to effectively work on the learning tasks associated with the stories which in turn helped them to develop their language skills efficiently. However, limited access to WiFi or Internet, not seeking available support to execute the task were issues to develop the skills and independent learning style, despite a strong desire to learn English using YouTube.

Keywords: Online Learning, Stories on Youtube, Improve Listening Skills, Transfer of Skills

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Introduction

"Globalization has changed the conditions under which foreign languages are taught, learned and used" (Kramsch, 2014, p. 302). Many language learners and teachers nowadays widely use YouTube as a learning and teaching tool. Within the context of using YouTube for language learning and teaching purposes, researchers describe it as a "worldwide literacy practice environment" that is informal and convenient for English language learners and teachers (Koutsogiannis & Mitsikopoulou, 2004, p. 83). Kramsch (2014) points out that a frequent use of online resources has become a norm and its use especially YouTube is significantly increasing in teaching and learning contexts. Benson (2015) adds that such environment creates a real-life immersion to language including access to English speaking background people, English texts and language exchange. Although Internet provides rich environment for language teachers and learners, there is a lack of rich evidence in literature that captures how this impacts on developing EFL students listening and transfer of skills including pronunciation, reading comprehension, note taking and speaking skills. This research project aims to add to this research direction by investigating EFL students' ability to develop their listening skills (primary goal) using stories available on YouTube as their self-independent work project which is part of their curriculum (but executed outside the curriculum), and assessed and marked. The study is also interested in finding out if the development in listening skills transferrable to other skill areas (secondary goal).

Literature review

EFL teachers often have difficulties using multimedia and technology to motivate students to learn English language in and outside the language classrooms due to lack of access skills and funding. YouTube makes both teachers and learners' job easier by being readily and freely available on the Internet. YouTube, a video hosting platform that started in 2005 is viewed billions of times every day around the world. Among a vast array of diverse content, YouTube offers a plethora of resources for educational purposes. However, substantive scholarly research documenting use of YouTube in EFL context is sparse. A study that looks at the use of video clips in a college EFL classrooms provided reasons why YouTube should be used in language learning and suggested teachers to incorporate videos in their classrooms by selecting YouTube content according to their purpose (Berk, 2009). Watkins and Wilkins (2011) highlight that teachers and students can literally do any exercises that they normally do in their classrooms using YouTube such as examining speech modulation, intonation shifts, grammatical elements, conversational nuances and many other topics.

Another study that examined the effectiveness of YouTube as a teaching tool to enhance EFL students on their listening comprehension skills found that significant effect on the part of the experimental group subjects' listening comprehension skills (Alqahtani, 2015). The differences found in the listening comprehension scores of the pre- and post-tests between the two groups, provided evidence of the significant effect of YouTube on the performance of the experimental group. These positive results implied that the use of YouTube videos provided an authentic native speaker setting that is beneficial to EFL learners. It is also regarded as a motivating factor that

encouraged EFL students to develop their listening comprehension skills and gained a deeper understanding of the foreign language (Alqahtani, 2015).

Watkins and Wilkins (2011) in their research paper entitled *Using YouTube in the EFL Classroom* point out that YouTube provides a real-life exposure to English language and promotes independent learning style. When students browse YouTube videos and listen to English media (Watkins & Wilkins. 2011), they are being immersed in English authentic language learning environment that largely lacks in EFL contexts (Johnson & Swain, 1997). This then increases second language (L2) input which in turn positively contributes to language acquisition process (Mangubhai, 2005). More positive impacts of YouTube have been documented in the literature such as it increases learners' ability to connect with the foreign language they are learning (Wang, 2005), and helps students to learn independently and potentially promotes autonomous learning habits (Leung, 2004). Benson and Voller (1997) describe learner autonomy as a mixture of five ideas: students are primarily responsible for their language development; students should develop transferable learning skills; students should be provided with opportunities to learn the language independently; students choose their path for learning; and students are interested in self-guided education.

An interesting question that was posed in Watkins and Wilkins' 2011 (p, 114) paper: "who should be more responsible for the direction taken in learning a language: the teacher or the student?" Their response was if teacher's focus is to develop students' learner autonomy, YouTube can be used to achieve this. Watkins and Wilkins' (2011) take on the use of YouTube and development learner autonomy formulated based on Benson and Voller's (1997) five idea of learner autonomy, is useful to this study. First, learners can identify their language limitations and areas for improvement while viewing YouTube videos in their own time while. This then provides possibilities for learners to further develop their language skills by viewing/listening the video of their choice as many times as they wish. Finally, given YouTube provides such learning opportunity for learning, self-guided follow up examination or in the context of this study comprehension tasks can be incorporated.

Improving listening skill

It is useful to consider what listening skill is. O'Malley and Chamot's defined that "listening comprehension is an active and conscious process in which the listener constructs meaning by using cues from contextual information and from existing knowledge, while relying upon multiple strategic resources to fulfil the task requirement" (1989, p. 19). As the definition shows, listening is an active process of understanding and constructing meaning from what learners are listening. In this study, students had to listen to the stories and read the captions at the same time. The primary goal for students was to listen and understand the stories with the aid from the captions and pictures. Therefore, reading and viewing were supplementary to the development of the listening skills. The benefit of listening to stories freely available on YouTube is that students could listen to the stories as many times as they liked. However, telling students to 'listen and repeat' if needed is not enough. To successfully learn a language, students need to know: what happens when they listen? and how listening skills help to improve other skills such as pronunciation, reading and vocabulary growth or speaking?

This means that teachers need to increase students' awareness on cognitive processes of listening and mindful listening. There are two cognitive processes: bottom-up (data-driven) and top-down (conceptually driven) (Nunan, 1998). The bottom-up processing involves constructing meaning from the smallest unit of the spoken language to the largest one in a linear mode (Nunan, 1998). The bottom-up processing involves:

- decoding several sounds to form words.
- Then words are linked to form phrases, which make up sentences.
- These sentences build a complete text.
- The grammatical relationships (grammar elements, stress, rhythm, and intonation) also contribute to this data-driven processing (van Duzer, 1997). For example,

Learners can be trained to perform this processing (Nunan, 1998). The top-down processing is about interpreting meaning as intended by the speakers by means of schemata or structures of knowledge in the mind (Nunan, 1998). This emphasises background knowledge already possessed by the learners; and prior knowledge may facilitate their attempt to grasp the incoming information by relating the familiar with the new one. It is essential that learners are accustomed to performing this processing, usually by extracting the gist of the exchange they listen to. This again shows that teaching/discussion about the cognitive processes of listening to learners is essential to successfully develop listening skills and language learning for that matter. Griffiths (2003) points out that language learners should practice noticing language use when listening to native speakers.

Therefore, the concept that was useful to inform the development of this study and listening skills (other transferable skills) was 'mindful repetition' (Weiler, 2017) (see Figure 1). Weiler points out that key to learning is to be engaged in what we are doing. It is about being present to what one is learning.

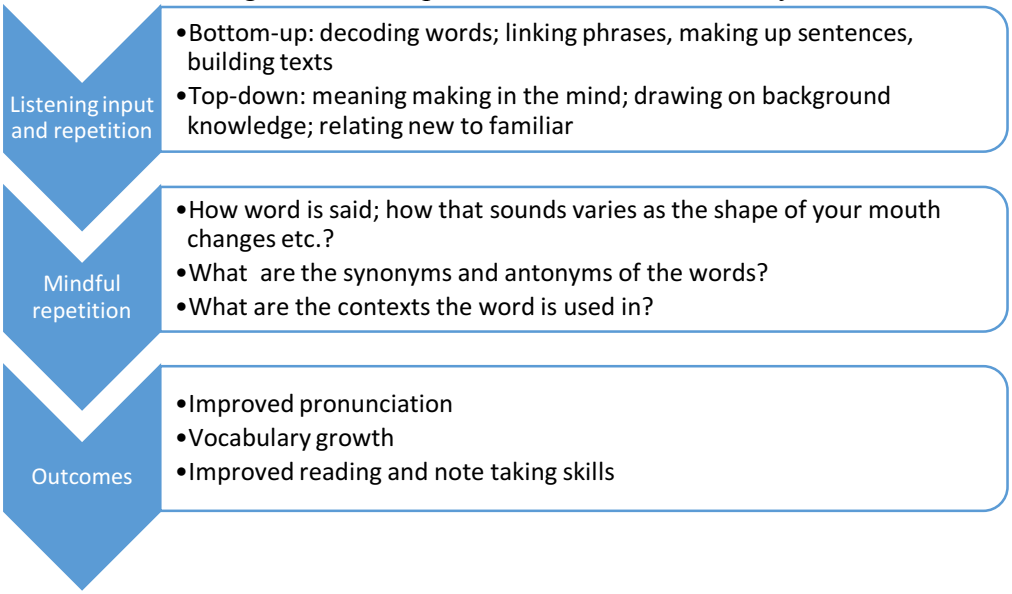
Figure 1: Weiler's continuum to mindful repetition

On this diagram, at one end of the spectrum there is 'repetition' commonly used word in teaching and literature. And at the other end, there is something called "mindful" repetition. Weiler says that learners' practice sits somewhere along that continuum. The first variety or repetition is where we believe that just by repeating, our practice or memory will improve. It works but when it is successful there are additional elements that language learners bring to what they may think as repetition. So, when this happens, "mindful repetition" happens. Mindful repetition is about having heightened awareness and noticing what you are doing consciously. Connecting to the mind and being engaged.

Conceptual framework of the study

Based on the cognitive processes of listening and the concept of 'mindful repetition', the following conceptual framework has been developed (see Figure 2).

Figure 2: Conceptual framework of the study



This shows that when students listen to an input (ie., a conversation) and repeat listening, cognitive process begins. They start from bottom up by decoding words; linking phrases, making up sentences, building texts then move on to top-down approach by meaning making in the mind; drawing on background knowledge; relating new to familiar.

As Weiler (2017) said, when people succeed in listening/learning, they engage in mindful repetition. This means they are aware of what is happening is their mind. What is working or what is not working? They ask questions actively: How word is said; how that sounds varies as the shape of your mouth changes?; What are the synonyms and antonyms of the words?; What are the contexts the word is used in?; What needs work on? Is something missing? Is the quality of the sound similar? Was the rhythm similar? etc. As a result of active mindful repetition, the outcome is usually positive. This study hoped to see improvement in students' listening skills, reading comprehension, note taking skill, and ability to retell stories. It also is interested how independent learning style is developed because of such learning.

The study

This study aimed to gain an insight into using YouTube stories to develop and improve listening skills (primary goal). Also, it looked at understanding the process of listening and its impact on language learning and transfer of skills such as reading, note taking and retelling of stories. In this study, a series of fifteen stories published in Eden Buttenshaw's YouTube channel (originally from English7level.com) was used. The YouTube channel provided opportunities for learners to learn English through stories. These stories were selected because students can look at the pictures and read the captions as they listen to the stories that are clearly spoken by native English speakers with well-balanced speed and tone. List of stories are shown in Table 1.

Table 1. Learn English through stories (Buttenshaw, 2017)

Stories	**Length**
1. Emma	3 hours 30 minutes
2. Ethan Frome	1 hour 43 minutes
3. Rebecca	3 hours 20 minutes
4. The enemy by Desmond Bagley	2 hours 50 minutes
5. About a boy	2 hours 35 minutes
6. The street lawyer	2 hour 5 minutes
7. The firm	2 hours 47 minutes
8. The Alchemist	2 hours 54 minutes
9. The Canterville ghost	31 minutes
10. The client	1 hour 50 minutes
11. Robinson Crusoe	1 hour
12. Remains of the day	4 hours
13. The stranger	55 minutes
14. One day	2 hours 30 minutes
15. Bridget jones's diary	2 hours 36 minutes

Initially, the stories seemed too long. But during the trial stage, teachers found out that once students are hooked in the unfolding of the story, they liked the fact that the stories were long. Before the commencement of self-independent work,

- teachers and students discussed what listening is and how it develops with the emphasis on conscious listening, meaning making and mindful repetition.
- teachers and students discussed how to use captions and pictures to aid their listening.
- students were familiarized with ways to take notes: notebooks, choice of note taking apps and mind mapping.
- students were familiarized with the follow up tasks that would be assessed and marked by the teachers (see **The study** section)
- students were encouraged to seek support from the teachers when needed.
- students were encouraged to listen to the stories at the University using the University Wi-Fi.

Sixty-eight English major students participated in this study. They were studying in their first year of University degree course. Students had one and a half month to spend on the self-independent work. This included listening to the story of choice and do follow up tasks. The follow up tasks that were assessed and marked consisted of retelling the story in front of the class and teachers. Students were allowed to retell the story looking at their notes. Students were instructed to take notes using only key words/phrases and drawing mind maps. They were not allowed to write full paragraphs and sentences from the YouTube video captions in their notes. The idea behind this was that when students look at the keywords and mind maps at later stage (during assessment time), the words and mind maps should trigger their memory and they can remember the story line (provided they learnt the words and also understood the story). Before the commencement of the retelling, students had to email their mind maps to the teachers but not the notes of the keywords. However, the notes were screened to ensure the instruction was followed.

Data collection and analysis

Data were collected using online survey called Survey Monkey (free of charge). This was used to collect data on the use of YouTube stories. Online survey is a convenient way to collect data from a large cohort answering the same questions (de Vaus, 1995) and it is one of the widely used survey methods (Walter, 2010). It is convenient in a sense that different types of data on different topics can be collected electronically from different respondents (Jansen, Corley & Jansen, 2007) in a short time and at little or no cost (Czaja & Blair, 2005).

The online survey was hosted on surveymonkey.com. The online survey link was sent to the students after the end of the one-and-a-half-month period. Students completed the surveys voluntarily before the final task and the respondents were anonymous which meant non-identifiable. Surveymonkey.com is a user-friendly tool that automatically analyses data itself. Respondent rate was very high –92%.

Students' marks awarded for their self –independent work was considered as data as they were used to see the relationship between marks awarded and results identified as a result of the online survey. Data analysis aimed to find meanings in data (Patton, 2012) or students' experiences with the tasks and their impact on developing listening, other transferable skills and also independent learning.

Results and discussion

Online survey results indicate that overall students enjoyed doing the self-independent work. They reported that the more they understood the stories the more they enjoyed listening to them. Some of the points mentioned were: stories were easily accessible which made it easy to just open and listen on the go on their phones; the sound of the narrator's voice was soothing and clear that this motivated them to pronounce words clearly; the captions aided understanding of the story lines; aided the spelling when note taking; and the pictures also aided understanding as they created context to the stories.

Students also found the ongoing support during the one-and-a-half-month period from the teachers was useful. Although there were not many, some students needed help with unpacking some sections of the content, asked questions about using mindful prepetition technique. It was difficult for them to continue listening to the story if they missed a section of the story. Other students sought help with their mind maps to check if they were on the right track. There were even some positive anecdotal comments from the students saying that active engagement with what they listened helped them to improve their listening and other skills "being present with these stories is very useful". However, there was an issue with not being able to listen to the story due to having a limited access to the Wi-Fi or Internet. Although they could listen to the stories at the University using University Wi-Fi, they did not seem to use this opportunity much.

Other survey questions identified that students noticed significant improvement in listening, pronunciation, reading comprehension, and some even reported speaking skills. Repeated mindful listening played a key role in improving those skills. There was no clear indication whether listening improved first then pronunciation or vice

versa. Or whether students reading comprehension improved first then listening skills. Regardless, it was clear from the data that mindful repetition technique was useful to develop those skills. Students seemed to approach differently to decode and unpack the stories. Some listened to the stories without reading the captions for the first time then the second or subsequent times, they listened and read at the same time which was "incredibly useful to understand" one student reported. Another student reported that reading captions first without even understanding the story was useful to a warm up as this exercise assisted the student to understand the story better the second time around "I first read and read. I was listening but I did not understand but still I read and read. Then after that I listened and read again, I understand the story well with dictionary".

Note taking and mind mapping were also reported useful to better understand the story "I listened to the story many times. First, I just listened. Then I listened and read the captions in front of my computer and took notes. Third, I listened, read, and looked at my notes to check my understanding. It was good because it was easy to write my mind map after". Students appeared to create their mind maps after they fully understood the stories by listening and reading several times, based on their notes of key words/phrases. They seemed to really enjoy creating the mind mapping exercise. One student wrote "when I write my mind map, I can see all stories in front of me". Another student reported "I am glad I did mind map because I can check my understanding and see my understanding on the paper in front of me". Several students created very colourful mind maps with pictures, although it was not the requirement, it was a sign of them enjoying working on the exercise.

All sixty-eight students successfully passed the self-independent work. 67% of the students were awarded higher marks ranging from 76 -96 and 33% of the students scored between 62-75. Compared to self-independent works in previous semesters, this time around the marks were significantly higher. This may be since students enjoyed listening to the stories, enjoyed doing follow up tasks and the fact that they were already using the YouTube made this task easier. It was found that higher scoring students created detailed but easy to follow mind maps. They also sought helps during the one-and-a-half-month period. Looking at their notes, it was found they used bottom up approach by decoding words and linking meaningful phrases. These assisted to retell the stories well. When they get stuck with words, they looked their notes up and continued retelling the stories. The detailed mind maps showed that the meaning making process happened in the mind which made the retelling easier for them with flow and continuity.

Higher scoring students were not looking at their notes as much which indicated that their vocabulary growth significantly increased which in turn may be attributed to their improvement in reading skills (reading of the captions). This shows that students did use mindful repetition technique, and this impacts positively on the development of a range of skills. As was explained by Weiler (2017), mindful repetition is about having heightened awareness and noticing what you are doing consciously - connecting to the mind and being engaged. The successful students must have been using this approach. Weiler (2017) points out that with the help of mindful repeated listening many learners maximise their chances of learning a language successfully (listening, vocabulary or reading skills). They have improved understanding and unfolding awareness of their learning (Weiler, 2017) including what is working, why

is it working; what is not working or why is it not working. This approach to learning increases learners' ability to connect with the foreign language they are learning (Wang, 2005), and helps students to learn independently and potentially promotes autonomous learning habits (Leung, 2004).

On the other hand, lower scoring students did not seek help from the teachers, their mind maps were largely unorganised as it was difficult to follow how the story was unfolding, and some were not able to recognises the key words/phrases that they wrote on their notes. This made it difficult for them to retell the stories successfully and fully. This shows that they may have been able to decode words, linked phrases to be able to retell stories but they may have not been able to successfully engage in meaning making process leading up to the final assessment. As was identified by Weiler (2017) listen and repeat technique has its limitations because it does not help students to know or be assured that success would be achieved (Weiler, 2017). This indicates why many learners struggle in their efforts to learn languages which may have been the case in these students' context.

However, it should be noted that in the final assessment it was found that almost all students' pronunciation skills markedly increased. This shows that mindful repetition and conscious listening exercises did in fact help language learners increase their pronunciation skills. When students listen to English media (Watkins & Wilkins. 2011) or in this case YouTube, they are being immersed in English authentic language learning environment (Johnson & Swain, 1997). Benson (2015) adds that such environment creates a real-life immersion to language including access to English speaking background people and English texts. The YouTube must have provided a great opportunity for the students to improve their pronunciation skills.

Finally, students made suggestions that incorporating YouTube stories into curriculum may be a way to motivate more students to learn English and develop language skills. However, the suggestions also included choosing shorter stories more appropriate to students' proficiency levels. This was because some students spent a lot of time looking up unknown words in the dictionary as they were not able to guess the meanings off the pictures or context.

Conclusions

The development of theoretical framework that guided the study throughout was very useful. This framework was not only used to inform the study but also used as a learning tool for students to understand the listening process and how this process transfer to other skills over time. Looking at the higher scoring students experiences with the task; listening was indeed an active process of understanding and constructing meaning from what learners are listening. When this is done well, transfer of skills happened in the background or at the same time even sometimes the students may have not been aware of this process. The successful students were able to "constructs meaning by using cues from contextual information and from existing knowledge, while relying upon multiple strategic resources to fulfil the task requirement" (O'Malley & Chamot,1989, p. 19). Therefore, helping students to develop language learning techniques before giving them the actual task, discussing how the learning process works and how listening and other skills improve, and also

providing support along the way greatly assists them to significantly improve their language skills and achieve higher marks.

The use of YouTube for the self-independent work/task which was described as "worldwide literacy practice environment" that is informal and convenient for English language learners and teachers (Koutsogiannis & Mitsikopoulou, 2004, p. 83) was a key contributing factor for the positive impacts mentioned above. It was difficult to draw a fine line between the development of listening skills and other transferrable skills such as improvement in pronunciation, reading skills, vocabulary growth and even speaking skills. This may be because students were listening, reading, taking notes, and viewing - repeating these several times, it was not easy for them to exactly pinpoint the actual process. Although this was not the intention of this study, it might be useful for other researchers who are interested in studying the cognitive side of the learning process.

Independent learning was evident in higher achieving learners. They needed guidance at the beginning of the self-independent work period but when they knew what they must do to perform well, they did not seek help and independently executed the task with great outcome. Those who achieved lower marks, did not seek help, and did not achieve good grades. This shows that in order for the learner to become an independent autonomous learner, they need to seek help and be supported along the way until they figured out themselves what needs to be done to perform well. Independent learning style can certainly be transferred to other learning areas and will be useful for them to achieve their desired goals at University and beyond. In the case of the higher achieving students they were responsible for their language development; developed transferable language learning skills; they took advantage of the opportunities available for them to learn the language independently; they chose their path for learning once they figured how to learn; and students were successful at self-guided learning. This is in line with Benson and Voller (1997) and Watkins and Wilkins' (2011) descriptions of the development of learner autonomy.

Practical Suggestions for Teachers

The two teachers have a few practical suggestions for the fellow EFL teachers based on the outcome of this research project. To helps ELF learner to develop and improve their language skills, it is useful to quickly and effectively.

- increase students' awareness on cognitive processes of listening and mindful listening.
- train learners to perform this processing as Nunan suggested (1998)
- turn away from what we can call mindless repetition.
- Find out what students are using to learn English outside the classroom (eg., YouTube)
- let students know that learning is to be engaged in what we are doing. It is about being present to what one is learning (Weiler, 2017)
- learning how to learn is just as important as learning what to learn.
- developing students learning techniques will have longer lasting effect on the student.
- when students have figured out 'how to learn', it then assists them to transfer skills and become independent learners.

To help students understand the learning process, encourage them to take notes of what they are learning and create mind maps. This exercise was especially useful in this project because it greatly aided students to develop their vocabulary, reading and retelling of stories. Also, to achieve the above, teachers' support is critical. Teachers need to motivate students to engage in self-directed learning and understand the learning process, especially when students are working tasks such as self-independent work.

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The Poetry Box: A Student Centered Constructivist Approach to Poetry Lessons in Secondary Education

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Abstract
Poetry is often compared to paintings because of its abstract and symbolic nature. Poetry lessons, therefore, tend to be elusive and teacher oriented. As the teacher is expected to present most information about poetry to the students in this conventional teaching style, many problems have been observed. Teachers and students have reported that they were not confident about their preparedness of teaching or studying poetry due to the pressures of having comprehensive knowledge of difficult poems; student engagement level was low; and the education did not lead to authentic learning. In order to counteract this, this research investigated the impact of implementing a constructivist teaching method called the Poetry Box on those three problem areas. This was because constructivist teaching has been known to increase students' role as proactive participants in the learning process and create less stressful lessons. In four ELA/ESL classes in a high school, the participants of the research used the method and reported the implications of the lessons regarding self efficacy, student engagement level, and authentic learning experience. The result of this study indicated that students gained more confidence regardless of their levels of English, began to enjoy writing and reading poems, and developed their English language skills when poetic freedom and creativity were emphasized pedagogically based on constructivism. As students became more active, teachers were less pressured to gain exclusive knowledge of poetry and focused more on their role as facilitators of education, which improved their self efficacy.

Keywords: Poetry Pedagogy, Constructivist Teaching Method, Self Efficacy, Student Engagement, Commentary Workshop, Poetry Box

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Introduction

The Freedom and Creativity of Poetry

Poetry is one of the oldest forms of literature that has never ceased to exist in all cultures. Poetic elements and styles can be found everywhere and have steadily been relevant in songs, speeches, and commercials, not to mention in literature. Contemporary singers romantically serenade their desires for love and kisses today the way Catullus demanded his beloved Lesbia “a thousand kisses” in his poem more than two thousand years ago. Inspiring and touching poems are read during wedding ceremonies and presidential inaugurations. States elect their poets laureate, and a great poet may even receive a Nobel prize today.

Although there are many reasons for its longevity, the success of poetry owes a great deal to its flexibility that allows the poet and the audience to freely engage in their creativity and emotions that are often obscured in everyday conversations. Eliade (1964) argued that “pre-ecstatic euphoria” and “an act of perfect spiritual freedom” through “the creation of a personal universe of a completely closed world” may be the origin of poetry (50). In the same vein, Allen Ginsberg mentioned that “poetry is not an expression of the party line. It's that time of night, lying in bed, thinking what you really think, making the private world public, that's what the poet does” (Columbia University, 2004). Salvatore Quasimodo also said, “poetry ... is the revelation of a feeling that the poet believes to be interior and personal which the reader recognizes as his own” (Quasimodo, 1960, 47). Time and time again, people have acknowledged the close relationship between poetic creativity and liberating subconscious level introspection of human emotions that connect all people.

Indeed, poetic creativity seems to come from spiritual freedom when reading the works of poets whose imaginations do not conform to the objective physical reality completely. Emily Dickinson, for example, wrote “I felt a funeral in my brain.” This is one of shocking yet compelling figurative images she created in many of her poems through the use of unusual verbs. Ordinarily, people may “see” or “attend” a funeral, but here Dickinson selected “felt” to create her own emotional surrealist language to convey her inner experience without worrying about the accuracy of the information. The syntax of her poem also doesn't agree with the convention either as it lacks the punctuation, letting her express complicated feelings without grammatical restrictions.

The Benefits of Poetry Education in Secondary School

Because of this free association-like self emotional disclosure aspect, poetry has been a significant element of many literature curricula around the world. Especially in secondary school, poetry is written and read to help students understand themselves and their surroundings through development of their interpretations and individual voices (Sigvardsson, 2019). Collie and Slater (1987) emphasize how poetry can teach students the essence of humanity; "... they often explore themes of universal concern and embody life experiences, observations and the feelings evoked by them" (226). And Richard Beach et al. (2016) point out the possibility of using poetry as a tool to create a more inclusive learning environment; "..., teachers can use literature as a means of welcoming students' identities and interests into the classroom. This is especially true of poetry" (160). However, poetry is also found to be one of the least

favorite topics to teach amongst literature teachers because of the exclusivity of personal emotions and language in poetry that make it abstract and difficult to understand (Vala et al., 2012). In fact, research has found that many secondary school teachers are inexperienced with poetry lessons and feel uncertain about how to engage students with poems (Benton, 2000; Dymoke, Lambirth, & Wilson, 2013; Ofsted, 2007; Wolf, 2002). The low self efficacy of teachers result in less engagement of the students. For example, discussing the consequences of poetry lessons given by unconfident teachers, Showalter (2006) states that "Teachers lament that students find it difficult and intimidating" (62).

The Problems

Based on the findings from the present literature, the most prominent problems in traditional poetry lessons seem to be classified into three categories: low level of the self efficacy of teachers and students, low level of student engagement, and the lack of authentic learning experience. That is, as teachers and students get intimidated by and feel unconfident about poetry lessons, students do not actively participate in learning, and the lessons become superficial rather than experiencing poetry authentically.

Main problems	**Specific causes**
Low self efficacy of teachers and students	First, as poetry was considered high culture for elite readers in the past, readers assume that they need to understand poems in the strict sense of the word even though the language and the cultural context may change, leaving a narrow room for their own imaginative interpretation (Vala et al., 2012). Second, students may not be familiar with the innate ambiguity of poetry as they are trained to find objective facts, and it is rare to grapple with complex feelings verbally in memorization oriented school lessons. That is, "the tension between what a poet wants to express by his words and what the words are able to evoke" can deter students from experiencing poetry proactively (Režná, 2007 as cited in Vala et al., 2012).
Low level of student engagement	This seems to be related to the teaching method. First, students may find it difficult and stressful to learn poetry using the pedagogies and curricula that focus on efferent reading to get specific information from individual lines of poems rather than facilitating aesthetic reading opportunities (Fleming & Mills, 1992). Also, a curriculum that goes over the poems that do not correspond to the age and culture of the students in the class might make students perceive poetry lessons as unpleasant activities and this emotional response may last throughout their academic years and beyond (Vala et al., 2012).
Lack of authentic learning	The lack of authentic learning experiences in poetry classes seems to be derived from the combination of the low self efficacy of the

	teachers and pedagogical choices. That is, teachers may not be prepared to teach poetry as there are so many poems to examine, and they cannot memorize all facts and background knowledge about those poems. Consequently, their unconfidence might lead them to employ an insensitive and superficial approach to poetry during their lessons and ignore students' unorthodox or creative views on poems even though "a teacher should be cautious and try not to disrupt the initial impact of the poem on the students, not to impose their opinion on the students and not to deprive the poem of its liveliness" (ZeleĖáková, 2011 as cited in Vala et al., 2012). This disconnectedness between the student's experience and teacher-oriented lesson objectives is likely to motivate students to take the lesson halfheartedly.

Table 1. Main Problems in Traditional Poetry Lessons and The Causes

The heart of the issue is the assumption that there is only one particular way to interpret a poem. Researchers have pointed out that, in traditional classes, when the teacher asks questions about poetry, "... there is often a feeling on the part of the students that the teacher is slowly but surely edging them to particular answers that he or she has in mind" (Collie & Slater, 1987, 8) and treats the students as if they were"... empty vessels dutifully waiting to be filled up... " (Collie & Slater, 1987, 5). Even when the lesson is effective, the whole process of learning might be dominated by the teacher alone as "some teachers have the confidence and charisma to use the classroom as the venue for a one-man or one-woman show" rather than collaborating with the students (Showalter, 2006, 32). Teaching methods of poetry based on this kind of attitude may rob students of the joy and freedom of poetry and do not allow students to explore poetry for their emotional development. In addition to that, a test focused school curriculum may further cause both the teacher and student to bypass authentic learning opportunities although there is not enough evidence that indicates the efficacy of test-oriented curriculum such as Common Core (An & Cordona-Maguigad, 2019). This situation raises the question about the possibility of creating a more well-balanced curriculum, which has culminated in a quite robust body of literature on poetry pedagogy.

Alternative Poetry Teaching Methods

Linking various theories to classroom practice, researchers and teaching practitioners developed new teaching methods during the twentieth century (Hanauer, 2001). Since the 1970s, the theoretical mainstream has focused on the readers' responses while the emphasis on the teaching of form decreased (Dressman & Faust, 2009).

This type of alternative poetry pedagogy highlights the value of student engagement. For example, Harmer (2001) argues that "Teenagers, if they are engaged, have a great capacity to learn, a great potential for creativity, and a passionate commitment to things which interest them" (39). Showalter (2006) also asserts that "teaching poetry offers the literature instructor some of the most fundamental, immediate, active, even physical ways to engage students in learning" (62). From this perspective, poetry lessons can be enhanced when students can develop their real interest in poetry and become serious about writing and reading poetry. Engaging lessons would develop

"…toward an active, collaborative learning that takes place as the student confronts the text directly" (Showalter, 2006, 35).

Another type of alternative poetry pedagogy stresses the importance of teaching critical theories like Marxism or feminism. For example, Appleman argues that critical theory "provides lenses designed to bring out what is already there but what we often miss with unaided vision" (Appleman 2000, xvi) such as the ideological undertone or biases imbued in poems. Because it is important for the students to enrich their ability to "read and interpret not only literary texts but their lives," the teacher should not just give information about certain poems but also instill the skills in the students with which they can critically and independently analyze poetry (Appleman 2000, 2).

But none of those methods became influential and reliable enough to replace the traditional teaching methods in practice. Also, there is a lack of empirical studies on poetry pedagogy (Dymoke et al., 2013), and only a dearth of research specifically focused on teaching poetry in secondary education (Peskin, 2007). More importantly, there hasn't been any pedagogy that addresses the specific problems of poetry education in secondary schools, and most teachers are not sure about the objectives of instructional design models that come with each pedagogical strategy.

The Purpose of the Poetry Box

Drawing on the diverse constructivist approaches to poetry education, the Poetry Box is designed to directly address the aforementioned five causes of the three main problems with poetry lessons without disrupting the mainstream secondary school ELA curriculum based on the Common Core. To be specific, the method is to achieve the following specific objectives through various activities in order to obtain the three ideal results.

The ideal results	**Specific actionable objectives**
1. Increase self efficacy of the teacher & the student	A. Helping students learn poetry using their own imaginative interpretations B. Familiarizing students with the innate ambiguity of poetry
2. Increase the level of student engagement	A. Offering students aesthetic as well as efferent reading opportunities B. Selecting poems that correspond to the age and culture of the students
3. Create authentic learning opportunities	A. Trying not to disrupt the initial impact of the poem on the students

Table 2. Objectives to Address the Problems of Traditional Poetry Lessons

Theoretical Framework

To increase self efficacy of the teacher and the student, boost the level of student engagement, and create authentic learning opportunities, the Poetry Box method mostly depends on constructivism theoretically. This is because constructivist teaching has been known to increase students' role as proactive participants in the learning process and create less stressful lessons.

Constructivism theory focuses on active learning through the learner's experiences and cultural factors. Hence, learners' different interpretations and ideas should be shared with their learning community rather than getting ignored from a constructivist point of view (Oakes et al., 2018). John Dewey, the philosophical founder of constructivism, underscored the importance of experiential learning; "We get so thoroughly used to a kind of pseudo-idea, a half perception, that we are not aware how half-dead our mental action is, and how much keener and more extensive our observations and ideas would be if we formed them under conditions of a vital experience which required us to use judgement: to hunt for the connections of the thing dealt with" (Dewey, 1916, 156). This is clearly aligned with the direction of helping students learn poetry using their own imaginative interpretations and familiarizing students with the innate ambiguity of poetry as Dewey would consider teacher-oriented lessons without the learner's imagination and experience to be "a half perception."

Dewey's idea about experiential learning is holistic and allows the students to be adaptive, flexible, and self-aware learners. It nurtures the whole learner and not just the learner in the intellectual environment. It is a student-centered collaborative approach that allows them to learn to think profoundly about the world, become compassionate global citizens, discover real-world situations and actions that could bring positive change. Most of all, it allows students to think about "why." Why is this content important to my life? What can it teach me and how would this be connected to my life? (Charlton, 2012). Thus, Dewey would also support selecting poems that correspond to the age and culture of the students since that is the best way to connect learning to real life.

Unlike behaviorism which focuses on the passivity of the learners as they learn through positive and negative reinforcement, constructivism allows the students to think of multiple interpretations without fear of receiving the negative feedback, which leads to a more student-centered approach to learning. In this approach, teachers are still the authority figures, but they would act more as the facilitator rather than someone who provides information to the students. Naturally, they would try not to disrupt the initial impact of the poem on the students. Students would generally work in groups and become active participants (Oakes et al., 2018). The teachers would be able to provide guiding questions that could facilitate the discussions so that they are productive. This means that students could have ample time to explore aesthetic as well as efferent reading opportunities while learning poetry depending on their own desires.

This remarkable synchronization between the actionable objectives to resolve the issues with traditional poetry education and the constructivist approach to teaching and learning shows positive implications of implementing constructivist instructional

strategies. But what are the actual classroom activities that can be done in a poetry class? What would John Dewey do to teach poetry?

Constructivist Poetry Activities

First, John Dewey would have encouraged students to experience poetry as poets and readers. He said, "when we experience something we act upon it, we do something with it; then we suffer or undergo the consequences. We do something to the thing and then it does something to us in return" (Dewey, 1916). Therefore, he would not have appreciated the teacher explaining everything about poems to the students before they read them. He would have warned the students not to read any explanation or analysis about the poems and asked them to read the poems and struggle to figure out what poetry does to them in return. To fully explore the creative freedom of poetry, he would have recommended the students to write their own poems, thus being faithful to his philosophy of learning-by-doing.

Then, Jean Piaget (1952) would have echoed how crucial active learning is while simultaneously suggesting that the students might be able to utilize cognitive learning strategies such as schema. Piaget (1952) defined a schema as: "a cohesive, repeatable action sequence possessing component actions that are tightly interconnected and governed by a core meaning"(7). He would have considered the different stages of cognitive development of the students depending on their age and provided the right environment to interact with the poems. For example, he would have differentiated the learning environment for 11 years olds and 12 years olds because they belong to different stages of cognitive development (Inhelder & Piaget, 1958). Because 11 years olds may not understand abstract concepts, he might have asked the students to utilize drawings and pictures to understand poetry.

Vygotsky (1999) would have, also, joined the discussion by emphasizing the role of sociocultural interactions and language in learning. He perceived the social environment within which the learners interact with persons as a vital factor for learning especially for children. He realized that to enhance social connection for better learning, speech skills have the utmost importance; "... the role of speech, ..., is crucial for understanding not only the structure of behavior, but also its genesis: speech stands at the very beginning of development and is its most important and decisive factor" (20). He would have said that by effectively communicating with "more knowledgeable others," the students would learn about difficult concepts of poetry that they might not understand otherwise. Hence, he would have preferred poetry activities that promote cooperative learning and language development such as group discussions and presentations that offer scaffolding with a teacher working as a facilitator.

Yet, these activities might be considered to be too general and not specific enough to help design individual poetry lessons. Ultimately, students have to read and analyze various poems to learn more about the elements of poetry and even theories. How can it be done more efficiently without too much pressure and control of the teacher while respecting constructivism? Rosenblatt's transactional reading theory may offer an answer. According to the theory, the readers are just as important to the text as the poet, and there is an active process in creating meaning. Rosenblatt (1970:35) mentions that "the same text will have a very different meaning and value to us at

different times or under different circumstances" (as cited in Naylor & Wood, 2012, 16). Reading, accordingly, becomes a two-way process since the poem serves as a stimulus that elicits memories (understanding the poet's world) and personal associations (connecting the reader's mind to the poet's world) (Naylor & Wood, 2012).

In other words, both reading and writing poetry should involve the same amount of free and active introspective exploration. Then, it is conceivable to develop writing and reading skills together interactively creating a cycle of learning. Suppose that the class has to read well-written but difficult poems after writing their own poems about similar topics or styles. Since they have gained experience of writing their own poems, they would be able to relate better to the poet. They would then in turn use those poems as their inspiration and revise some of the poems that they have written. This would greatly strengthen the experiential connection between the students, the poet, and poetry. Moreover, because the students would have used the literary and linguistic devices in writing, they would be better able to remember and identify them in reading. As difficult elements of poetry feel less foreign to them, the students would gain confidence and motivation to learn more about poetry.

	□	**Concrete Experience** (feeling what poetry does)	□	
Active Experimentation (writing & reading poetry)		Students in groups Teacher as a facilitator		**Reflective Observation** (discussion & review)
	□	**Abstract Conceptualization** (commentary writing & presentation)	□	

Table 3. Poetry Learning Cycle Inspired by David Kolb's Experiential Learning Model

The point is that the student has to be the center of reading and writing poetry. Blau (2003) states that "as long as teachers are teaching, students are not going to learn, because the kind of experience teachers have that enables them to learn what they have to teach is the experience that students need to have, if they are to be the ones who learn" (2-3). Thus, the teacher should allow the students to experience learning for themselves instead of just witnessing and recording the teacher's learning. Still, it is important for the students to critically analyze and argue about the poems they read. In other words, they have to be assessed and improved.

For the purpose of assessment and more critical engagement with poetry, Blau proposes utilizing commentary workshops instead of requiring students to write formal essays or take multiple choice tests. By writing and sharing simple and self-directed commentaries about poetry they read, the students could reflect on a line or stanza of the poem freely and profoundly without having to be concerned about the form of their essays. Through this process, most students would be able to develop

meaning or, at least, an interesting perspective that may go beyond the basic ideas of the poetry (Blau, 2003).

Also, they would be able to discuss and collaborate with their partners in order to try to understand complicated texts. Since the reader finds a connection or relationship to the text and sometimes each reader's interpretation could vary, the students would be able to understand that there may be more than one interpretation of a poem that could be justified, enriching their understanding of poetry (Blau, 2003). In commentary workshops, students would work in groups which create a social setting that enhances learning. According to Vygotsky's theory of Zone of Proximal Development (ZPD), activities and social groups that present problems that could challenge students but do not go beyond their ZPD with proper scaffolding are highly effective in learning (Oakes et al., 2018). Therefore, in a commentary workshop setting, students may work together and learn without feeling intimidated by concepts, theories, and ideas that are beyond their understanding.

Based on the above theories and ideas as foundation, Aaron created the Poetry Box method and subsequently it has been put into practice in real high school ELA lessons by teachers Jamie and Silvia.

The Poetry Box Method

To narrow the gap between the imagination of the poet and that of the reader (the student), there has to be a process of communal experience between the poet and the student. That is, if the student has experienced what the poet is discussing in the poem, the student is likely to understand it better and enjoy it more. The Poetry Box starts with this experiential foundation by positioning the student as a poet who has to write a poem about a specific topic. Whereas conventional classes make students approach poems as readers, the Poetry Box sees the student as a participant of an original poetic experience.

It is important that the teacher facilitates the creative writing process as not all students are skilled in poetry. Usually, students do not know what to write and how to write at this stage. That is why an empty box is given to the student to fill out and develop a poem using the resources and inspiration provided. The student is asked to fill the box with sensory stimuli, such as music, art, objects, pictures, videos, sentences, events, etc. For example, the teacher may ask the student to choose any object in and around the classroom. It may be a pencil or a framed picture. Anything the student chooses can be the subject of the student's poem.

Then, the student needs to see, think, and wonder (Project Zero Harvard School of Education, 2006) about the chosen object instead of waiting for serendipitous inspiration from mythical muses. The student's sensory experience with a tangible object or topic may not be enough to induce an unconscious burst of creativity in his or her hidden literary genius, but it gives ample materials for the student to develop personal connection to it and describe in the poetry box. Simply put, the student would need to describe anything about the object based on his or her observations. Suppose the student chose to write about a desk. Then, the student can write about how big it is and how it feels subjectively. Naturally, the student's subjective

perspective would be more valued than objective facts, and the personal narrative would develop into a poetic point of view.

Some may emphasize the benefit of the desk as it sets up an organized and optimized workstation while others might complain about how boring it can be to sit at the desk and study too long. Most students can fill out the poetry box with a clear attitude, topic, and narrative at this subjective descriptive stage. But the draft may not be considered to be poetic yet due to the absence of figurative language and other poetic devices. That requires the student to consider what can be useful for his or her own draft to become a poem while revising it and reading exemplary poems. Reading well written or canonic poems aloud several times and discussing them with other students in a group engenders deep learning and critical thinking, which is likely to lead to better composition and analytic skills. Even though the skills the student learns from this process is not unlike what a teacher can teach in a conventional lesson, the student may feel more ownership of the knowledge as it is not spoon fed but proactively learned.

Lastly, the student can share the analysis of the sample poem and his or her own poem with other students in a commentary workshop online or in class. By participating in presentations of various poems, creative ideas, and poetic skills, the student may unknowingly prepare for any type of test as well. If it is needed, the teacher might introduce test-taking skills, critical theories, or sample questions and answers at this point. In order to achieve this goal, the teacher might need to remember that different levels of tests should be given to the student.

Four Stages of the Poetry Box Learning Cycle	
Active experimentation (Thinking box)	The student fills out the poetry box with a descriptive draft about a topic.
Concrete experience (Inspiration box)	The student revises the draft while reading inspirational poems.
Reflective observation	The student engages in a discussion about poetry to review. Although it is not a separate activity, it is incorporated in each stage of the poetry box.
Abstract conceptualization (Commentary box)	The student writes analytic commentaries on the poems or other lesson points discussed in the lesson.

Table 4. Four Stages of the Poetry Box Learning Cycle

The Poetry Box in the ELA/ESL Classroom

Participants

Participants in this program were High School students at a mid-size private institution in South Korea. The students were classified into ninth grade ELA and ESL students with limited to no prior exposure to the formal study of poetry in a traditional classroom. The students were divided into cohorts based on their English

language ability between Beginner/Intermediate (20 students) and Intermediate/Advanced (20 students). All participants had experienced English immersive classes at varying levels.

Thinking Box

The first stage of the Poetry Box focused on the ESL/ELA learner's interests in specific topics. While filling out the box with the descriptions of the chosen topic, individual students concentrated on their own subjective sensory and emotional experiences. They began with an ordinary tangible object found in the classroom and then wrote a description about it in small groups or with partners in order to share their unique ideas and feelings about the topic in a collaborative learning environment. Then they had a minute to write descriptive words about the object and five minutes to write a simple rough poem with those words. For example, in one poem about a pillow, a pair of students wrote words and phrases that were warm, comforting, and familiar to them. Through this activity, personal narratives were developed, and several themes about their home and family were discovered naturally. When students read their poems aloud, they noticed that their unpolished poems surprisingly contained literary devices such as repetition, similes, metaphors, alliterations, and rhyme.

Theme	(optional)
Topic	E.g. pillow
Opinion	Rest, home, bed, couch, sleep, comfort, everywhere, colorful
Write a descriptive poem	The pillow, the only reliable resting place Always over the house, in beds and couches on chairs and ground or on my face. It is the object to rely on after a long day of labor. Without it, there is no rest nor comfort to sleep. Without comfort nor rest, it kills the means of sleeping.

Table 5. Thinking Box Student Example

Depending on the class, the teacher needed to scaffold the lesson by asking several questions. There were some students who were not able to generate many words or phrases for their thinking box. For instance, during the class in which classical music was used as the prompt, the teacher asked several questions to elicit words and expressions from the students. While the music was playing, she asked the students: "How do you feel? Is it happy or sad? Where are you? What do you see? Where did the music take you?" These questions helped the students use their senses and imagination so they can write down several words.

Inspiration Box

The Inspiration Box utilized culturally relevant and understandable poems to help the students connect with poetry. The teacher curated a list of inspirational poems to aid students in the acquisition and mastery of poetic skills and devices. By focusing on diverse skills and themes of poetry, the teacher expedited the students' improvement of creative writing skills. Through the experience, students were able to imitate, analyze, and master transferable creative writing skills. It was noticeable that students supported and learned from each other through natural discussions without the teacher having to lecture them. For example, they talked about the use of metaphors, imagery, tone, and repetition while reading model poem "Hammer" by Carl Sandburg. Afterwards, a pair of students used that poem to revise their original poem.

Inspirational Poem	**Student's Poem**
"Hammer" by Carl Sandburg I have seen The old gods go And the new gods come. Day by day And year by year The idols fall And the idols rise. Today I worship the hammer.	"Desk" by a Student I have glimpsed Peasants leave Slaves arrive Week by week Month by month Speechless leaders fall Smart tyrants rise Yesterday I worshipped the computers

Table 6. Inspiration Box "Hammer" by Carl Sandburg and Sample Student Poem, "Desk"

Commentary Box

The Commentary Box enhanced the students' experience by providing an opportunity to reflect on the lesson's outcomes and helped them improve their skills in articulating their ideas in a social setting without feeling the constraints of grammar or essay structure. As the students gained confidence in writing and analyzing their own poems, the teacher introduced a curated list of poems to be used for the Commentary Box. They brainstormed ideas about the poem's themes or motifs. Furthermore, students were asked to find a word, line, or stanza that intrigued them and write a commentary on it. The class then discussed the commentary and the essence of the poem to gain a more comprehensive understanding of it. Throughout the course, the students wrote longer commentaries about the whole poem and not just about a few words or lines due to their increased confidence in analyzing the poems.

"Fork" by Charles Simic	**A student's commentary focused on the mood:**
This strange thing must have crept Right out of hell. It resembles a bird's foot Worn around the cannibal's neck. As you hold it in your hand, As you stab with it into a piece of meat, It is possible to imagine the rest of the bird: Its head which like your fist Is large, bald, beakless, and blind.	As I am reading this poem, I noticed that its mood is very dark, negative and even bizarre. The fork is a normal thing that everyone uses. However, in this poem, the writer describes fork as if it were a tool to kill somebody...

Table 7. Commentary Box Student Example

The Results

The ELA/ESL courses that used the Poetry Box method showed recognizable improvement in the three problem areas of traditional poetry lessons.

Problem areas	**Implications**
Self efficacy of teachers and students	Since the students had the freedom to creatively think about and interpret the poems, they became more confident about reading poetry, and their commentaries became longer, more insightful, and complex. As a result, the teacher did not have to spend a lot of time reading sourced material and literary analysis of the various poems to teach. The teacher served more as a facilitator walking around and assisting the students with their analysis or understanding of certain terminologies. Therefore, there was less time needed to prepare for the course. Furthermore, the teacher was able to use the poetry box to establish a routine for the students. When they arrived into the classroom, the students knew whether they were writing poems or reading and analyzing the poems. This enabled the teacher to better manage the classroom and their self efficacy gradually increased.
Student Engagement	As the students were able to freely connect with the poetry, they became more active and engaged in their learning experience. The students also were allowed to select from a variety of poems to read and analyze, and it made them feel more accountable in their learning. The students enjoyed and retained more information from the lessons that amplified their overall cognitive skills through poetry writing. They became actively involved in their learning and were able to confidently explain a few literary devices such as rhymes, anaphora, spondee, and consonance. It went beyond the basic input process because they experienced the poetry enabling students to think about the poems critically and creatively on their own. For example, when students were introduced to Emily Dickenson's poems, they started to ask each other questions, such as: "Why is the

	capital letter used in the middle of her poem?" "Why did she use a bee to represent fame?" "What is the relationship between industry and funeral?" As they were talking about the tempo and rhythm of her poems, some of the students were tapping their hands, desk, or moving their hands up and down to feel the meter. They would also voluntarily share pictures or drawings related to the topics of the poems to express their ideas and emotions about them more clearly.
Authentic learning experience	The teacher adapted the lesson to expand the students' personal experience in writing poems by utilizing their sensory skills. The class went outside, listened to music, looked at surreal art, and watched short videos. Each new experience corroborated with exposure to new literary elements and opened the students up to a new style of poetry. For instance, on the day they went outside, they read narrative poems, and on the day they listened to music, they read lyrical poems. The students also began to relate their own poetic experiences with the world around them. For instance, they examined a poem written during the English industrial revolution and related the themes in the poem to their own present experiences or what they have observed. They contemplated the ideas of consumerism, the environment, society, and even their own political ideologies, paving the way for integrated subject learning. Thus, the students became more aware of their own emotions and ideas about various aspects of life; increased their meta-cognitive skills and empathy. The continuous collaborative learning activities throughout the courses helped them improve their language, communication, and social skills. Particularly, ESL students improved their English skills, and the second language became more personalized. As they thought of different words in pairs, they were able to increase their vocabulary easily. Poetry writing worked as a mirror to the students' identities as it reflected their word choices consciously or unconsciously. They made personal meaning through simple words and explored their own poetic identities in the second language (Hanauer, 2010). This enabled the students to express themselves in English better. Reading poetry also provided the ESL students with authentic learning materials that would help them access the cultural background of the language. They seemed to learn higher-level thinking skills and express their emotions better in the second language through this process (Aladini & Farahbod, 2020).

Table 8. Problem Areas and Implications of Poetry Box Method

Conclusion

Traditional poetry lessons that do not recognize the importance of the student's role in learning contradicts the true nature of poetic creativity that thrives on imaginative freedom. As a consequence of that, both the teacher and the student have been

suffering from a low level of self efficacy, engagement, and authentic learning. Constructivist approach may be the missing puzzle piece to resolve those issues. Through a constructivist curriculum that taps into the student's gaining authentic experience and making meaning of poems, poetry education can become more accessible and profound. There are various positive effects when this approach is implemented in secondary education. Students may learn to enjoy writing their own poems, reading poetry written by notable poets, and critically analyzing their world as they reflect on their learning. In the end, what was once invisible and confusing may become visible and clear to them while what was once seen as ordinary and empty may become special and personal to the students. Moreover, the belief in the student's capabilities, personal experience, and social learning would lead learners to the real "perfect spiritual freedom" of poetry in the real world.

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Resistant and Nonresistant Teachers' Identities

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Abstract
In many educational materials, it is recognized that the broader social conditions in which teachers live and work, and personal and professional factors in life, experience, beliefs and practices. The teacher is inseparable from each other, and there are often tensions between these things that impact a greater or lesser degree of sense of self or the teacher's identity. If identity is a key factor affecting teachers' intentions, effectiveness, motivation, commitment, satisfaction and job performance, then investigate the positive and negative influences of the contexts in which these occur and the consequences for practice, is essential. Although notions of personal identity are much used in educational research and theory, critical engagement with individual teachers' cognitive and emotion has been relatively rare. An interest in raising and maintaining teaching standards, especially in the context of centralized reforms, is likely to destabilize long-term beliefs and practices. This paper addresses the issue of teacher identities in Vietnam context by studying together the nature of the relationships between social structures and individual institutions; between the notions of a social construction, and therefore, depending and always being redone, 'self', and a 'self' with dispositions, attitudes and behavioral responses which are durable and relatively stable; and between cognitive and emotional identities. Based on current literatures of research papers and findings which studying variations in teacher work and life and the impact of them to students. It finds that identity is neither intrinsically nor fragmented, as previous literature suggests. Instead, the teacher identity may be more, or less, stable and more or less fragmented at different times and in different ways according to a number of lives, career and situation factors.

Keywords: Resistant, Nonresistant, Identity

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Introduction

Early notions of personal identity

An understanding of teachers' selves, their cognitive and emotional identities, is central to the analysis of variations in teachers' work, lives and effectiveness in which structure (external influences) and agency (one's ability to pursue the goals that one values) are perceived to be in dynamic tension (Archer, 1996, 2000). The concepts of self and identity are often used interchangeably in the literature on teacher education. Both are complex constructs, not least because they draw on major research and theoretical areas of philosophy, psychology, sociology and psychotherapy. Earlier writers (e.g. Cooley, 1902) tended to position the self as a singular, unified, stable essence that was little affected by context or biography. These initial views on the construction of self-focused on the ability of an individual to create a defining system of concepts. These concepts, which remained constant over time, were developed through the subjectively interpreted feedback from others, and were distinct and identifiable to an individual. Progressing from this fundamental principle, the connection between self-awareness and the perceived opinions of others began to develop as a major influence on the construction of self. This theoretical advance, which Cooley (1902) called the 'looking glass self, enhanced his initial opinions, as it situated the formation of self as part of a reflexive, learning process by which values, attitudes, behaviour, roles and identities are accumulated over time. Drawing on the individual's concern for how others relate to him/her, Mead (1934) believed that the self, though stable, was a continuous concept closely linked to social interactions and created through language and social experiences.

These perspectives, though fundamental to our theoretical understanding of self, do not take into account the fact that people's lives are multifaceted. Goffman (1959) went some way towards addressing this issue when he presented the idea that each person had a number of'selves', each one focusing on the execution of one role at any given time and situation (Goffman, 1959). He believed that the ability to adapt the self was essential in order to effectively communicate the social processes necessary within each situation. However, even in the light of this development, these theoretical perspectives do not allow for a continuous, lifelong development of self which may undergo many changes over time. More than a decade later, referring specifically to 'professional identity', Ball (1972) usefully separates *situated* from *substantive* identity. He views the situated identity of a person as a malleable presentation of self that differs according to specific definitions of situations (e.g. within schools) and the more stable, core presentation of self that is fundamental to how a person thinks about himself or herself.

Parallel to these perspectives, but in the psychoanalytic tradition, Erikson (1959) suggested three 'stages' in adult life which he characterised as crises: (i) distantiation (a readiness to defend one's identity against all threats); (ii) generativity versus stagnation (motivated and goal oriented or coasting, on the road to disenchantment); and (iii) integrity versus despair and disgust (a readiness to defend the dignity of one's own lifestyle against all physical and economic threats) (Erikson, 1959, p. 98). Erikson's theory provides insights into the inner, sometimes conflicting forces which affect identity during particular life phases. Importantly, it suggests that identity is 'never gained nor maintained once and for all' (Sikes *et al.,* 1985, p. 155).

(i) Teachers' identities: personal and professional

Common to all this early research is a recognition of the importance of an understanding of self to beliefs, attitudes and actions, and thus the kinds and effects of such actions. In teacher education also, much research literature demonstrates that knowledge of the self is a crucial element in the way teachers construe and construct the nature of their work (Kelchtermans & Vandenberghe, 1994) and that events and experiences in the personal lives of teachers are intimately linked to the performance of their professional roles (Ball & Goodson, 1985; Goodson & Hargreaves, 1996; Acker, 1999). Several researchers (Nias, 1989, 1996; Hargreaves, 1994; Sumsion, 2002) have noted that teacher identities are not only constructed from technical and emotional aspects of teaching (i.e. classroom management, subject knowledge and pupil test results) and their personal lives, but also 'as the result of an interaction between the personal experiences of teachers and the social, cultural, and institutional environment in which they function on a daily basis (Sleegers & Kelchtermans, 1999, p. 579).

The ways in which teachers form their professional identities are influenced by both how they feel about themselves and how they feel about their students. This professional identity helps them to position or situate themselves in relation to their students and to make appropriate and effective adjustments in their practice and their beliefs about, and engagement with, students. James-Wilson, 2001, p. 29)

Geert Kelchtermans (1993, pp. 449-450) suggests that the professional self, like the personal self, evolves over time and that it consists of five interrelated parts:

- *Self-image:* how teachers describe themselves though their career stories;
- *Self-esteem',* the evolution of self as a teacher, how good or otherwise as defined by self or others;
- *Job-motivation',* what makes teachers choose, remain committed to or leave the job;
- *Task perception',* how teachers define their jobs;
- *Future perspective',* teachers' expectations for the future development of their jobs.
- In his (1996) study of the career stories of 10 experienced Belgian primary school teachers, Kelchtermans found two recurring themes.
- *Stability in the job',* having achieved ambition, led to job satisfaction;

Vulnerability', to the judgements of colleagues, the head teacher and those outside the school gates, e.g. parents, inspectors, media, which might be based exclusively on measurable student achievements. As vulnerability increased, so they tended towards passivity and conservatism in teaching.

Thus, a positive sense of identity with subject, relationships and roles is important to maintaining self-esteem or self-efficacy, commitment to and a passion for teaching (Day, 2004).

In *Primary teachers talking: a study of teaching as work,* Jennifer Nias (1989) located the primary school teacher's self in the social context of education in England in the 1980s, which she described as encouraging 'individualism, isolation, a belief in one's own autonomy and the investment of personal resources' (p. 13).

Their involvement in activities within the school also provided them with 'personal and emotional satisfactions within their working lives rather than outside them' (p. 18). However, this integration of identities, and the concomitant levels of commitment to work which it signals, produced a 'paradox'; that is, teachers' investments in their work, their levels of commitment-understood as 'a readiness to allocate scarce personal resources' (Lortie, 1975, p. 189, cited in Nias, 1989, p. 18) led to increasing demands upon them for ever-greater investment. This in turn resulted in a reduction of satisfaction when these demands could not be met. A second key contribution of Nias's research, therefore, concerned differences in commitment between teachers' performance and motivation. As in Lortie's (1975) research, commitment demonstrated involvement and activity in work beyond the immediate demands of the post. It was through reference to levels of commitment, also, that the teachers distinguished between those who were seen to 'care about the children' and 'take the job seriously' and those who did not, between those who were 'real teachers' and those whose interests were elsewhere, between those who are 'professionals' and those who are not (Nias, 1989 pp. 30/32).

A third area to which Nias's research draws attention are the tensions and contradictions in the primary teacher's role, which are principally produced through the opposition between the impulse and requirement to 'care and nurture' and the impulse and requirement to 'control' (p. 193).

For Nias, all of these, together with the institutional organisation of the school, are implicated in the production and acting out of teachers' 'work identities'.

(ii) The teacher, the pupils and the school

Douwe Beijaard's (1995) research with 28 secondary school teachers in the Netherlands draws upon and adds to Nias's insights on teacher identity. For Beijaard, the concept of identity refers to 'who or what someone is, the various meanings someone can attach to oneself or the meanings attributed to oneself by others' (p. 282). Drawing on the work of Sikes *et al.* (1991), he examined three main features of secondary school teachers' professional identities: the subject that teachers teach, their relationships with pupils, and their role or role conception. Beijaard argued that for secondary school teachers, professional identity is derived, in the first instance, from the subjects that they teach, which have a strong and ongoing influence on their perceptions of themselves as professionals. With Sikes *et al.* (1991), he noted that relationships with colleagues in the school who also teach the same subject have particular significance to teachers, together with the different statuses of particular subjects.

Beijaard also noted the significance of pupil agency in this process. Drawing also on the work of Riseborough (1985), who maintains that the perceptions and behaviours of pupils are 'instrumental in the generation of differential rates of teacher "achievement", vertical and horizontal promotion, "satisfaction", absenteeism, nervous breakdowns, "deviance", resignation, etc. (Riseborough, 1985, p. 262, cited in Beijaard, 1995, p.283), Beijaard proposed that pupils' attitudes and behaviour may have profound effects upon the teacher's 'self ('me') *and* his/her structural position at the meso (organisational) level as 'adult', 'parent', 'teacher'. The more personal and professional selves are integrated into teacher identity, the more this is affected by

positive or negative pupil behaviour. Beijaard's findings also point to the importance of teachers' experience being taken into account in research on personal histories and their 'substantial' selves. Like Sikes (1992), he found that 'teachers of similar age and sex share similar experiences, perceptions, attitudes, satisfactions, frustrations, and concerns, and the nature of their motivation and commitment alters in a predictable pattern as they get older' (Sikes, 1992, p. 40, cited in Beijaard, 1995, p. 284).

For Beijaard, then, as with Nias (1989), an important element of teachers' identities related to their experiences of school. Like Rutter *et al.* (1979), Galloway *et al.* (1982); Mortimore *et al.* (1988); Pollard (1985) and Woods *et al.* (1997), he found that the culture of the school, its internal dynamics and organisation, enable or constrain the achievement of 'satisfaction', 'commitment' and 'motivation' and impact upon teachers' constructions of their teacher identities and the acceptance or rejection of the identity teacher as an aspect of self. He suggested that teachers have high stability in their careers 'when they have a good relationship with pupils and when they function well in the school organization' (p. 292), and that a change to one of these aspects results in a period of instability within the teacher's career. His research showed that, overall, the teachers' actual perceptions of their professional identities were influenced in a positive manner by:
(1) the transition in schools from teacher-centred towards pupil centred education, (2) schools' directedness towards pupil counselling, (3) the co-operation between colleagues in general and between those who teach the same subject in particular, (4) the possibility of having additional jobs in but also outside the school, and (5) the opportunity to influence the development of school policy, (p. 288)

(1) Negative influences included: colleagues (for example by the feeling that one's subject is not taken seriously by colleagues or as a result of different levels of previous education), (2) effects of mergers (for example by possessing no adequate teaching style when one has to teach other categories of pupils, in particular pupils of schools with a 'lower status' and (3) the school organization and its structure (often criticised for being obscure and insufficiently open, it remains unclear whether this is really the case or a reaction of teachers to personal frustrations), (pp. 288-289)

The most important contributions by Beijaard's research to understandings of teacher identity, then, concern (i) the interplay between teachers' relationships and interactions with their pupils, (ii) their perceptions of their subject status, (iii) the influence of the school environment, and (iv) the relationship between these and stability or instability of identity. (v) The multiple 'I': agency and structure in the early years of teaching

In Canada, Cooper and Olson (1996) and Reynolds (1996) investigated the interconnections between the personal and professional elements of teachers' identities exposed by Nias and Beijaard. Their work goes beyond these, however, by its identification of 'multiple selves' of teachers, which, they suggest, are continually reconstructed through the historical, cultural, sociological and psychological influences which all shape the meaning of being a teacher.

Nias's (1989) work and suggests that, in the early phase of their career, teachers have little agency in the shaping of their identities, and, moreover, that the 'interactional processes' in which teachers' selves are constituted have little impact upon the

structures (educational or otherwise) through which their identities are lived out.

Issues of teacher agency and its relationship to social and educational structures for teachers in their early years were explored further by Celia Reynolds, (1996). She suggested that teachers' selves are both constructed in their identities and constructive of them (Davies, 1993). In an application of this 'subjectification' model to longitudinal data collected from beginning teachers in Ontario, Canada, Reynolds and her colleague identified three problems: (i) although beginning teachers had accepted that 'at this early stage in their work as teachers, their primary goal was to "blend in" to their surrounding landscape in order to survive "induction" and to be "enculturated" as a "good teacher" according to prescribed definitions and scripts' (p.75), interviews with the teachers three years after their teacher education showed that this view had changed. They had found a diversity in the 'landscapes' of schools which confounded earlier definitions and challenged them to assert their own sense of agency; (ii) through exposure to a variety of schools, the teachers experienced conflict and confusion. 'Many of them began to question previously held beliefs about themselves and about their students. A few expressed concerns about the dominance of a discourse which they now saw as robbing individuals of the "potential to become something other than what has been predicted'" (p. 75); and (iii) as they progressed, teachers found that pupils and parents did not fit the images that they had previously held whilst training. These three 'scripts' of 'constraint' highlight the shifting sands of personal experience and school cultures on which identities are constructed, deconstructed and reconstructed in the early years of teaching.

(iii) Fragmented selves

The concept of an 'active' agential teacher self, as suggested by Reynolds through her metaphor of the 'landscaper', was also proposed by MacLure (1993) through her empirical research with 69 teachers at the beginning of a period of radical systemic reform in England. Critical of earlier notions of an essential or substantial 'self, MacLure advocated a post-structuralist understanding of identity which is formed and informed through the 'discursive practices' and interactions in which individuals engage. Here identity is not a stable entity that people possess, but rather, is constructed within social relations and used by individuals as an interactional resource. This view is not dissimilar to those expressed by Beijaard, Olson and Cooper and Reynolds. However, it locates teacher identity in a particular view of broad, social movements.

Variations in identity

For a given individual, or for a collective actor, there may be a plurality of identities. Identities are sources of meaning for the actors themselves, and by themselves, constructed through the process of individuation. The construction of identities uses building materials from history, from geography, from biology, from productive and reproductive institutions, from collective memory and from personal fantasies, from power apparatuses and religious revelations. (Castells, 1997, pp. 6-7)

The effects of the interaction of biography, experience and context in the construction and reconstruction of identity seem, however, to be disputed. For some researchers (e.g. Nias, Beijaard), teachers have a relatively stable identity, rooted in core sets of

values, beliefs and practices. For others (Cooper & Olson, Reynolds, MacLure), teachers' identities are essentially unstable, their temporary stability likely to be affected at any time by either their own 'biographical projects', change in their working environments or a combination of the two. Additionally, although all are present in each of the research projects, more or less cognisance is taken of:

- macro structures: broad social/cultural features usually referred to in discussions of social diversity and/or government policy as it is implicated in the order of an education service;
- meso structures: the social/cultural/organisational formations of schools and teacher education;
- micro structures: talked of in terms of colleagues, pupils and parents;
- personal biographies: values, beliefs, ideologies.

A further consideration in the discussion of teacher identity is that of emotional factors. In a review of empirical research, Sutton (2000) found that love (as a social relationship) and care, surprise and joy, anger, sadness and fear, excitement and pleasure in students' progress and achievements are among the most commonly cited emotions. Because of their emotional investments, teachers inevitably experience a range of negative emotions when control of long held principles and practices is challenged, or when trust and respect from parents, the public and their students is eroded. Kelchtermans (1996) has also reported on teachers' feelings of *vulnerability,* engendered when professional identity and moral integrity are questioned either by policy changes, parents, inspectors, or colleagues in the light of unrealistic expectations or their failure to help students achieve higher standards. In England, Jeffrey and Woods (1996) found *professional uncertainty,* confusion, inadequacy, anxiety, mortification and doubt among teachers when they investigated primary school teachers' responses to an external (Office for Standards in Education) inspection, associating these with 'dehumanisation' and 'deprofessionalism'. Other negative emotions are: frustration; anger exacerbated by tiredness, stress and students' misbehaviour; anxiety because of the complexity of the job; guilt, sadness, blame and shame at not being able to achieve ideals or targets imposed by others. Emotions play a key role in the construction of identity (Zembylas, 2003). They are the necessary link between the social structures in which teachers work and the ways they act:

emotion is a necessary link between social structure and social actor. The connection is never mechanical because emotions are normally not compelling but inclining. But without the emotions category, accounts of situated actions would be fragmentary and incomplete. Emotion is provoked by circumstance and is experienced as transformation of dispositions to act. It is through the subject's active exchange with others that emotional experiences is both stimulated in the actor and orienting of their conduct. Emotion is directly implicated in the actor's transformation of their circumstances, as well as the circumstances' transformation of the actors' disposition to act. (Barbalet, 2002, p. 4)

The literature cited so far suggests that identities are a shifting amalgam of personal biography, culture, social influence and institutional values which may change according to role and circumstance. They depend upon:

the sustaining of coherent, yet continuously revised, biographical narratives, [which] takes place in the context of multiple choice ... Reflexively organised life planning ... becomes a central feature of the structuring of self-identity. (Giddens, 1991, p. 5)

Thus, the ways and extent to which reforms are received, adopted, adapted and sustained or not sustained will not only be influenced by their emotional selves but will exercise influence upon them.

Conclusion

The architecture of teachers' professional identities is not always stable, but at certain times or during certain life, career and organisational phases may be discontinuous, fragmented, and subject to turbulence and change in the continuing struggle to construct and sustain a stable identity. Indeed, today's professional has been described as, 'mobilizing a complex of occasional identities in response to shifting contexts' (Stronach *et al.,* 2002, p. 117). Such mobilisations occur in the space between the 'structure' (of the relations between power and status) and 'agency' (in the influence which we and others can have); and it is the interaction between these which influences how teachers see themselves, i.e. their personal and professional identities. Stronach *et al.'s* (2002) research with nurses and teachers, like others before it (Nias, 1989; Bowe & Ball, 1992; Kelchtermans, 1993; Hoyle & John, 1995; Hanlon, 1998; Furlong *et al.* 2000; Friedson, 2001), claims that 'professionalism' is bound up in the discursive dynamics of professionals attempting to address or redress the dilemmas of the job within particular cultures (p. 109). Their reading of professional identities and their own data from teachers in six primary schools in England, though limited, and 'walking the tightrope of an uncertain being' (p. 121), resonates with much other empirical research on teachers' plurality of roles (Sachs, 2003) within work contexts which are characterised by fragmentation and discontinuities (Huberman, 1995) and a number of tensions and dilemmas (Day *et al.*$_y$ 2000) within what is generally agreed to be increasingly intensive external audit policy cultures (Power, 1994) which are present in many developed nations.

Teachers in all countries need support for their commitment, energy and skill over their careers if they are to grapple with the immense emotional, intellectual and social demands and as they work towards building the internal and external relationships demanded by ongoing government reforms and social movements. The picture of teachers in English schools involved in the VITAE project gives cause for concern and hope concern because it is clear that there *are* variations in perceived effectiveness which relate to life events, age, experience, phase of schools and their socio-economic status; concern because of the high levels of professional stress which, for many, are having negative effects upon their personal lives; concern also as to whether such levels can be sustained without loss of some of the best teachers or loss of their energy, commitment and sense of purpose. Yet there is hope, too, because of the high levels of commitment and agency, often against the odds, which many teachers' accounts reveal.

The VITAE research does suggest that some teachers themselves do seek and find, in different ways, their own sense of stability within what appears *from the outside* to be fragmented identities, and that the capacity to sustain such stability is directly associated with a combination of positive factors to be found within personal life situations and school working contexts (Day *et al.,* 2005). Furthermore, it suggests that neither stability nor instability will necessarily affect their effectiveness.

Sustaining a positive sense of effectiveness to subject, pupils, relationships and roles

is important to maintaining motivation, self-esteem or self-efficacy, job satisfaction, and commitment to teaching; and although this research shows consistently that identity is affected, positively and negatively, by classroom experiences, organisational culture and situation-specific events which may threaten existing norms and practices (Nias, 1989; Kelchtermans, 1993; Flores, 2002), successive reform implementation strategies have failed to address the key role played by these, and thus, paradoxically, fail to meet the standards' raising recruitment and retention agendas which they espouse.

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Upholding Academic Integrity: An Institutional Response to Student Use of Contract Cheating Services

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Abstract
Students paying online contract cheating services for individualized and affordable responses to their assessment tasks is a serious threat to academic integrity in universities. Australian universities were thrown into this arena due to public press coverage of the MyMaster contract cheating 'scandal' in 2015. This incident named prominent universities, numbers of student cheaters, details of payments, and more. Since then, Australian universities have sought to understand the extent of the problem, find ways to address practices, manage reputational risks, and demonstrate responses to the government regulator's requirements. Existing data matching software rarely detect these customized student submissions. Contract cheating services are readily available and promoted to students through social media, peers and direct marketing on internet browsers. Of particular concern are vulnerable students who may be persuaded by such marketing to use these sites, believing they are not doing anything wrong or having no thoughts of future consequences. This paper provides insights into the thought leadership and practices of a large research-intensive metropolitan university in Australia that is addressing this challenge, based on an institutional academic integrity action plan. Aspects of the Plan include ensuring robust policies are in place; supporting academics in investigating breaches; taking appropriate action against misconduct; strengthening administration structures and practices; building an institutional culture of integrity; educating staff and students; strengthening assessment design; and exploring technological solutions. This paper aims to inform readers and encourage further collaboration across the sector to combat this challenge.

Keywords: Academic Integrity, Contract Cheating, Institutional Policies, Action Plan, Student Misconduct

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Introduction

Academic integrity is the moral code of academia and includes staff and student commitment to the values of honesty, responsibility, transparency, respect, trust and courage in assessment, research, and publishing (UQ PPL.3.10.02Assessment Policy). Universities expect all staff and students to be responsible for their actions, with staff acting as role models for students (Universities Australia 2017). Academic misconduct includes long-standing practices such as unintentional or minor grievances due to poor referencing and inadequate academic skills, intentional plagiarism of others' ideas or words, and collusion amongst students sharing their work with others. These practices are usually detected by data matching software platforms used by universities. 'High tech' cheating practices, however, using ghost writers, a practice commonly called 'contract cheating', a term coined by Clarke and Lancaster (2006), is more difficult to detect by matching software or markers. Rowland, Slade, Wong and Whiting (2018) comment that contract cheating practices are 'central to much modern cheating behaviour' (p. 653).

Students paying online contract cheating services for individualised and affordable responses to their assessment tasks, which they then submit as their own, is a serious threat to academic integrity in universities. Australian universities were thrown into this arena due to public press coverage of the MyMaster contract cheating 'scandal' in 2015. This coverage named prominent universities, numbers for student cheaters, details of payments, and more. Since then, Australian universities have sought to understand the extent of the problem, find ways to address practices, manage reputational risks, and demonstrate responses to the government regulator's requirements.

Literature Review

A significant body of scholarly literature helps us understand why students cheat, with researchers suggesting both individual and contextual factors are involved. Early work in the 1990s by McCabe, Trevino, and Butterfield (1999) found academic and family pressures, the desire to get higher grades, stress, laziness or apathy, and a lack of preparation were influencers. A later survey by McCabe and Trevino (1997) added peer attitudes and behaviour. Later research found individual drivers to include procrastination and fear of failure (Siaputra, 2013), low self-control (Curtis et al. 2018); surface learning and disengagement with morality (Barbaranelli et al., 2018), a competitive focus but impulsive with reduced confident (Moss, White & Lee, 2018) and psychological health problems, such as stress, anxiety, and depression (Tindall & Curtis, 2020). Contextual drivers include students seeing opportunities to cheat, lack of language proficiency, and dissatisfaction with the teaching and learning environment (Bretag et al., 2018).

Commercial contract cheating services respond to these individual and contextual drivers by reaching out to students using multiple persuasive marketing techniques, as would a website legitimately selling products and services. Research by Rowland et al. (2018) analysed these persuasive techniques using a six-dimensional framework previously used to measure initial website persuasiveness for holiday choices (see Kim & Fesenmaier 2008; Diaz & Koutra 2013). Their analysis of the contract cheating services' homepages revealed marketing strategies, such as live chat, discounts for first time use, easy to use ordering button and price calculator, assurances of quality work,

a plagiarism free report, money back guarantee, and testimonials. Further, students could buy almost all assessment types across the gamut of disciplines, for example, from annotated bibliographies to oral presentation slides, essays and textbook answers, through to thesis proposals, and dissertations. Cost is determined by the number of pages and timeframe needed for delivery and can be much cheaper than paying fees to repeat a course.

The student, institutional and societal risks that accompany academic misconduct are heightened in contract cheating practices. Students are focused on meeting their immediate need of getting an assessment task response, rather than future implications of their actions. They are, however, open to being blackmailed by these unscrupulous services, both as students and future professionals (see Yorke, Sefcik & Veeran-Colton, 2020) and if caught by their institution will receive academic penalties, ranging from no credit for the task or course, or more seriously being suspended or expelled from their institution. Institutions that do not address student misconduct as open to reputational damage, the devaluing of their degrees, threats to their existing culture of honesty, and equity issues for honest students. Public risks are significant if we have under-qualified graduates working in society.

In summary, two questions must be asked:
1. 'How can we ensure that students genuinely complete assessment responses for which they get university credit? and,
2. 'In what ways can universities respond to this new form of cheating?'

Case Study Example

The following sections of this paper provide insights into the thought leadership, research, and practices of a large metropolitan research-intensive university in Australia, with approximately 55,000 students. Figure 1 outlines the academic integrity progress made by the University from 2016 until the present.

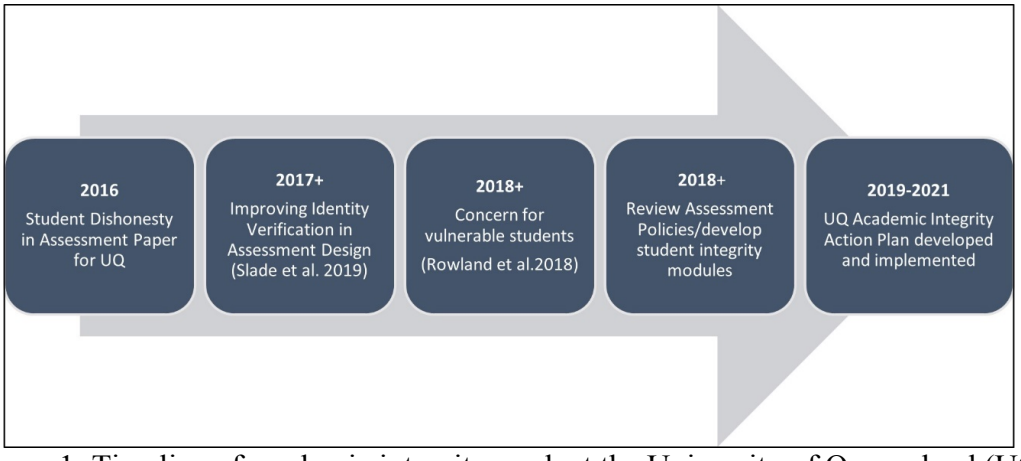

Figure 1: Timeline of academic integrity work at the University of Queensland (UQ)

In 2016 the University's Assessment Sub-committee asked the author, and two of her colleagues, to investigate the current issues involved in student dishonesty in assessment. The resulting publication, Addressing Student Dishonesty in Assessment Issues Paper for the UQ Assessment Sub-Committee, provided an overview of scholarly literature and an environmental scan of other universities' responses at the

time. A summary of the paper's recommendations is provided in Figure 2, which includes ensuring robust policies are in place, supporting academics in investigations, taking punitive but educative action against misconduct, strengthening administrative structures and practices, ensuring an institutional culture of integrity, providing educative resources for students and staff, strengthening student identity verification in assessment design, and exploring available technologies. No one of these initiatives are enough to combat student misconduct in assessment, but rather all eight aspects need to function together to have an effective institutional approach to maintaining academic integrity (Slade, Rowland & McGrath, 2016).

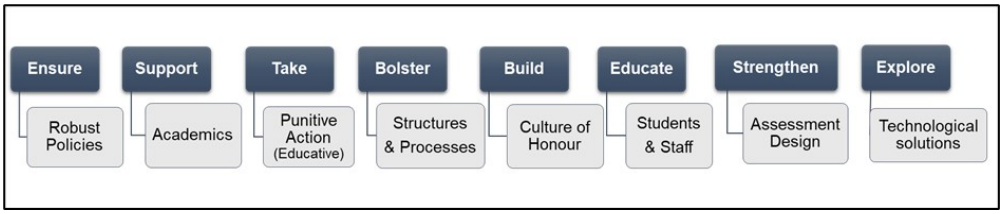

Figure 2: Holistic approach to institutional academic integrity
(Slade, Rowland & McGrath, 2016)

In October 2016 the Asia Pacific Forum on Educational Integrity (APFEI) funded the project 'Developing Student Identity Verified Assessment: A response to contract cheating'. With these funds, the author as project leader, and Professor Susan Rowland, from the Institute for Teaching and Learning Innovation (ITaLI) at The University of Queensland, facilitated two creative co-design workshops – one in Brisbane and the other in Melbourne – in early February 2017. Representatives from fifteen Australian universities collaborated in the workshops to redesign a suite of generic assessment tasks, (other than exams) to improve the verification of student authorship in completing the tasks. The workshop processes and outputs can be found in the International Journal for Academic Development. The author continues to facilitate similar co-design workshops at inter/national and institutional levels, as educators learn how to strengthen their assessment design in response to contract cheating.

The publication, mentioned previously about the vulnerability of students to the persuasive messages of online contract cheating services by Rowland, Slade, Wong & Whiting was published in 2018 as the output of a student-staff partnership research project. In the same year, the author was UQ's representative on the Epigeum International Development Collaborative in which twenty universities globally developed new academic integrity modules, for both students and staff. The student modules are based on interactive scenario-based pedagogies that aimed to help students make good ethical decisions when confronted with typical academic integrity challenge points. The modules are customised to include extra UQ resources and compulsory assessment questions are sprinkled throughout the modules; all of which the student needs to answer correctly before module completion can be recorded. Staff, who support students in the teaching and learning environment, are encouraged to complete the staff modules. The development and implementation of these academic integrity modules became Recommendations 3-5 of the University's Academic Integrity Action Plan, discussed below.

The concept of student identity verified assessment (IVA) with hurdles continued to be discussed and implemented at different levels across the University. IVA is defined as an assessment task designed to ensure that the task is completed by the student. IVAH

is identity verified assessment with a hurdle that requires students to achieve at a particular level to be awarded grades. This concept became Recommendation 13 of the Action Plan, outlined in Table 1.

Other recommendations of the Action Plan outlined in Table 1 include: establishing a student designed and led honour code; ensuring robust policies are in place; supporting academics in investigating breaches; encouraging student reporting of misconduct; taking appropriate educative action against misconduct; raising awareness of misconduct penalties; supporting students who have English as an additional language; consolidating administration structures and practices; adopting effective e-Assessment options; and strengthening assessment design

No.	Description	Progress
1	Establish a Student Academic Integrity Honour Code	In progress
2	Develop an operationally enforceable Student Code of Conduct to replace the current Student Charter applicable to all UQ students.	TBA
3	Provide an educative online academic integrity program for students and staff – the Epigeum Academic Integrity Program (EAIP).	Completed
4	Require students to complete the student-facing online academic integrity program.	Completed
5	Request academic and professional staff who directly support teaching to complete the staff-facing online academic integrity program.	Completed
6	Create an encouraging environment for students to report breaches of academic integrity by their peers.	In progress
7	Adopt an educative approach to sharing past breaches with students and how these breaches were penalised.	Completed
8	Implement a campaign to highlight and promote the importance of academic integrity.	In progress
9	Develop a support program for students with English as an additional language (EAL) and culturally and linguistically diverse (CALD) students.	In progress
10	Support academic staff in detecting and reporting academic misconduct. Support Integrity Officers to promote appropriate practices and decisions within Schools regarding suspected and actual breaches of academic integrity	Completed
11	Support the uptake of effective and reliable e-Assessment tasks	In progress
12	Revise the academic integrity and misconduct policy	TBA
13	Review the Assessment PPL entry to include Identity Verified Assessment with Hurdles (IVAH) in each course and establish guidelines that promote assessment design to reduce the risk of academic misconduct whilst achieving other essential teaching and assessment goals. Support staff in the design and uptake of new assessments.	In progress

Table 1: Description and progress of academic integrity action plan recommendations (UQ Academic Integrity Action Plan)

The implementation of the UQ Academic Integrity Action Plan's recommendations is underway, despite the interruption in 2020 of enacting rapid remote delivery of teaching and learning in response to the COVID-19 pandemic. A working party with representatives from across the University, including student leaders, academics, and professional staff, is furthering the implementation in 2021.

Conclusion

This paper presents the academic integrity challenges contemporary tertiary institutions face from sophisticated online commercial contract cheating services. It also briefly outlines a large metropolitan University's response to these challenges. Unfortunately, there is no end to the cheating opportunities the internet provides to students. Institutions need to remain vigilant as new services emerge and respond with sound but flexible policy and practice outcomes. No individual institution is exempt from contract cheating services; this is a shared problem which requires the sector to collaborate in research initiatives, to share practices (both positive and negative) and resources and take collective action to combat this challenge.

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Developing and Evaluating an E-learning Material for Speaking Practice with the Latest AI Technology

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Abstract
Recent years have seen remarkable advancements in information and communication technology (ICT) and artificial intelligence (AI), and many e-learning materials that use ICT and AI have become available on the market. However, none of them has been proven effective at improving speaking skills in English as a Second Language (ESL) and English as a Foreign Language (EFL) classrooms. The author's previous work suggested that speaking practice with voice recognition and an AI scoring system is an effective method because it allows students to practice speaking anytime and anywhere, without a partner. Furthermore, learners' psychological anxiety may be alleviated, eliminating the resistance to speaking English. With AI, learners do not have to feel embarrassed even if they make mistakes, and they can repeat the practice materials many times. This study describes a newly developed e-learning material that makes the best use of advanced AI technology. It includes activities such as shadowing, role-playing conversations, and speech delivery practice with automatic evaluation and scoring. Also reported are the results of comparisons between pre- and post-test scores on the Test of English for International Communication (TOEIC) and the Oral Proficiency Interview – computer (OPIc) test to evaluate the effectiveness of speaking practices and the improvement of oral skills with the proposed system. Finally, a questionnaire is used to examine learners' opinions on learning English with AI. Possible further developments of the e-learning system using AI technology include improving the accuracy of speech recognition for utterances by non-native English speakers, updates to reflect the latest evolution of AI, and the addition of a capability for free conversations instead of just set phrases.

Keywords: Voice Recognition, Artificial Intelligence, Shadowing, Pronunciation, TOEIC, Opic

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1. Previous Studies

There has been much discussion about the problems in teaching English speaking skills in Japan. One issue is that many Japanese EFL teachers are not good at or do not have confidence in their own pronunciation, and as a result, speaking classes are often left to be taught by native speakers. However, those native speakers are sometimes not qualified to teach ESL or lack appropriate strategies for teaching non-native speakers.

Another problem is class size. Many EFL classes in Japan have about 30 to 40 students, which makes it difficult to teach speaking skills. Other problems are a lack of appropriate teaching materials and Japanese students' characteristics such as shyness and hesitance to speak in public.

Yet despite the various problems, there have been growing expectations for improving Japanese students' EFL speaking skills. For instance, Japan's Ministry of Education has recently emphasized a balance of the four skills of English, especially speaking. Globalization is another key issue, and, though it is doubtful, the Olympics and Paralympics might take place in Tokyo in 2021.

1.1. English Central

As a Japanese EFL teacher, I have tried various materials and methods for teaching speaking over the past few years. I describe some of my trials here. In 2017, I asked students to use the English Central website, which provides short video clips for listening practice. On the site, students repeat phrases from the video clips, and an AI technology called Intellispeech recognizes and evaluates their pronunciation. The results are shown in three colors. However, Intellispeech uses a somewhat primitive voice recognition system, and its evaluation is vague. Also, it only recognizes certain set phrases.

Alongside the use of English Central in 2017, I arranged for the students to practice speaking with Filipino teachers through Skype. This combined method seemed to be a better approach; however, the limited class budget allowed only for two Skype sessions per year (i.e., once a semester). The students needed more interaction with native English speakers.

1.2. Filipino Teachers

Another trial was done with a Filipino teacher (Sakamoto et al., 2016). This time, I organized one-to-one speaking practice through Skype. This trial was made possible by financial support from a company. Without the financial support, the students would have had to pay their own cost, which would have posed an extra burden for them and would not have been an ideal practice for a classroom setting.

Then, I had another opportunity to work with Filipino teachers (Sakamoto et al., 2017). This time, I received financial support and invited Filipino teachers to Japan. I organized small group lessons with them, and they used the Callan Method. The lessons were popular and received a good reputation. However, it was difficult to obtain approval for the lessons to be recognized as a formal class where students

could earn credits because the Filipino teachers were not approved by the ministry even though they held Teaching English as a Second Language (TESL) certificates in the Philippines.

2. The First Trial

2.1. Shikibu App

After the previous trials, I created my own e-learning materials with voice recognition and AI. I implemented the materials using three different platforms: Shikibu, SpeakBuddy, and the English Listening and Speaking Test (ELST). Below, I describe the three trials in which students used the materials on these platforms. There are several technologies related to voice recognition such as Siri, Google Assistant, and many AI speakers. Also, there advancements have been made in AI technologies like IBM's Watson.

The first trial was carried out using the Shikibu app, with support from NTT Learning Systems. NTT Learning Systems developed a speaking practice system using Apple's Siri and IBM's Watson. The system was designed for Japanese students of EFL to practice English utterances. It uses Siri for voice recognition and Watson for evaluation and giving responses. Since it uses Siri, it is available only on iPhones.

The study for the first trial was done with 26 students at my university, and all of them were computer science majors. The experiment was carried out over approximately a three-month period from July to September 2017, during their summer break. Students used the app to practice English on a self-study basis.

Fig. 1 Shikibu's Main Menu

Fig. 2 Lesson Menu on Shikibu

Fig. 3 Example of a Speaking Exercise on Shikibu

Fig. 1 shows the main menu of the Shikibu on the iPhone. Fig. 2 shows a lesson menu. All the exercises are designed based on the questions for TOEIC speaking test. There are a read-aloud practice, a word and phrase exercise with multiple choices for fill in the blank, and a picture description practice. In the picture description practice (Fig. 3), Siri recognizes the student's utterance and Watson evaluates whether the answer is correct or not. In the question practice, the conversation is documented as a chat record for students to refer back to.

2.2. Questionnaire

After the experimental practice, I analyzed the effectiveness of the system by asking the students about their impressions and reactions using a Google questionnaire form (Shishido, 2018: 1). The questionnaire items were divided into five major categories based on whether they were related to 1) English learning, such as the student's English ability, 2) Shikibu's functions, including the app's effectiveness, 3) Shikibu's contents, 4) benefits of using the app, and 5) future use.

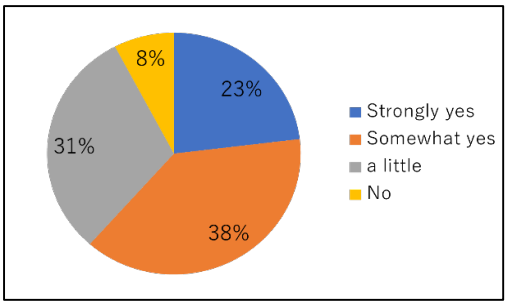

Fig. 4 Interest in Shikibu

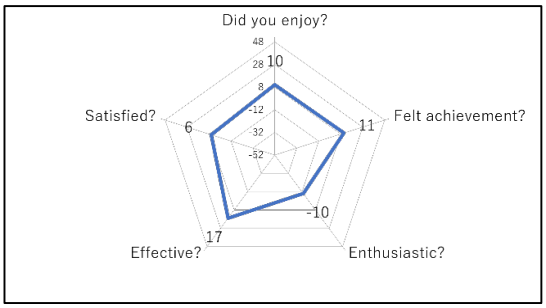

Fig. 5 Radar chart

In response to the question "Were you interested in the app with AI?," 23% of the students answered "yes," while 38% said "somewhat yes" and 31% said "a little." Thus, a total of 92% responded that they were interested in the app (Fig. 4). This is a very high percentages of students indicating interest.

Fig. 5 summarizes the results for the responses to the five questions about the students' impressions of Shikibu, which related to enjoyment, achievement, enthusiasm, effectiveness, and satisfaction. The total scores were calculated based on a score scale with four categories: 2 points for "yes," 1 for "somewhat yes," -1 for "somewhat not," and -2 for "no." The scores for each question were as follows: enjoyment, 10 points; achievement, 11 points; effectiveness, 17 points; satisfaction, 6 points; and enthusiasm, -10 points (Fig. 5). Only the score for enthusiasm was negative, while those for the other questions were affirmative and very high. This seems to indicate that the students found Shikibu very effective and fun to study with, and they felt a sense of achievement and satisfaction when they had completed their studies. Some of the reasons for the low score for enthusiasm may lie in the unfamiliarity of TOEIC among the students and the difficulty level of the questions. It may be possible to improve the enthusiasm scores by changing the contents of future lessons.

In answer to the question "Did you find the English spoken in Shikibu natural?," 84% of the students reported that it was natural even though Shikibu uses Siri and its voice is artificially composed (Fig. 6). The majority of the students' responses were

positive and affirmative. Japanese learners often have negative feelings about speech practice in English because they feel embarrassed about speaking in English and are not confident. However, when asked about their experience using the app, 85% answered that they "felt less resistance to speaking English" and 92% said they were "not embarrassed to make mistakes." Thus, practicing English conversation with e-learning materials using AI allowed the students to overcome negative feelings, make progress, and gain confidence in English conversation with autonomy (Fig. 7).

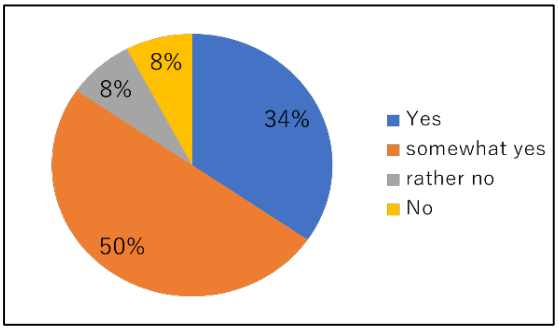

Fig. 6 Is the AI English natural?

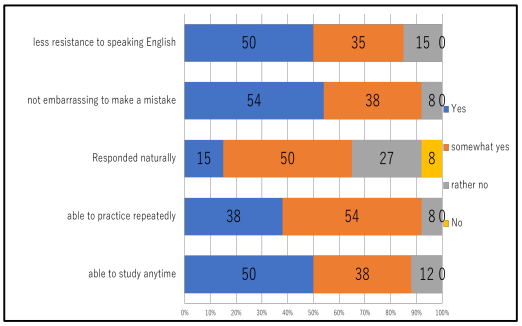

Fig. 7 Benefits of Shikibu

When asked if the English conversation practice with AI matched their learning style, 19% of the respondents said "yes" and 62% said "somewhat yes." Thus, a total of 81% thought the conversation practice with AI somehow matched their learning style and wanted to engage in this kind of English learning exercise.

3. The Second Trial

3.1. SpeakBuddy App

For the second trial, I received support from a company called AppArray. They created a smartphone app named SpeakBuddy with Google voice recognition and AI. The second trial was conducted from April to December 2018 in regular university classes on English speaking skills. The students were 209 first-year students in six different classes, all majoring in information and computer science. The students studied with the smartphone app during the class for nine months and took the questionnaire in the last week of May.

Using smartphones is usually prohibited during the class, but for the experiment, the students used their smartphones to practice English conversation with AI. Fig. 8 is a screenshot of the smartphone app SpeakBuddy. Once the user taps the app icon, the menu screen appears. The contents of SpeakBuddy focus on business English conversation. There are main lesson contents and several exercises in a lesson. The vocabulary practice consists of multiple-choice questions for matching vocabulary words and their meanings in Japanese. Then, in the listening practice section, a model conversation is played. After the students have listened to the model conversation, they proceed to the speaking practice section, where they repeat certain phrases they heard. The AI evaluates their pronunciation and provides feedback using three colors: red, yellow, and green (Fig. 9).

There is another speaking practice with blank spaces (Fig. 10). The students guess the words to fill in the blanks and pronounce the full phrases. The AI judges if their

answers are correct and evaluates their pronunciation at the same time.

Fig. 8 SpeakBuddy lesson menu

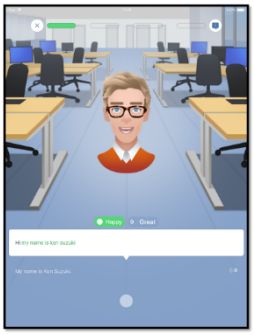

Fig. 9 Screenshot of the speaking exercise in SpeakBuddy

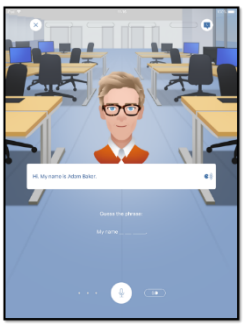

Fig.10 Screenshot of the exercise on speaking to fill in the blank in SpeakBuddy

3.2. Questionnaire

In the last week of May, about two months after the students had studied with SpeakBuddy, they completed a questionnaire (Shishido, 2018: 2). The questionnaire items were classified into five categories: English ability, SpeakBuddy functions and effectiveness, lesson contents, benefits of the English conversation app using AI, and future use.

The radar chart in Fig. 11 summarizes the results for the students' responses to five questions about enjoyment, achievement, enthusiasm, effectiveness, and satisfaction, respectively. The total scores were calculated based on a score scale with four categories: 2 points for "yes," 1 for somewhat "yes," -1 for "somewhat not," and -2 for "no." The scores for each question were as follows: enjoyment, 27 points; achievement, 55 points; effectiveness, 64 points; satisfaction, 7 points; and enthusiasm, -76 points. Only the score for enthusiasm was negative, while those for the other questions were positive and relatively high. This seems to indicate that the students found SpeakBuddy very effective and fun to study with, and they felt a sense of achievement and satisfaction when they had completed their studies. Some of the reasons for the low score for enthusiasm may lie in the unfamiliarity of business English conversation among the university students and the difficulties of the lesson contents. It may be possible to improve the enthusiasm scores by changing the contents of future lessons.

In response to questions about the benefits of practicing English speaking skills with SpeakBuddy as an AI app, 28% chose that they could study anytime (Fig. 12).

Meanwhile, 26% responded that they did not feel embarrassed to make mistakes, 20% said that they could practice repeatedly, and 19% selected that they felt less resistance in speaking English.

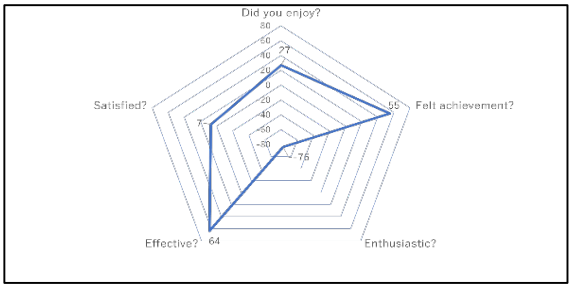

Fig. 11 Student impressions of SpeakBuddy

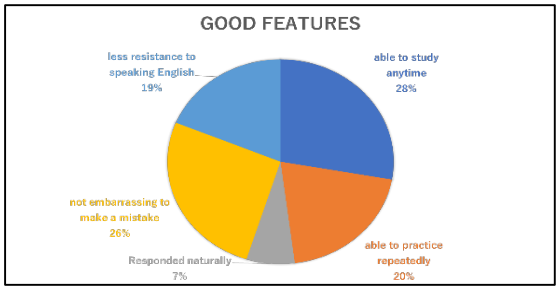

Fig. 12 Benefits of SpeakBuddy

Even though the questionnaire results showed many positive reactions from the students, as the class teacher, I needed to create supplemental materials for as exercises. Since the functions of the smartphone app are very limited, I created vocabulary exercises with Quizlet. I also used Hot Potatoes to create a variety of other grammatical and content-based exercises such as mixed up sentences and cloze tests. These exercises were available on the students' computers, so that they used a combination of the smartphone and computer during class.

In summary, in the second trial, the students practiced their English speaking skills on an individual basis at a low cost, anytime and anywhere. They felt less resistance to speaking, did not feel embarrassed about making mistakes, and were able to repeat the exercises many times. However, the contents of the lessons should be matched to the students' interests and needs. In addition, the voice recognition system needs to be developed further to enhance the recognition of non-native speakers' English.

4. The Third Trial

4.1 ELST Program with Textbooks

For the third trial, I worked with a Japanese company called Sinewave, which created the ELST. This system uses the Chinese voice recognition and AI of iFLYTEC, which was developed to recognize Asian speakers' English. The students were 25 first-year students at the Japanese university. The study was conducted from April to December 2019. The materials were presented in a regular English class.

In addition to the technological support from Sinewave, I also received support from Seibido, a Japanese publisher, to publish a matching textbook. The previous two smartphone apps did not have accompanying textbooks, and I believed this to be a strong necessity. Also, for this product, I created original contents on the topic of "Introducing Japan in English." The contents consisted of all four skills: reading, listening, speaking, and writing.

Figs. 13 to 16 are samples of the textbook. Fig. 13 shows a vocabulary exercise followed by the reading section. The comprehension questions, a note-taking exercise, and grammar practices come after the essay (Fig. 14). The second section is

the listening practice (Fig. 15). After listening to the model conversation, the students work on a fill-in-blank exercise, vocabulary, and comprehension exercise. Speaking and writing sections follow (Fig. 16).

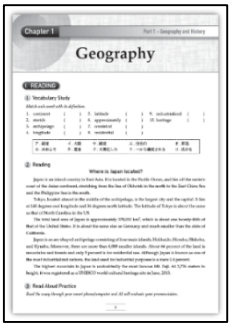

Fig. 13 Reading lesson in the textbook accompanying ELST

Fig. 14 Note-taking lesson in the textbook accompanying ELST

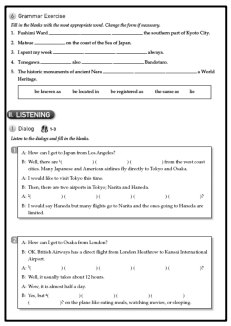

Fig. 15 Listening lesson in the textbook accompanying ELST

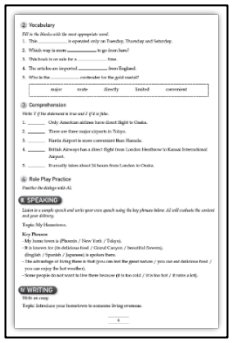

Fig. 16 Speaking lesson in the textbook accompanying ELST

When the computer program opens, the main menu appears. A vocabulary exercise is presented first. The students can listen to a model pronunciation, look at the phonetic

symbols, and read about the meaning. They can also practice their pronunciation and receive an evaluation of it from the AI (i.e., red, yellow, or green). The score appears on the top right of the screen. At the end of the section, the students take a quiz to check their understanding of the vocabulary meanings. There is also a fill in the blank grammar exercise.

The shadowing exercise is the main feature of ELST. In this exercise, the students listen to a model pronunciation and repeat what they hear sentence by sentence. The AI system recognizes their pronunciation and assigns each word a color based on how well it is pronounced: green, yellow, red, or gray. The top left of the screen also shows total evaluations for accuracy, fluency, and integrity. At the same time, a total overall score appears on the top right (Fig. 17). This is also a notable feature of the ELST system.

In the listening section, the model conversation is played, and the students can practice the conversation. The AI system evaluates their pronunciation and generates evaluation feedback in the same way as in the reading section (Fig. 18).

In the speaking section, the students select words and generate their own utterances based on key phrases. The system provides an evaluation of their utterances on the screen. Figs. 17 and 18 show screenshots of the ELST system. The students demonstrated very concentrated and enthusiastic study attitudes in the class.

Fig. 17 Shadowing exercise in ELST

Fig. 18 Dialog practice in ELST

4.2 Comparison of the Pre- and Post-test Results

This section compares the pre- and post-test results of OPIc and TOEIC. The students in the ELST class were requested to take both OPIc and TOEIC at the beginning and end of their academic year. The pre-test OPIc and TOEIC were given in May, and the post-test ones were done in December.

The Oral proficiency Interview-computer test (OPIc) is a speaking proficiency test organized by the American Council on the Teaching of Foreign Languages (ACTFL), and the scales are from 1 the lowest to 8 the highest. In Fig. 19, the blue bar indicates the pre-test results, and the orange bar shows the post-test results. Both the pre- and post-test results have the same lowest and highest level, namely, 1 and 4. In terms of the lowest and highest, there were no differences in improvement. However, a comparison of the mean shows that there was a slight improvement: the mean of the pre-test was 2.04, while that of the post-test was 2.28.

A closer comparison of the OPIc results focuses on the number of students at each

level (Fig. 20). The blue bars are for the pre-test, and the orange bars are for the post-test. As one can see, there was an improvement. Nine students were at level 1 on the pre-test, while this number decreased to four on the post-test. Meanwhile, the number of students increased from 8 to 10 for level 2 and from 6 to 10 for level 3. Even though there was a decrease in the number from 2 to 1 for level 4, most students improved, and the results showed a positive effect of the system overall.

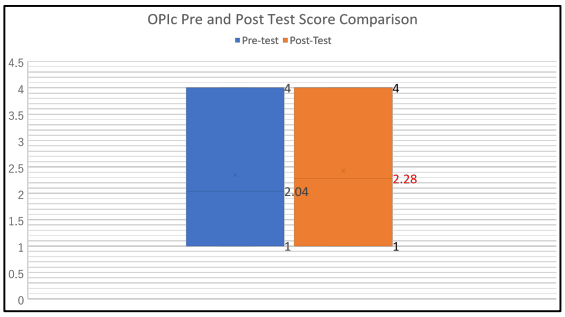

Fig. 19 OPIc pre & post-test results 1

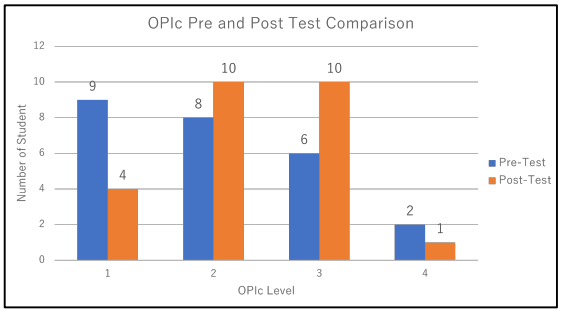

Fig. 20 OPIc pre & post-test results 2

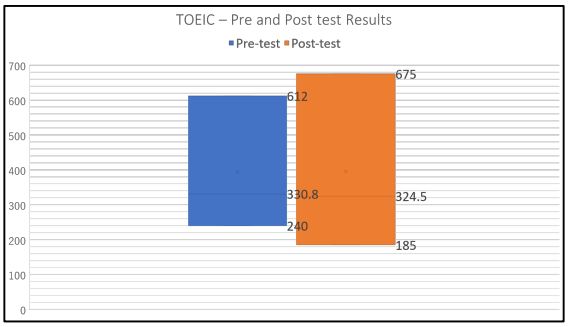

Fig. 21 TOEIC pre- and post-test 1

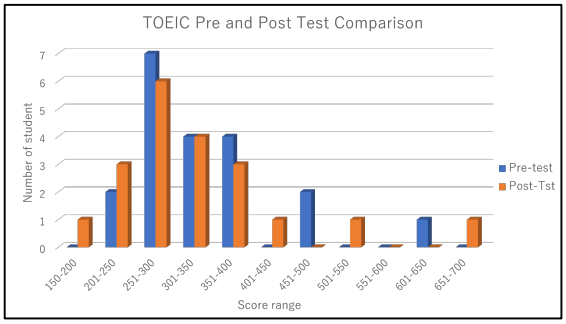

Fig. 22 TOEIC pre- and post-test 2

Next is a comparison of the TOEIC pre- and post-test results. The highest score showed an improvement from 612 to 675, while the lowest score declined from 240 to 185. The mean showed a slight decrease of 6.3 points, from 330.8 to 324.5. A comparison of the number of students in each 50-point range shows some improvement in the higher scores and a decrease in the lower scores.

To analyze and compare the TOEIC scores, I developed the idea of Score Development Rate (SDR), which indicates a potential increase of scores of a test-taker. The concept is intended to rectify the slight unfairness of comparing just the increases or decreases in raw scores. For example, if a student with 490 on the pre-test scores 590 on the post-test, the increase is 100 points. In the same way, if a student with 890 on the pre-test scores 990 on the post-test, the increase is also 100 points. However, these increases may have different meanings. When the increases are calculated with SDR, there is a distinctive difference between the two examples. The SDR of the former student is 20%, while that of the latter is 100%. The SDR formula is given below. The difference is significant, and so the SDR was used to analyze the increases of test scores for the third trial.

SDR = (Post-Test Score–Pre-Test Score) / (Full Mark–Pre-Test Score) × 100
Example 1: TOEIC score increase 490 to 590
(590-490) / (990-490) × 100 = 20%

Example 2: TOEIC score increase 890 to 990

$$(990-890) / (990-890) \times 100 = 100\%$$

The highest SDR was 16.67, and the lowest was -10.56.

The mean SDR was -1.49. Therefore, the SDR overall showed a negative result (Fig. 23).

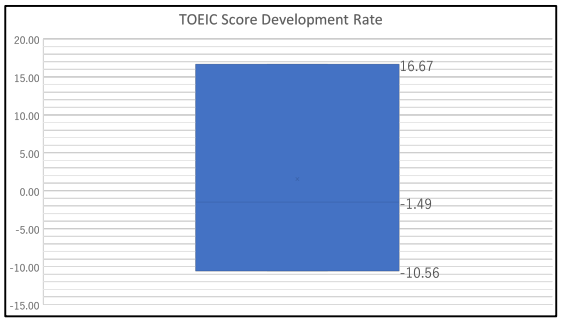

Fig. 23 SDR of TOEIC

4.3 Questionnaire

The questionnaire were administered in December around the end of the study. The answers were scaled from 5 to 1, positive to negative. In response to the question "Were you interested in the ELST?," 23% of the students responded with 5 "very much," 50% with 4 "yes," 23% with 3 "a little," 4% with 2 "not much," and 0% with 1 "no." The average score for interest was 3.93 out of 5. This is a very positive result (Fig. 24).

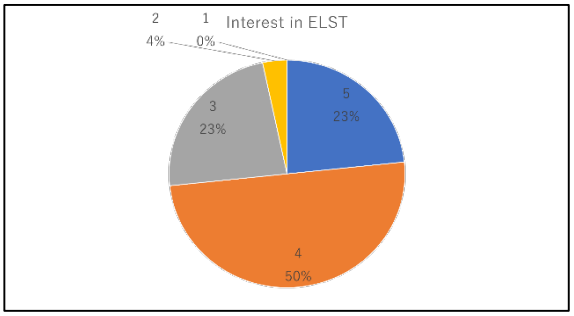

Fig. 24 Student interest in ELST

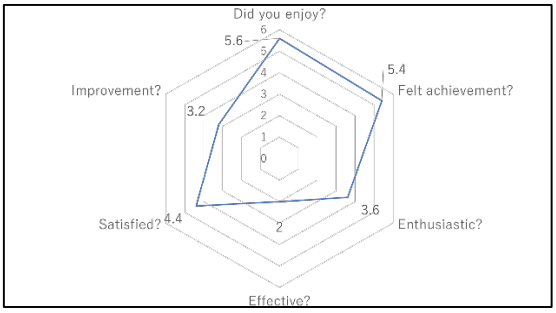

Fig. 25 Student impressions of ELST

Fig. 25 summarizes the results for six questions concerning the students' impressions of the ELST system: enjoyment, achievement, enthusiasm, effectiveness, satisfaction, and improvement. The students were asked to assign number scores from 5 "the best" to 1 "the worst." The total scores were calculated as follows: 2 points for a score of "5," 1 for "4," 0 for "3," -1 for "2," and -2 for "1." For enjoyment, achievement, and satisfaction, the scores were very high (6, 5.4, and 4.4, respectively). Enthusiasm and improvement also showed relatively high scores of 3.6 and 3.2, respectively, while effectiveness did not receive a very positive result with only 2 points.

In the same way, Fig. 26 shows the benefits of practicing speaking with the ELST system. Questions were asked for five categories: if the students felt less resistance to speaking English, they were not embarrassed to make mistakes, ELST responded

naturally, they were able to practice repeatedly, and they were able to study anytime. All five questions received very high scores and very positive responses.

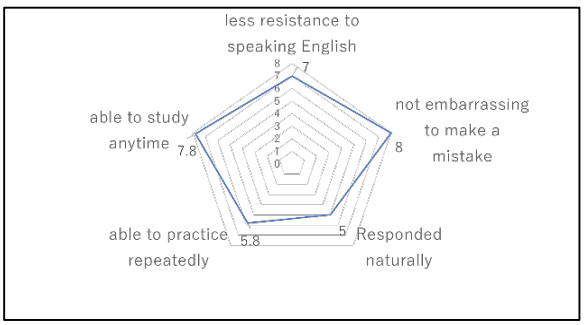

Fig. 26 Benefits of ELST

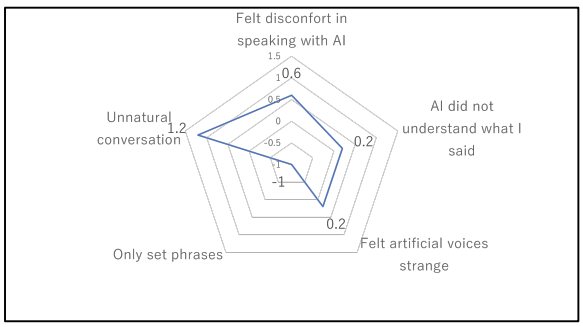

Fig. 27 Negative feelings about ELST

The radar chart in Fig. 27 shows the drawbacks of the ELST system. The lower the scores, the positive or the better the responses were. Questions were asked in five categories: if the students felt discomfort in speaking with AI, the AI did not understand what the students said, the students thought the artificial voice sounded strange, the students were able to practice only set phrases, and the conversations seemed unnatural.

Answers were given on a 5-point scale: 5 “strongly agree,” 4 “agree,” 3 “neutral,” 2 “disagree,” and 1 “strongly disagree.” The scores were calculated in the same way as in the previous radar charts: 2 points for a score of “5,” 1 for “4,” 0 for “3,” -1 for “2,” and -2 for “1.” The question about whether the conversation seemed unnatural received a mean score of 1.2, but the other categories had mean scores of 0.6 and 0.2. The question about practicing only set phrases received a mean score of -1, a very negative response, which means very good. Therefore, the students did not have any negative feelings about using the ELST system.

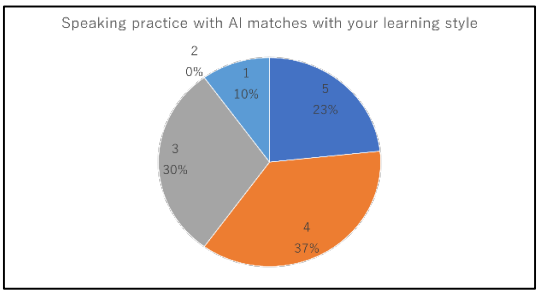

Fig. 28 Learning styl

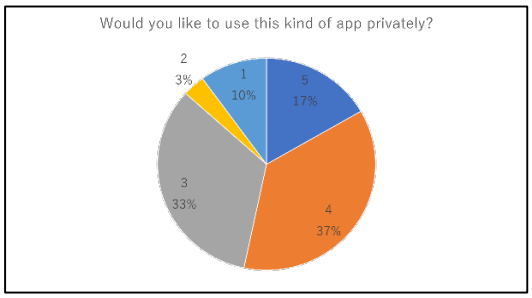

Fig. 29 Students who would like to use the app privately

In response to the question “Do you think speaking practice with AI matches with your learning style?” 23% of the students gave a rating of 5 points, 37% assigned 4 points, and 30% said 3 points. In total, 90% answered with positive responses, and the average score was 3.63 (Fig. 28). Therefore, the majority of students showed very positive reactions. For the question, “Would you like to use this kind of app privately?,” 17% of the students chose 5 points, 37% 4 points, and 33% with 3 points. The negative responses were 3% for 2 points and 10% for 1 point. A total of 87% was positive, and most students said they would like to use the app even outside the class (Fig. 29).

Fig. 30 shows the co-occurrence network of the words in written comments, in other words, how each word in the comments is related. There is a strong connection among the words "English," "fun," and "study" and among the words "AI," "interesting," "study," and "fresh." Therefore, the students indicated that studying English with AI is interesting and fun, and it is a fresh experience for them.

Fig. 31 shows another co-occurrence relation. There is a strong relationship between the words "pronunciation," "improvement," "content," "score," and "change." Relationships are also found between "pronunciation" and "good" and between "pronunciation" and "enhanced." Thus, the students felt their pronunciation had improved and their abilities had increased.

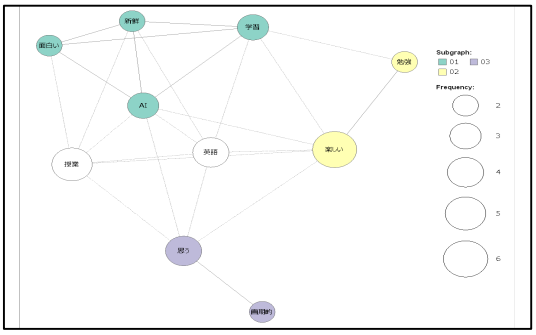

Fig. 30 Co-occurrence network 1

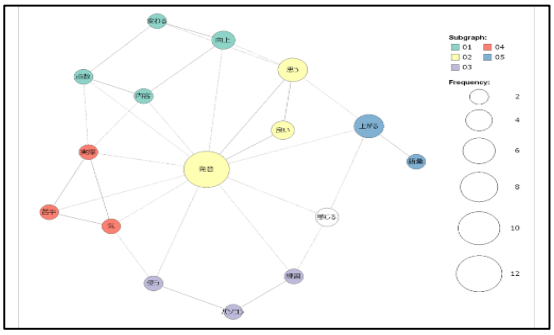

Fig. 31 Co-occurrence network 2

In summary, the results of the third trial indicate that the speaking practice with e-learning material using voice recognition and AI had a positive outcome. The students enjoyed studying with AI and saw it as a fresh experience. They believed they had improved their speaking skills, and their abilities and OPIc scores rose.

5. Future Development

In the future, I plan to improve the ELST system by adding a multiple-choice chatbot so that the students can have rather free conversations with AI. In the current development stage, the chatbot offers three multiple choices for six turns, yielding 27 possible conversations that begin with the same starter question.

Fig. 32 shows the structure of a possible conversation with the multiple-choice chatbot. With this improvement, the students can enjoy free conversation, and I expect the system will become more effective. The new system will become available in 2022.

AI	Student	AI	Student
			4.1.1. I live alone.
	2.1. I'm going home.	3.1. Who is waiting?	4.1.2. My mom.
			4.1.3. My dog.
			4.2.1.I study science.
1. Where are you going?	2.2. I'm going to school.	3.2. What do you study?	4.2.2.I study economics.
			4.2.3.I study math.
			4.3.1. I want a jacket.
	2.3. I'm going shopping.	3.3. What will you buy?	4.3.2.I will get a shirt.
			4.3.3.I am not sure yet.

Fig. 32 Example conversation with the multiple-choice chatbot

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Student Voices as Nouveau Committee Work: Providing a Platform and Safe Community for the Realization of Inspired Student-led Projects

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The IAFOR International Conference on Education – Hawaii 2021
Official Conference Proceedings

Abstract
Department committee work is a necessary yet vital component of higher education institutions. Untapped potential exists within students, and committees can be established or adapted to support the passionate interests of innovative students. When students receive trust, respect, and freedom to author ideas of personal importance into manifestation, they are enriched at a comprehensive level. This paper shares the origins and initial successes and challenges of a committee that provides a safe and encouraging platform for diverse and talented students to critically produce meaningful content at an international university in Japan. Beginning with the establishment of a respectful and inclusive environment, the main roles of the committee members are to facilitate student-led projects, hold regular meetings, advise, and provide accountability for students to be empowered achievers beyond the classroom. In addition to the students' sincere commitment, mandatory criteria for the student-led projects include being: inclusive, ongoing, realistic, educational, and featured as part of the Student Voices committee community. This paper describes examples of current student-led projects based on topics such as: social justice, environmental education, university clubs, and intercultural exchange. There is a need for a new style of committee that is focused on the development of skills of intercultural communication, Social Networking Service (SNS) content production, and leadership action by students. Further strategies for how to frame the benefits of a niche committee service to department directors are suggested.

Keywords: Student Voices, Student-Led, Student Empowerment, Committee Work, Committee Service, Faculty Work

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Introduction

More than merely teachers or researchers, educators should be advocates for student voices. Furthermore, student voices, ideas and projects should be supported and nurtured by faculty instructors at the university level, as this will foster the growth of student empowerment, leadership development, and university community. Assor et. all (2002) state that the essential role of an instructor is to attempt to comprehend students' passions and goals…. teachers may help them in establishing such passions and goals. Students who seek to enhance their leadership skills require assistance in understanding how their desire toward development may prosper or be stunted by self-development activities (Allen & Hartmen, 2009). Therefore, university instructors can play a vital role in assisting students to pursue their passion. Instructors have the opportunity to enable student leadership development while encouraging student-led projects outside of the classroom. Understanding that university instructors have a responsibility to take on committee work, the authors of this paper were able to turn this responsibility into an opportunity to create "Student Voices." The formation of this nouveau committee supports student-led projects that express students' ideas, goals, and passions.

Levin et al. (2006) suggest that as teaching and student advising roles and their accompanying responsibilities grow, committee work, particularly for full-time staff, becomes more institutional, and increasingly aligned with the interests and goals of the management staff of the university. However, why must this institutionalized, austere nature of committee work continue to be inflexible in its approach and departmental implementation? Instead of committee work feeling like a burden for many university instructors, this mandatory responsibility should be seen as departmental programming that is engaging for both students and staff. Euster and Weinbach (1998) offer the query "Is membership in some committees more sought after than in others, or are all committee services viewed as a necessary evil?" The authors were able to create a new committee that fit their passions and skill sets, while supporting the passions and developing valuable skill sets of the students in the production of their projects. The creation of this new committee was made possible by the commitment of the authors, effective planning, framing the benefits of the nouveau committee to colleagues and superiors, and necessary support from department directors.

This nouveau committee work, and specifically the student-led projects, began to grow organically and take on a didactic nature; various projects - wholly student conceived and nurtured - leaned toward relevant social problems, cultural relativity, and developing social media and networking skills. While this was not a goal of the new committee work, this homegrown focus, and the eventual production of student-led project content was at times challenging; however, it was an overall rewarding experience for everyone involved. While planning and preparing for this new committee, the authors had a vague idea of how it might take shape in regards to student involvement, social focus of the student-led projects, navigating inter-departmental communication in the creation of a new committee, and what the overall impact of this new committee would be. Defining clear principles and allowing related precepts to guide the formation and ongoing work of this nouveau committee has given the authors the opportunity to thrive.

Motivation

Several motivating factors for the formation of the Student Voices committee were foundational elements and require a more thorough explanation in order to understand the essence of the committee. The initial motive of the authors was to support the development of students' identities and passions. Students should have a safe platform from which to express their authentic selves and genuine interests. Further, the diverse student body with meaningful backgrounds and unique life experiences should have an outlet for sharing their creations and to be validated. In addition, since TIU comprises students from over 60 countries, there is abundant opportunity to build intercultural understanding and awareness. These were the key motivational factors for the new committee.

Proposal for Nouveau Committee

Exciting ideas and the conception of a possible platform are fine in theory, but there is a process to turn abstract ideas and concepts into practical reality. Fortunately, the authors' department directors at TIU are typically open to new ideas if needs and benefits are clearly communicated. Porter (2007) states that faculty attitudes regarding how committees are assigned and how faculty perceive this committee experience remain meaningful topics for future studies and discussion. Further, Euster and Weinbach (1998) note that where university administrators regularly acknowledge the need for crucial responsibilities such as curriculum planning and design, student enrollment, and professional development, often there is scant personal benefit for undertaking this compulsory and expected committee work. Understanding this common, unrewarding atmosphere for mandatory university committee work, the authors decided to carefully strategize in planning a new committee. Before a formal request was made to begin a new committee, multiple meetings were held among the authors with the intention of thoroughly discussing practical logistics of creating the new committee and how to effectively articulate the motivation, goals, and benefits of that potential committee. The authors articulately proposed the new committee to the department directors, focusing on the benefits for the students, the department, and the university. Additionally, the proposal was expressed with both sincerity and passion to underscore the importance of the committee's values and the committee members' willingness to follow through with their proposed action plan to start a new and dynamic committee. The Student Voices committee proposal was accepted in December 2019, and the initial vision of this committee has since come to fruition. Student Voices maintains open and honest communication with the department directors and continues to develop based on its foundational motivating factors that have been consolidated into clearer principles.

Principles

The driving principle of the new committee is to promote student voices through student-led projects as honestly and effectively as possible. By empowering students to develop projects based on their own motivations and passions, increased intrinsic motivation, personal fulfillment, and unique expressions of innovation are produced. Further effects of empowerment include expanded levels of self-direction, authorship, and accountability (Herzberg, 1968). Coinciding with providing the platform for students to share their thoughts, ideas, and projects, the second principle is to create a

safe space for students to thrive. In order for students to flourish and approach their creative potential with an authentic voice, they need to feel safe, secure, and confident with sharing meaningful and vulnerable pieces of themselves and their authored works. Seifert (2004) supports the point of view that students often become more intrinsically motivated and develop a sense of confidence and autonomy when they have mentors who are accessible, supportive and sympathetic. The realization of this safe space is made all the more effective with the next principle of fostering an environment of respect and inclusivity. Members of Student Voices are often asked to be open-minded toward others, and allow any willing member of the university to contribute to their project. The final principle is to develop student-led projects that educate and make a positive impact. Although a primary aim of the Student Voices committee is for students to confidently express themselves, a more meaningful objective is to transcend self-fulfillment by benefiting others. The ability to be actively aware of what is outside oneself, or be selfless, is a crucial characteristic of the peak level of human development (Erikson, 1987; Maslow, 1971; Rogers, 1961). These core principles helped lay the foundation for this new kind of committee.

Nouveau Committee

The authors' new committee, Student Voices, is contained within a department that houses approximately 50 staff-member instructors. Those 50 instructors compose roughly a dozen different "coordinator groups" ranging from Curriculum Development, Technology Support, and Testing and Placement; these "traditional" committees include roughly three to six members per group. There is no clear and stated policy for how committee work is requested or allotted, or how long an instructor must work on a committee. Generally, new employees are offered the chance to rank their committee preferences; often, the first preference is not granted. However, an instructor may subsequently request to change committees or propose the formation of a new committee. Department directors have the power to grant or deny such requests or proposals to establish a new committee. Directors have informally stated that any proposal for a new committee must be focused on benefiting students by in some way enhancing their needs and academic skills. Therefore, in order to propose a new committee and have a proposal successfully granted, instructors must plan carefully, clearly articulate the goals, and most important, describe how the new committee will benefit students and assist in their skill development. Moreover, it is crucial to state how and why the new committee will increase student engagement, and to describe the realistic possibility of increasing students' academic skills in relation to raised test scores and graduation rates. Essentially, any new committee must fit a real need and overall goal of the department and university. Any new committee proposal that is not articulated effectively in how it will meet these criteria has a strong chance of being denied.

Following the approval of the Student Voices committee application and once core guiding principles have been established, the next step was to transform plans into reality. The first phase consisted of recruiting students who might be interested in student-led projects. Initially, the authors recruited only their current and former students, then asked colleagues to advertise to a wider university audience with a description of the committee. Recruitment has since become more effective by utilizing a website and displaying current students' projects as examples of what could be created. After a number of students expressed interest, the first online Zoom

meeting was held, followed by six additional meetings throughout the first year of Student Voices. A total of 35 students attended at least one of these meetings. The authors focused on creating an atmosphere of inclusivity and inspiration while students shared their ideas for possible projects. A number of these student-generated ideas then became actual student-led projects with the guidance of the authors. These projects of various sizes and topics were brainstormed, developed, produced, and shared online. Since there is a variety of types of projects, the Student Voices members have requested and received assistance and contributions from colleagues who are able to provide certain appropriate skill sets and advice based on their specialized experiences. As the number of Student Voices projects has expanded, the more opportunity there is for colleagues to become involved, share ideas, and offer their own guidance and suggestions.

Project Criteria

While it is a prominent feature of Student Voices to allow its students the freedom to produce their own projects, in addition to being aware of the Student Voices principles, there are certain criteria to which each project must adhere. First, each student-led project must be inclusive. To explain further, other students of TIU need to be able to participate, or contribute to the project in at least a minimal way. Next, the projects are required to be ongoing. For example, a project cannot be a one-time event or have an end point; they must be weekly, monthly, or continually developing. The third criterion for the student-led projects is that they need to be realistic. Although Student Voices members are encouraged to dream big and have high expectations of themselves, the projects need to be anchored in what is achievable and practical. In addition, the projects must be educational or enabling. Students cannot simply create something exclusively for their own satisfaction; the projects need to be of service in some way. Finally, the projects and their members must agree to being a part of the Student Voices community.

Current Projects

As of February 2021, there are eight ongoing projects of various sizes in differing stages. The first project, Humans of TIU, consists of enlightening interviews with a wide range of TIU students and faculty according to monthly themes such as the environment or holidays. The next group, Culture Mixing, is a project that shares primarily about Japan's unique way of life and intercultural understanding. Another project, Student Learning Center (SLC) Sempai, focuses on assisting underclassmen with tips for studying English and dealing with general academic challenges. Seeking to reduce the use of plastic on campus, Eco-TIU is a project created to raise awareness of environmental issues. The purpose of the Student Clubs project is to shine a light on lesser-known university clubs and groups through in-depth interviews and articles. Attempting to increase consciousness about social justice issues locally and globally, the Social Justice project creates content through various styles of writing. Since the university consists of international students in addition to students from numerous prefectures in Japan, TIU-Gurashi is designed to aid new students with local recommendations, tips, and life hacks. Finally, two students created a podcast that features thoughtful interviews on meaningful topics and different perspectives. Some project groups have only one student member, while others consist of up to eight members. Most of the projects utilize Instagram or a blog to

share their content; in addition, a Student Voices Google site and Facebook group exist in order to recruit and educate students. Students have used online media almost exclusively to share their projects since COVID-19 forced the university to conduct all classes online.

Impact on Students and University Community

A cursory review of this nouveau committee, Student Voices, reveals diverse impact in a multitude of areas. The resulting impact has so far proven to be rewarding for students, the authors, and the overall university community. In understanding the overall impact of this committee work, a triumvirate has emerged that focuses on: a) development of students' skills and self-esteem in the process of assisting and supporting their student-led projects; b) an increased awareness and motivation for *students* and the school community in knowing that there is now a safe space and opportunity for them to incubate and create whatever projects they wish to pursue; c) inspiration and guidance for departmental colleagues in understanding that new committee ideas can be actualized when pursued strategically and diplomatically.

As students have progressed with various projects, the development of specific skills has occurred. Leadership skill development has been witnessed; for example, planning and setting meeting agendas, meeting facilitation, note-taking, and ensuring the inclusivity of all members of a particular project group. Organizational and time-management skills have been developed in the process of students' formation and progression of their projects; this includes regular meetings and production of timelines with clear goals. For some students, this may be the first time they have actively worked with students representing diverse nationalities and cultural backgrounds. As the student body of TIU consists of students from Japan as well as international students, the collaboration between these groups while working together in student-led projects has resulted in increased intercultural understanding and communication skills.

Furthermore, students have developed advocacy and leadership skills in upholding democratic processes such as making decisions and giving equal responsibilities to all members in project groups. All ideas, voices, and dissenting opinions are intently encouraged by student facilitators within project groups. In relation, student activism and advocacy skills are being developed; the EcoTIU project is allowing students the opportunity to conduct research in hopes of educating and organizing the university community around plastics use and general environmental concerns. Moreover, as EcoTIU develops, implements, and analyzes data-filled surveys about plastics use and the environment, students are attaining valuable skills related to statistical analysis, survey methodology, community activism, and advocacy. While the development of these activism-based skills was not foreseen, this critical engagement and skill building has been invaluable for students.

Students have been able to develop meaningful skills in the area of Social Networking Service (SNS) content development, planning, and publication. Various student-led projects rely on SNS applications and sites to reach a broader population both inside and outside the TIU community.

Numerous skills including student interviewing, transcribing, podcasting, article writing, website development, graphic design, publicity, and outreach have been developed. In fact, this online presence has become an integral part of the student-led projects; students seek to effectively publicize their projects in order to gain a wide audience, and to gain acknowledgement and praise for their work. Finally, in the process of developing their skills through the creation and progression of their projects, as well as receiving peer approval, students have developed immense pride and self-esteem.

Further impact of the new Student Voices committee can be seen on the university community. As outreach for interested students and publicity for ensuing student-led projects increased, more students and staff became aware that there is now a platform in place that allows students to be creative and imaginative, take chances, and pursue meaningful projects. Student Voices is a project-oriented group where students can experiment, take risks and make mistakes. A core principle of this new committee is to create a safe and secure space, face to face and online, where students can meet, collaborate, and create inspirational projects. The authors wished for students to feel comfortable, confident, and secure in producing their work. As the overall university community becomes more aware of the presence and principles of this new committee work, the construction of a progressive, enriching community will continue to progress. Publicizing the student-led projects, which are diverse in their created content, along with outreach to students and staff about Student Voices, has brought notoriety and understanding of the presence of this nouveau committee within the university community. It is becoming widely known that Student Voices is a supportive community where students can cooperate with diverse others, develop skills, and work on whatever it is that they are passionate about.

Future

Although the Student Voices committee developed substantially in its first year, multiple areas for growth and improvement exist. First, recruitment of new student members is vital. The committee and student-led projects cannot exist without adequately and regularly notifying instructors and students throughout the university about the opportunity to join Student Voices. Efforts to raise awareness and recruit have mostly relied upon the authors' direct communication with current and former students, word of mouth, and having colleagues share the Student Voices website with their students. Because the committee is dependent upon other instructors effectively recruiting student members, maintaining harmonious relationships and finding ways to increase authentic buy-in for the Student Voices' vision from colleagues remain constant priorities.

The Student Voices website is a valuable recruiting tool as it contains the Student Voices introduction, information about the committee founders, member contact information, and produced content from each of the existing group projects. Each group has produced a 30-second "elevator pitch" video including a hook to make the audience informed and curious, and an enthusiastic and authentic description of their project. This "elevator pitch" serves as an excellent recruiting tool as well as a creative assignment for the students to organize their project's purpose, configuration, and goals. The most important future step in developing the current projects is to launch a high-quality website that is simple to access and navigate. Since the current

website is rudimentary, an emphasis will be placed on properly displaying the projects' valuable content to ensure that the students' voices are amplified and effectively heard on a wider scale. It is worth noting that students can join at any point of the school year since the projects do not have an endpoint. Therefore, recruitment is ongoing.

Finally, Student Voices aspires to work together with other committees and colleagues to discover opportunities for mutually beneficial collaboration. Since the committee is relatively new, it is still malleable, and sustainable standards can be set. The authors desire to be proactive and earn a reputation for seeking synergistic win-win relationships with other departmental committees. Because Student Voices has only two instructors leading the committee, the potential, available skill sets, and areas of expertise are limited. However, when additional colleagues become willingly involved in a project, such collaboration can benefit everyone. As an example, the Eco-TIU group seeks to inform the university about environmental issues and influence campus policy by eliminating one-time-use plastic products. Other instructors with a background in and passion for environmental awareness were informed of the project and now regularly contribute their time, ideas, and expert feedback. This results in a more well-informed and fruitful student-led project, and allows colleagues to voluntarily and meaningfully contribute to a cause that they genuinely care about. In this way, Student Voices can act as a medium for involved instructors to become more fulfilled by addressing their intrapersonal values, such as having diverse avenues for development. In addition, instructors who offer assistance to Student Voices may increase their feelings of connection and belonging, therefore benefiting their interpersonal values (Ilies et al., 2018). In sum, Student Voices seeks to expand upon these types of win-win collaborations in the future.

Conclusion

The authors' nouveau committee work, Student Voices, was conceived in order to experience meaningful, required university service work. Further, the authors sought to effectively support students' ideas that take the form of content-based projects. In the process of realizing this new committee, mistakes were made, yet successes were achieved. In discussing the conclusion, lessons learned and takeaways will focus on two main areas: how to work with students in cultivating their passions, and how to advocate for a new committee within the department structure.

Addressing the lessons learned from helping students create meaningful projects, the authors have devised a number of general yet crucial takeaways for those hoping to maximize their students' potential. Foremost, an instructor should make a strong effort to mentor rather than lead. Because the focus is on student-led projects, the instructor may guide, and provide suggestions and advice, whereas leading may involve excessive decision-making and control from the instructor. Leading may also foster disempowerment where students' ideas are not properly validated or built upon. When students are able to choose what to do and how to do it, they feel a stronger sense of ownership, accountability, and meaningful investment. In sum, providing the appropriate amount of guidance, motivation, and feedback goes hand in hand with the knowledge that although the scaffolding has been constructed by the instructor, the benefits are best yielded when students themselves make important decisions and have the ultimate say in their projects' direction. Successes rooted in self-

determination may increase students' self-confidence and provide a lifelong template for meaningful achievement and self-actualization.

In addition to ensuring that students are empowered as much as possible, instructors may find value in cooperative goal setting. When students invest their time in creating thoughtful and meaningful goals, they have a clearer vision of the purpose of a project and are aware of how to achieve subsequent objectives and effectively communicate with fellow project members. During this initial process of beginning a project, the goal-setting stage is the best opportunity for instructors to ensure that a strong foundation is set. Thereafter, sound goal setting allows students to feel comfortable and have considerable autonomy in pursuing their projects. The goal-setting process often includes articulating the purpose and motivation of the project, setting short- and long-term goals with specific deadlines, and ensuring that each student is comfortable and confident in his or her role within a group project. Once the instructors and students agree that the goals align with the original motivations of the project, instructors may emphasize that the aim of the projects should be profound and ambitious. However, students should balance these high hopes with being rooted in what is realistically achievable.

The final point to underscore in terms of optimizing student efforts is to provide them with the space to make mistakes, face difficult challenges, and be uncertain about outcomes. Students likely experience enough stress to perform well within the confines of their regular classes, but given the opportunity to create a personal project, they should not be burdened with additional pressure to achieve perfection. What comes with the fulfillment of developing one's own meaningful project includes low-risk and high-reward consequences. Instructors should encourage their students to take chances, be bold, and dare to take a first independent step. They should emphasize that making mistakes is not only acceptable but an opportunity to learn, find a silver lining, and problem-solve. In a context similar to that of Student Voices, students do not receive a poor grade for bravely and creatively expressing themselves if the project is imperfect; instead, they receive constructive criticism, useful feedback and warm encouragement.

Another critical lesson learned in the process of developing the Student Voices committee is the need to recruit students from the university community who are self-motivated, passionate, and accountable. The authors hope that students will earnestly follow through on their project goals. The authors have learned that dedicated and responsible students are needed in order to have an impactful committee. Students who have taken on a leadership role have proven to be paramount, as they are able to inspire their peers while progressing with the project work. Further, students who may appear reserved, but who show potential for growth, should be valued. Ultimately, the Student Voices community will continue to grow because of the involvement of goal-oriented, responsible, ambitious students who wish to collaborate with peers in the creation of student-led projects.

In regards to navigating the university departmental structure in order to plan, propose, and be granted a new committee, several main points should be considered. First, clearly understanding the culture and structure of a given department is critical. The departmental decision-making process, and criteria by which new committee group proposals are granted, should be clearly understood. Attaining sincere buy-in from

both colleagues and superiors is key; without consistent support from peers and supervisors, the process of working toward a new committee will be extremely challenging. Further, support from colleagues in the form of sage advice, technological skills, and hands-on assistance with student-led projects is immeasurably helpful. Notably, acceptance and validation from peers in the process of forming a new committee has allowed the authors to make substantial progress with a sense of pride and purpose.

Creators of a new committee should develop a clear "pitch" for their work. This includes developing a short, thirty-second "elevator pitch" to state to colleagues in passing, and a longer two-minute pitch for a more thorough explanation. The ability to succinctly express a new committee idea and goals to colleagues is critical, as it allows for buy-in and support to follow. Conversely, when not articulated effectively, the new committee idea may not gain support from or be validated by colleagues. When meeting with department directors, crafting a concise written proposal which outlines clear goals is important. Subsequently, when meeting with departmental directors to orally explain and justify your proposal, the authors recommend creating a concise, attractive PowerPoint presentation, and approaching the meeting with complete professionalism; this expresses sincerity to the directors in undertaking this nouveau committee work.

Colleagues have become more knowledgeable about how best to plan, strategize, and advocate for a new committee. As stated earlier, proposing a new committee must take into account the needs of the department, specifically focused on enriching student support and development of students' academic and professional skills. As a result of the committee proposal being accepted, the process by which the new Student Voices committee came into existence can be understood as having shaped the way in which future colleagues may wish to plan and present their ideal committee work. Mistakes made and successes experienced during this process have allowed the authors' colleagues to better understand specifically what is needed to advocate successfully for a new committee. In understanding the lessons learned and takeaways, future proposals for nouveau committee work may become a reality.

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A Study of the Mutual Phonetic Resemblance between Japanese Kyōiku Kanji and Chinese

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Abstract
This study investigated the mutual phonetic resemblance of Chinese ideograms between Japanese and Chinese using the official list (expanded in 2020) of *Kyōiku kanji* (Chinese ideograms in Japanese, taught in elementary school). This analysis aimed to determine methods for helping learners from non-*kanji* backgrounds to quantify the phonetic gap between these two languages. First, since most kanji symbols can be read in multiple ways (*on'yomi* [Chinese reading in Japan] and *kun'yomi* [Japanese reading]), the rate of the use of *on'yomi* for each of the 1,026 *kanji* was calculated at 66.1% by accounting for the factor of the frequency of all 9,292 words that contain these *kanji* and are classified in the Japanese-Language Proficiency Test word list. Second, 12 Chinese native speakers were surveyed using questionnaires (with a rating score of 0–100%) about the phonetic approximation between *on'yomi* in each of these 1,026 *kanji* and Chinese reading in China. In this survey, no noticeable trends were identified between each rating score and the four Chinese tones. However, the statistical analysis of *pinyin* decomposed into vowels and consonants revealed the following: (a) the rating score was high for characters beginning with a vowel; (b) the score was high for characters that contain apical consonants (a mean value of 32.6) or labial consonants (25.8); and (c) almost all characters that contain retroflex consonants (in particular, "zh" [mean 7.5], "r" [7.5], and "ch" [10.6]) were identified as having no phonetic similarity with their Japanese counterparts.

Keywords: Japanese, *Kyōiku Kanji*, Chinese, Phonetic, Logographic, Cross-Comprehension, Simultaneous Learning

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1. Introduction

1.1 Background

The number of language learners taking Japanese and Chinese language proficiency tests, JLPT (*Nihongo Nôryoku Shiken*) for Japanese, and HSK[1] (*Hanyu Shuiping Kaoshi*) for Chinese, has been steadily increasing (see Figure 1 below), as has the number of learners who are passing the tests.[2]

	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

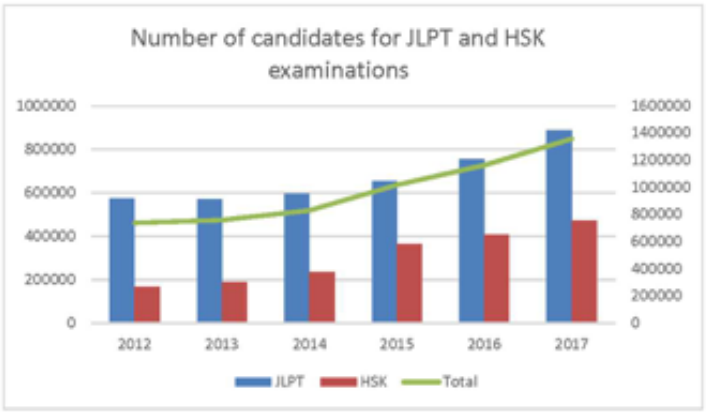


Figure 1. *Number of candidates for JLPT and HSK* (Obataya 2019, pp.1–2)

The increased interest in these two East Asian languages has encouraged students at Geneva University, who must choose two majors for their bachelor's degree, to take two Asian languages as their primary subjects. According to a survey conducted in 2012, students experienced difficulties in simultaneously learning Japanese and Chinese without any prior knowledge of them. However, this has not precluded a number of students from choosing Japanese and Chinese as their main subjects even today[3]. Between 2010 and 2018, about 20% of the students, on average, chose Japanese and Chinese. While the research previously had focused only on the graphic resemblances between these two languages,[4] in 2018, a study was conducted of a database based on the characters required to pass each language's proficiency test: the JLPT and HSK.

The main objective of these studies was initially to integrate a systematic contrast of Japanese kanji and simplified Chinese characters into our teaching methods and materials in an effort to minimize mutual interferences.

[1] For the purpose of this series of study, the author took the HSK exams and passed with a proficiency level of HSK 6 – the highest level – in 2014.
[2] In comparison, the number of people who participated in the DELF/DALF exams was 389,120 in 2015.
[3] Berger C., & Obataya Y. (2014).
[4] Obataya (2018), p. 2.

1.2 Research Aim and Objectives

According to my previous studies on the same database, the phonetic differences between the Japanese and Chinese languages required further study. However, comparative studies on phonetics are still scarce (for example, Kayamoto 1995, Gi 2017, and Obataya 2019). In addition, there is still room in my previous work for a more detailed analysis. Therefore, the study aim is as follows:

・to conduct a more detailed quantification of the resemblance between the two languages.

To analyze the degree of resemblance in more detail, the Chinese *pinyin* were broken down into vowels and consonants. In addition, by using the recently renewed Japanese official list of *kanji,* more universal data had to be collected to fulfill the study aim. Therefore, the study objectives are as follows:

・to modify the database for collecting the recent data

・to examine the new database by breaking down the *pinyin* into vowels and consonants

・to verify whether the phonetic resemblance between Japanese and Chinese has a relationship with the Chinese four tones.

2. The Difficulties of Learning Japanese and Chinese Simultaneously and the Introduction of Chinese Characters to the Japanese Writing System

One of the difficulties students face when learning these two languages simultaneously is the complexity of the Chinese ideograms used in both languages. For example, Chinese ideograms used in Japanese – called "*kanji*" – sometimes differ in shape, meaning, and pronunciation from simplified Chinese characters in the People's Republic of China (PRC). Since the pronunciation is different between Japanese and Chinese, *kanji* can be read by Japanese speakers in the Japanese way ("*kun'yomi*," henceforth referred to as *kun*-reading) or in the (original) Chinese way ("*on'yomi*," henceforth referred to as *on*-reading). Furthermore, as shown in Figure 2, a *kanji* sometimes has two, three, or more *on*-readings (*go-on*-reading, *kan-on*-reading, *tô-on*-reading, and other *on*-readings), because *kanji* phonetics have evolved differently over centuries (depending on epoch and region).[5]

Figure 2. *Examples of* kanji *with different* on-*readings types* (Yano, 2012, 42/Obataya, 2019).

[5] In addition, a simplification of the Chinese characters in the PRC took place in the 1950s, following the Japanese government's simplification in 1926. These simplifications resulted in the lists of *Tôyô kanji* in 1946 and *Jôyô kanji* in 1981.

3. The Introduction of Chinese Characters to the Japanese Writing System

Contemporary Japanese has three main graphic systems: *kanji*, Chinese ideographs used in Japanese, and two syllabaries (*hiragana* and *katakana*).[6] In order to better understand the relationship between Japanese *kanji* and Chinese characters, it is necessary to review the history of these three graphic systems.

The Japanese, having no writing system of their own, imported Chinese characters, or *kanji*, as early as the 4th or 5th century. Some three centuries later, a cursive and simplified form of *kanji* appeared, chosen for its phonetic value: the *manyôgana,* the name of which was derived from an anthology of poetry written using this simplified *kanji* during the *Nara* era (710–794) entitled "Collection of Ten Thousand Leaves," or *Manyôshû*. *Manyôgana* would give rise to both the *hiragana* and *katakana* syllabary in the 9th century. Its current form, however, became fixed in the 12th century. Figure 3 provides examples of the three writing systems in Japanese.

Figure 3: *Three writing systems in Japan*[7] (Obataya, 2019).

4. Previous Studies on the Graphic, Semantic and Phonetic Resemblance

The analysis of three aspects – the graphic, semantic, and phonetic – of another database has been undertaken in my three previous works, respectively Obataya (2018a), Obataya (2018b), and Obataya (2019).

An analysis of the degree of mutual graphic similarity indicated that 71% of Chinese characters are identical in both languages. After graphic resemblance analysis, I carried out a semantic resemblance analysis, which revealed that 89% of the characters are identical or only show slight variation. Finally, the result of the analysis of phonetic resemblance was only 12% (see Figure 4). Such clarification of the three values of graphic, semantic, and phonetic resemblance helps to explain the "*kanji* paradox," a notion applied in one of our previous works. This notion explains that the simultaneous acquisition of Chinese and Japanese is, in fact, difficult despite the assumption of easy cross-comprehension due to the common usage of Chinese ideograms.

[6] This does not take into account the *romaji*, or Latin alphabet.
[7] The document used for the annual "open campus" session at Geneva University for high school students.

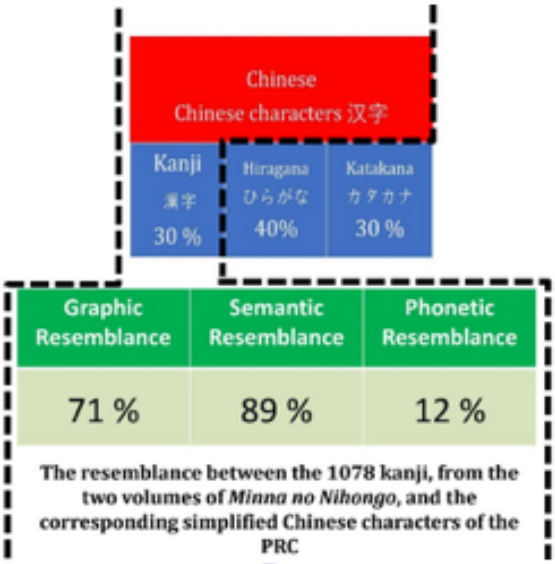


Figure 4. *The final results of the three fields and the approximate proportion of the three systems in contemporary Japanese* (Obataya, 2019).

5. The Database Change from *Minna no Nihongo* to the Renewed *Kyōiku kanji*

1st year 80 *kanji*

一右雨円王音下火花貝学気九休玉金空月犬見五口校左三山子四糸字耳七車手十出女小上森人水正生青夕石赤千川先早草足村大男竹中虫町天田土二日入年白八百文木本名目立力林六

2nd year 160 *kanji*

引羽雲園遠何科夏家歌画回会海絵外角楽活間丸岩顔汽記帰弓牛魚京強教近兄形計元言原戸古午後語工公広交光考行高黄合谷国黒今才細作算止市矢姉思紙寺自時室社弱首秋週春書少場色食心新親図数西声星晴切雪船線前組走多太体台地池知茶昼長鳥朝直通弟店点電刀冬当東答頭同道読内南肉馬売買麦半番父風分聞米歩母方北毎妹万明鳴毛門夜野友用曜来里理話

3rd year 200 *kanji*

悪安暗医委意育員院飲運泳駅央横屋温化荷界開階寒感漢館岸起期客究急級宮球去橋業曲局銀区苦具君係軽血決研県庫湖向幸港号根祭皿仕死使始指歯詩次事持式実写者主守取酒受州拾終習集住重宿所暑助昭消商章勝乗植申身神真深進世整昔全相送想息速族他打対待代第題炭短談着注柱丁帳調追定庭笛鉄転都度投豆島湯登等動童農波配倍箱畑発反坂板皮悲美鼻筆氷表秒病品負部服福物平返勉放味命面問役薬由油有遊予羊洋葉陽様落流旅両緑礼列練路和

4th year 202 *kanji*

愛案以衣位茨印英栄媛塩岡億加果貨課芽賀改械害街各覚潟完官管関観願岐希季旗器機議求泣給挙漁共協鏡競極熊訓軍郡群径景芸欠結建健験固功好香候康佐差菜最埼材崎昨札刷察参産散残氏司試児治滋辞鹿失借種周祝順初松笑唱焼照城縄臣信井成省清静席積折節説浅戦選然争倉巣東側続卒孫帯隊達単置仲沖兆低底的典伝徒努灯働特徳栃奈梨熱念敗梅博阪飯飛必票標不夫付府阜富副兵別辺変便包法望牧末満未民無約勇要養浴利陸良料量輪類令冷例連老労録

5th year 193 *kanji*

圧囲移因永営衛易益液演応往桜可仮価河過快解格確額刊幹慣眼紀基寄規喜技義逆久旧救居許境均禁句型経潔件険検限現減故個護効厚耕航鉱構興講告混査再災妻採際在財罪殺雑酸賛士支史志枝師資飼示似識質舎謝授修述術準序招証象賞条状常情織職制性政勢精製税責績接設絶祖素総造像増則測属率損貸態団断築貯張停提程適統堂銅導得毒独任燃能破犯判版比肥非費備評貧布婦武復複仏粉編弁保墓報豊防貿暴脈務夢迷綿輸余容略留領歴

6th year 191 *kanji*

胃異遺域宇映延沿恩我灰拡革閣割株干巻看簡揮危机貴疑吸供胸郷勤筋系敬警劇激穴券絹権憲源厳己呼誤后孝皇紅降鋼刻穀骨困砂座済裁策冊蚕至私姿視詞誌磁射捨尺若樹収宗就衆従縦縮熟純処署諸除承将傷障蒸針仁垂推寸盛聖誠舌宣専泉洗染銭善奏窓創装層操蔵臓存尊退宅担探誕段暖値宙忠著庁頂腸潮賃痛敵展討党糖届難乳認納脳派拝背肺俳班晩否批秘俵腹奮並陛閉片補暮宝訪亡忘棒枚幕密盟模訳郵優預幼欲翌乱卵覧裏律臨朗論

Figure 5. *List of* Kyōiku kanji.

The database used in my previous research was a commercial textbook for foreign learners of Japanese, namely, *Minna no Nihongo I* (translation, 2nd ed., 2013) and *Minna no Nihongo II* (translation, 2nd ed., 2015).

In the current study, a new database was created of the official *kanji* list for instruction that Japanese students learn in elementary school in order to compare it with its Chinese equivalent. This list is used in my new database not only because it is the official list but also because it was recently modified. The "*Kyōiku kanji* (literally "education *kanji*")" is an official Japanese list of 1,026 *kanji*, revised in 2017 and implemented in Japanese elementary schools starting in the 2020 academic year (in April in Japan).[8]

Several studies have been conducted on the phonetic similarity between Japanese and Chinese words and characters using the ancient lists of *Kyōiku kanji* (see Obataya, 2019). However, research on this new list has not yet been undertaken.

6. Analytical Approach

In this study, the method of Obataya (2019) was adopted in order to quantify the phonetic resemblance between the current *Kyōiku kanji* and Chinese.

The scores calculated by the multiplication of two values were taken to be the real phonetic resemblance of Chinese ideograms utilized both in 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 Chinese pronunciation. To calculate the latter value, I distributed questionnaires concerning 1,026 *Kyōiku kanji* as a database to Chinese native speakers with considerable knowledge of the Japanese language.

Here is the summary of the profile of survey respondents:
- All 12 respondents were Chinese native speakers teaching Chinese to Japanese students.
- 9 respondents have acquired JLPT N1, and three have passed N2.

[c]	[e]	[g]	[h]	[o]	[k]	[f]
Kyokasho-tai font	*Kun* -reading	JLPT Word list	JLPT Word list (reading)	Calculation of points (JLPT levels)	Proportion of *On*- reading (%)	*On* -reading
社	やしろ **yashiro**				**97**	シャ **sha**
1	**kaisha**	会社	かいしゃ	5		
2	**shakai**	社会	しゃかい	4		
3	**shachō**	社長	しゃちょう	4		
4	**jinja [jin+sha]**	神社	じんじゃ	4		
5	**shinbunsha**	新聞社	しんぶんしゃ	4		
6	**shakaikagaku**	社会科学	しゃかいかがく	2		
7	**shasetsu**	社説	しゃせつ	2		
8	**shōsha**	商社	しょうしゃ	2		
9	**nyūsha**	入社	にゅうしゃ	2		
10	**shakō**	社交	しゃこう	1		
11	**shataku**	社宅	しゃたく	1		
12	**shussha**	出社	しゅっしゃ	1		
13				**32**		
14	**yashiro**	社	やしろ	1		
15				**1**		

Figure 6. *Example of a calculation of a kanji.*[9]

[8] Japanese elementary schools follow a six-year system.
[9] Obataya, 2019, 8.

7. The Calculation of the Frequency of *on*-Reading Usage

In this research, the values signifying the usages of *on*-reading in the target *kanji* data were identified. First, the usage of each *kanji* in words was investigated. Next, 9,292 words in the previous JLPT list[10] were separated into three categories according to their pronunciations: *on*-reading, *kun*-reading, and others.

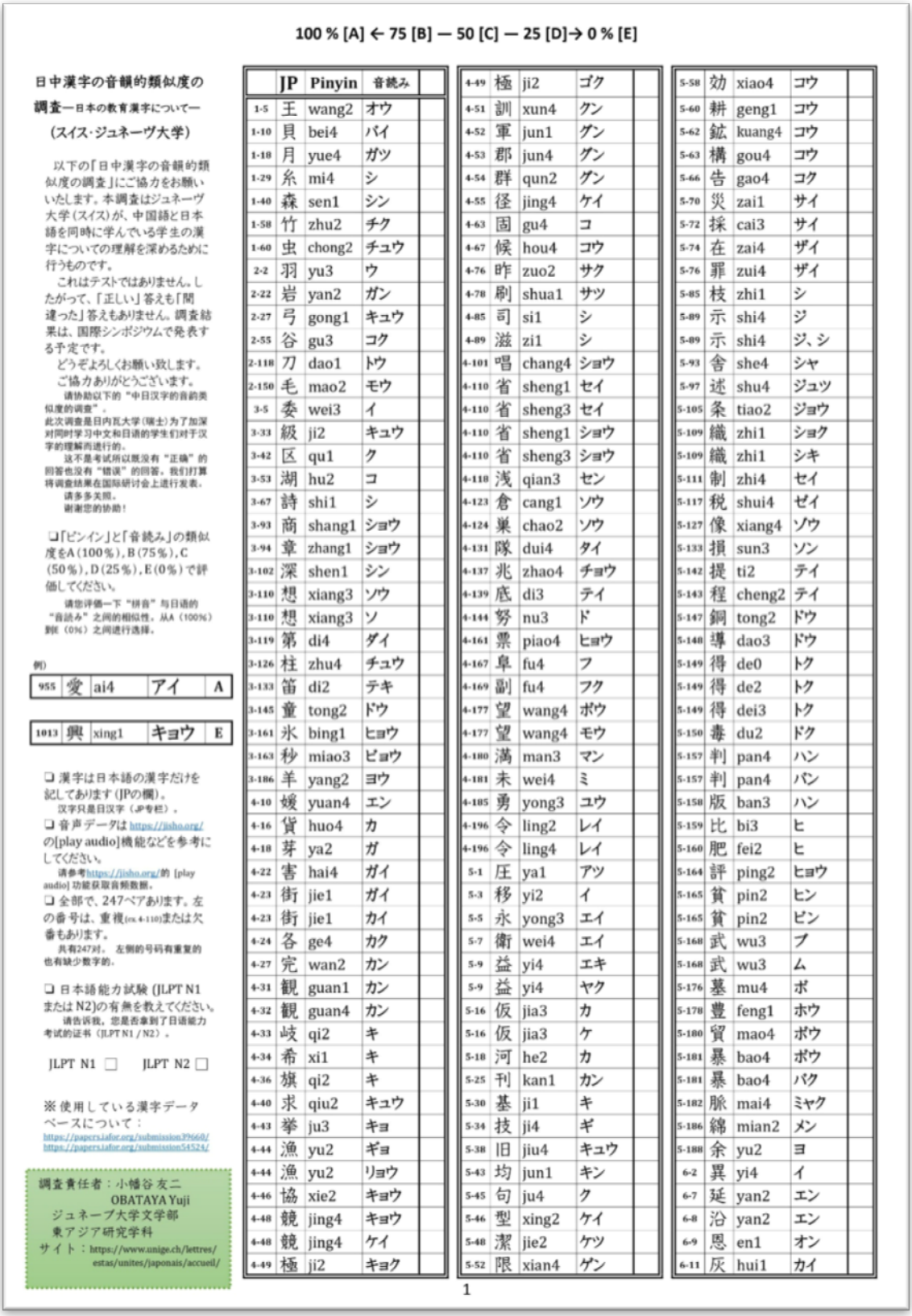
All five levels were counted differently to reflect the frequency of *on*-reading usage according to the levels of difficulty designated by the JLPT. For example, a word that contained a *Kyōiku kanji* in N1, the highest proficiency level in JLPT, was calculated as 1 point, whereas a word in N5, the easiest in the JLPT, was calculated as 5 points. It was assumed that the easier a *kanji* is, the more frequently it is used.

For example, with the *kanji* 社, twelve words use this *kanji* by pronouncing it as /sha/. All the scores of these words were counted according to the difficulty levels and added to the total score. There is only one word categorized in N1 that uses *kun*-reading, /yashiro/. Therefore, the score of *kun*-reading for this *kanji* was 1. The frequency of *on*-reading of this *kanji* was, therefore, found to be 97%.

8. Questionnaires Concerning Phonetic Resemblance between *Kyōiku kanji* and their Chinese Counterparts

Another important criterion for this study was the value of the phonetic resemblance of each *kanji* evaluated by questionnaires. For *kanji* that had already been collected in my previous study (Obataya, 2019), these data were used. For about 23% of kanji pairs (247 pairs), a new questionnaire was administered under the same conditions, and the total was calculated.

[10] In the previous JLPT (= Old Japanese Language Proficiency Test Levels 1–4), before the renewal of the current JLPT (= Levels N1 to N5) in 2010, "Test Content Specifications" was published to help the candidates (The Japan Foundation and Japan Educational Exchanges and Services, 2007). This book contained a word list, *kanji* list, and grammar list, respectively classified into four different levels. The current JLPT does not publish such a book; therefore, to determine the new JLPT levels for the current work, I referenced the Jisho.org website and Jonathan Waller's JLPT Resources page. According to Waller (http://www.tanos.co.uk/jlpt/aboutjlpt/), the new JLPT N1 is equivalent to the old JLPT 1, JLPT N2 to the old JLPT N2, JLPT N3 to halfway between the old JLPT 2 and JLPT 3, JLPT N4 to the old JLPT 3, and JLPT N5 to the old JLPT4.



100 % [A] ← 75 [B] — 50 [C] — 25 [D]→ 0 % [E]

日中漢字の音韻的類似度の調査—日本の教育漢字について—

(スイス・ジュネーヴ大学)

以下の「日中漢字の音韻的類似度の調査」にご協力をお願いいたします。本調査はジュネーヴ大学(スイス)が、中国語と日本語を同時に学んでいる学生の漢字についての理解を深めるために行うものです。

これはテストではありません。したがって、「正しい」答えも「間違った」答えもありません。調査結果は、国際シンポジウムで発表する予定です。

どうぞよろしくお願い致します。

ご協力ありがとうございます。

请协助以下的"中日汉字的音韵类似度的调查"。
此次调查是日内瓦大学(瑞士)为了加深对同时学习中文和日语的学生们对于汉字的理解而进行的。

这不是考试所以既没有"正确"的回答也没有"错误"的回答。我们打算将调查结果在国际研讨会上进行发表。

请多多关照。

谢谢您的协助!

❑「ピンイン」と「音読み」の類似度をA(100%),B(75%),C(50%),D(25%),E(0%)で評価してください。

请您评価一下"拼音"与日语的"音読み"之间的相似性。从A(100%)到E(0%)之间进行选择。

例)

955	愛	ai4	アイ	A
1013	興	xing1	キョウ	E

❑ 漢字は日本語の漢字だけを記してあります(JPの欄)。
汉字只是日汉字(JP专栏)。

❑ 音声データは https://jisho.org/ の[play audio]機能などを参考にしてください。
请参考https://jisho.org/的 [play audio] 功能获取音频数据。

❑ 全部で、247ペアあります。左の番号は、重複(ex.4-110)または欠番もあります。
共有247对。 左侧的号码有重复的也有缺少数字的。

❑ 日本語能力試験 (JLPT N1 または N2)の有無を教えてください。
请告诉我,您是否拿到了日语能力考试的证书(JLPT N1 / N2)。

JLPT N1 ☐ JLPT N2 ☐

※使用している漢字データベースについて:
https://papers.iafor.org/submission39660/
https://papers.iafor.org/submission54524/

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サイト:https://www.unige.ch/lettres/estas/unites/japonais/accueil/

	JP	Pinyin	音読み
1-5	王	wang2	オウ
1-10	貝	bei4	バイ
1-18	月	yue4	ガツ
1-29	糸	mi4	シ
1-40	森	sen1	シン
1-58	竹	zhu2	チク
1-60	虫	chong2	チュウ
2-2	羽	yu3	ウ
2-22	岩	yan2	ガン
2-27	弓	gong1	キュウ
2-55	谷	gu3	コク
2-118	刀	dao1	トウ
2-150	毛	mao2	モウ
3-5	委	wei3	イ
3-33	級	ji2	キュウ
3-42	区	qu1	ク
3-53	湖	hu2	コ
3-67	詩	shi1	シ
3-93	商	shang1	ショウ
3-94	章	zhang1	ショウ
3-102	深	shen1	シン
3-110	想	xiang3	ソウ
3-110	想	xiang3	ソ
3-119	第	di4	ダイ
3-126	柱	zhu4	チュウ
3-133	笛	di2	テキ
3-145	童	tong2	ドウ
3-161	氷	bing1	ヒョウ
3-163	秒	miao3	ビョウ
3-186	羊	yang2	ヨウ
4-10	媛	yuan4	エン
4-16	貨	huo4	カ
4-18	芽	ya2	ガ
4-22	害	hai4	ガイ
4-23	街	jie1	ガイ
4-23	街	jie1	カイ
4-24	各	ge4	カク
4-27	完	wan2	カン
4-31	観	guan1	カン
4-32	観	guan4	カン
4-33	岐	qi2	キ
4-34	希	xi1	キ
4-36	旗	qi2	キ
4-40	求	qiu2	キュウ
4-43	挙	ju3	キョ
4-44	漁	yu2	ギョ
4-44	漁	yu2	リョウ
4-46	協	xie2	キョウ
4-48	競	jing4	キョウ
4-48	競	jing4	ケイ
4-49	極	ji2	キョク
4-49	極	ji2	ゴク
4-51	訓	xun4	クン
4-52	軍	jun1	グン
4-53	郡	jun4	グン
4-54	群	qun2	グン
4-55	径	jing4	ケイ
4-63	固	gu4	コ
4-67	候	hou4	コウ
4-76	昨	zuo2	サク
4-78	刷	shua1	サツ
4-85	司	si1	シ
4-89	滋	zi1	シ
4-101	唱	chang4	ショウ
4-110	省	sheng1	セイ
4-110	省	sheng3	セイ
4-110	省	sheng1	ショウ
4-110	省	sheng3	ショウ
4-118	浅	qian3	セン
4-123	倉	cang1	ソウ
4-124	巣	chao2	ソウ
4-131	隊	dui4	タイ
4-137	兆	zhao4	チョウ
4-139	底	di3	テイ
4-144	努	nu3	ド
4-161	票	piao4	ヒョウ
4-167	阜	fu4	フ
4-169	副	fu4	フク
4-177	望	wang4	ボウ
4-177	望	wang4	モウ
4-180	満	man3	マン
4-181	未	wei4	ミ
4-185	勇	yong3	ユウ
4-196	令	ling2	レイ
4-196	令	ling4	レイ
5-1	圧	ya1	アツ
5-3	移	yi2	イ
5-5	永	yong3	エイ
5-7	衛	wei4	エイ
5-9	益	yi4	エキ
5-9	益	yi4	ヤク
5-16	仮	jia3	カ
5-16	仮	jia3	ケ
5-18	河	he2	カ
5-25	刊	kan1	カン
5-30	基	ji1	キ
5-34	技	ji4	ギ
5-38	旧	jiu4	キュウ
5-43	均	jun1	キン
5-45	句	ju4	ク
5-46	型	xing2	ケイ
5-48	潔	jie2	ケツ
5-52	限	xian4	ゲン
5-58	効	xiao4	コウ
5-60	耕	geng1	コウ
5-62	鉱	kuang4	コウ
5-63	構	gou4	コウ
5-66	告	gao4	コク
5-70	災	zai1	サイ
5-72	採	cai3	サイ
5-74	在	zai4	ザイ
5-76	罪	zui4	ザイ
5-85	枝	zhi1	シ
5-89	示	shi4	ジ
5-89	示	shi4	ジ、シ
5-93	舎	she4	シャ
5-97	述	shu4	ジュツ
5-105	条	tiao2	ジョウ
5-109	織	zhi1	ショク
5-109	織	zhi1	シキ
5-111	制	zhi4	セイ
5-117	税	shui4	ゼイ
5-127	像	xiang4	ゾウ
5-133	損	sun3	ソン
5-142	提	ti2	テイ
5-143	程	cheng2	テイ
5-147	銅	tong2	ドウ
5-148	導	dao3	ドウ
5-149	得	de0	トク
5-149	得	de2	トク
5-149	得	dei3	トク
5-150	毒	du2	ドク
5-157	判	pan4	ハン
5-157	判	pan4	バン
5-158	版	ban3	ハン
5-159	比	bi3	ヒ
5-160	肥	fei2	ヒ
5-164	評	ping2	ヒョウ
5-165	貧	pin2	ヒン
5-165	貧	pin2	ビン
5-168	武	wu3	ブ
5-168	武	wu3	ム
5-176	墓	mu4	ボ
5-178	豊	feng1	ホウ
5-180	貿	mao4	ボウ
5-181	暴	bao4	ボウ
5-181	暴	bao4	バク
5-182	脈	mai4	ミャク
5-186	綿	mian2	メン
5-188	余	yu2	ヨ
6-2	異	yi4	イ
6-7	延	yan2	エン
6-8	沿	yan2	エン
6-9	恩	en1	オン
6-11	灰	hui1	カイ

1

Figure 7. *The first page of the questionnaire*.

	JP	Pinyin	On-reading
1	人	ren2	ジン
1	人	ren2	ニン
2	先	xian1	セン
3	生	sheng1	セイ
3	生	sheng1	ショウ
4	学	xue2	ガク
5	会	hui4	カイ
6	社	she4	シャ
7	行	hang2	コウ
7	行	hang2	ギョウ
7	行	xing2	コウ
7	行	xing2	ギョウ
8	大	da4	ダイ
8	大	da4	タイ
9	何	he2	カ

Figure 8. *Example of the plural* on-*reading or Chinese pronunciations* (Obataya 2019, 10).

9. Evaluation of 1,084 Pairs of *kanji* for Phonetic Resemblance

The number of characters in the renewed *Kyōiku kanji* list is 1,026, but this questionnaire evaluated 1,084 characters. In the case of plural *on*-readings or Chinese pronunciations existing in one *kanji*, respondents evaluated them separately. As shown in Figure 8, 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 assessed the phonetic similarity in four pairs independently.

10. Findings of the two Statistical Analyses

10.1 Findings from the Frequency of the *on*-Reading Usage

The following represents the findings from the frequency of *on*-reading usage:
・The rate of frequency was 66.0%.
・297 kanji (29% of the total number of the data) only have *on*-reading pronunciations.
・7 *kanji* only have *kun*-reading pronunciations.

10.2 Findings from the Survey on Phonetic Resemblance by Means of Questionnaires

The following represents the findings from the survey on phonetic resemblance by means of questionnaires:
・The mean value for the phonetic resemblance from the survey was 19.8%.[11]
・The number of *kanji* with complete correspondence between Japanese and Chinese was minimal (n=6 *kanji*, 医他愛衣信 and 因).
・The rate of *kanji* with more than 90% resemblance was only 3.3% (n=34).[12]

[11] 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)
[12] These 34 *kanji* are 医他愛衣信因心理意部付利引新父来打負印府富民婦夫林飲苦流在異太里移臨.

・There was no resemblance for 16% of *kanji* (n=165).

Furthermore, the ones with a less than 10% resemblance made up almost half of the data (n=462). Chart 1 shows the mean and standard deviation.

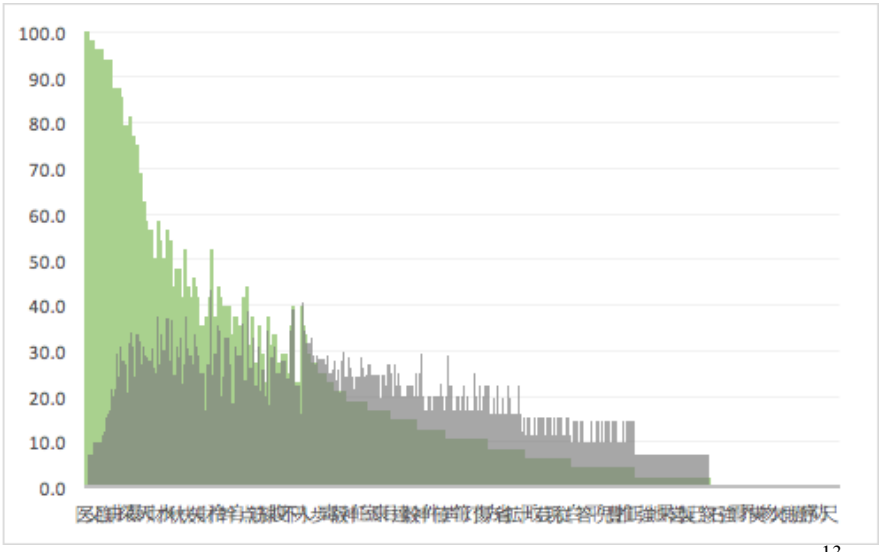

Chart 1. *Distribution of the mean and the standard deviation*.[13]

Chart 2, which clarifies this dissimilarity, illustrates the distribution of the number of *kanji* in the mean value range, showing the number of *kanji* on the vertical axis and the range of the mean value on the horizontal axis. As can be seen, the major dissimilarity is pictured on the left, and the minor similarity is pictured on the right of the chart.

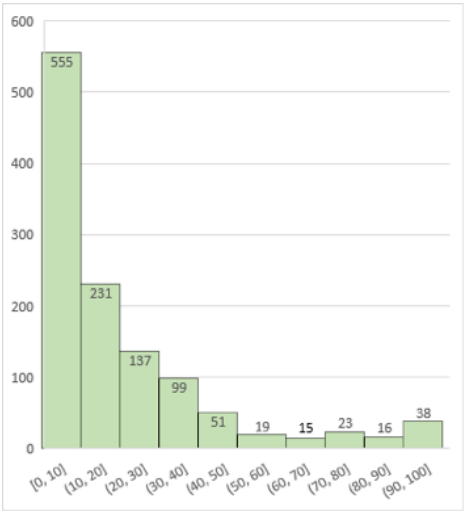

Chart 2. *Distribution of the number of averages*.

The previous survey indicated a possible correlation with the four Chinese tones since "most of the *kanji* with perfect correspondence were first and fourth [Chinese] tones."[14] Therefore, the potential correlation between the four Chinese tones and resemblances was investigated. However, the means and standard deviations were similar, and there was no noticeable trend.

[13] The *kanji* on the bottom are representative at each stage.
[14] The result of the current work was almost the same: 医(yi1)、他(ta1)、愛(ai4)、衣(yi1)、信(xin4) and 因(yin1).

The following represent the values for each tone

	Numbers	Mean	Standard deviation
1st tone:	242	18.54	15.01
2nd tone:	278	17.90	14.36
3rd tone:	200	20.45	15.81
4th tone:	456	20.40	15.69

11. Findings from the Total Scores by Multiplying the Values of (1) and (2)

The following is the summary of the "Findings from the total scores by multiplying the values of (1) and (2)":

・The score of multiplication of the values from the analysis of (1) and (2) was 13.8%.

・Only three *kanji* (医愛信) have 100% frequency of usage of *on*-reading as well as 100% phonetic similarity.

Chart 3 is the distribution graph. This chart shows a strikingly high rate of dissimilarity between Japanese and Chinese.

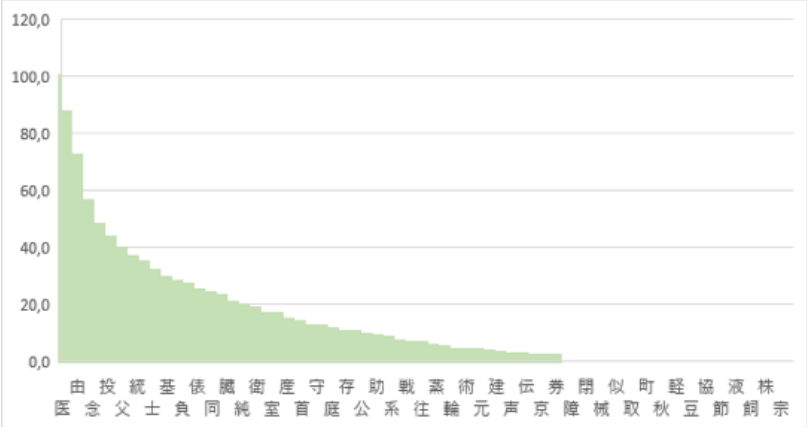

Chart 3. *"Real" phonetic resemblance degree: (1) × (2)*.[15]

12. The Analysis is Broken Down into Vowels and Consonants

Next, the Chinese *pinyin* was broken down into vowels and consonants, and all the Chinese characters in our database were analyzed. For example, the characters with a pronunciation that begins with /zh/ have low phonetic similarity to Japanese (about 7.5 on average).

[15] The *kanji* on the bottom are representative at each stage.

Serial number	JP	Pinyin	Four tones	On'yomi	2	3	4	6	7	8	9	10	11	1	5	12	Means	Standard deviation	Av ± σ	Av - σ	Av + σ
126	側	zhai1	1	ソク	0	0	0	0	0	0	0	0	0	0	0	0	**0,0**	0	0±0	0	0
121	宅	zhai2	2	タク	0	0	0	0	0	0	0	0	0	0	0	0	**0,0**	0	0±0	0	0
140	張	zhang1	1	チョウ	0	0	0	0	0	0	0	0	0	0	0	0	**0,0**	0	0±0	0	0
109	長	zhang3	3	チョウ	0	0	0	0	0	0	0	0	0	0	0	0	**0,0**	0	0±0	0	0
128	帳	zhang4	4	チョウ	0	0	0	0	0	0	0	0	0	0	0	0	**0,0**	0	0±0	0	0
124	着	zhao2	2	チャク	0	0	0	0	0	0	0	0	0	0	0	0	**0,0**	0	0±0	0	0
124	着	zhe0	0	チャク	0	0	0	0	0	0	0	0	0	0	0	0	**0,0**	0	0±0	0	0
115	折	zhe2	2	セツ	0	0	0	0	0	0	0	0	0	0	0	0	**0,0**	0	0±0	0	0
122	争	zheng1	1	ソウ	0	0	0	0	0	0	0	0	0	0	0	0	**0,0**	0	0±0	0	0
113	政	zheng4	4	セイ	0	0	0	0	0	0	0	0	0	0	0	0	**0,0**	0	0±0	0	0
43	正	zheng4	4	ショウ	0	0	0	0	0	0	0	0	0	0	0	0	**0,0**	0	0±0	0	0
102	証	zheng4	4	ショウ	0	0	0	0	0	0	0	0	0	0	0	0	**0,0**	0	0±0	0	0
109	織	zhi1	1	ショク	0	0	0	0	0	0	0	0	0	0	0	0	**0,0**	0	0±0	0	0
112	直	zhi2	2	チョク	0	0	0	0	0	0	0	0	0	0	0	0	**0,0**	0	0±0	0	0
97	植	zhi2	2	ショク	0	0	0	0	0	0	0	0	0	0	0	0	**0,0**	0	0±0	0	0
110	職	zhi2	2	ショク	0	0	0	0	0	0	0	0	0	0	0	0	**0,0**	0	0±0	0	0
92	質	zhi4	4	シツ	0	0	0	0	0	0	0	0	0	0	0	0	**0,0**	0	0±0	0	0
94	種	zhong	3	シュ	0	0	0	0	0	0	0	0	0	0	0	0	**0,0**	0	0±0	0	0
94	種	zhong4	4	シュ	0	0	0	0	0	0	0	0	0	0	0	0	**0,0**	0	0±0	0	0
135	仲	zhong4	4	チュウ	0	0	0	0	0	0	0	0	0	0	0	0	**0,0**	0	0±0	0	0
113	装	zhuang1	1	ショウ	0	0	0	0	0	0	0	0	0	0	0	0	**0,0**	0	0±0	0	0
138	展	zhan3	3	テン	25	0	0	0	0	0	0	0	0	0	0	0	**2,1**	7,22	2,1±7,2	0	9,3
92	障	zhang4	4	ショウ	25	0	0	0	0	0	0	0	0	0	0	0	**2,1**	7,22	2,1±7,2	0	9,3
105	整	zheng3	3	セイ	25	0	0	0	0	0	0	0	0	0	0	0	**2,1**	7,22	2,1±7,2	0	9,3
43	正	zheng4	4	セイ	0	0	0	0	0	25	0	0	0	0	0	0	**2,1**	7,22	2,1±7,2	0	9,3
109	織	zhi1	1	シキ	0	0	0	0	0	0	25	0	0	0	0	0	**2,1**	7,22	2,1±7,2	0	9,3
112	直	zhi2	2	ジキ	25	0	0	0	0	0	0	0	0	0	0	0	**2,1**	7,22	2,1±7,2	0	9,3
92	質	zhi4	4	シチ	25	0	0	0	0	0	0	0	0	0	0	0	**2,1**	7,22	2,1±7,2	0	9,3
116	製	zhi4	4	セイ	25	0	0	0	0	0	0	0	0	0	0	0	**2,1**	7,22	2,1±7,2	0	9,3
64	至	zhi4	4	シ	0	0	0	0	0	0	0	0	0	0	25	0	**2,1**	7,22	2,1±7,2	0	9,3
82	終	zhong1	1	シュウ	25	0	0	0	0	0	0	0	0	0	0	0	**2,1**	7,22	2,1±7,2	0	9,3
138	築	zhu2	2	チク	0	0	0	0	0	0	25	0	0	0	0	0	**2,1**	7,22	2,1±7,2	0	9,3
96	祝	zhu4	4	シュク	0	0	0	0	25	0	0	0	0	0	0	0	**2,1**	7,22	2,1±7,2	0	9,3
139	貯	zhu4	4	チョ	0	0	0	0	0	0	0	0	0	25	0	0	**2,1**	7,22	2,1±7,2	0	9,3
104	専	zhuan1	1	セン	25	0	0	0	0	0	0	0	0	0	0	0	**2,1**	7,22	2,1±7,2	0	9,3
135	転	zhuan3	3	テン	25	0	0	0	0	0	0	0	0	0	0	0	**2,1**	7,22	2,1±7,2	0	9,3
77	札	zha2	2	サツ	0	0	0	25	0	0	25	0	0	0	0	0	**4,2**	9,73	4,2±9,7	0	13,9
74	者	zhe3	3	シャ	50	0	0	0	0	0	0	0	0	0	0	0	**4,2**	14,4	4,2±14,4	0	18,6
94	針	zhen1	1	シン	25	0	0	0	0	0	0	0	0	25	0	0	**4,2**	9,73	4,2±9,7	0	13,9
59	中	zhong1	1	ジュウ	0	0	0	0	0	25	0	25	0	0	0	0	**4,2**	9,73	4,2±9,7	0	13,9
59	中	zhong1	1	チュウ	0	0	0	0	0	0	0	0	0	0	0	50	**4,2**	14,4	4,2±14,4	0	18,6
95	周	zhou1	1	シュウ	25	0	0	0	0	0	0	0	0	25	0	0	**4,2**	9,73	4,2±9,7	0	13,9
87	諸	zhu1	1	ショ	0	0	0	0	0	0	0	0	0	25	0	25	**4,2**	9,73	4,2±9,7	0	13,9
130	著	zhu4	4	チョ	0	0	0	0	0	0	0	0	0	0	50	0	**4,2**	14,4	4,2±14,4	0	18,6
113	装	zhuang1	1	ソウ	0	0	0	0	0	0	25	0	0	0	25	0	**4,2**	9,73	4,2±9,7	0	13,9
101	真	zhen1	1	シン	25	0	0	0	0	25	0	0	0	25	0	0	**6,3**	11,3	6,3±11,3	0	17,6
63	止	zhi1	1	シ	25	0	25	0	0	0	25	0	0	0	0	0	**6,3**	11,3	6,3±11,3	0	17,6
134	置	zhi4	4	チ	25	0	0	25	0	0	0	0	0	0	25	0	**6,3**	11,3	6,3±11,3	0	17,6
129	忠	zhong1	1	チュウ	0	25	0	0	0	0	25	0	0	0	25	0	**6,3**	11,3	6,3±11,3	0	17,6
79	衆	zhong4	4	シュ	0	0	25	0	0	0	25	0	0	0	25	0	**6,3**	11,3	6,3±11,3	0	17,6
101	招	zhao1	1	ショウ	0	0	0	0	0	0	0	0	25	25	0	50	**8,3**	16,3	8,3±16,3	0	24,6
111	制	zhi4	4	セイ	0	0	25	0	0	0	0	25	0	0	50	0	**8,3**	16,3	8,3±16,3	0	24,6
86	重	zhong4	4	チョウ	0	0	25	0	0	0	0	0	0	0	75	0	**8,3**	22,2	8,3±22,2	0	30,5
58	竹	zhu2	2	チク	75	0	0	0	0	0	25	0	0	0	0	0	**8,3**	22,2	8,3±22,2	0	30,5
119	戦	zhan4	4	セン	25	0	0	25	0	0	25	0	0	0	0	50	**10,4**	16,7	10,4±16,7	0	27,1
111	朝	zhao1	1	チョウ	25	0	0	0	0	25	0	0	0	25	0	50	**10,4**	16,7	10,4±16,7	0	27,1
111	朝	zhao1	1	チョウ	25	0	0	0	0	25	0	0	0	25	0	50	**10,4**	16,7	10,4±16,7	0	27,1
103	照	zhao4	4	ショウ	25	0	0	0	0	0	0	25	25	50	0	0	**10,4**	16,7	10,4±16,7	0	27,1
93	蒸	zheng1	1	ジョウ	50	0	25	0	0	0	0	0	0	0	50	0	**10,4**	19,8	10,4±19,8	0	30,2
68	紙	zhi3	3	シ	75	0	0	0	0	0	25	0	0	0	25	0	**10,4**	22,5	10,4±22,5	0	32,9
65	指	zhi3	3	シ	25	0	25	25	0	0	25	0	0	0	25	0	**10,4**	12,9	10,4±12,9	0	23,3
69	誌	zhi4	4	シ	50	0	0	0	0	25	25	0	0	25	0	0	**10,4**	16,7	10,4±16,7	0	27,1
79	衆	zhong4	4	シュウ	0	0	25	0	0	0	25	25	0	0	50	0	**10,4**	16,7	10,4±16,7	0	27,1
80	州	zhou1	1	シュウ	25	0	0	0	0	25	25	0	0	0	0	50	**10,4**	16,7	10,4±16,7	0	27,1
75	主	zhu3	3	シュ	25	0	0	50	0	0	25	0	0	25	0	0	**10,4**	16,7	10,4±16,7	0	27,1
106	状	zhuang4	4	ジョウ	25	0	0	0	0	50	0	25	0	0	25	0	**10,4**	16,7	10,4±16,7	0	27,1
94	章	zhang1	1	ショウ	25	25	75	0	0	0	25	0	0	0	0	0	**12,5**	22,6	12,5±22,6	0	35,1
88	治	zhi4	4	チ	25	0	0	50	25	25	0	0	0	25	0	0	**12,5**	16,9	12,5±16,9	0	29,4
84	志	zhi4	4	シ	50	0	25	25	0	25	0	0	0	0	25	0	**12,5**	16,9	12,5±16,9	0	29,4
127	値	zhi4	4	チ	50	0	0	0	0	50	25	0	0	25	0	0	**12,5**	19,9	12,5±19,9	0	32,4
86	重	zhong4	4	ジュウ	0	0	0	0	0	50	0	0	0	0	25	75	**12,5**	25	12,5±25	0	37,5
128	宙	zhou4	4	チュウ	25	0	0	0	25	25	25	25	0	25	0	0	**12,5**	13,1	12,5±13,1	0	25,6
90	助	zhu4	4	ジョ	25	0	0	0	0	25	0	0	0	0	75	25	**12,5**	22,6	12,5±22,6	0	35,1
125	注	zhu4	4	チュウ	25	0	50	0	0	25	0	0	0	75	0	0	**14,6**	24,9	14,6±24,9	0	39,5
91	昭	zhao1	1	ショウ	25	0	0	0	0	25	0	25	0	50	0	75	**16,7**	24,6	16,7±24,6	0	41,3
82	支	zhi1	1	シ	25	0	50	25	0	25	50	0	0	0	25	0	**16,7**	19,5	16,7±19,5	0	36,1
77	週	zhou1	1	シュウ	25	0	0	0	0	25	50	0	0	50	0	50	**16,7**	22,2	16,7±22,2	0	38,9
130	追	zhui1	1	ツイ	25	0	25	25	0	25	0	0	0	50	25	25	**16,7**	16,3	16,7±16,3	0,4	33
85	枝	zhi1	1	シ	25	50	25	25	0	0	25	0	0	0	25	50	**18,8**	18,8	18,8±18,8	0	37,6
108	昼	zhou4	4	チュウ	25	0	25	0	25	25	0	25	0	25	0	75	**18,8**	21,7	18,8±21,7	0	40,4
106	知	zhi1	1	チ	25	25	25	25	25	50	50	0	25	25	0	0	**22,9**	16,7	22,9±16,7	6,2	39,6
126	柱	zhu4	4	チュウ	50	50	75	25	0	25	25	0	0	0	0	50	**25,0**	26,1	25±26,1	0	51,1
99	準	zhun3	3	ジュン	25	0	50	0	0	75	0	25	0	50	25	50	**25,0**	26,1	25±26,1	0	51,1
137	兆	zhao4	4	チョウ	50	50	25	0	25	25	50	25	0	0	75	25	**29,2**	23,4	29,2±23,4	5,7	52,6
88	治	zhi4	4	ジ	50	25	25	75	0	75	0	25	25	25	50	50	**35,4**	24,9	35,4±24,9	10,5	60,3
85	住	zhu4	4	ジュウ	25	25	75	0	0	75	100	25	50	50	0	0	**35,4**	34,5	35,4±34,5	0,9	69,9

Figure 9. *86 characters beginning with "zh."*

Serial number	JP	Pinyin	Four tones	On'yomi	Means
126	側	zhai1	1	ソク	0
121	宅	zhai2	2	タク	0
140	張	zhang1	1	チョウ	0
109	長	zhang3	3	チョウ	0
128	帳	zhang4	4	チョウ	0
124	着	zhao2	2	チャク	0
124	着	zhe0	0	チャク	0
115	折	zhe2	2	セツ	0
122	争	zheng1	1	ソウ	0
113	政	zheng4	4	セイ	0

Serial number	JP	Pinyin	Four tones	On'yomi	Means
43	正	zheng4	4	ショウ	0
102	証	zheng4	4	ショウ	0
109	織	zhi1	1	ショク	0
112	直	zhi2	2	チョク	0
97	植	zhi2	2	ショク	0
110	職	zhi2	2	ショク	0
92	質	zhi4	4	シツ	0
94	種	zhong	3	シュ	0
94	種	zhong4	4	シュ	0
135	仲	zhong4	4	チュウ	0

Figure 10. *Twenty characters beginning with "zh" that have no similarity at all.*

More precisely, Figure 8 shows the characters with Chinese *pinyin* that begins with "zh." There were 86 characters beginning with "zh." Of these, 20 *kanji* were judged to have no similarity at all (0% [Figure 10]).

The results of the statistical analysis revealed the following:
a) The average score was higher for characters beginning with a vowel.
b) The average was higher for characters that contain apical consonants [mean value 32.6] or labial consonants [25.8].
c) Almost all characters that contain retroflex consonants (in particular, /zh/ [mean 7.5], /r/ [7.5], and /ch/[10.6]) have no phonetic similarity with their Japanese counterparts.

The following table shows the mean and standard deviation for each of the 21 consonants.

consonnes	子音グループ	平均値	標準偏差
l	舌尖音 apical consonant	38,28627451	19,89579777
k	舌根音 radical consonant	37,17894737	21,56495511
f	唇音 labial (sound)	35,77804878	15,87978845
n	舌尖音 apical consonant	34,70434783	18,64720862
t	舌尖音 apical consonant	33,19767442	20,82330342
s	舌歯音 linguadental	31,34583333	22,93881481
d	舌尖音 apical consonant	24,31594203	17,8003113
m	唇音 labial (sound)	24,20454545	18,8237082
b	唇音 labial (sound)	22,59090909	18,27161936
p	唇音 labial (sound)	20,72777778	21,85060758
z	舌歯音 linguadental	17,60232558	17,84275477
c	舌歯音 linguadental	17,48387097	17,84327541
sh	そり舌音 retroflex consonant	17,35483871	18,11704646
x	舌面音 dorsal consonants	14,64722222	10,53723287
g	舌根音 radical consonant	12,052	15,18573507
ch	そり舌音 retroflex consonant	10,62325581	12,4953234
q	舌面音 dorsal consonants	10,33913043	12,22004874
j	舌面音 dorsal consonants	8,871428571	10,62687754
r	そり舌音 retroflex consonant	7,51	11,23613907
zh	そり舌音 retroflex consonant	7,508235294	11,59644148
h	舌根音 radical consonant	7,48627451	9,976812952

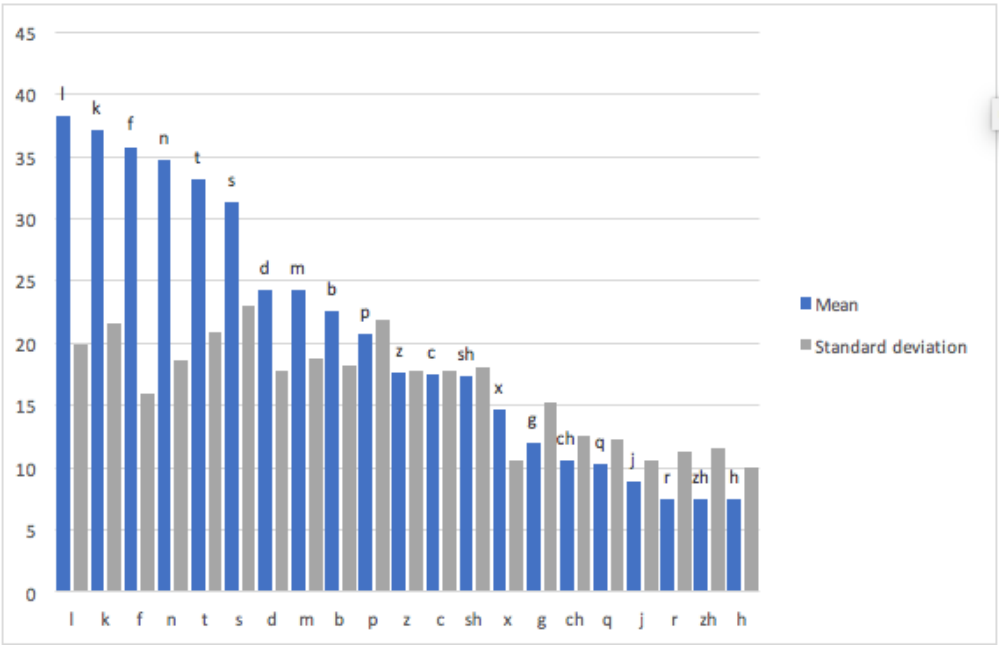

Figure 11. *Phonetic resemblance degree by 21 consonants: (l, k, f, n, t, s, d, m, b, p, z, c, sh, x, g, ch, g, j, r, zh, and h)*.

As a Japanese person who took and passed HSK6, the highest level of the Chinese test, I knew from experience that it is challenging to pronounce and understand the retroflex consonants. For example, "Japanese people" is pronounced as "*nihonjin*" in Japanese, but in Chinese, it is pronounced as "*ri4 ben3 ren2*," despite the fact that the Chinese characters are the same. Since the retroflex consonant "r" does not exist in Japanese, it is quite difficult to pronounce and understand. However, the way in which the current work quantifies the phonetic resemblance will make it easier to identify the sounds that need to be focused on during language training.

13. The Advantages of *kanji* for Improving Cross-Comprehension of Japanese and Chinese

13.1 Prescription to Prevent Learning Detours or Fixation on Mispronunciation

According to our analysis, the final score of the phonetic resemblance was 13.8%. Despite this low rate, it is unnecessary to reject attempts at simultaneous learning or cross-comprehension of Japanese and Chinese. There are considerable advantages to the resemblance of forms and meanings in the common *kanji* (see Figure 4). By informing students during the early stages of learning about the imbalanced rates of resemblance among the three components – sounds, forms, and meanings – it is possible to improve the efficacy of their study and to prevent learning detours. Moreover, following the analysis of the consonants, Japanese speakers should focus on the practice of retroflex consonants during the earliest stages of learning.

13.2 From "*kanji* Paradox" to Unexpected "*kanji*-Sphere Bonus"

The aforementioned concept of the "*kanji* paradox" entails a somewhat negative view of the languages. However, based on the quantification of my research, this notion might be reframed in a positive way, that is, as "*kanji* advantages" or "*kanji*-sphere bonus."

Even if Japanese people have never studied modern Chinese, they can infer the meaning to some extent because they know many Chinese ideograms. The reverse holds true as well. This view of languages is useful in disproving the stereotype that we are studying only one language. Of course, in terms of European languages, this is not a new concept. In fact, European languages are interconnected with Latin, Greek, and other languages on many levels, such that many elements in one language can be used to learn other languages.[16] Edgard Pich sums up this notion of languages well: "You are not studying one language. You are learning several languages at the same time."[17] This view of language is useful in disproving the stereotype that we are studying only one language and can be applied as well to Asian languages, in this case, Japanese and Chinese.

14. Discussion

14.1 General Discussion

This study supports the findings of Obataya (2019, p.15), which showed the importance of developing special learning strategies for students studying *kanji* in order to acquire listening and speaking skills. By using the JLPT levels and the deviation value, the quantification of the current database will be beneficial for all foreign learners of the Japanese and Chinese languages.

14.2 Limitations and Recommendations for Future Research

There are some limitations to this study. First, there is still room for further analysis of this database. The graphic and semantic aspects of the current *Kyōiku kanji* should be analyzed in

[16] For example, the adjectival form of the English word "*water*" is "*aquatic."* The Latin word *aqua*, from which this word originated, is used as the Italian word for water. (The spelling is slightly different.)
[17] When I was a graduate student, I studied French with Professor Emeritus Edgar Pich (1938–) of the University of Lyon II Lumière in France. These phrases were heard during his French lessons.

future studies to address these limitations.[18] Second, as an extension of the *Kyōiku kanji*, it would be worth examining the degree of resemblance to the *Jōyō kanji* (about 2,000 characters) through the same method.

14.3 Theoretical and Practical Implications

The findings have several theoretical and practical implications. As for the theoretical implications, this study confirmed that through the statical analysis of *pinyin* decomposed into vowels and consonants, the phonetic resemblance between Japanese and Chinese languages could be quantified in further detail. As to the practical implications, according to our analysis, teachers could advise Japanese speakers who are learning Chinese to focus on the practice of retroflex consonants at the beginner's stage of learning.

15. Conclusions

15.1 Review of the Study Aim and Objectives

The interest in Japanese and in Chinese languages is increasing not only among our students but also across the world. However, few works have analyzed the phonetic aspect of the latest character lists between these two languages. Therefore, it was necessary to develop an effective teaching method for the phonetic cross-comprehension of these two East Asian languages. Thus, the study aimed to conduct a more detailed quantification of the resemblance between the two languages.

After creating the database on the renewed official *kanji* list, the phonetic resemblance between Japanese and Chinese on this database was analyzed. Moreover, by breaking down the Chinese *pinyin* into vowels and consonants, the resemblance degree was examined in more detail.

15.2 Synthesis of the Main Findings

The main findings are divided into two parts: the quantification of the phonetic resemblance by means of a questionnaire and the analysis decomposed into vowels and consonants. First, it was statistically confirmed that each character is pronounced differently regarding the attempt to quantify the phonetic resemblance. Second, the average was higher for characters that contain apical consonants or labial consonants. Almost all characters containing retroflex consonants (in particular, /zh/, /r/, and /ch/) have no phonetic similarity with their Japanese counterparts.

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[18] As for form and meaning, we analyzed the previous database but not the current one. However, 70% of the data in the previous and current databases are the same. Thus, we can say that the trend is the same regarding form and meaning.

and analysis. Finally, I would like to thank the administrators of Jisho.org and Jonathan Waller, creator of the JLPT resources pages, for determining the JLPT levels in my database.

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Amplifying Vulnerabilities: How COVID-19 Is Impacting Japanese at Risk Youth

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Abstract
There are 608 "Children's Homes" (児童養護施設 jidō yōgo shisetsu) across Japan caring for youth unable to live their parents for an array of reasons mainly abuse and poverty. According to the most recent data 13.9% (2020 OECD) Japanese youth live in poverty and in 2018, 159,850 child abuse consultations were made (2018, MHLW). Institutionalization of any kind is always difficult for youth as well for their caretakers. Inside the children's homes, the situation is difficult due to limited staff and tight budgets. The onset of COVID-19 has meant an increase in the need for support while at the same time a decrease in the support institutions could provide, putting an already vulnerable population at added risk. Based on interviews with leaders at leading non-profit organizations working with children from low-income families and in Children's Homes, this examines the immediate difficulties faced during the emergency order when schools were closed and during spring/summer when youth returned to school. Interviews revealed both the needs faced by youth and staff as well as the potential long-term educational and social impacts.

Keywords: COVID-19, Vulnerable Populations, Children's Homes, Child Abuse, Child Poverty, Japan

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Introduction

For most of us, the COVID-19 pandemic has required that we change our personal and professional routines to protect ourselves from infection and to adjust to the different prevention measures (social distancing, stay at home requests, etc.), however those already institutionalized are more vulnerable to infection and have less options. All over the world, there are children living separately from their families and particularly in wealthy nations these children are invisible. Public or private institutions step in and assume responsibility for these young people and in Japan, there are diverse types of organizations attempting to serve the needs of the children, all working with limited resources. During the best of times, young people living in orphanages struggle with isolation, schoolwork, trauma from past experiences, and being ostracized. Any disruption impacts what they are able to do and a major crisis such as a pandemic can have dramatic effects on their work and the youth they serve.

This paper mainly focuses on the "jidō yōgo shisetsu (児童養護施設), Japanese institutions usually translated into English as "orphanages" or "Children's Homes." The children come from families unable to care for them, although they often retain some contact with birth parents. These licensed social welfare institutions are residential facilities that are designed to care for children while they attend regular school until the completion of high school.

Nonprofit organization leaders working with children's homes or their parents were interviewed after gathering data and information from publicly available reports. Interviews were conducted during different phases of the pandemic: during the first wave in spring 2020 during the emergency order when schools were closed; in summer 2020 after children returned to school; and at the beginning of the third wave before the limited emergency order in December 2020. Interviews illustrated the changing conditions in terms of daily life inside the homes, in family relationships and education - both formal and social.

Any institution has to be particularly careful to protect itself from any type of infection, the homes had to curtail almost all contact to the outside world during the spring 2020 emergency order when not only could the children not go to school, but they were constricted to limited contact with other children and even their own family members. Preventative isolation, lack of sufficient staff support and insufficient resources greatly increased the difficulty both for children and the staff who are supposed to take care of them. From June 2020, children were back in school in person. While many youth were thrilled to be able to go out and see friends, some were concerned about travel due to the crowds and long commutes common in major cities in Japan (Benkhart, August 2020; Clemons, August 2020). The Dec 2020-Feb 2021 Emergency Declaration over the most populated areas of Japan did not close public schools, despite a drastic increase in COVID numbers[1]. The article describes the impacts over the course of the year and shows that many challenges were ongoing despite the return to "normal".

[1] While COVID-19 numbers in Japan have not reached the levels of nations like the U.K. or U.S. at the time of this writing in early Jan 2021, patient cases were rapidly increasing.

Alternative Care in Japan

There are a range of alternative care institutions with different missions and target populations. Facilities include maternal and child life support facilities (母子生活支援施設 boshi seikatsushien shisetsu) for children and mothers fleeing family violence; child psychotherapy facilities (児童心理治療施 jidō shinri chiryōshi) for those requiring regular psychological care; independent living group homes (自立援助ホーム jiritsu enjo hōmu) for 15 to 19 year-olds who have left other care facilities; infant care facilities (乳児院 nyuuji-in) for those up to age 2; foster parent homes ; foster family group homes (ファミリーホーム famirii hōmu or 小規模住居型児童養育事業 shōkibo jukyō-gata jidō yōiku jigyō) where five to six children live with a family; and kinship-based foster parents (親族里親 shinzoku sato-oya) where youth live with grandparents or older siblings (MoHLW, 2020; Human Rights Watch, 2014). These quasi-government social welfare institutions were designed to provide basic needs including food, clothing, basic support and a safe living space. While there is much overlap in the issues faced, this will focus only on Children's Homes.

Children's Homes (児童養護施設 jidō yōgo shisetsu) are institutions for six or more children aged two to eighteen years old who cannot live with their parents. They are sometimes mistakenly referred to as "orphanages" in English; however, since most nonprofit leaders refer to these as 'Children's Homes,' because most have contact with their birth parents, this article uses that term and "care workers" to refer to the people who work in them.

According to the Ministry Health Labor and Welfare (MoHLW, 2020), 93.3% of the 27,000 youth in children's homes, have 1 or 2 parents living, and 97.9% of them were from "single parent homes." About 65%, have some type of regular communication with parents 2 to 11 times a year and less than 20% have "no interaction" with family members. As of 2018, 608 children's homes housed 27,026 young people throughout Japan accounting for 60% of all children not living with their parents.[2] The average age was 11.5 years old and on average youth stay in these homes for about five years, but not necessarily consecutively (MoHLW, 2020).

Youth placement may be due to parents being sick, disabled, or poor, but the main causes involve neglect or abuse. Precarious conditions are legally categorized separately as neglect, abuse, absentee parents, leaving children unattended, abandonment, and refusal of childcare under Japanese child welfare laws and more than 45% of children are placed in homes for one of these reasons. The ratio of children that has ever experienced some form of abuse is higher at 65.6% and this includes physical abuse (41.1%), sexual abuse (4.5%) neglect (63.0%) and psychological abuse (26.8%). For all alternative childcare facilities except infant homes, the rates of abuse experienced exceeded 50% (MoHLW, 2020).

Decisions regarding the placement of children in Japan are made at the local government level by child guidance centers, who are generally predisposed to placing youth in institutions, as opposed to adoption or foster care. According to Human Rights

[2] As a point of reference, of the approximately 45,000 of the children not able to live with their birth parents, 86% are living in orphanages and 13% are in foster care.

Watch, 78 % of child guidance centers indicated that children are placed in institutions instead of foster care based on the preference of the birth parents (Human Rights Watch, 2017)[3].

Children's homes are residential facilities and 93.4% attend school regularly. While more than 36% were reportedly behind in school, 56.4% reported "no particular problems with schoolwork". They may face other challenges: 36.7 % have some type of disability, mostly intellectual or psychological disabilities. Of these 47.5% have developmental disorders (autism spectrum), 37% have ADHD, 29.2% have reactive attachment disorder, 12.6% have intellectual disabilities, and 9.7% have PTSD (MoHLW, 2020).

Youth may stay in the homes until they graduate from high school or leave the education system upon completion of obligatory education from age 15 years (MoHLW, 2020; Human Rights Watch 2014). Despite having living relatives, when these young people leave the homes and enter society upon leaving junior or senior high school, there are no familial safety nets to support them in their transition to adulthood, resulting in the solo navigation of finding and keeping a job, finding an apartment and managing daily life such as signing up for and paying for utilities without any support (Bridge for Smile, 2020).

The Organizations Involved in this Study

After gathering basic information on the situation facing youth in the systems from the government and reports, I interviewed employees at six leading Japanese nonprofits working with those from children's homes and economically disadvantaged families. The following nonprofit organizations support disadvantaged youth and provided the information for this paper.[4]

- Mirai no Mori works to build the capacity and potential of youth in children's homes by engaging them in outdoor activities.
- You Me We's primary mission is to help children in homes to become fully capable and financially independent young adults as they prepare to leave the home.
- Bridge for Smile (B4S) focuses on, helping to prepare teenagers for post-orphanage life, developing both their hard and soft skills.
- Hands on Tokyo (HOT) promotes civic engagement through partnerships between organizations needing support and people who want to get involved.
- KIDS DOOR works with lower income families.
- Ashinaga provides educational support to orphaned children worldwide.

What follows is an overview some of the issues faced in daily life and related to education, family and socialization as well as how nonprofits responded to meet these new challenges faced.

[3] In 2017, a new policy was enacted aiming to place pre-school children in foster care instead of Children's homes, however this was met with opposition by some local governments and Children's Homes alike.

[4] Although in spring 2020 I contacted 25 children's homes through cold calling and email, I was not able to get sufficient responses directly from them. Most responded that they were too busy to address my questions. Other information was gathered from their websites – however these contained limited information.

Stresses and Pressures Faced

Throughout the year the most common concerns were about the stresses put on the youth and how it would manifest itself in life in the homes and school. In April 2020, Lights on Children conducted a survey of children's facilities to assess COVID-related impacts, resulting in 74% reported stress on children, and 50% concerned about education. The Youth Support Fund surveyed 46 homes in September 2020 and 90% responded that COVID was causing great damage to young people in social care (Sept 2020). In interviews, nonprofit leadership explained that the stresses these children experience are similar to others of a similar age, however the impacts are worsened due to past abuse experience and family separation. Their isolation amplifies the trauma and difficulties they face (Uemura, 2020). Likewise, some care workers expressed that there were more fights between the children and one specifically mentioned that at any given time, one child in the facility was crying (Oka, May 2020). Younger children refusing to separate themselves from the care workers, becoming more competitive with each other for attention was also observed (Koirala, 2020). While struggling with cabin fever due to COVID-19 stay-home measures was not unique to children's homes, most people are not doing so while also living with a large group of unrelated persons sharing communal space.

Inside the Homes

The first concern in all institutions has been avoiding the spread of infection and maintaining order. During the spring 2020 during the initial emergency declaration period, a lack of masks and antiseptic was prevalent but these material need gaps abated by summer 2020. Mask wearing and hand washing are not controversial issues, as they are in other nations, but social distancing poses a challenge. While on average there are openings at homes, in more densely populated areas such as Tokyo, the homes operate at or over capacity (Uemura, 2020).

Care workers were directed by government authorities to adhere to social distancing without specific directives, which is challenging given the lack of extra space. Children's homes established different rules regarding social distancing, and some separated the youth into groups of four to six that are not allowed to mingle outside of these smaller groups (Clemons, May 2020). The shared facilities - bathrooms, toilets, and eating areas - pose the biggest health concerns. In some homes, shifts were created to determine when each person could take a bath or eat, resulting in further stress and conflict (Koirala, 2020).

Since June 2020, when children went back to school and society seemed to return normal, Care workers have kept trying to maintain social distancing rules and limit interaction of large groups. While easier to limit the younger ones, it became increasingly more difficult for homes to limit the movement or engagement of teens especially as they need to work, and crowds returned to many places over the year. (Clemons, Aug 2020; Oka, Aug 2020).

The changing situation also posed financial challenges for the homes which rely for roughly half of their funding each from the public and private sectors (Uemura, 2020). Initially, funds were needed for basic preventative costs such as plastic sheeting, masks and disinfectant but increased costs for food and overtime staff pay during the initial

emergency declaration period were also significant. Initially, the government did not anticipate all the additional costs which is why throughout 2020, the Japan National Council of Social Welfare had to repeatedly request additional funds to cover preventative measures (June 2020), to allow care workers access to relief funds and PCR tests and to ensure they may be vaccinated as soon as possible in spring 2021 (August 2020).

The Need for Routine

During the "lockdown" in Spring 2020, homes struggled to keep children occupied and engaged; having diverse activities and a set schedule was important to maintain some semblance of order and normalcy (Clemons, May 2020). Mirai no Mori responded by creating activity kits in spring and summer 2020 which included songs, videos, and activities sheets based on their summer camp and weekend programs. For example, Nature Bingo was adapted so that instead of looking for animal footprints in the woods, children could look for leaves on their Home grounds. Cooking tutorials aimed to keep the camp spirit alive as well as encourage children to take a more active role in the homes. These helped not only keep the children busy with fun activities but also helped serve as a channel for children's connection to the outside world. The interactive educational materials were also aimed at motivating youth to keep learning (Oka, May 2020).

Managing Education Needs

The OECD reported in Dec 2020 how the COVID-19 crisis could have long-lasting impacts for students globally. Such experiences can impair memory and attention, making learning difficult (Rowena, 2020). Since children's home residents tend to have a lower school performance and difficulties due to disabilities or trauma, the ramifications may also pose a more severe challenge for them. Even before the pandemic the children's inability to keep up with schoolwork weighed heavily on Care Workers and while they play an important role in helping youth with homework, Care Workers are not teachers (Koirala, 2020). In Spring 2020, while some national and private schools have started online learning, most public schools distributed worksheets to be completed at home. Care Workers do all they can to help youth keep up with schoolwork, but during the lockdown the aim was to help them not get too far behind (Oka, May 2020). Helping a number of children aged 2 to 18 years old, with assignments from different schools, all of whom need different types of support, while also trying to complete home management and administrative tasks would be a challenge even for the best teachers or administrators.

Connecting to the World Online

The lack of Wi-Fi, overhead projectors, and computers in most homes was a challenge prior to the pandemic which is why You Me We had for years worked with private donors and homes to distribute 500 computers and tablets to young people and staff at homes throughout Japan (Clemons, May 2020). Throughout 2020, organizations responded with computer and cash donation campaigns. Lights on Children initiated a "Give a computer to an orphanage in Tokyo," for children's homes in Chiba, Saitama and Kanagawa prefectures (Lights on Children, 2020; Save the Children Japan, 2020). After assessing how high school students were falling behind by not being able to take

part in online programs, HOT held a fundraising campaign aiming for five million yen to provide 100 youth computers, tablets and technical support (Hands on Tokyo, 2020).

Organizations attempted to respond to the needs as they evolved by creating new initiatives in diverse forms. Besides the aforementioned self-learning kits, organizations created new phone, and online classes, and programs. For example, after initial assessment in spring 2020, Kids Door launched some phone-based education support programs and shifted to offering programs using diverse methods, including phone, online, in-person and hybrid systems (Benkhart, May and Dec 2020).

The issues of access are more complicated than having PC and Wi-Fi access. A Lights on Children survey of 56 facilities results showed that while 85% answered that they would like to use the Internet to supplement studies, 82% of homes had problems in how to utilize the computers distributed (Lights on Children, 2020). Even when computers are distributed it does not mean that there is adequate internet access or knowledge of how to make the most of having a computer (Uemura, 2020; Clemons May 2020). Care workers also lacked confidence in how to manage online security and children's online safety (Clemons, Aug 2020***).***

If youth were falling more behind in school was not really clear, however teens were behind in high school and college examination preparation. Due to both schools being closed in spring, and the delay of preparation courses, teens were not where they should be in exam preparation (Benkhart, Dec 2020). In a country where entrance exams are so important for moving ahead, this could have lifelong impacts on at-risk youth.

While 2020 posed many challenges, a common sentiment was that long-term, internet and computer accessibility would have positive impacts once new programs were normalized. Not only can this give youth greater access to information and promote the development of new skills, but it could also foster different ways of learning that some youth might find rewarding. The push to "go online" has the potential to bring about new opportunities in the future, given lasting infrastructure development, although this is also an additional ongoing cost to Children's Homes' already tight budgets.

Financial Pressures

For teenagers, keeping up with studies and exams are just part of their struggles. The transition to living on their own after they leave the Children's Homes is always stressful, but COVID-19 brought about new unknowns. Many teens noted a reduction in hours and wages and/or concern about having less money (Ashinaga, 2020, Youth Support Fund, 2020). Working to save money and secure any type of employment is intrinsic to their post-home survival since they have no support system if they do not find employment. If teenagers are unable to work part-time due to pandemic, it also means they could experience difficulties paying their cell phone bills, which isolates them from both their social network, and more importantly holds them back from contact with potential study and work opportunities (Uemura, 2020). In fall 2020, Kids Door and Ashinaga stepped up efforts for scholarship funds. Based on prior research showing the economic insecurity teens faced, these campaigns aimed to support the costs of examination practice tests, entrance exams and the transport which all cost money that they did not have (Benkhart, Dec 2020; Ashinaga, Dec 2020).

Family Connections

Family relations, an ever-present issue, became more pressing in 2020. During the emergency declaration, a priority was placed on health, so visits from outside persons, including parents, were restricted in many homes (Oka, May2020). Guidelines were generally eased from June. However, the type of work parents engage in either presented a higher potential risk for infection or increased negative economic impact, or both. Parents of those in homes tend to have irregular or unstable employment, and many work at jobs with high risks of infection such as nursing, elder care, food service, and hospitality businesses making them concerned about making visits (Ashinaga 2020). Some children visit or stay at their parent's homes regularly and/or usually have visits during the summer or winter year-end holidays. Limited visits by family members due to concern over infection or financial reasons presents another stress (Clemons, August 2020; Oka, Dec 2020). The fear of losing family connections and the potential for re-abandonment could have serious impacts on the children (Oka, May 2020; Clemons, May 2020; Uemura 2020).

Technology can ease some of the stress by helping maintain contact with parents, family members, teachers, volunteers, and friends, which is why the availability of video calling platforms such as Skype is meaningful (Uemura, 2020; Clemons 2020). Even though parents want contact this can be a challenge due to the parents' lack of infrastructure. (Social Welfare News Online, May 2020). The loss of these parent-child meetings is particularly devastating in the cases where there was the expectation of reunion (Clemons, Aug 2020; Oka, Aug 2020).

Socialization and Connections to the World Outside the Homes

Nonprofit employees and volunteers not only provide much needed financial, material and service support, but as individuals, they also function in developing social skills and provide exposure to new ideas and perspectives. Throughout 2020, organizational leaders expressed concern about what the long-term impacts of the limited exposure to their volunteers would be on children.

During the spring, all volunteers were prohibited from direct engagement. Not being able to accept volunteers into the homes to assist with schoolwork, to play games with, or to provide computer, life skills, or English classes, when exposure to the outside world was most limited posed a particular challenge (Clemons, August, Dec 2020; Uemura 2020). Many homes extended isolation rules through the year due to infection and social distancing concerns despite COVID-19 cases dropping after summer. Other times, volunteers were unable to provide direct engagement support due to either corporate policy or their own chronic health issues (Benkhart August 2020; Clemons, Dec 2020)

Through their programs, nonprofit volunteers provide necessary alternative role models. Young people in homes generally have a limited scope of adult role models – usually care workers and teachers. Children living with parents can meet parents' friends, people with different jobs and interests, and these role models expose the youth to new possibilities (Koirala 2020). Volunteers represent alternative future options as well chances to get new perspectives on life. The lost potential of broadening each child's

world because they cannot meet new people from whom they can learn may have long-term effects (Oka 2020).

The role of nonprofits is especially important in the area of building community connections. Partly due to the increased COVID-19 numbers, December holiday events were canceled. Often these events involve neighborhood residents as well as volunteers and these are significant beyond the presents the youth receive.[5] Mirai no Mori decided to switch focus away from the youth receiving gifts and to the spirit of giving through their new Christmas activity kit. Kits included information on holiday craft making and cookie baking as well as greetings from Mirai no Mori leaders. By having the youth make cards and/or gifts for others, they were able to turn fun activities into a new learning experience. (Oka, Kozue; Dec 23, 2020). The engagement aspects of programs provide both a respite from stress and a sense of connection and normalcy.

Silver Linings?

While the pandemic highlights the divide between youth who live/don't live with their families as well as those with/without resources there may be some positive knock off effects. The most obvious is the increased access to technology. Care workers, nonprofit organizations and supporters all had to step up and improve their own online, offline and hybrid program delivery by trying new things. The diversity of programs and events shifted to match changing conditions and this flexibility may also be meaningful for the youth long term.

Another potential silver lining could be if more attention was brought to the plight of these children, there could be more active collaboration between the children's homes and other agencies or sectors (Benkhart May 2020; Uemura, 2020). Some organizations found local government more flexible about support guidelines (Benkhart Dec 2020); and other organizations recognized the need to consider new ways of working with the Care workers themselves (Clemons Dec 2020). More partnerships at the local level between nonprofits and local governments, the business sector, and social welfare agencies could result in more people sharing expertise and contributing to the growth and development of these young people into active, successful members of society (Clemons, May 2020).

Representative of these positive trends was the first ever online exchange event for people from orphanages throughout Japan held in a hybrid fashion online and in various location, supported by the Ministry of Health Labor and Welfare. While only 150 people joined, participants were from all over Japan. They not only talked about issues that matter to them, but also shared singing and dancing performances (Social Welfare News Online, Nov 2020). Should events like this continue, this may help develop a broader identity, awareness or public acknowledgement of the issues they face.

On the flip side, because underlying issues that contribute to the difficult situation these children face - neglect, abuse, and economic pressures – have not been addressed, there is nothing to show that these youths will not get by unscathed. During the best of times, young people living in orphanages struggle with schoolwork, trauma from past

[5] This information came from nonprofit leaders and the review about children's homes websites showing the cancelation of holiday and Christmas parties.

experiences, and ostracization and the pressure to grow up earlier than their peers. The importance of the nonprofits supporting the homes has greatly increased because they provide the needed support networks.

Concluding Thoughts

Throughout 2020 nonprofit leaders had to be nimble and adapt to changing needs and all showed concern over the long-term impacts as well as for the children living in abusive homes. While moving some of these young people into the more institutionalized children's' homes is necessary, this move also comes with its own challenges, as we have seen in this article. Beyond the children who are already in homes or alternative care, attention and empathy needs to also be extended to those children who *should* be in care homes but are not. Such children have an urgent need to be protected from a range of abuses, but they are invisible because they are stuck in the place where the abuse is occurring (Oka, May2020; Clemons, May 2020).

The impacts of the 2020 pandemic on these youths are difficult to predict. Much depends on how long the pandemic continues, if COVID-19 numbers in Japan spike again and if nonprofits have the resources to continue programs and services. The pandemic has shown just how chronically vulnerable the institutions and the youth inside are, not just during a pandemic or any similar crisis, but on an everyday basis. However, it will take more altruism to alter the conditions. A shift in attitudes towards them as well as changes in the systems which confine them will require an investment of resources, including money, time and expertise to bring about broader change. In such a rapidly aging society, which cannot afford to let any youth fall through the cracks, the pandemic offers an opportunity for this investment.

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Isolated, Intimidated and Bullied on University Campus: The Students' Experience and Recommendations

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Abstract
Exclusionary behaviors, including offensive and hostile behaviors (such as bullying and harassment), are a common problem in universities worldwide. However, student perspectives regarding their experience with exclusion on campus, the cause and impact of such experience, as well as potential solutions are not well understood. We collected and analyzed quantitative and qualitative data in a campus-wide student survey at a U.S. predominantly white university to understand student perspectives. Among 2511 survey respondents (response rate: 29%), almost one in five students (19%) experienced isolation, intimidation, or harassment in the recent 12 months. Students of color experienced more exclusion than white students (26% among students of color and 15% among whites, X^2=37.8, p<0.01). Students who identified with non-binary (e.g., transgender) or other gender identities were more likely to experience exclusion than male/female (47% vs. 18%, X^2=21.4, p<0.01). A range of bases for exclusionary behaviors was identified, including race, political views, physical characteristics, age, and socioeconomic status. Although very few students reported these incidents they experienced to the campus authorities, such experience had a significant negative impact on the student's perception of their life on campus and of the campus climate. The student-suggested action areas included policy enforcement, campus governance, diversity recruitment, cultural competence training, multi-cultural activities, as well as continuous assessment and open dialogues. **Conclusion:** In a 2018 university student survey, we identified a high prevalence (19%) of exclusionary behaviors with some gender and racial differences, the causes and impact, as well as action areas to address the issue.

Keywords: Exclusionary Behaviors, University, Cultural Competence, Campus Climate, Mixed Method

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Introduction

Exclusionary behaviors, including offensive and hostile behaviors (such as bullying and harassment), are a common problem on university campus worldwide (Cismaru & Cismaru, 2018; Universities UK Taskforce, 2016). For example, by one estimate in 2004, nearly one million college students are the victims of racially motivated harassment each year in the U.S. (Willoughby, 2004). Exclusionary misconducts may affect the victims significantly, who may feel isolated (e.g., shunned or ignored), intimidated, traumatized, even suicidal (Brank, Hoetger, & Hazen, 2012; Cowie & Myers, 2014; National Center for Injury Prevention and Control, 2014; Universities UK Taskforce, 2016). The bases of exclusionary behaviors may include race, sexual or gender orientation, religion, or other diversity dimensions and personal characteristics, disability, political views, and socioeconomic status (Bilias-Lolis, Gelber, Rispoli, Bray, & Maykel, 2017; Carabajal, Marshall, & Atchison, 2017; Cowie, Myers, & Aziz, 2017; Iverson, 2007; Rivers, Duncan, & Besag, 2007; Russell, Sinclair, Poteat, & Koenig, 2012; Zulfiqar, Nadeem, & Pervaiz, 2018). University students' experience with these behaviors has been studied before, often via questionnaire surveys or (focus group) interviews. This research aims to take a multi-modal approach to understanding student experience and perspectives of exclusionary behaviors, via collecting and analyzing both quantitative and qualitative data in a student survey at a U.S. university.

Materials and Methods

As part of an institutional initiative to improve student experience at a predominantly white university, a campus-wide student questionnaire survey collected student perspectives on a range of topics, including exclusionary behaviors. This study took a mixed method approach to analyze the survey findings related to student experience with exclusionary behaviors and their recommendations on how to address the issue. The study protocol was reviewed and approved by this university's Institutional Review Board (IRB).

Site and Sample

This study was conducted in a predominantly white university, in terms of both the faculty/staff and student populations. Among the 1506 faculty and staff members in the university, 78% identify as white, and 69% white in the student body. A total of 2511 responses to a campus-wide student survey (female: 68%, ages of 20 – 22: 50%, white alone, not Hispanic or Latino: 68%) were included in this analysis.

Data Collection Procedure

During the Spring semester 2018, all enrolled students in the university (N=8770, including 7874 undergraduate students and 896 graduate students) were invited to complete a web-based anonymous questionnaire survey on a range of topics of their campus life. Student demographic information was collected, along with their campus experience and perspectives often via Likert-scaled questions. Moreover, the survey collected students' qualitative comments in an open-ended question soliciting action recommendations to address the issues they identified. The university records regarding student demographics, faculty and staff demographics, as well as

exclusionary incident reports were collected for this study from the university's Office of Institutional Research, the university's Police Department, and the Clery Compliance Coordinator at the university. The survey instrument is available on request and discussions on other issues such as sexual harassment are included in a separate report (Shah & Gu, 2020).

Data Analysis Methods

All responses to the student survey that completed at least one question on their experience or perceptions are included in the analysis, i.e., excluding those providing only demographic information. Student information on race and Hispanic origin was reported using the U.S. Census Bureau standards (U.S. Census Bureau, 2018). Based on student-reported experience with exclusionary behaviors within past 12 months, the prevalence rate was calculated and presented in percentage. The distributions of students according to their experience and perceptions were also presented in percentages. The students also identified the perpetrator groups of exclusionary misconducts, the base of exclusionary behaviors, and their reaction to the incident. The percentage calculations when reporting these aspects used the total number of the survey participants who have experienced exclusionary behavior as the denominator.

Chi-square tests were performed to examine the relevance of gender and race factors to personal experience with exclusionary behaviors on campus; these demographic factors were also tested in relation to the experience impact and reaction. Wilcoxon-Mann-Whitney tests were performed to examine the exclusionary misconduct's impact on student perceptions of campus life. The Microsoft Excel application and SAS package were used in the quantitative data analysis (at <0.05 significance level).

We undertook thematic analysis of the qualitative student comments. Constant comparison was applied not only to compare between student perspectives but also to triangulate with the findings from the quantitative survey data and university records (on student demographics, faculty & staff demographics, and incident reports). Data saturation was achieved in this analysis. The key themes that emerged in the data were reported in the next section.

Results

Participant Characteristics

A total of 2511 survey responses (response rate: 29%) were included in this analysis. The majority of the survey participants were female (68%), half of them within the age of 20 – 22 (50%), and the majority identified themselves as 'white alone, not Hispanic or Latino' (68%). The survey also collected information on sexual orientation (with 13% participants identifying with LGBTQIA), veteran status (3%), first language (English: 91%), and disabilities (2% identifying with physical disability, 5% with learning disability, 6% with psychological disability, and 1% with sensory disability). The lack of racial and linguistic diversity among the survey participants, mirrors the university student population as a whole (e.g., white: 69%). The distribution pattern of the survey participants in terms of other characteristics (such as race, age, living arrangement status, and year of study) appears comparable to that of the university's student body, suggesting that the survey respondents are a

representative sample of the University student population.

Prevalence of Exclusionary Misconducts on Campus

According to the survey data, 465 (19%) students personally experienced exclusionary behavior (such as being shunned or ignored), or behaviors that were intimidating, offensive, or hostile (including bullying and harassing) at the university in the past year. Race appeared relevant to this prevalence as significantly less students who identified with 'white alone' had personal experience with exclusionary behaviors than students of color (15% among white and 26% among other racial groups, $X^2=37.8$, $p<0.01$). Similarly, some gender differences were observed, with a significantly higher prevalence among the students who identified with non-binary (e.g., transgender) or other gender identities than those of mainstream gender identities (47% among non-binary/other genders and 18% among male/female, $X^2=21.4$, $p<0.01$), as shown in Table 1. Between female and male students, there was no statistically significant difference in terms of prevalence ($p=0.33$).

	Had personal experience with exclusionary behaviors in past 12 months?		
Gender	**Yes (N, %)**	**No (N, %)**	**Total (N, %)**
Female	317 19%	1394 81%	1711 100%
Male	127 17%	625 83%	752 100%
Non-binary or Other	18 47%	20 53%	38 100%
Total *	**465 19%**	**2046 81%**	**2511 100%**

Table 1. Student experience with exclusionary behaviors on campus by gender
* Ten students (including three reporting exclusionary behavior experience) did not answer the gender question, hence are only included in the last row.

Among the 465 students who reported personal experience with exclusionary misconducts on campus in the past year, 446 students also made observation on the frequency of such behaviors. A total of 200 students (45%) observed three or more times of this type of conduct, 153 (34%) observed twice, and 93 (21%) observed one such conduct. There was no statistical significant difference among gender or racial groups in terms of this frequency ($p>0.05$).

The Perpetrators and Bases of Exclusionary Behaviors

The survey asked the students who experienced exclusionary misconducts (N=465) about the perpetrators and the bases for such conducts. Table 2 reported on the perpetrators of exclusionary behaviors, identifying that most of these behaviors were conducted by fellow students. The student beliefs on the base of such behavior were summarized in Table 3.

Perpetrators of the exclusionary behavior	**N**	**%**
Fellow student	388	83%
Faculty/instructor of a class you were enrolled in	85	18%
Staff member	30	7%
Other faculty member	26	6%

Perpetrators of the exclusionary behavior	N	%
Administrator (e.g., Chair, Dean, Director, etc.)	22	5%
Supervisor (including internship supervisor and past preceptor)	15	3%
Member/administrator of student organizations (e.g., club, sorority, and student veteran organization)	4	1%
Stranger	1	0.2%

Table 2. The perpetrators of exclusionary behaviors

Base of Exclusion	N	%
Race	159	34%
Country of origin	45	10%
Ancestry	36	8%
International status	16	3%
Political views	102	22%
Religious/spiritual views	59	13%
Participation in an organization/team	52	11%
Physical characteristics	85	18%
Age	65	14%
Gender identity	60	13%
Sexual orientation	48	10%
Gender expression	42	9%
Sexism	2	0.4%
Socioeconomic status	61	13%
Position (staff, faculty, student)	51	11%
Psychological condition	36	8%
Medical condition	34	7%
Learning disability	28	6%
Physical disability	14	3%
English language proficiency/accent	29	6%
Pregnancy	16	3%
Marital Status (e.g., single, married, partnered)	14	3%
Parental status (e.g., having children)	13	3%
Other (e.g., personality, popularity, etc.)	10	2%
The nature of perpetrators being abusive	8	2%

Table 3. Student beliefs on the bases for exclusionary behaviors

There was no statistically significant difference between female and male students in terms of their beliefs regarding the bases for exclusionary behaviors ($p>0.05$). On the other hand, the students who identified with non-binary/other gender identities were more likely to name gender identity/gender expression, sexism, and sexual orientation related issues as a base for exclusionary behaviors than female/male students (78% among those with non-binary/other gender identities vs. 18% among female/male, $X^2=38.1$, $p<0.01$). In terms of racial differences, white students were less likely, than students of color, to name race, ancestry, country of origin, and international status as a base for exclusionary behaviors (19% white vs. 67% among students of color, $X^2=107.8$, $p<0.01$), were less likely to name English language proficiency/ accent as a

base for exclusionary behaviors (3% vs. 11%, X^2=11.3, p<0.01), and less likely to name pregnancy as a base for exclusionary behaviors (1% vs. 7%, X^2=10.1, p<0.01); but white students were more likely to name medical conditions (including psychological conditions) and disabilities (physical and learning disabilities) issues as a base for exclusionary behaviors (20% vs. 13%, X^2=4.2, p=0.04).

Student Reaction to Exclusionary Behaviors

When asked how they reacted to the experience, the students identified a range of emotional and other reactions to exclusionary behaviors, as shown in Table 4. There were some statistically significant gender differences in terms of their reactions. For example, female students were more likely to feel embarrassed than male students (35% female as compared to 20% male, X^2=10.0, p<0.01), to feel angry (43% vs. 32%, X^2=4.0, p=0.04), to feel worried about grade (16% vs. 8%, X^2=5.5, p=0.02), to confront the harasser later (7% vs. 1%, X^2=7.4, p<0.01), and to tell a friend about the incident (39% vs. 24%, X^2=9.0, p<0.01) or tell a family member (28% vs. 13%, X^2=10.8, p<0.01). The students who identified with non-binary/other gender identities were more likely to feel responsible for the incident than female/male students (33% among those with non-binary/other gender identities vs. 10% among female/male, X^2=9.5, p<0.01), to feel afraid (28% vs. 10%, X^2=5.3, p=0.02), to confront the harasser later (22% vs. 5%, X^2=8.6, p<0.01), to tell their instructor/supervisor/preceptor about the incident (28% vs. 7%, X^2=9.5, p<0.01), and to seek information online (17% vs. 4%, X^2=6.9, p<0.01). There were no statistically significant differences between white students and students of color in most reactions except that more white students tended to confront the harasser later (8% white vs. 3% among students of color, X^2=5.5, p=0.02).

Reaction to the exclusionary behavior	N	%
I was angry	186	40%
I felt embarrassed	148	32%
I felt worried about my grade	67	14%
I worried about how this would affect my future career	58	13%
I felt somehow responsible	52	11%
I was afraid	52	11%
I ignored it	131	28%
I avoided the harasser	82	18%
I left the situation immediately	62	13%
I did nothing	57	12%
I confronted the harasser at the time	54	12%

Reaction to the exclusionary behavior	N	%
It didn't affect me at the time	35	8%
I confronted the harasser later	28	6%
I told a friend	163	35%
I told a family member	113	24%
I told my instructor/supervisor/preceptor	38	8%
I didn't report it for fear that my complaint would not be taken seriously	35	8%
I did report it but I did not feel the complaint was taken seriously	31	7%
I reported it to a [University Name] employee/official	29	6%
I contacted a local law enforcement official	7	2%
I sought support from a staff person/administrator/faculty member	42	9%
I sought support from a campus resource (e.g., The Office of Students Rights)	26	6%
I sought support from a spiritual or religious advisor	11	2%
I didn't know who to go to	39	8%
I sought information online	21	5%
Other	6	1%

Table 4. Student reactions to the exclusionary behavior

As shown in Table 4, very few students reported the incidents they experienced to the campus authorities (either the police or university offices), which was confirmed in the university records. The survey also asked about student satisfaction with the resolution if they have ever reported exclusionary incidents they experienced on campus. Among all 272 students who answered this question, only 17% reported satisfaction (including 7% very satisfied with the resolution and 10% somewhat satisfied) with the rest reporting neutral feeling (56%) or dissatisfaction (12% somewhat dissatisfied and 15% very dissatisfied) with the resolution. There were no statistically significant gender or racial differences in terms of how satisfied the students were with the resolution once they reported the incident ($p>0.05$).

Impact of Experiencing Exclusionary Behaviors on Campus

Among all the students who reported having experienced exclusionary behaviors in the past 12 months (N=465), 121 students (26%) reported that such behavior interfered with their ability to work or learn, and 342 (74%) reported no interference. Female students were more likely to feel the experience interfering with their work/learning than male students (29% female as compared to 17% male, $X^2=6.1$, $p=0.01$). There was no statistical significant difference among white students and students of color in terms of this impact ($p=0.22$).

The students who experienced exclusionary behaviors on campus in the recent 12 months perceived their life on campus and the campus climate with less positivity than those who did not have such experience, as shown in Figure 1. These students, who were isolated, intimidated, or bullied, felt more out of place and disconnected ($Z=15.4$, $p<0.01$), less happy and less satisfied with campus life ($Z=-11.5$, $p<0.01$), and less comfortable in both the academic program ($Z=-12.6$, $p<0.01$) and residential

program ($Z=-8.3$, $p<0.01$). They perceived the campus climate as less diverse ($Z=-7.6$, $p<0.01$) and less inclusive ($Z=-6.7$, $p<0.01$). They tended to assess their fellow students in the university as less understanding of other cultures ($Z=-9.2$, $p<0.01$) and less well educated about different cultures ($Z=-7.5$, $p<0.01$), the faculty less understanding of other cultures ($Z=-7.9$, $p<0.01$) and less well educated about different cultures ($Z=-7.5$, $p<0.01$), and the staff less understanding of other cultures as well ($Z=-7.6$, $p<0.01$). They tended to believe that the university had not given students sufficient information regarding physical, psychological, or sensory disability ($Z=-7.3$, $p<0.01$). They were more likely to believe that people from different race, ethnic, language, or international, or disability backgrounds felt uncomfortable at the university ($Z=4.7$, $p<0.01$). And they held more biases regarding academic grades achieved between students of color and white students ($Z=-5.9$, $p<0.01$), as well as between students with different language backgrounds and local students ($Z=-4.7$, $p<0.01$).

Action Recommendations on How to Address the Exclusionary Misconduct Issue

A total of 493 (20%) survey participants commented on the open-ended question that solicited action suggestions for improving the campus climate. Among these responses, some did not observe any problems and stated that no actions were needed. Nonetheless, majority of the comments provided specific suggestions that provided a triangulation dimension to the quantitative data. Analysis on all the action recommendations to address the exclusionary misconduct problem identified six key areas for action, as:

To enforce anti-exclusionary misconduct rules

A number of students suggested focusing on education and enforcement of inclusion policies (including anti-exclusionary behavior rules) on campus. For example, a student stated, “students at orientation need better programs to understand that diversity and inclusion is part of our goal and if they do not adjust or behave discriminatory, they will face consequences”. Another student related,

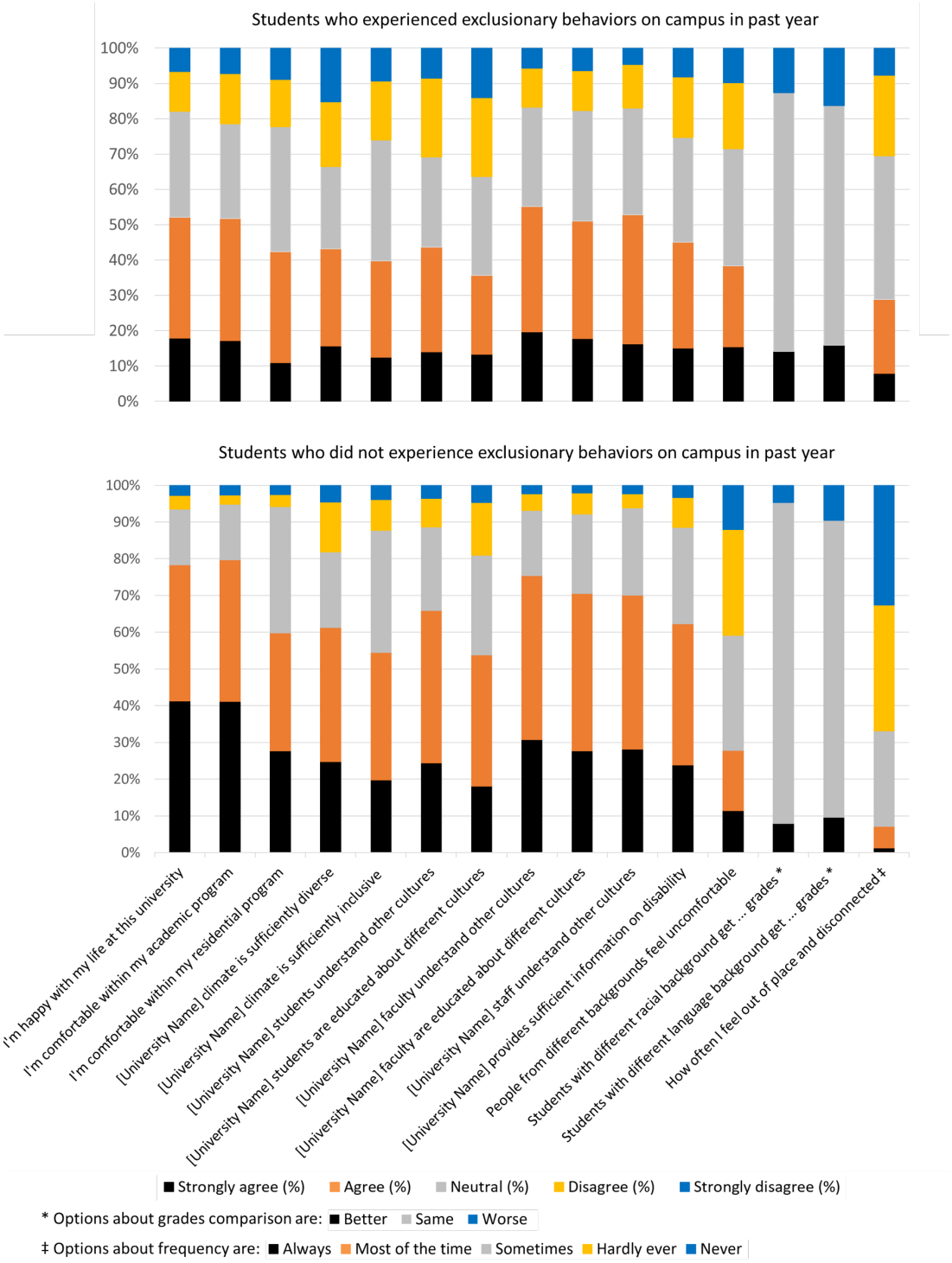

Figure 1. Student perception of campus life grouped by exclusionary behavior experience

I believe [University Name] should make people aware that exclusive behavior and bullying is not acceptable. The [University Name] community needs to be made aware of the potential consequences for each party for such actions. Many people wouldn't know about the antibullying and inclusion policies unless they went online and specifically searched for and read them.

In terms of how to improve the rule enforcement process, a student stated, "Some students are still caught bullying those different than themselves. Cameras that catch this action should identify those students and take action, or make it easier for students to reach those who can handle the situation." Changes were requested by several students to handle exclusionary misconduct complaints more effectively. This request appeared urgent considering the majority of the victims chose not to report the incident according to both the quantitative data (with only 7% victims reporting to university officials and 2% reporting to police) and qualitative comments. And there was a very low level of satisfaction (17%) with the resolution after reporting to authority. A student suggested, "Just address student complaints and diversity issues as they arise. Don't try to hide it in any way or disregard any remarks. Full transparency and support behind your students wants/needs/complaints". Another student related, "Show the students that this matter is to be taken seriously and these actions have consequences. No one reports it because people will not take it seriously."

To enhance campus governance

Related to the above inclusion policy enforcement recommendation, comments that requested better monitoring and governance of campus life also emerged. One student suggested, "Residential life for freshmen should be more monitored, possibly have two RAs per floor so that there's almost always someone there to help." Another requested, "Stop sororities from being rude". Although a few students identified student clubs as potential organizers for cultural events to promote openness and inclusiveness, student clubs were also mentioned by some students in a different light. One student suggested, "look into greek life. [They are] not nearly as inclusive as they pretend to be". Another observed "hate groups disguised by religion and political beliefs are allowed to table on campus". A student suggested, "Disband any antisemitic organizations that may be forming on campus".

Better campus governance in terms of proactive support for (potential) victims of misconducts such as exclusionary behaviors was also mentioned. A student recommended to "explore options to protect people of ALL political views." Another suggested to "provide support groups for understanding and welcoming diverse groups in our community." Electronic information and communication technologies may help improve the accessibility of victim support services and increase the reach to the student population. As one student suggested, "open an anonymous online chat room to talk to someone when facing a problem."

To recruit and retain more diverse students, faculty, and staff

Many students observed the lack of diverse population on campus. As related by a student, "I believe that if I saw more professors and faculty of different ethnic backgrounds the sense of feeling out of place wouldn't be so present." Active recruitment, of both students and faculty/staff, among diverse populations was repeated suggested by the survey participants. The mentioned diversity dimensions included various racial/ethnic, LGBTQ, disability, political, cultural, and religious backgrounds. A student stated, I have never known any experience regarding my race with professors and staff. All my issues come from the students. I do not think any dramatic change will occur with their thinking unless more diverse students begin

coming to [University Name].
The students also called for "more women and minority professors" and "more diversity in the police force."

Cultural competence training

A number of students identified the need for cultural competence training to promote tolerance and to educate students, faculty, administrators and staff on topics such as "different cultures", "global competency and civics", "race, ethnicity, and diversity", "minority differences", "disabilities", "mental health issues", and "fluidity of gender". One student suggested, "Educate everyone about race and inclusion and how to interact with people other than their race instead of ostracizing others." Several students mentioned the benefit from a range of courses already offered on campus, such as "disability and dignity" and "Latinos and health". Many students further suggested that the university should make cultural competence training mandatory. A student explained,

I believe there should be more mandatory classes to learn about diversity and different cultures. There are, in my opinion, and [an] abundant amount of students who refuse to learn and remain close-minded. Being that this institution is primarily white, there hasn't been that culture shock moment some students need. Which leads to the white supremacist ads being posted around and making the rest of the student body who are PoC [people of color], feel uneasy. I see we have cultural seminars and sometimes speak about current events in writing classes but in my experience there aren't any mandatory classes to discuss cultures and xenophobia to actually break into the wall of close-minded students.

To host more multi-cultural events and activities

In addition to curricular training to develop cultural competence, suggestions on multi-cultural events and activities such as "an international night" and "a cultural awareness week" also emerged. Students showed strong interest and enthusiasm towards a variety of formats and elements, including presentations, displays, group sessions, (information) meetings, food, music, dance, and club activities. One student suggested,

Host some kind of 'melting pot' event where we can celebrate and experience the diverse cultures represented here at [University Name]. Sort of like a 'Heritage Day' where we have food, dance, etc. from all the cultures in a social mixer-like setting.

Another student related, "I think having a night at the campus center about diversity (maybe different foods, music, or traditions) would be fun. Some people may be nervous to talk to someone different but food brings people together :)". Suggested topics for these multi-cultural events went beyond race and ethnicity, as students commented, "I would like to see more political activities such as marches for gun control, LGBTQ rights, Black Lives Matter" "Maybe hold more campus wide events which encourage interaction between students with disabilities and/or students of different backgrounds".

To continue assessing the campus climate and to facilitate open dialogues

Several students expressed their appreciation for this survey that aimed to collect student perspectives on campus issues such as exclusionary misconducts. Students also pointed out the need to continue assessing these issues, and to have open and honest dialogues regarding the issues. For example, a student related, "Making the commitment to assess climate on an ongoing basis will in itself be an important institutional action that demonstrates a strong interest in improving climate." Another suggested, "Collect more data and have discussion with students who are from different cultures." A student provided an idea:

Have a suggestion box where students from disability, different cultures, and different ethnic backgrounds submit ideas, and the large majority becomes implemented into the [University Name] structure, and then slowly work on the other ideas that were less common.

On the other hand, a few students warned that over-emphasizing "political correctness" and alienating specific groups could cause harm. One student pointed out, "Honestly, sometimes as a white, Christian, heterosexual person, I feel people judge me and assume many things." This suggested that it is critical to the success of any institutional inclusion strategy to demonstrate respect for all students and to recognize "hate speech against 'white, local heterosexual students'". Another student explained,

There is no doubt that there is major reform needed to better the quality of life and opportunity of people from different races, sexual preferences, gender identities and disabilities, both at [University Name] and in this country. However, most of the classroom and campus discussions I have seen are done in a way that seems to alienate those who are not part of those groups (particularly straight, white males), as if we are part of the problem.

Campus wide dialogues ought to have clear objectives to improve all students' experience, and ought to be facilitated and moderated. The goal should be, as envisioned by a student, "all feel comfortable, safe and welcome to contribute towards moving towards inclusion and equality together!"

Discussion

In a student survey in a predominantly white university, a high prevalence rate of exclusionary behaviors was identified, with 19% students having personal experience with such misconducts (e.g., shunning, ignoring, intimidating, offensive, and/or hostile behaviors such as bullying and harassment) on campus in recent 12 months. This experience had a significant and negative impact on the student's perception of their life on campus and the campus climate. To address this exclusionary misconduct issue, students suggested a range of action areas, including inclusion policy enforcement, campus governance, diversity recruitment, cultural competence training, multi-cultural activities, as well as continuous assessment and open dialogues.

Literature has identified many systemic issues associated with exclusionary behaviors in schools such as racism and homophobia (Cowie et al., 2017; Larochette, Murphy,

& Craig, 2010; McNamee, Lloyd, & Schubotz, 2008; Rivers et al., 2007). These issues were also reflected in our survey data, for instance, more students of color experienced exclusionary misconducts than white students did, and more students who identified with non-binary/other gender identities experienced exclusion than female and male students did. The racial differences in the prevalence rate and student experience have been highlighted in literature (Rankin & Reason, 2005); and the gender differences have been observed before as well (Vaccaro, 2010). In our study, we further identified racial and gender differences in student beliefs regarding the base of exclusionary behaviors, their reaction to such misconduct, and the impact of the misconduct. Students of color were more likely, than white students, to name race as a base for exclusion, which is consistent to literature findings (King & Ford, 2003; Shelley et al., 2017). The racial and gender differences in student experience with exclusionary behaviors suggest that effective strategies targeting the problem need to develop customized and targeted intervention to meet the needs of all students, including the vulnerable groups. For instance, voluntary LGBT training programs such as Safe Zone, Safe Space, or Ally Program have been offered to faculty and staff in some schools, and were recommended for training both faculty/staff and students to increase cultural sensitivity towards the LGBT community (Jacobson, Matson, Mathews, Parkhill, & Scartabello, 2017).

The survey participants identified the majority of exclusionary misconduct perpetrators as fellow students, including those in student organizations. They also observed a variety of bases for such behavior, including race, political views, physical characteristics, age, and socioeconomic status. Accordingly, development of an effective strategy to address the exclusionary behaviors on campus ought to target these identified areas, e.g., via culture competence training to address these topics, active recruitment to increase diversity in faculty/staff and students, and campus governance including monitoring and inclusion policy enforcement. These areas also emerged in the student-recommended actions in this study as well as in literature. For instance, literature recorded the association between social fraternities and campus crimes, including ethnic/racial hate crimes (Bausell, Bausell, & Siegel, 1991; Van Dyke & Tester, 2014), highlighting the need for improving campus governance, e.g., better surveillance and management of campus activities including student organizations. Literature also suggested active recruitment of minority students since the schools that were most successful in diversity recruitment reported fewer race-related exclusionary behaviors on campus such as hate crimes (Stotzer & Hossellman, 2012).

Consistent with the data in literature (Cismaru & Cismaru, 2018), this study identified a low reporting rate of exclusionary misconducts among the victims. We also identified a low level of satisfaction with any resolutions after reporting the incident to authority. This indicated an urgent need to improve student experience with the reporting process and with the complaint processing agencies. This may be a key step to enable inclusion policy enforcement, and the inclusion policy itself should include a roadmap for the exclusionary misconduct incident reporting and reviewing processes. To improve student satisfaction, transparency during the complaint handling process is crucial according to the student comments in this study. The student-proposed online tool for victim support could potentially be extended for the incident reporting purpose and for disseminating the investigation progress reports as well. Furthermore, improvement in inclusion policy enforcement on campus should

not only focus on the incident reporting process and the disciplinary action process, but also should address the policy training needs of students as well as faculty/staff (Universities UK Taskforce, 2016). Teacher training should be mandated as it is a common element in effective school-based anti-bullying programs (Farrington & Ttofi, 2009). The training should clarify the behavioral expectations for the individual, and should explain the roles of various offices and the available resources on campus that are relevant to exclusionary misconduct issues. Descriptions of the resources and procedures, e.g., in the form of a flow chart, to clarify the pathway to address misconduct issues, should be visible and reiterated to students at regular intervals. The policy training should aim for all students, faculty and staff to (1) be vigilant of (exclusionary) misconduct issues, (2) to know the immediate point of contact that is designated for each type of problem, (3) to be aware of the resources and support available on campus, and (4) to feel confident and able to report incidents when they occur.

Study Limitations

There were a few limitations of this study. For example, the convenience sampling of one predominantly white U.S. university indicated that the findings might not represent other higher education institutes in the country or institutes in other countries. Furthermore, the study survey was designed to address a range of issues beyond exclusionary behaviors, hence was not as extensive on this topic as other more focused surveys. However, the triangulation of quantitative and qualitative data regarding exclusionary misconduct in this study highlighted several interesting findings on the topic and increased the robustness of this analysis. Future research may increase sample size and include multiple institutes to improve generalizability, as well as focus on the issues regarding isolation, intimidation, and harassment to further understand the misconduct frequency, severity, and predictors. Another potential limitation of this study was related to the method of self-report in the student questionnaire survey, which also depended on self-selection. However, the multi-modal data sources, the data saturation, and constant comparison method in this study provided multiple dimensions to the data and enhanced the study rigor. Future (large-scaled) longitudinal research may also take such mixed-method approach to data collection and analysis of multiple data sources. Another potential limitation was related to the limited number of factors included in the survey. Future research may explore the relevance of other factors to exclusionary behavior experiences, such as socioeconomic factors and exposure to diversity off campus.

Conclusion

Almost one in five students personally experienced exclusionary behaviors on a university campus within 12 months. Experiencing such misconducts had a significant negative impact on the student's perception of their life on campus and of the campus climate. To address the exclusionary behavior problem, students suggested several action areas, including inclusion policy enforcement, campus governance, diversity recruitment, cultural competence training, multi-cultural activities, as well as continuous assessment and open dialogues. There is an urgent need to improve university students' experience on campus by addressing all these areas.

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Challenges Presented to Paraguayan Teachers by the Measures Adopted due to Covid-19

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Abstract
Due to the pandemic caused by COVID-19, educational systems around the world have been disrupted as they were forced to stop face-to-face classes in at least 70% of institutions. Paraguay was not the exception, interrupting classes early and abruptly forcing teachers to quickly adapt to this new reality. This mixed quan-qual study presents an analysis of teachers' views on the challenges posed by access to technology, teacher training, student and parent limitations in Paraguay. Data were collected using a questionnaire consisting of open and close-ended questions administered during the first weeks of the quarantine. The sample included 1030 teachers from public and private institutions at all levels. Qualitative data were organized according to teacher's access to technology, teacher training before and after the quarantine, student and parent communication and difficulties. The quantitative analysis involved univariate descriptive statistics as well as chi square statistics associating level of difficulty with teacher characteristics such as location, internet connection, experience, ICT use, and ICT competence. Results show that the main difficulties are associated with internet access, the frequency of ICT use and the scarce training in the use of educational ICTs as well the change in the structure of the classes. Opportunities noted by teachers include the creation of a new "collective conscience," and "restructuring the current systems." As ensuring the continuity and quality of education constitute the main challenges in this new context, it is imperative that educational institutions focus on teacher training and support.

Keywords: COVID-19, Teachers, ICT, Challenges

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1. Introduction

The pandemic caused by the new COVID-19 virus has led governments around the world to take extreme measures to reduce its spread and prevent the collapse of health systems. The pandemic has affected all educational systems worldwide as academic activities have been disrupted at all educational levels for about 70% of students worldwide (Chang & Yano, 2020). In this manner, with the implementation of remote learning strategies due to school closure and the current confinement regulations caused by COVID-19, the maxim: the education system should guarantee equality of opportunities for all has been challenged (Cáceres-Muñoz et al., 2020; Trujillo et al., 2020).

The advent of epidemics is nothing new. Several countries have turned to school closure and the use of technology to ensure the continuation of education, namely, China, Mexico, and Nigeria (Trucano, 2014). In past situations, in the face of flu epidemics and the SARS virus, it was important to establish social distancing measures to prevent transmission (Uscher-Pines et al., 2018; Fox, 2004). In Hong Kong, the sudden closure of schools and the introduction of other teaching methods (remote education) highlighted the lack of skills or experience with the use of ICTs from the teachers' perspectives (Fox, 2004; Guðmundsdóttir & Hathaway, 2020). Currently, due to the nature of the COVID-19 virus, prolonged closure of educational institutions could have a more negative than positive effect as it could exacerbate social, economic, and health inequalities. On the other hand, the return to face-to-face classes could generate a resurgence of the virus (Esposito & Principi, 2020). Researchers have questioned the efficacy of prolonged school closure at preventing the spread of the virus (Wang et al., 2020) and others proposed implementing less disruptive measures since the effectiveness of mass school closures in the face of the COVID-19 pandemic is unknown (Viner et al., 2020).

A report on education in the COVID-19 era presents an analysis of government responses to the pandemic (Reimers & Schleicher, 2020). Researchers noted that, in countries where classes were cancelled, governments have encouraged schools to continue through online learning or mass media such as television. Similarly, teacher training became a priority in order to support and guide the teaching-learning process through digital media. Some priorities and challenges in response to the crisis include the well-being of students and teachers, professional support for teachers, support for students who lack independent study skills, and ensuring educational continuity (Reimers & Schleicher, 2020). In Latin America, some see this situation as an opportunity for digitalization (Almazán Gómez, 2020) and for creating links between families and schools (Muñoz Moreno & Lluch Molins, 2020), but challenges have been especially evident due to the unequal conditions of education systems (CEPAL, 2020; Cifuentes-Faura, 2020; Monasterio & Briceño, 2020).

Paraguay registered its first case of coronavirus on March 7, 2020 prompting authorities to take immediate measures to contain its spread. On March 10 of that same year, confinement restrictions took place, and all public and educational activities that involved gatherings of people were suspended (Britez, 2020). As a result, The Ministry of Education and Science (MEC) developed a continuity plan called "Your School at Home". This plan follows the UNESCO guidelines (2020a) and includes an analysis of the means available to students and teachers such as cell

phones, the content provided through the official MEC website (https://aprendizaje.mec.edu.py/aprendizaje/) and other media, as well as the distribution of printed materials, classes through TV, radio and newspapers (MEC, 2020). Similarly, higher education institutions have implemented technology-mediated classes. On April 16, the National Council of Higher Education (CONES) published a set of guidelines for the implementation of digital tools to face-to-face classes. As of January 10, 2482 academic programs have been approved both in universities and higher education institutions across the country (CONES, 2020). This study presents an analysis of the perspectives of teachers at the beginning of these measures with respect to the challenges presented, taking into account the preparation that existed related to infrastructure and access to technology, training, student and parent limitations, as well as the changes in schedules and workload generated by this new way of working.

2. Methods

A mixed quan-qual methodology was used with closed and open question questionnaires adapted from Wozney, Venkatesh and Abrami (2006) to the conditions of confinement by COVID-19, followed by focus groups with volunteer participants. The study was conducted during the fourth week of academic confinement (late April and early May) and the sample included 1030 teachers from public, private and subsidized institutions at all levels throughout the country. Seventy percent of the teachers who participated in the survey reside in the country's capital and in the Central Department, the rest in the other departments. Approximately 65% of the teachers who participated in the study work in public educational institutions and the rest in private and subsidized institutions. The majority of the teachers (49.3%) teach in universities and higher education institutes, 25.9% in high school and a smaller proportion teach in pre primary (kinder), primary and elementary schools.

The questionnaire consisted of 37 questions including some referring to access to technology, teacher capacities and training, time dedicated to planning, types of activities used, media and instruction, accompaniment of parents, possibilities and difficulties encountered. The open questions aimed to record the perspectives of the teachers not recorded through the other items and to be able to deepen on the challenges presented by the extraordinary situation presented by the COVID-19. The questionnaire was designed on Google Forms and distributed through digital media including mailing lists, social networks such as Facebook and WhatsApp groups.

The data was analyzed using descriptive univariate statistics (counts and percentages through statistical tables and graphs) and tests of association or difference in proportions such as chi-square. The Excel spreadsheet was used for the manipulation and arrangement of the data, while the statistical analysis was done through the statistical software R (R Core Team, 2020) with the integration of some packages such as ggplo2, ggpubr and RcmdrMisc. The open answers as well as the transcripts from focus groups were analyzed qualitatively through coding and categorization in order to understand the perspectives of the participants in relation to their answers in greater depth. The results were grouped into three main categories including: a) accessibility to technological resources, b) communication and exchange of academic activities, and c) difficulties, challenges and opportunities presented to participants.

3. Results

Access to Technology

Approximately 99% of teachers have responded by having at least one smartphone in the home. This is to be expected because of the great usefulness of this electronic device in many areas of academic life. On the other hand, teachers' responses showed less home computer ownership compared to cell phones. This may be due to the fact that computers have a higher cost and are more difficult to access. In this sense, a high percentage stated that they had only one computer for the whole family (48%) or even no computer at all (7.4%). However, a not-so-low percentage of teachers (35.2%) have stated that the home has at least one computer for each school-age member. This was shown mostly in cities such as Asunción and the Central Department. The distribution in terms of internet connection is very different for the factors that have been considered. A high percentage of teachers who reported having an Internet connection through fiber optic, cable, antenna or wifi services were observed, which normally have high costs compared to mobile data packages. Following the same line, an important proportion of teachers (37.7%) indicated that the only Internet connection they have is through a cell phone. About 60% of the participants stated that the Internet connections they have at home are unlimited, this is also supported by the results that most teachers have Internet services through fiber optics, antenna, cable or wifi, which are usually unlimited. The gaps are important and significant among teachers with limited and unlimited connection who reside in Asunción, Central and the rest of the country (2=81.8, p<0.001).

		%
Smartphone ownership	Yes	99.3
	No	0.7
	Total	**100**
Household computer ownership	None	7.4
	One computer per family	48.0
	Less than one per school-age family member	9.4
	One per school-age family member	23.4
	More than one per school-age family member	11.8
	Total	**100**
Internet connection	Mobile, from the cell phone	37.7
	Mobile, via modem	11.3
	Fiber optic, cable, antenna or wifi	62.4
Type of internet connection	Limited	40.4
	Unlimited	59.6
	Total	**100**

Table 1: Access to technology from home

Communication channels used	With the institution	With students	With parents
There is no communication	0,3	1,6	36,6
Text Messages	4,5	3,9	3,1
WhatsApp	82,2	76,5	50,4
Facebook	6,7	4,2	1,7
Email	45,3	34,3	11,5
Online Education Platform	38,1	43,5	7,4
Videoconference	27,2	26	3,8

Table 2: Communication channels used by teachers

WhatsApp and email are the most used communication channels by schools where teachers work to transmit notices about educational issues (82% teachers use the first communication channel while 45% use email). Similarly, for communication with students and parents, teachers use the WhatsApp messaging service more frequently (76% and 50%, respectively). It should be noted that the use is not exclusive, teachers use more than one communication channel with the institution and with students and parents (Table 2). At the beginning of the distance classes, more than half of the teachers (55%) used synchronous activities such as videoconferences, live chats, among others for the development of academic activities. It should be noted that most of those who carried out these synchronous activities maintained the class schedule used in the face-to-face mode (45% of the teachers), 32% indicated that adapted class schedules were established for contingency, while 23% did not use fixed schedules but rather carried out the synchronous activities according to the need and circumstances presented as the educational process advanced, which was new for many educational actors (Table 3).

Synchronous activity schedule	Count	%
Class schedule used in the face-to-face mode is maintained	250	45
An adapted class schedule was established for the contingency	175	32
We do not use a fixed schedule, meetings are scheduled when the need arises	127	23
Total	**552**	**100**

Table 3: Distribution of teachers according to schedule of activities synchronized with students

Training and skills in the use of ICT before and after the declaration of quarantine

Figure 1 shows high percentages of teachers who had had some training in the use of ICT for teaching before the health emergency was declared and the partial closure of the country's educational institutions. More than 47% of the teachers expressed having been trained at least 3 hours before the quarantine. In this regard, it was noted that about 31% of those teachers who did not receive any training before the quarantine, have received it once declared. However, there was a high proportion of teachers who had not yet received any training in the use of ICTs, at the time of this study ($\chi^2=211.9$, $p<0.001$). Regarding the stages of the process of integration of ICTs in teaching, according to Wozney, Venkatesh, and Abrami (2006), 13.7% of the teachers declared

themselves to be in the stage of Awareness (I am aware that technology exists, but I have not used it, perhaps I am even avoiding it. The possibility of using computers makes me anxious) before quarantine. However, in the course of the quarantine this percentage decreased significantly (approximately 10%). Slight increases were evident in the Familiarity, Adaptation, and Creative Application stages. In the case of the Creative application stage the increase was around 10% (2=54.4, p<0.001).

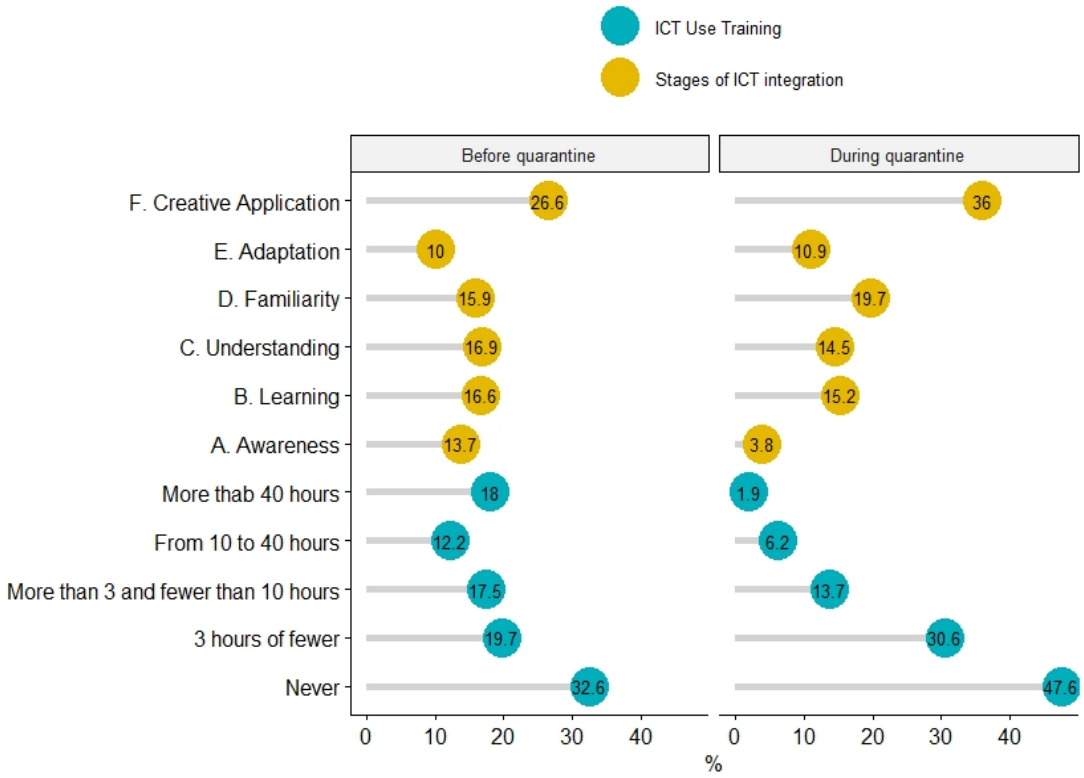

Figure 1: Training and skills in the use of ICT before and after the declaration of quarantine

Difficulties and opportunities presented

The main difficulties that teachers have experienced in distance education from the measures taken by the government due to the COVID-19, according to their own statements, are related to problems with internet connection (39%), lack of knowledge in the use of technological tools (29%), lack of technical support (18%) and lack of technological tools (17%). To a lesser extent, difficulties associated with the lack of materials (10%) and the lack of support from educational institutions were also shown. It should be noted that 22% of the teachers indicated that they had no difficulties in this process of distance learning (Table 6). On the other hand, most of the teachers (52%) agreed that the main difficulty seen in the students for the realization of the activities proposed in this modality is centered in problems of internet connection. Similarly, difficulties such as lack of knowledge in the use of technological tools, lack of time or interest in the proposed tasks, limited access to ICTs, lack of understanding of the assigned tasks and to some extent difficulties related to lack of support from parents or guardians and lack of motivation were highlighted. In this opportunity only 7% of the teachers stated that they do not see difficulties in the students to carry out the proposed activities. There was a significant

increase in the time that teachers spent on preparing classes and pedagogical activities as well as on correcting work sent in by students. However, between 6% and 11% expressed that these activities decreased significantly. This may be due to the fact that some higher education institutions had not continued with the educational process through digital means or even some had not started the school year at the beginning of the quarantine and were not yet returning to academic activities.

Main difficulties experienced in distance learning	**Teachers**		**Students (according to teacher perception)**	
	Count	**%**	**Count**	**%**
There are no difficulties	224	22	68	7
Lack of motivation	-	-	181	18
Lack of institutional support	57	6	-	-
Lack of materials	103	10	-	-
Lack of knowledge in the use of technological tools	296	29	296	29
Lack of technical support	181	18	-	-
Lack of technological tools and/or access to ICT	173	17	245	24
Lack of access to information (for the completion of tasks)	-	-	125	12
Lack of time or interest	-	-	306	29
Lack of understanding of assigned tasks	-	-	193	19
Lack of support from parents/guardians	-	-	171	17
Internet connection problems	400	39	532	52

Table 4: Main difficulties experienced in online learning

In table 5 it can be observed that the years of experience that the teacher has did not influence his manifestation of having difficulties in distance education in this time of confinement. Moreover, this is verified with the square chi statistics (2=5.22, p=0.73). However, it should be noted that the percentages of teachers who indicated having difficulties ranged from approximately 71 to 84%, considering the years of experience. On the other hand, an interesting relationship was found between the frequency of the use of ICT in the regular classes and the difficulties in the academic process. It was observed that the greater the use of ICT, the less likely it is to manifest difficulties. The differences in the percentages are statistically significant (2=42.26,

p<0.001). Similarly, as the teacher manifested an advanced level of competence in the use of computer technologies, the probability of having difficulties decreased (2=55.12, p<0.001). Also, difficulties were observed in greater proportions in teachers who expressed limited internet connection. Nevertheless, a high percentage (>70%) of teachers with difficulties was observed in spite of having unlimited access to the Internet. The area of residence of the teacher was not a discriminating factor for the presence of difficulties. That is, no significant differences were evident in the manifestation of difficulties by department of residence (2=4.77, p=0.09). It is important to indicate that although there are no significant differences between the groups studied, high percentages of teachers with difficulties in the teaching-learning process were evidenced.

		Difficulties (%)		
		No	**Yes**	**Total**
Area of residency $\chi^2 = 4.77, p = 0.09$	Asunción	26,2	73,8	100
	Central	21,0	79,0	100
	Rest of the country	19,3	80,7	100
Internet Connection $\chi^2 = 47.12, p < 0.001$	Unlimited	29,2	70,8	100
	Limited	11,1	88,9	100
Teaching Experience $\chi^2 = 5.22, p = 0.73$	0 - This is my first year	18,8	81,2	100
	1-5 years	24,4	75,6	100
	6-10 years	22	78	100
	11-15 years	20,5	79,5	100
	16-20 years	24,8	75,2	100
	21-25 years	18,4	81,6	100
	26-30 years	16,1	83,9	100
	31-35 years	25	75	100
	More than 35 years	28,6	71,4	100
Frequency of ICT use $\chi^2 = 42.26, p < 0.001$	Never	12,9	87,1	100
	Seldom	12,0	88,0	100
	Occasionally	18,6	81,4	100
	Frequently	23,1	76,9	100
	Often	31,1	68,9	100
	Always	43,7	56,3	100
Level of competence in the use of ICT $\chi^2 = 55.12, p < 0.001$	Unfamiliar	8,3	91,7	100
	Beginner	16,6	83,4	100
	Advanced	30,6	69,4	100
	Expert	45,7	54,3	100

Table 5: Difficulties Associated with Teacher Characteristics

The qualitative responses aligned with the information above and provide more in depth information of the perspectives of teachers regarding the measures taken and the opportunities identified in the situation. In relation to the difficulties, the participants referred again mainly to issues related to access to technology reporting difficulties with "internet connection and technological equipment... In the vast majority of families there is only one cell phone and there are several children who have to use it for their homework" or that there is "low internet connectivity... [and]

lack of mastery of technology for virtual meetings with teachers, administrative and service staff". Moreover, teachers noted that the lack of training is one of the most important difficulties not only for them but also for students and their parents. On the one hand, teachers, as seen in the quantitative results above, admit their limitations in transferring their lessons through digital tools. They especially referred to the organization of time in this modality since "now you have no time or rest... weekends are no longer weekends because they believe that working from home you are always resting". This leads to "mental burnout" as expressed by teachers.

Moreover, teachers indicated that parents and students were not prepared to assume a new educational modality either. On the one hand, "parents are not prepared to accompany their children in their homework" was one of the difficulties expressed. On the other hand, neither were the students, despite being "digital natives", prepared to do their homework at a distance as indicated by the teachers. Thus, teachers noted difficulties for students and parents to understand the instructions sent through the various means used; and, many of them indicated that communication with students represents one of the greatest difficulties, stating that "the greatest challenge is to reach all students in the same way as I would do it in person". The latter is closely related to the concern of all members of the community to not only reach everyone but to "take care of the quality" of the teaching-learning process in this extraordinary context.

Despite difficulties, and that some participants did not find opportunities in this situation, several of the participating teachers were able to identify some opportunities presented. Sub-categories were identified regarding the opportunity to continue studying, for training, learning, implementing improvements, investing in infrastructure and rethinking the entire system to carry out digital migration. With respect to training, participants noted that this situation "presents incredible opportunities to apply differentiated instruction... to encourage creativity on the part of the student and the teacher. "It is providing the opportunity to grow in the use of technology and to access a world of possibilities. On the other hand, they also mentioned the opportunity to invest in infrastructure, especially technology. Finally, several referred to the "opportunity to restructure the systems we have" in order to effect change from the purview of teachers and use technology to "POWER the learning process." In this way, they see the possibility for the "creation of a COLLECTIVE AWARENESS" that may change our vision of education.

4. Discussion

While the use of technology presents opportunities for teacher professional improvement (Schleicher, 2020), the abrupt closure of schools left many teachers confused about their roles and without the tools necessary to use ICTs efficiently (Beteille et al., 2020; Flack et al., 2020). Brammer & Clark (2020) state that education has seen “the largest and quickest transformation of pedagogic and assessment practice ever seen” (p. 454) generating some negative effects, namely; loss of learning and human capital and diminished economic opportunities for students (Azorin, 2020; World Bank Education, 2020), the rise of school dropouts, and social and economic gaps in relation to access to technology (Álvarez et al., 2020; Armitage & Nellums, 2020; Esposito & Principi, 2020; Li & Lalani, 2020; Lloyd, 2020; Sanz, Sáinz González & Capilla, 2020; Vivanco-Saraguro, 2020).

The information collected in this study showcases that the lack of access to technological tools, and lack of limited or unlimited internet connection represent a challenge to the continuation of academic activities. While some teachers are familiar with ICT, this does not guarantee their efficient use in their classrooms (Salehi & Salehi, 2012). This becomes more evident when implementing abrupt measures such as closing institutions and adopting remote education. Considering this, Daniel (2020) proposes that instead of implementing teaching and learning complex methods, educational entities should focus on student learning. Likewise, the objective of remote education is not to imitate a robust learning system but to provide temporary access to education (Álvarez Marinelli et al., 2020). In other words, the educational strategies that took place in light of the pandemic confinement measures, only served to mitigate the effects of school closure since proper online education delivery would require more planning depending on the context and subject to be taught.

In the same vein, the results indicate that access to technological resources to carry out emergency remote learning poses difficulties for teachers regardless of their place of residency, years of experience, and internet connection. This could be the case due to the implementation of large scale technology-mediated instruction, lack of proper training and skills to efficiently use ICTs, and lack of time to prepare lessons that should have been delivered face-to-face (Cóndor-Herrera, 2020; Pérez-Narváez & Tufiño, 2020). Other researchers indicate that teachers encounter difficulties such as lack of access to technological tools, problems adapting content to the virtual environment, workload and work from home, and students' attitudes towards remote learning (Sánchez et al. 2020). Similarly, in a study on perspectives on the use of ICTs, Jones (2004) found that the barriers that hinder the use of technology are lack of confidence and skills in the use of computers, lack of technological and pedagogical training, lack of access to technological tools and lack of time, among others. The presence of barriers when dealing with technology-mediated education are present in the literature and has been explored by other researchers (Koptcha, 2012; Francom, 2016; Voogt & McKenney, 2017; Siefert et al., 2019) These difficulties are even more evident when planning classes, which in reality, would have to be developed face-to-face, if the benefits and limitations of remote education are to be maximized (Dunlap, Verma, & Johnson, 2016).

The study shows that there was an increase in the workload for teachers regarding the time they spend in planning and preparing their classes and correcting homework. On this note, Tomei (2006) indicates that planning for online classes requires 14% more time than planning for traditional lessons and that work overload tends to be more common during evaluation periods. However, in a study in which researchers explored the implementation and use of technology in the classroom, they found that teachers would spend much of their time providing “one-on-one support and immediate feedback to students” instead of providing whole-class instruction, grading and keeping track of students homework (McKnight et al., 2016, p. 204). In today’s context, the increase of time for school workload could be linked to working from home. This factor implies finding a balance between household tasks, having a workspace free of distractions, having the necessary technological tools and stable internet, which is not the reality of many teachers (Monasterio & Briceño, 2020; Zhang et al., 2020). It is important to consider that much of today’s teaching is also affected by increasing concerns about income and job security (UNESCO, 2020b) which could lead teachers to make a great effort to maintain their jobs to support

themselves and their families. This is why the role of the teacher has so far been of utmost importance since the beginning of the quarantine, since the continuity of education in the face of this unprecedented situation is a necessity (Hincapié, 2020).

Furthermore, results show that teachers received training in the use of technology before and after the confinement measures. It is important to note that through training received during the quarantine, levels of knowledge on the use of technology slightly increased. Considering Wozney, Venkatesh and Abrami's model (2006), the increase in the stages of creative adaptation, adaptation and familiarity could be due to the context of lesson development. Once confinement was implemented, the main means of instructions was mediated by technology. It is important to note that the results do not consider what kind of technological training these teachers received nor what the content of such training was. Such information could shed some light as to why some teachers' integration of technology on stages of understanding, learning, and awareness decreased. Other research indicate that teacher use of technology might depend on teachers' confidence in their use of technological tools (Li et al., 2018), their pedagogical beliefs (Heitink et al., 2016; Li et al., 2018), and also the kind of training they receive (Koptcha, 2012). On this note, a study by Koptcha (2012) demonstrates that sustained and situated professional development could have long-term positive effects in promoting student-centered use of technology throughout the years of teaching. Such training could serve as an opportunity to explore the different technological tools available and their limitations, such as the WhatsApp messaging service (Vilches Vilela & Reche Urbano, 2019), especially when their use is widespread for communication and sending tasks. It should be noted that some Latin American countries have been implementing strategies in the use of ICTs for student education, and these could serve as a model for the implementation of emergency strategies as well as for strengthening education and the use of ICTs (Cobo & Sánchez, 2020).

Despite the barriers faced by teachers, qualitative results demonstrate that opportunities still arise from adversity. Among the answers provided, it can be seen that some teachers believe there is a need to restructure the education system, and some see this chance as a way to work together for a common good: the continuity of the teaching and learning process. On this note, Azorin (2020) states that due to the pandemic, schools were forced to reconfigure their academic offers and adapt to the complex context we are now living in. In the same vain, she emphasizes the importance of networks in education in times of hardship, and how such collaboration among professionals, with its focus on collectivity instead of individuality, "has proved the power of professional capital" (Azorin, 2020, p.3). Tailoring content and learning new technological skills were also seen as growth opportunities by the teachers in this study. On this note, Zhao (2020) considers the short break caused by the pandemic, a great opportunity to rethink and change what and how students learn and where this process takes place. The emphasis is placed in the need to make curriculum content more flexible, shift to more student-centered approaches, and view learning as holistic activity that happens everywhere, not only on school grounds (Zhao, 2020). Lastly, such a view on education, places great responsibility not only on teachers as the main educational agents, but also on the school staff, the community, parents and students.

5. Conclusion

The evolution of technology has indeed affected different areas of our lives and one of them is education. With the advent and spread of COVID-19, technology played a major role in uniting the educational community in the task of continuing the educational process. Technology does provide an opportunity to enhance the teaching and learning process if implemented properly and with the right amount of training and planning (Koptcha, 2012). Unfortunately, emergency remote learning required educational systems to make swift changes that, at times, may have rendered teachers' efforts and technology's potential insufficient. The Paraguayan response towards the spread of the virus was fast and consistent, cancelling all face-to-face activities after the confirmation of the second case (Britez, 2020). The rapid response of the Ministry of Education in light of confinement measurements allowed for education to continue for those with access to technology and the knowledge to use it.

The results of this study showcase that the main challenges presented to teachers at the onset of the pandemic correspond to issues of connectivity and the technological tools necessary to approach lessons. Other difficulties, namely, lack of knowledge in the use of technological tools along with lack of materials and institutional support might have been accentuated by home office. Working from home and balancing various responsibilities, could represent a challenge to teachers who might otherwise be able to prepare their materials and have more support from institutions if they were working at school. Regarding material preparation, an important challenge was met by teachers since, overnight, they had to adapt class content, not only for online lessons, but also for other means of distribution such as TV, radio or printed materials to be sent by email (Hiancapé, 2020). Furthermore, it can be seen that while many teachers were trained, a significant number were not and had yet to be trained after the start of quarantine, which is evidenced by their accounts on the main difficulties such as the lack of knowledge related to the use of technological tools.

Considering the uncertain times in which we are living, and the fundamental role that teachers play as facilitators of both face-to-face and distance learning, it is essential to understand their perspectives in relation to the reality they are living. Institutions through public policies can organize and implement mechanisms of accompaniment and support so that the educational quality provided to students, in these times of crisis and uncertainty, is the best that can be given within their educational context, especially taking into account that the existing gaps in society were highlighted by the COVID-19 pandemic. Moreover, it is important not note that adaptation in times of crisis can lead societies to become more resilient and effective. Knowing the context, implementing innovations and evaluating responses are processes to consider in a proactive society. Such steps should be taken to ensure the mitigation of negative effects and the preparation for future growth (World Bank Group, 2020). Based on these results, a follow-up study is in process to compare the perspectives of educational actors during the different phases of the interruption of face-to-face education due to COVID-19.

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At the Intersection of Technology and Teaching: The Critical Role of Educators in Implementing Technology Solutions

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Abstract
Educators are critical for the successful implementation of any technology. Acrobatiq by VitalSource can use data to demonstrate the dramatic impact instructors—and their course policies—can have on courseware engagement. Acrobatiq courseware incorporates learning content, formative practice, homework assignments, adaptive practice, and summative assessments into a single learning environment for students, with additional data dashboards for instructors. Previous research has shown that the "learn by doing" approach, central to the courseware, has a six-times effect size on learning than reading alone, so engaging with the formative practice is critical to student success. A statewide system of colleges and universities used Acrobatiq's Probability and Statistics courseware in a grant-funded initiative. The instructors were all provided extensive training on the courseware features, instructor dashboards, and pacing suggestions before the term began, however, each instructor was able to dictate how they incorporated the courseware into their teaching practice and course grades. We analyzed the courseware data using a visualization called engagement graphs and found a surprising level of variability between instructors. These findings demonstrate the impact that instructors and their policies have on the successful implementation of the courseware. Because engagement is a vital component for the learning benefit of the courseware learning environment, research is needed to better identify implementation practices which affect student engagement. At this intersection of learning science-based technology and teaching practice is immense potential to increase student success.

Keywords: Courseware, Student Engagement, Fidelity of Implementation, Teaching Practice

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Introduction

When technology is developed on a foundation of learning science and is rigorously researched to iteratively improve and optimize its performance, students benefit from increasingly effective learning environments. The Acrobatiq platform utilizes a proven "learn by doing" method to help students master content efficiently (Lovett et al., 2008). The courseware integrates frequent formative practice with the explanatory text and media, allowing students to practice at the point of learning. This formative practice provides immediate targeted feedback and gives students a low-stakes environment to check their learning. This learning by doing method produces the doer effect: engaging in practice has six times the effect size on learning than reading alone (Koedinger et al., 2015). The doer effect has also been shown to be causal in multiple research studies, including Acrobatiq courseware used at scale, allowing us to recommend this method with confidence (Koedinger et al., 2016; Koedinger et al., 2018; Olsen and Johnson., 2019).

The courseware provides an effective method for learning and practicing new content as well as delivering adaptive activities and graded summative assessments. In previous research done on the course analyzed in this paper, we found that the adaptive activities were beneficial for students, especially low and intermediate performing students (Van Campenhout et al., 2020). After students complete a module of lessons (which includes content and formative practice tied to learning objectives), students completed an adaptive activity before the summative module quiz. The adaptive activity personalized a set of questions based on the students' needs; their performance on the formative practice informed what level of scaffolding to provide to each student for each learning objective they encountered. Results showed that a significant portion of students who completed the adaptive activities were able to increase their learning estimate (a learning measure generated by Acrobatiq's predictive model). Students who increased their learning estimates through the adaptive activities scored higher on the summative assessment than their peers who did not (Van Campenhout et al., 2020).

While the benefits of a research-based learning environment are clear, the classroom instructional model has been shown to have a large effect on student learning. Instructional content can be delivered in class or outside of class, through the instructor or through technology. In a meta-analysis of studies on the effectiveness of mixed methods course design, the flipped blended model was the only type that outperformed other models of delivery (Margulieux et al., 2015). The flipped blended model delivers content via technology and provides feedback via the instructor. When courseware is used as the instructional material outside of class in a flipped-blended model, students have the added benefit of receiving feedback from the technology for formative practice as they learn the material, which enhances their mastery of content before working through activities with the instructor in class.

Given the optimization of both the courseware as a technology-based learning environment and the instructional model best fit to utilize this learning resource as the out-of-class instruction, what additional variables could impact the effectiveness of this method? Individual instructor variation in implementation can greatly impact the outcomes expected from a technology or instructional model. As Kessler et al. (2019) noted, "research consistently indicates that instructional innovations are only as

effective as their implementation." The role of the instructor in computer-directed learning environments is often minimized, as these environments are required to be designed for a wide audience and various complex and divergent learning situations (Kessler et al., 2019). The Acrobatiq courseware was designed to fit a variety of learning models, with research showing effective outcomes in student self-directed asynchronous models as well as faculty-led flipped blended models (Olsen and Johnson, 2019; Van Campenhout et al., 2020). While the student interface is designed as a complete environment for them, the instructor dashboards are a significant feature of the platform. For contexts where instructors are involved in the courseware delivery, the dashboards organize data around actionable questions to facilitate instructor involvement in the interactions between students and their course. The delivery of actionable data to instructors for use at their discretion is a type of Course Signal, which has been shown to help increase course and university retention (Arnold and Pistilli, 2012; Baker, 2016). As other researchers have recently proposed, the proper utilization of both the educational environment and intelligent tutoring systems should produce a better learning experience than either could produce on their own (Ritter et al., 2016).

The importance of implementation is not a new concept; Fullan and Pomfret (1977) reviewed research literature on implementation to define the construct, address its importance, and identify how researchers measured it. O'Donnell (2008) completed a review of the literature to define and measure the relationship of implementation and outcomes in intervention research. O'Donnell (2008) defines fidelity of implementation as a "determination of how well an intervention is implemented in comparison to the original program design during an efficacy and/or effectiveness study." There are several key ideas in this definition to unpack for their relevance to this paper. First is the concept that the intervention implementation should be compared to the original program design. Courseware is designed using specific learning science principles to elicit specific benefits for students. While there are many different mixed methods teaching models being used, the implementation of courseware into a model should also be compared to the design intentions and the literature to understand what the expected outcomes might be. Meaning, if the efficacy results were measured using a flipped blended teaching model, but an implementation uses a lecture hybrid model, it should not be expected to find the same results as the original design. Second, fidelity of implementation is critical when doing an efficacy study, but not all uses will have this as a goal. With a variety of educational settings for courseware, it is reasonable that not all will be designed to optimize effectiveness for various reasons. However, for uses in which efficacy is a goal or measurement of success, fidelity of implementation is critical. Finally, fidelity of implementation requires a determination of how well an intervention is implemented, which indicates the need to evaluate based on criteria. While a review of public health literature identified five criteria for measuring fidelity of implementation (adherence, duration, quality of delivery, participant responsiveness, and program differentiation), it is also clear that establishing criteria for fidelity of implementation requires a close evaluation of the treatment and its acceptable uses (O'Donnell, 2008).

Implementation

Through a research grant, a state-wide system of universities and community colleges were able to use the same courseware across all introductory probability and statistics courses. There were 8 individual institutions and 20 course sections in the fall pilot. Instructors were required to attend two trainings to onboard them with the Acrobatiq courseware. The first session included an overview of the course and basic navigation of the platform that was held prior to the semester start. After 5 weeks, a subsequent training focusing on utilizing the data in the Learning Dashboard was delivered that focused on how instructors could identify engagement risks and learning objectives that students were struggling to master in their own courses.

Best practices were established for course setup and grading to help increase student engagement. Instructors were encouraged to set due dates on all quizzes and assignments to clearly establish these elements as required course components for their students. It was recommended that instructors give a participation score (5% are greater) to students for completing all the formative practice in the course. Instructors were encouraged to use the courseware in a flipped blended teaching model, so students could complete the foundational work via the courseware and instructors could evaluate their progress via the dashboards before class. Instructors still had the ultimate control over their teaching model and how they implemented the courseware as a part of their syllabus and gradebook.

Data

The Engagement Graph

After the semester had concluded for all institutions, the Acrobatiq Research and Development team used a data visualization called an engagement graph to compare aggregated institutions as well as individual instructor sections. The engagement graph was developed as a way to visualize how students were engaging with the courseware over time. The pages of a course are ordered along the x-axis, and the number of students along the y-axis. This creates a view of a class over time in the courseware. Dots are added to each page to show the number of students who read content on a given page, the number of students who engaged with the formative practice on that page, and the number of students who completed adaptive or summative assessments.

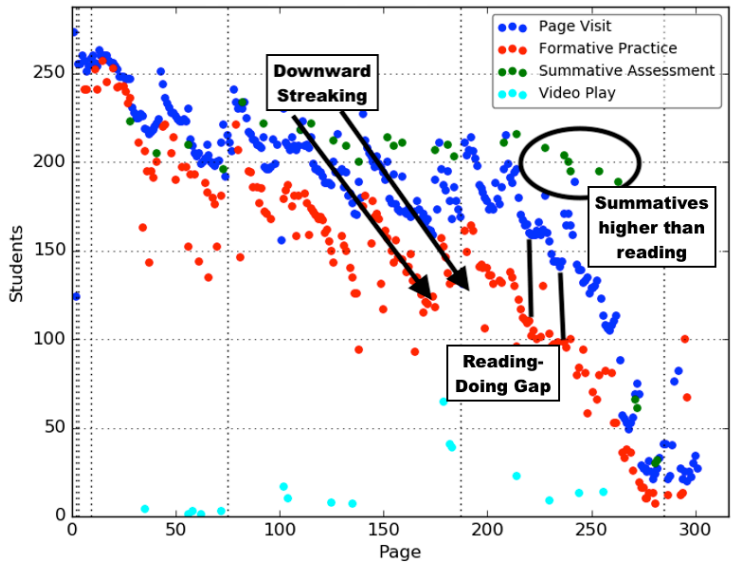


Figure 1. An engagement graph marked to show examples of within-unit streaking, the reading-doing gap, and higher summative engagement than reading or doing engagement.

This engagement graph example shows a relatively typical course. As we move along the x-axis from the beginning of the course to the end, there is a steady decrease in engagement, with a steeper drop-off toward the end. This tells us what is generally known— that some students stop doing their work toward the end of the semester. We also see downward streaking from left to right in a downward repetitive pattern. This notes a pattern that within modules, some students drop out partway through the module only to return at the start of the next. The blue dots indicate the number of students who read each page, while the red dots indicate the number of students who did the formative practice questions. The red dots are below the blue, meaning some students read the page but do not do practice. We call this the reading-doing gap. As seen in this graph, that gap between reading and doing widens over time, meaning fewer students engage in the practice as the course nears the end.

In an ideal world, all students would read every page and do all the practice opportunities, so the engagement graph would be a horizontal line at the number of students in the course. It is unrealistic to set this as the goal, but it is reasonable to aim to reduce the reading-doing gap and increase engagement across the course.

Engagement Graphs by Institution

The first level of inspection took place at the institution level. It was expected that we might see differences between institutions due to variables such as differing student characteristics between institutions of different types. The engagement graphs which had combined data for all sections at the institution confirmed there were drastic differences in how students engaged with the courseware between institutions. Figure 2 shows three institutions as a side-by-side comparison.

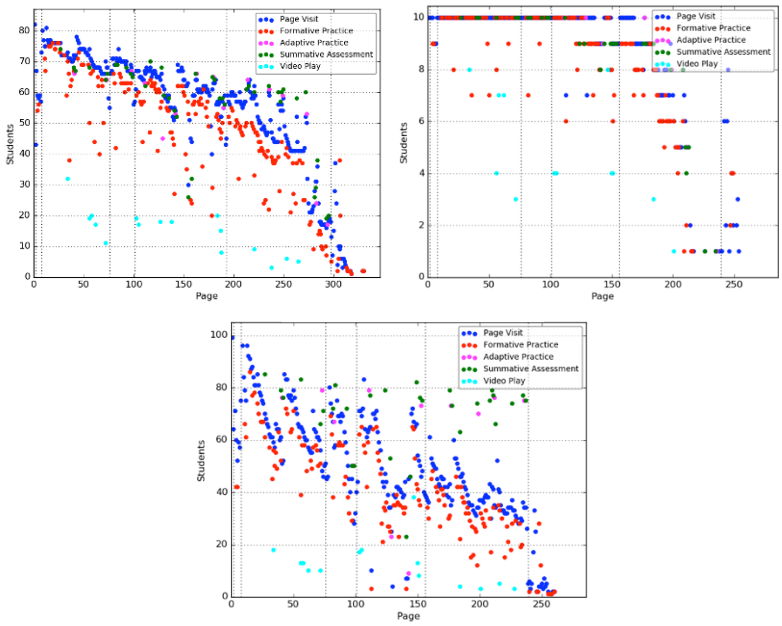
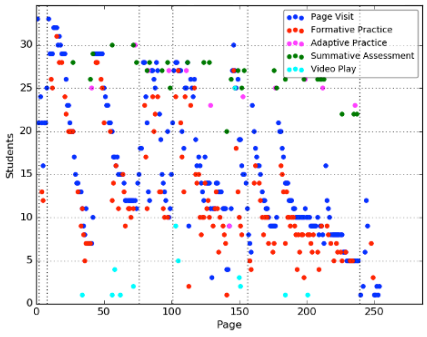
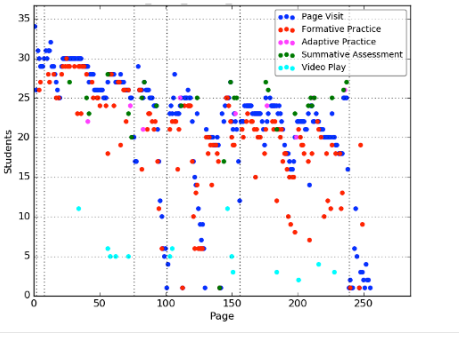


Figure 2. A series of three aggregated institutional engagement graphs which show strongly divergent patterns of engagement.

Each engagement graph looks drastically different at a glance. The number of total students varies from 10 to 100. The engagement graph on the left shows a slow decline in use over time but a fairly steady decrease with minimal vertical streaking. The engagement graph in the middle shows dramatic vertical streaking and poor engagement through the majority of the course. The engagement graph on the right has a nearly horizontal line of engagement for reading and doing, which is close to ideal usage. If these were the only data views available we might conclude that the influencing factor could be institutional policies or differing student characteristics.

Engagement Graphs by Instructor

Most institutions had multiple sections of the courseware being used by different instructors. When we look at a selection of engagement graphs separated by instructor, as in Table 1, we see unique differences.

	Instructor A	Instructor B
Institution 1		

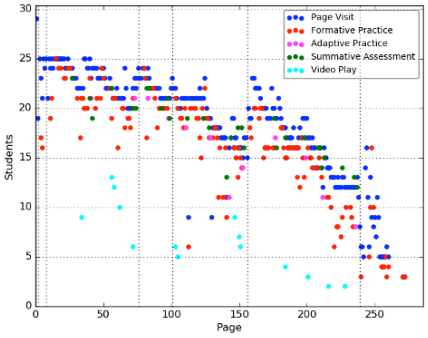
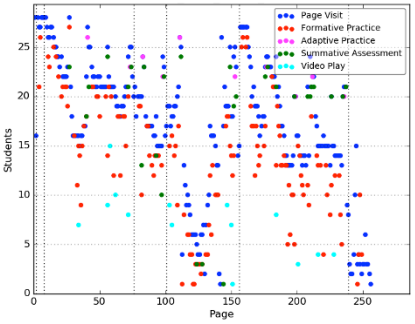
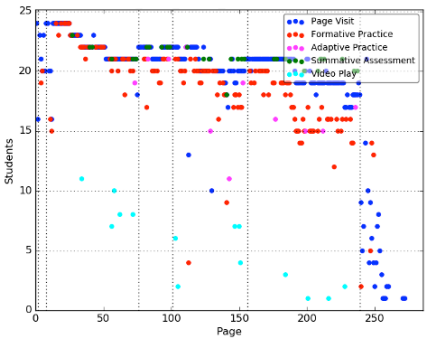
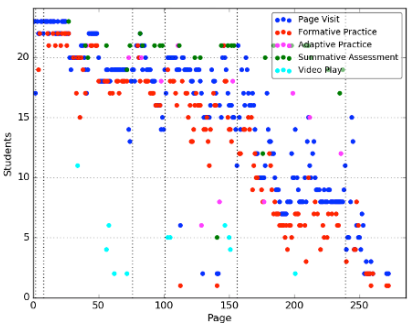
Institution 2		
Institution 3		

Table 1. A comparison of engagement graphs between two instructors at the same institution.

Visual inspection of these different engagement graphs shows very divergent student engagement patterns with the courseware between instructors. Instructor 1A's section shows extreme vertical streaking and low overall usage. Students in this section took the summative assessments, but most students quickly stopped looking at pages or doing practice within modules, with only about a third of all students working through the courseware consistently. Comparatively, instructor 1B's section shows that the majority of students consistently used the courseware, with vertical streaking limited to a range of roughly five students.

At the second institution, instructor 2A's section shows a fairly tight band of reading-doing, with only a few students fluctuating vertically, and almost all students doing the practice as well as reading. Instructor 2B's section shows a large variation of engagement, with nearly half the class reading or not reading, doing or not doing. While instructor 2A's section shows a slight dip in the middle of the course and a steady decline in usage in the last unit, instructor 2B's section shows a dramatic dip in the middle of the course and wide fluctuations in usage throughout.

At the third institution, instructor 3A's course shows a fairly horizontal line with variation in reading and doing of only two or three students, with a slightly larger decrease in doing at the end of the course. Comparatively, instructor 3B's section shows a consistent vertical variation in reading and doing of five or six students, with a dramatic decrease at the end of the course.

Engagement and Final Exam Scores

While each institution created their own final exam for the course, there was a portion of questions that were the same across all institutions. A comparison of the engagement graph patterns for the institution as a whole with the mean score of the common questions for students at each institution shows a relationship between the overall level of engagement and the mean assessment score for common questions. The courses at the top with more student retention to the end of the course had higher scores while the engagement graphs at the bottom with low engagement had lower scores.

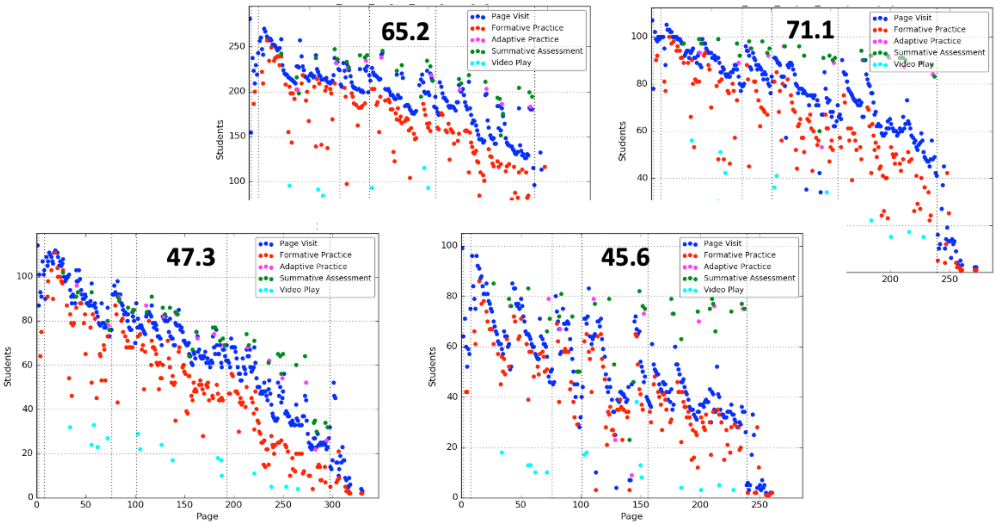


Figure 3. Four institutional engagement graphs of varying patterns with the mean score of the common final exam questions.

Results and Discussion

Inspection of these data visualizations revealed valuable insight into the variability of engagement within individual course sections. While not a randomized experiment with control over all variables, this initiative provided many controls across a large number of courses run in a natural setting. With a single initiative organizing the mission of the project, the same courseware being used, and the same training and instruction provided to instructors, we had some expectation of similarity of usage and outcomes. Our initial assumptions were to see variation according to differing student populations between institutions. Instead, we see significant variation in engagement patterns between sections at the same institution. While it's possible that additional variables could contribute to differing engagement (different course times, different student groups, etc.), it is unlikely that those could account for the entirety of such drastic differences. The instructor and their choices regarding implementation greatly impacted how students chose to engage with the courseware.

Instructors who had the highest student engagement shared several important commonalities: they used due dates for assessments, included completion of formative practice as a part of the student's participation grade, attended all trainings and attempted a flipped classroom model to some degree. Though training was a required element of this pilot, the several instructors who did not attend all trainings

were also the instructors that had some of the lowest student engagement in their course sections. These findings informed how training, instructor resources, and best practices were created and used in subsequent pilots. Using a flipped classroom model was recommended for instructors but this was implemented at varying degrees. Better defining what a flipped classroom model was and providing additional tools for instructors to better leverage this teaching modality was one of the lessons learned from this pilot.

Conclusion

This data validates our belief that the instructor is critical to the success of technology in the classroom. While the courseware itself is proven to be effective in helping students learn, it can only do so if students engage with it. Instructors hold enormous sway over how students engage with the courseware and therefore benefit from the technology.

This data analysis suggests that the usage of courseware should also be paired with a framework to evaluate the fidelity of implementation. The validity of efficacy research is diminished if the results cannot be clearly attributed to the courseware or the implementation of the courseware. Further work should be done to establish a theoretical framework and criteria for implementation as well as an evaluation of the level of fidelity to that implementation.

These findings indicate several avenues for future research. First, it is clear that more work needs to be done to investigate how a fidelity of implementation framework could be leveraged in real-world contexts to increase the validity of effectiveness research. Second, given that engagement with the courseware is the only way to benefit from the proven learning science principles inherent to its design, increasing engagement must be the focus of future research. We would be interested in evaluating how instructor policies such as participation scores, late work policies, and gradebook settings are related to student engagement. Additional research should also be done into how qualitative factors such as approaches to introducing students to courseware, expectation setting, and instructor attitudes can influence student engagement.

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Correlation of STEM Interest and Career Intent in High-School Students

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Abstract
Understanding high school students' perceptions and dispositions toward STEM, and the role science and math self-efficacy play in establishing STEM career aspirations is imperative to preparing the STEM workforce of the future. Project STEMulate is an industry-aligned and technology-rich Problem-based Learning (PBL) model. The goal of this NSF ITEST grant-funded study (2018-2020) was to improve students' attitudes towards STEM. Project STEMulate focuses on Upward Bound students in Hawai`i and was implemented at three sites: Maui, Hilo, and Oahu. The participants voluntarily selected to participate in this program. The current study reviews year one data collected on the impact of Project STEMulate on low-income and underrepresented and/or native Hawaiian students' STEM career interest, and their science self-efficacy. Students' reactions to the STEM learning experience were extremely positive. 80% of students expressed a desire to pursue a career in STEM at the post test. High school students who listed their plan to pursue a career in STEM also showed a higher self-efficacy and motivation. Analysis of the results demonstrates this program was effective in empowering students with insights into careers, enhancing knowledge that would serve them in pursuit of a career in STEM. In addition, the project fostered a can-do attitude and increased students' science self-efficacy.

Keywords: Native Hawaiian Students, Underrepresented Students, Science Self-efficacy, Science Education, STEM, STEM Careers, STEM Camps

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Introduction

Studies have repeatedly reported the gap observed in student interest in Science, Technology, Engineering, and Mathematics (STEM) and their desire to pursue STEM major or careers (ACT, 2015; Blotnicky et al., 2018; Christensen et al., 2015; Kier et al., 2013). This is despite the current recognition of STEM careers as the most versatile careers (Mokter Hossain & Robinson, 2012). Moreover, the rapid expansion of STEM careers demands an increase in the preparation of the high school graduates who are prepared for post-secondary education, training and careers in STEM (Hayes, 2017). However, many STEM-interested students are not prepared to succeed in the rigorous college math and science coursework required of STEM majors.

While many believe proficiency and interest in STEM should be initiated in middle school (Christensen et al., 2015), others selected later elementary school years as the right time (Tai et al., 2006). We agree that earlier engagement of students' interest in STEM is preferable, however, students who are already in high school and will be heading to college soon are also a concern. How can we help this group? Other researchers (Kitchen et al., 2018; Maltese & Tai, 2011) showed majority of students interested in STEM made that choice in high school. This puts us in agreement with Maltese et al. (2014) that many pathways toward STEM study and careers exist, with none being singularly preferred (p. 937). We want to present the results of a study showing that an out-of-school program, i.e., Upward Bound program, can provide opportunities—particularly to low-income and first-generation to college students—to promote their interest in STEM.

Lack of Interest in STEM Workforce

Although research on the relationship between student interest in and pursuit of STEM careers has been on the rise (Christensen & Knezek, 2017), the issue of increasing student interest in STEM is of greater magnitude when it comes to the achievement of underserved and underrepresented students in the STEM fields. The National Academy of Sciences (2011) reported less than 10% of minority students to be college educated in science and technology while they make up close to 30% of the population. It is a critical and growing need to draw minority students into STEM fields and to increase the number of minority graduates from STEM programs (May & Chubin, 2013). Numerous studies at the undergraduate level provide support for increasing minority students' retention in STEM majors (Carpi & Lents, 2013; Junge et al., 2010; Kardash, 2000). Nevertheless, preparing students to sustain study at undergraduate level is also important. Thus, intervention programs such as Project STEMulate, focusing on high school students, are imperative to ensure that minority students are learning the skills needed to be successful in completing college degrees, especially in STEM fields.

Native Hawaiian students are often underprepared, underrepresented, and underserved in STEM fields. Various national and international assessments show that Native Hawaiian students perform far below white students in STEM skills and reading (DeSilver, 2018; NAEP, 2017). Furthermore, in a report on Hawaiian students and STEM education, it was determined that these students are taught by inexperienced science and math teachers (Gay, 2013). Research also has demonstrated that students' lack of exposure to STEM career possibilities is a reason for why they are less likely

to pursue STEM careers (Mokter Hossain & Robinson, 2012). The National Science Foundation (NSF) has clearly seen the need to address this problem and funded many studies where their goal has been to support, implement, and assess any program that fosters academic success of minority students majoring in a STEM field.

Informal or Out-of-School Education

Informal or out of school education refers to learning that occurs outside of traditional schooling (Dierking et al., 2003). Common informal learning environments include after-school and weekend and/or summer camp programs. Reports on such programs confirm they have increased students' interest in STEM majors (Bicer et al., 2015, 2018; Vela et al., 2020), improved students' mathematics and science vocabulary knowledge (Bicer et al., 2015), enhanced students' artistic self-efficacy in STEM (Capraro et al., 2014), enriched students' communication skills (Bicer et al., 2015), advanced students' self-identity (Barroso et al., 2016), and improved students' scientific reasoning (Gerber et al., 2001).

Upward Bound Program

The Upward Bound (UB) program, established in 1965, is designed to provide services to high school students identified as low income and first-generation-to-college and support their transition to, and enrollment in postsecondary educational institutions (U. S. Department of Education, 2012). The federal fund allocated to UB program is to address existing educational inequities, and to provide required resources and support to prepare students both academically and socially for enrollment and retention in postsecondary education (Strayhorn, 2011; Villalpando & Solorzano, 2005). Given the kind of preparation needed and the support required, a major goal of UB programs at all of their sites MUST be to offer instruction in math, laboratory science, composition, literature, and foreign language.

Perspective(s) or Theoretical Framework

Underrepresented students are a significant school population in the United States, and their educational access is particularly jeopardized and lag behind other students. The full power of ubiquitous learning for educational transformation can be conceptualized through the overcoming of challenges related to infrastructure, human learning and ability, and motivation. This paper focuses on the implementation of a STEM PBL program drawing on constructivism (Dewey, 1933/1998), social cognitive career theory (SCCT) as articulated by, Lent et al. (1994), and culturally relevant education (Dover, 2013). The tenet belief of constructivism is that learners actively participate in interpreting information and creating their own knowledge (Piaget, 1972). PBL provides an active learning environment (Dahlquist & Cutucache, 2013) that engages learners in their learning process by transferring some responsibilities from teachers to students (Nariman & Chrispeels, 2016). According to SCCT, the other theoretical basis of this study, individuals pursue college or career majors that are aligned with their interests and match with their academic and career goals (Lent et al., 1994). Therefore, career choices are influenced by the quality of educational experiences. Consequently, increasing the opportunity to engage students in STEM-related experiences will increase the likelihood of pursuing STEM majors and careers. Although recommendations on when to act in order to have an impact on

students' college and career pathways are different, we agree with Beier and Rittmayer (2009), Bicer and Lee (2019), and Hansen (2011) that before and during high school is the most effective time. Seventy-eight percent of college students reported that they decided on their selection of a STEM major in high school (Microsoft Corporation, 2011).

Culturally Relevant Education (CRE)

The CRE emerged from the union of culturally responsive teaching (Gay, 2010) and culturally relevant pedagogy (Ladson-Billings, 1994). The goal for culturally relevant pedagogy is to create equal opportunity for students from diverse cultural backgrounds (Ladson-Billings, 1994) with the view of creating a meaningful connection between students' background knowledge (i.e., culture, language and previous life experiences) and what they learn at school so they can see the relevance of their learning. According to Gay's culturally responsive teaching "the cultural knowledge, prior experiences, frames of reference, and performance styles of ethnically diverse students," (2010, p. 31) have to come together to make meaning and find relevancy in what is learned. This connection only comes through providing all students with equal opportunities to be academically successful (Banks, 2008; Gay, 2010, 2013; Ladson-Billings, 1995). CRE supporters believe that valuing students' cultural backgrounds and cultural identities creates the optimal learning environment for students to thrive (Gay, 2010; Ladson-Billings, 1994; Nieto, 1999) because it demands a student-centered instruction (Irvine & Armento, 2001) where teachers are acting as facilitators with high expectations of students, creating a learning environment within the context of culture (Ladson-Billings, 1994). This requirement matches perfectly with PBL strategy and its tenets. PBL has proven to have the capabilities to help students in this process and to guide and inspire them to relate their previous knowledge to the present, and further connect it to their future studies and career selection. Therefore, the purpose of this project is to support Upward Bound students with a PBL intervention that encourages and motivates them to successfully navigate towards an undergraduate degree in a STEM field.

Problem-based Learning

PBL is an innovative learning and instructional approach that empowers learners to conduct research, integrate theory and practice, and apply knowledge and skills to develop a viable solution to a defined problem, a problem very relevant to the learners (Savery, 2006). Essential tenets of PBL include: 1) real-world focus; 2) collaboration; 3) student-driven and student-centered design; 4) open-ended outcomes; and 5) an interdisciplinary approach (Savery, 2006). In such a PBL setting, students actively participate in learning (individually or in small groups) to address real and relevant problems contributing to their own understanding and achievement of concrete outcomes (Barrows, 1985; Hmelo-Silver, 2004; Marx et al., 2004). Students are consequently better able to apply their learning to new problems in a variety of settings (Barrow, 1985). Furthermore, PBL has proven to be effective for teaching critical thinking, communication, collaboration, and applying knowledge to real-world situations (Walker & Leary, 2009; Darling-Hammond et al., 2008, Strobel & van Barneveld, 2009). The promising results of several high school PBL studies indicate PBL is "as or more effective" than traditional teaching approaches (Boaler,

1998; Mergendoller et al, 2006), especially with low-income students (Lynch et al., 2005; Cueva, 2005; Gallagher & Gallagher, 2013).

Need for New Programs

Many researchers agree that real-world hands-on problem/project-based learning that personally and locally connects to students is of value (Christensen & Knezek, 2015).

This study was guided by the following research questions:
1. What was the likelihood of students selecting a STEM career?
a. What role did gender play in the likelihood of selecting a STEM career?
2. What level of STEM career interest existed among high school students?
3. What was the correlation between student science self-efficacy and STEM interest?
4. How did Project STEMulate impact students' STEM career interest?

Methodology

Context of Study

Project STEMulate was organized as a STEM Problem-based Learning (PBL) curriculum and model that operationalizes key PBL tenets while meeting programmatic requirements and academic outcomes to develop motivation and interest in STEM. The primary goal of Project STEMulate was to develop Upward Bound (UB) high school students' interest in STEM content and to elevate their perceptions of STEM careers. The program focused on hands-on activities where students explored and researching solutions to a real-world industry-aligned problem. The context for this program was a five-week UB summer academy on three islands, Maui, Oahu, and Hawai`i during 2018-2020. This paper draws on year 1 data.

The integration of the culturally relevant research and Bandura's (1986, 2001) social cognitive theory and constructivist theoretical frameworks in a PBL setting were used as an analytical lens along with a mixed method approach. The data collection included: pre- and post-surveys, semi-structured focus group interviews, observation of participants' final presentation, and review of their final reports.

Participants

The target population was the low income, underrepresented, first-generation, and/or Native Hawaiian 9th through 12th grade students participating in the UB summer Academy. Data were gathered from students who participated in Project STEMulate and a comparison group who had a similar summer experience with traditional courses in math, science, and language arts. In total, 113 high school students participated in this study with 64 in STEMulate group and 49 in the comparison group. The breakdown of UB program participants at each participating site was: University of Hawai`i Maui College (UHMC) (n=51), University of Hawai`i at Hilo (UHH) (n=37), and the Windward Community College (WCC) - University of Hawai`i (n=25). Overall, there were 62% female and 38% male students. The STEMulate group comprised of 58% female and 42% male students and the comparison group had 67% female and 33% male students.

Problem Explored

The problem explored in Year 1 was: "How can the island of meet the statewide goal of 100% energy from renewable sources by 2045 considering different strategies along with pros, cons, and potential hurdles to overcome."

Measures and Instruments

Science Self-Efficacy (SSE). This eight-item scale was used to measure student self-efficacy and ability in science, partially adapted from the science section of the STEM Career Interest Survey (Kier et al., 2013). SSE used a 5-point Likert scale and achieved high internal consistency at Time 1 (pre-survey) and Time 2 (post-survey) (SSE Pre = 0.75; SSE Post = 0.74). A composite score was created by averaging all items together, such that higher scores indicated greater SSE.

STEM Career Aspiration. Students responded to the prompt "I plan to have a career in..." by selecting one of the following: science, technology, engineering, math, or others.

STEM Career Interest (SCI). This twelve-item scale assessed students' career interest, adapted from Tyler-Wood, Knezek and Christensen (2010). SCI used a 5-point Likert scale and achieved high internal consistency at Time 1 and Time 2 (SCI Pre = 0.82; SCI Post = 0.85).

Findings

Research Question 1: What was the likelihood of students selecting a STEM career?

Students' responses to the question: "I plan to have a career in science, technology, math, or engineering" was calculated at the pre-post survey for comparison. As Figure 1 demonstrates, the percentage of STEMulate group students planning for a career in STEM increased at the end of the program. In particular, there was a 19% gain for the STEMulate students who aspire to have a career in science. However, Figure 1 demonstrates no consistency in the increase or the decrease of the likelihood of selecting a STEM career for the comparison group.

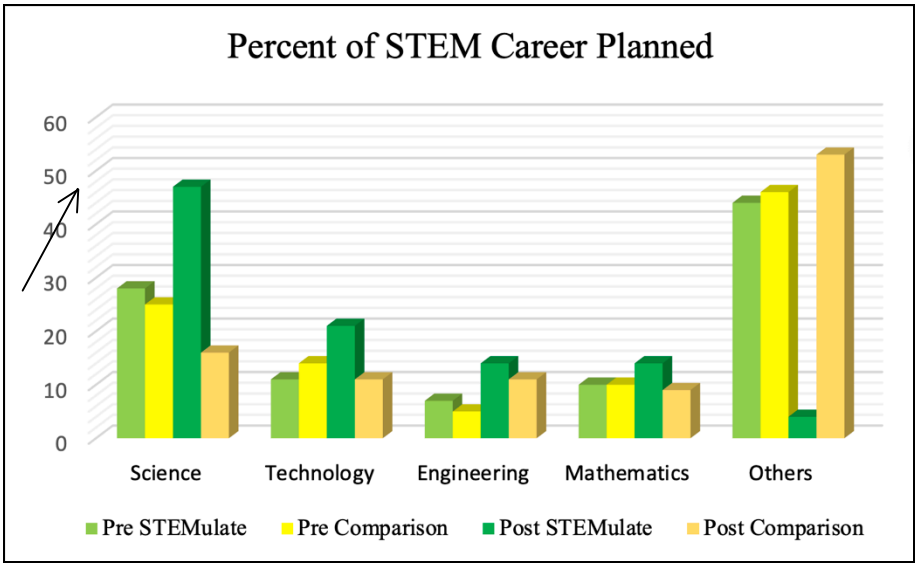

Figure 1: Percentage of STEM career planned for STEMulate and Comparison groups at T1 and T2

Furthermore, when students' responses were dichotomized to create two separate measures: STEM selection (i.e., science, technology, engineering, and mathematics) and non-STEM, a large impact was observed in the STEMulate group as those who planned for a career in STEM gained 39% compared to the comparison group that lost 7% (see Table 1 shows).

Table 1: Percent of Participants Planning STEM Career at Time1 (T1) and Time 2 (T2)

		GROUPS	
		T1	T2
STEMulate Group	STEM	57%	96%
	Non-STEM	43%	4%
Comparison Group	STEM	54%	47%
	Non-STEM	46%	53%

Research Question 1.a: What role gender played in the likelihood of selecting a STEM career?

When the data for the likelihood of selecting STEM career were further analyzed for gender, the program effects on girls were more noticeable. Table 2 shows the changes in students' planning for careers in STEM vs. non-STEM by gender, for both STEMulate and comparison groups. Overall, male students from both groups were equally divided into STEM and non-STEM careers while a greater percentage of females indicated preference for STEM careers at both the pre- post survey for both groups. In fact, both genders in the comparison group lost interest in planning for a STEM career, and the females in the STEMulate group showed more intention for pursuing a STEM career.

Table 2: Comparing Percentage of Different Gender in Planning for STEM Career at T1 and T2

		Comparing Gender			
		T1_Female	T2_Female	T1_Male	T2_Male
STEMulate Group	STEM	62%	97%	50%	95%
	Non-STEM	38%	3%	50%	5%
Comparison Group	STEM	55%	50%	50%	39%
	Non-STEM	45%	50%	50%	61%

Research Question 2: What level of STEM career interest existed among high school students?

Students' Career Interest was calculated as the average of the 12 items of the SCI scale. The parallel analyses revealed the extent to which SCI detected the effects of Project STEMulate on students' career interest. The internal consistency of the SCI scale for Time 1 and Time 2 was calculated, and SCI exhibited a high internal validity for both times: Time 1 ∝= .86, and for Time 2 was ∝= .89. The value of the Cronbach's Alpha falls in the range of "respectable" to "excellent" according to DeVellis's guidelines (1991).

SCI is also consisted of three subscales, *Support*: perception of being in a supportive environment for pursuing a career in science, *Education*: intent to pursue educational opportunities that would lead to a career in science, and *Importance*: perceived importance of a career in science. Table 3 shows the Mean and Standard Deviation for SCI and its subscale at both Time 1 and Time 2 for both groups. The mean of the subscales ranged from 2.11 to 4.17 across the subscales and groups. For both groups, SCI Part 1 (Support) had the lowest Mean while SCI Part 3 (Importance) had the highest Mean at both Time 1 and Time 2. The result of an independent sample t-test indicated a significant difference in career interest satisfaction between the STEMulate and comparison group, $t(108) = .834$, $p < .001$. Nevertheless, no difference in career interest was observed based on gender.

Furthermore, the results of a paired-samples t-test was statistically significant for the career interest score of the STEMulate group from Time 1 ($M = 2.97$, $SD = .42$) to Time 2 ($M = 3.58$, $SD = .75$), $t(62) = 9.40$, $p < .001$.

Table 3: Comparing STEMulate and Comparison Groups on Career Interest at Time 1 and Time 2

	STEMulate Groups				Comparison Groups			
	T1_M	T1_SD	T2_M	T2_SD	T1_M	T1_SD	T2_M	T2_SD
SCI- All	2.97	.42	3.58	.75	2.68	.43	3.05	.67
SCI -P1 Support	2.37	.66	2.99	1.1	2.11	.72	2.34	.95
SCI - P2 Education	3.26	.41	3.69	.8	2.88	.41	3.08	.81
SCI - P3 Importance	3.28	.44	4.17	.55	3.11	.37	3.95	.59

Research Question 3: What was the correlation between student science self-efficacy and their STEM interest?

For the science self-efficacy (SSE) scale, students' responses to the eight statements were dichotomized by assigning a value of "1" to those who were most agreeable with Likert scale ratings of 4 or 5 to the statements, and a value of "0" was assigned to those who disagreed or strongly disagreed (Likert scale ratings of 1 through 3) with the statements. These eight measures were finally summed to create a single SSE scale. The final SSE score ranged from 1 (Low self-efficacy) to 8 (High self-efficacy). The distribution of the Science Self-Efficacy Scale at Time 2 is shown for both groups.

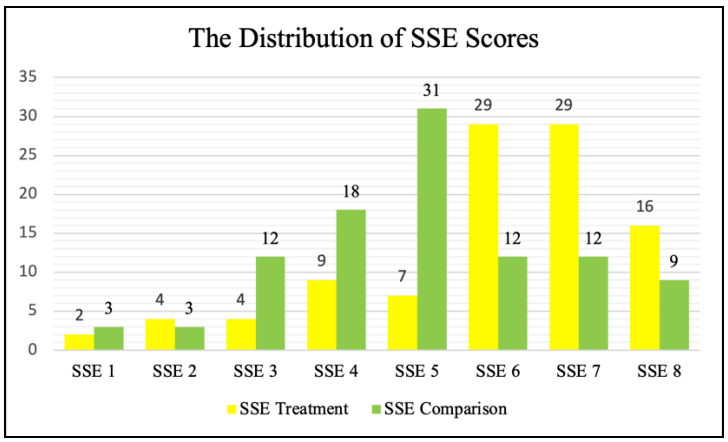

Figure 2: Distribution of Student Science Self-Efficacy (SSE) Scale for STEMulate and Comparison group at T2

For further analysis, the SSE scale were again divided into two subgroups: low SSE (scores of 1 - 4) and high SSE (scores of 5 - 8). This breakout identified students who were the most comfortable and confident in their science experiences. The results for the SSE scale were validated using confirmatory factor analysis (CFA) and reliability analysis. The factor analysis was statistically significant (KMO = .719, p <.001). These results suggested for students in the STEMulate group to have a higher SSE than the comparison group (see Figure 3).

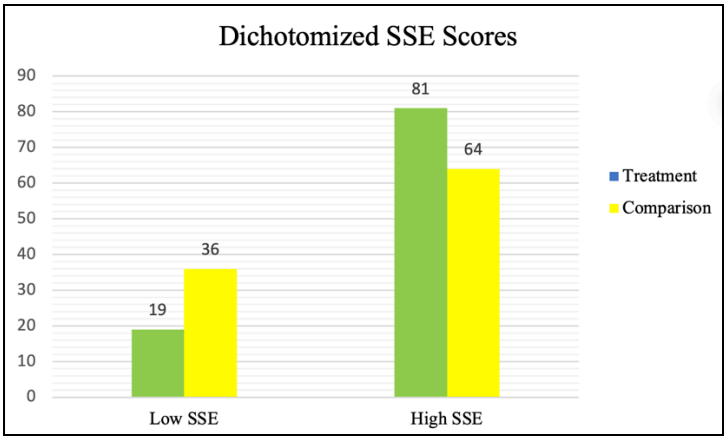

Figure 3: Comparing students' Science Self-Efficacy for STEMulate and Comparison groups at T2

Research Question 4: How did Project STEMulate impact students' STEM career interest?

To respond to this question, students' final reports were evaluated, in addition to their responses to the focus group interviews. All students engaged in a wide variety of activities that would support their competency to pursue STEM careers. Major examples included conducting experiments, performing mathematical calculations, doing research, administering surveys, and conducting interviews which will be further discussed.

Conducting Experiments. Students conducted experiments such as building a simple alternating current generator, using a voltmeter to measure the number of kilowatts per hour used by an old refrigerator vs. a newer energy-efficient model, and created a prototype of a concrete slab equipped with thermoelectric plates and then tracking and measuring the voltage generated over time. These and other experiments demonstrated students' engagement in skilled explorations relevant to their topics which required carefully executed scientific processes.

Mathematical Calculations. Students also engaged in complex and extensive mathematical calculations such as determining the amount of energy which could be generated by converting human waste into biogas, or calculating the price and amount of power generated by different types of solar cells. The various requirements of students' research made evident that they were learning important mathematical concepts essential to supporting their scientific inquiry.

Research. All of the groups conducted research related to their topics, the problems they were addressing, and their proposed solutions. The cited sources in their final papers included government and industry websites, scholarly journals, books, and a variety of online resources. Their work was well supported by the resources they relied on and it was presented in academically robust ways.

Surveys. Almost all the projects involved administering surveys, most often to assess awareness of and opinions about renewable energy issues. Students developed questions and conducted surveys with community members, experts, and local companies, often executing these online through email and social media. They also presented their quantitative results in graphs and charts. Their presentations and final papers reflected that their efforts in seeking out this kind of real-life data were principled and meaningful to them.

Interviews. Students also engaged with and interviewed a variety of professionals with positions in STEM fields, including government and industry representatives as well as relevant academics. By doing so, they obtained essential background information, got advice on how to conduct their research, and elicited comments relevant to the particular problems their projects focused on, for example by asking what these experts would say to those expressing concerns about the challenges inherent to switching to renewable energy resources (concerns that were raised by the community members they had surveyed). Having contact with those working in STEM fields—people who could serve as role models—provided opportunities for students to be exposed to and inspired by the kinds of careers they might one day pursue.

Additional Skills

In the focus groups, in addition to the skills discussed above, students specifically mentioned a number of other competencies they gained or improved upon by participating in the program. Examples include: presenting, critical thinking, time management, writing up papers, data collection, communicating ideas, and teamwork.

RQ 2. How did using technology-rich STEM PBL affect participating student's interest in STEM careers?

In the focus groups, 14 of 23 students explicitly indicated they were thinking about a STEM career, with examples including engineering, computer programming, forensics, aerospace, medicine, animation, and game design. Most responses were simple statements of career plans but many of the Maui students (aided by some probing by the interviewer) specifically indicated the impacts of this program on those decisions:

- STEMulate really opened new ideas towards science... like the hands on is really fun. I want to go into a job with lots of hands on. (Maui student)

The program also provoked student interest in STEM careers by affecting key steps along such path. The majority of focus group participants (19 of 23) agreed that the STEMulate program would help them be more successful at school, and over two-thirds said they were now more likely to take STEM classes in high school. One students said:

- I think I would want to take more STEM classes in my upcoming years, because this experience really gave me more insight on the different sides of STEM. (Oahu student)

Problem-based Learning

One of the major ways the program facilitated student interest in STEM and students' possible interest in STEM careers—was by making the learning relevant and focused on real life problems. Without exception, all the student projects addressed issues with both local and cultural relevance. Their problem-based explorations were rooted in things students could relate to, often involving existing controversies within the community. For example, an Oahu participant mentioned:

- With this STEM course, we dealt with real-world problems and I'm really interested in that.

Cultural Relevance

The cultural relevance of the work students engaged in was unmistakable throughout the focus group interviews.

- A lot of people think culture is more like hula and chatting and stuff, but there's more to it than that, there's culture to science. (Hilo student)

Likewise, in the final papers, students' respect for and investment in the cultural aspects of their research was apparent. For example, in the Maui groups, they acknowledged, valued, and proactively addressed community members' concerns:

- As we continue the process of getting to net-zero by 2045, we need to be aware of the deep historical meanings that the land possesses. By recommendation, it would be healthier … to place solar panels on houses/buildings rather than on the land itself, ensuring that we are not damaging the land and its historical roots. (Excerpt from Maui Group 6 Final Paper)

The solutions students proposed also drew upon culturally relevant connections. It is well established in educational research that cultural relevance can enhance student interest in their learning, something that is definitely observed in the data from this study. By encouraging and facilitating this kind of scientific research, Project STEMulate is also providing yet another reason why students might consider a STEM career in their future.

Discussion

The focus of the current study was to determine if participation in an industry-aligned technology-rich Problem-based Learning (PBL) model influenced the likelihood of students' selecting STEM careers. Prior research has indicated that the PBL environment can impact student's recognition and selection of STEM Careers (Christensen & Knezek, 2017; LaForce et al., 2017). This study is framed by culturally relevant research and Bandura's (1986, 2001) social cognitive theory, which suggests that students' behaviors are influenced by their learning environment. Results from the first research question indicated that the likelihood of selecting a career in STEM for the STEMulate group increased at the end (39% gain). In contrast, the likelihood of selecting a STEM career by the comparison group decreased by the end of the summer. These results imply that engagement in Project STEMulate positively exposed students to a variety of STEM career options, something that the comparison group was not exposed. The results also imply that students might have grasped the benefits associated with STEM careers as they explored to find a solution to their problem. In other words, they may not have been aware or exposed to such experiences. Additionally, the results indicated a higher likelihood for the female students in the STEMulate group to select a STEM career at the end of the camp, compared to the male students.

Results from the second research question showed that the level of STEM career interest among high school students was low at the beginning of the program, and it increased by the end of the summer: STEMulate group Time 1 ($M = 2.97$, $SD = .42$), Time 2 ($M = 3.58$, $SD = .75$), and Comparison group Time 1 ($M = 2.68$, $SD = .43$), and Time 2 ($M = 3.05$, $SD = .67$). Although the mean increased for both groups after the program, the paired-samples t-test was statistically significant for the career interest score of the STEMulate group only. These results align with previous research (Christensen & Knezek, 2017) stating that engagement in hands-on PBL activities will increase interest in a STEM career. As part of Project STEMulate, students had the support and guidance of a team of three teachers who facilitated their

learning daily, they went on many field trips where they listened to STEM partners, and they had access to University of Hawai`i math and science instructors.

Results from the third research question displayed a high positive correlation between student science self-efficacy and their STEM interest. Students who were most comfortable and confident in their science experiences showed a higher interest in STEM careers. On various field trips, the STEM partners explored traditional indigenous ways the renewable energy problem has been approached and they connected students' cultural references to mainstream science skills and concepts. Both STEM partners and the program facilitators engaged students in critical reflection, facilitated students' cultural competence to learn about their own and others' cultures, and provided opportunities for students to critique discourses of power and find opportunities to pursue social justice. This concurs with Lemus et al. (2014) in infusing traditional knowledge and ways of knowing into science education.

Also, to be effective, culturally relevant education demands for student-centered instruction where teachers are acting as facilitators with high expectations of students and creating a learning environment within the context of culture (Ladson-Billings, 2014; Lemus et al., 2014; Zaffos, 2013). The PBL setting of this project created the right environment for students' learning and supported them in recognizing, acknowledging, and applying their own cultural identities, strengths, backgrounds, and knowledge. It also acknowledges various ways of knowing and cultural strengths that students and teachers bring by creating space for STEM connection through PBL. This clearly existed in students' final presentations.

Conclusion

Prior research has implied the rising demand for the STEM workforce and the need to prepare students for STEM careers (Christensen & Knezek, 2017; Vela et al., 2020). The overall results from the present study indicated how an industry-aligned technology-rich PBL program can improve student likelihood of selecting a STEM career. This could be the result of hands-on engaging experiences, exposure to many field trips and access to STEM professionals. These experiences provided students with opportunities to learn more about potential STEM career options along with the benefits of those careers. This study is in alignment with Blotnicky et al. (2018), and Vela et al. (2020) that creating opportunities for students to learn about STEM careers directly enhances their interest in those careers. A special contribution of this study is that hands-on STEM PBL science activities, such as those embedded in this study, are particularly effective in enhancing STEM career interests for high school students. The hands-on real-world activities were effective in promoting students self-reported intent and interest in pursuing a career in STEM.

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Back to the Drawing Board: A Longitudinal Study of Fossilized Errors

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Abstract
The problem of fossilized errors has been a problematic issue with EFL researchers because it shows that traditional methods of instruction are not effective. Fossilized errors were thus examined with university-level first-year Japanese EFL students to better understand the context in which they are occurring and their frequency over the course of an academic year. Data was collected from two corpora, the Monologic and Dialogic Corpus (MDC) 2019, which has 20,368 words, and 42 subjects, and the second corpus MDC2020, which has 16,997 words and 29 participants. Errors in the 2019/2020 corpora were identified and then coded for frequency; results showed the following fossilized errors: articles deletions (92/94), prepositions (39/43) plurals (54/55), subject-verb agreement (85/46), and general wording (60/69). However, in looking at clauses with errors/100 words, there were 5.29 errors in the 2019 corpus, whereas, in the 2020 corpus, there was a slight improvement of 3.35 errors/100 words, indicating that marginal progress was made. These results show many of these errors are interlingual and that students are unaware of their errors that they are making in their spontaneous speech. Alternative methods of instruction are thus needed in EFL education to highlight awareness and self-editing skills.

Keywords: Fossilized Errors, Error Correction, Corpora

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Introduction

Nothing gets more attention than an error that keeps on being repeated, again and again, particularly in monologic or dialogic speech. Fossilization is a term coined by Selinker (1972) who described it as a cessation of development in a language system or subsystem, which can affect most second language (L2) learners/users, particularly in areas of a language that can be phonological, grammatical, or lexical (Han & Odlin, 2006). ICALTEFL[1] noted that a fossilized error is a mistake a student has made so many times that it has become part of their natural speech, pointing out that even native speakers or near-native-like speakers can often say grammatically incorrect expressions such as:

* The spaghetti are ready.
* Are the money on the table?

It could be argued that educators should be more aware of the problem if they were less focused on grading reading comprehension quizzes, assessing listening skills, or responding to a rigid set of grammatical forms that had to be addressed. However, to focus and adequately respond to students' output, particularly over time, takes enormous effort and commitment. Thus, it should come as no surprise that most university-level students are not improving as fast as they should be. Based on their research on students' progress over an academic year, (Long & Watanabe, 2020) found that progress was mixed: global errors showed a decline from 22 to 15 incidents, local errors increased from 76 to 112 errors with a t-test confirming there was no significant difference between the two speech corpora regarding to global and local errors. The five most frequent errors were: (a) lexical phrasing (71), (b) article omissions (41), (c) plural errors (19), (d) preposition omissions (19), and verb usage (9). This data pointed to the difficulty of having students self-edit themselves as little to no instruction is given about this skill.

Review of Literature

As a topic for research and practice, fossilized errors should be more extensively researched than they have been; however, due to a lack of training or time, language researchers have found the issue to be problematic and that, due to situational constraints and environmental settings, too many teachers are willing ignoring such errors or unable to correct them. Language learners might also be unaware of their spontaneous oral errors or apathetic about improving them. One issue is that many EFL educators have not had any or very much training in how to respond to such errors. In their study on fossilization, Qian and Xiao (2010) underscore how challenging it might be for both students and teachers to take the needed action to address these emerging mistakes. Therefore, the researchers focused on three strategies prevent fossilization: (a) taking the right attitude towards students' mistakes, (b) paying attention to verbal output by grasping the relationship between accuracy and fluency, and (c) providing students with strategic feedback. One issue with these three strategies is that they are open to interpretation and tend to be difficult to replicate, especially in considering the one issue of students' motivation and goals. A second issue that such researchers fail to address reviewing and recycling information to better highlight error correction. In another study, Wei (2008), research focused on

[1] ICATEFL. Retrieved from: http://www.icaltefl.com/fossilized-errors-in-tefl.

the implications of interlanguage (IL) fossilization in L2, for which he described five types of fossilization: phonological, morphological, syntactic, semantic, and pragmatic.

However, fossilized errors do not need to be permanent, and second language learners always have the opportunity to continue developing grammar usage.[2] Wei's research is critical as all too often teachers tend to miss recognizing syntactic, semantic-pragmatic, or morphological errors, putting their time and energy solely on grammatical forms whereas the other kinds of errors might have more importance or impact on the message. Another way of understanding error formation came from Han (2005), who identified 50 variables used to explain the causes of fossilization; these can be categorized into four factors (a) environmental, (b) cognitive, (c) neurobiological, and (d) socio-affective. Han then offers a systematic way of further analysis, relying on macroscopic and microscopic perspectives.

Hasbún (2007), having examined college students in Costa Rica, found that not only the verb form usage but also the prepositions and articles usage seem to be persistent errors over time, indicating the tendency of these errors becoming fossilized (p.126). Taher (2011) identified that Swedish junior high school students made frequent errors of verb tense, verb inflection, and subject-verb agreement. The causes of errors are considered to be incorrect transfer from Swedish into English as well as lack of grammatical knowledge. To correct errors in spoken English, Kayum (2015) proposed using feedback sheets, media technology such as recording, and self-correction by students. In the study of English-speaking learners of Japanese, Hirotani, Matsumoto, and Fukada (2012) targeted the students who enrolled in the first-year Japanese courses at a university in the U.S. to investigate how the fluency-related measures changed over time. They discovered that several measures of fluency deteriorated in both oral reading and Q&A tasks. Such complexity factors as new words were identified to have hindered fluency development.

Treatment of fossilized errors

In responding to fossilized errors, self-monitoring has been the first strategy for most EFL educators, with O'Malley and Chamot (1990) defining self-monitoring as "checking one's comprehension during listening or reading or checking the accuracy and/or appropriateness of one's oral or written production when it's taking place" (p. 46). Birdsong (1989) discusses how metacognitive awareness is really "a reflection of the growth of two skill components involved in language processing: the analysis of linguistic knowledge into structured categories and the control of attentional procedures to select and process specific linguistic information" (p. 498). Teachers, thus, are called upon to develop both linguistic knowledge as well as editing/proofing skills.

To better understand the role of attention, Kormos (2000) studied 40 EFL speakers in Hungary to analyze the frequency for self-repairs and correction rates. The results showed that in 12 speech samples, those lexical errors were repaired more than grammatical errors; moreover, students who had higher proficiency levels in their L2

[2] Carnegie Mellon University Intercultural Communication Center: Retrieved from: https://www.cmu.edu/icc/language-training/handouts/assets/fossilized-grammar.pdf

had corrected fewer mistakes than learners who had been at pre-intermediate levels. Pillai (2006) explored repairs in spontaneous production and found that speakers did not stop immediately upon being aware of the error; additionally, speakers tended to continue speaking longer before they interrupted themselves. The issue of self-monitoring and self-reflection has gained global attention, with Sánchez Luján (2012) using a blended environment at a Columbian university with distance classes; in the study, participants were asked to observe and record their own behavior. Results indicated that students could identify areas of improvement independently, but far more analysis is needed on the types of awareness that his participants gained from the self-assessment tools provided.

Kormos (2000) also investigated the role of attention in monitoring second language speech production, analyzing the frequency for self-repairs and the correction rate of errors in the speech of 40 native speakers of Hungarian. Results showed that in L2 speech, error repairs had been more frequent than repairs in L1; furthermore, it was also learned that students who had higher levels of proficiency in their L2 had corrected fewer mistakes than learners who had been at pre-intermediate levels. This research established that L2 learners pay particular attention to lexical choice.

A similar strategy in responding to error formation is that of self-evaluation; O'Malley and Chamot (1990) also defined self-evaluation as "checking the outcomes of one's own language learning against a standard after it has been completed" (p. 46); later, this definition was refined with Brown (2007) who stated that it was a process of "checking the outcomes of one's own language learning against an internal measure of completeness and accuracy" (p. 134). Thus, students are now prompted to assess their own performance in a variety of tasks, which can raise self-confidence and self-esteem if done correctly with self-assessing rubrics and checklists (Schraeder, 1996; Min, 2005; Tamjid and Birjandi, 2011), as well as improving skills, language acquisition, and meta-cognitive strategy use.

Fauziati (2011) looked at eight error types and tried a pedagogical intervention over a period of one semester; the rewrites of the first composition showed revealed that grammar instruction was capable of reducing 66% of the learners' errors, from 422 error cases in C1 to 142 error cases in C2. However, despite teachers' best attempts in addressing self-monitoring and self-repairs, little progressive improvement has been noted. One issue in students failing to catch errors is that L2 learners seem to pay more attention to lexical appropriacy and in, some cases, phonological appropriacy rather than to grammatical elements such as verb forms (Poulisse & Bongaerts, 1994).

A final analysis of how to understand and categorize grammatical errors comes from Ellis & Barkhuizen (2005:61):

1. Errors of omission: when the learner has left out a word e.g., "My sister happy."
2. Errors of addition: when the learner has added a word or an ending to another word which is grammatically incorrect e.g., "I have eated".
3. Misinformation/Substitution: when the learner uses the wrong form of a morpheme or structure e.g. when they use the wrong preposition in a sentence such as "It was the hardest time in my life".
4. Misordering: e.g. when the learner places a morpheme incorrectly in a grammatical construction such as "She fights all the time her brother".

5. Blends: when the learner is uncertain of which word to use and blends two different phrases e.g., “The only one thing I want”.

The evidence in the above studies point to the importance of the use of self-monitoring and self-evaluation to help students to improve their grammatical accuracy; however, a common problem with these studies lies in the difficulty of replication, with many of the procedures, materials, context (class size, time, level of students), and participants’ background (age, level), being too vague or generalized.

Fossilized Errors by Japanese EFL Learners

Research by Long and Hatcho (2018) had focused on the grammatical accuracy of Japanese EFL learners, with one aim being to see if English teachers can identify errors as being intralingual or interlingual, and which type of error was more common. From the Japanese University Student Corpus (JUSC) comprising of 61 transcripts containing 51,061 words, an inventory of errors was formed based on this corpus, which contained 400 errors in context.

The primary errors were incorrect use of articles (381), incorrect verb tense (162), incorrect use of prepositions (158), the omission of verbs (152), modifier errors (111), and incorrect subject-verb agreement (76), which indicated the commonality of particular errors and issue related to fossilization. In taking the analysis further, regarding intralingual and interlingual errors (the impact of L1 on error formation), it was found that 35% of the 400 errors that had been identified were deemed as being intralingual [859 responses], 51% were seen as interlingual [1233 responses], and 12.5% were undetermined [301 responses]. Likewise, Bryant (1984) stated that as for the types of errors that Japanese EFL learners, that research shows that articles, verb tense, prepositions, modifiers, and subject-verb agreement to be the most frequent errors made by Japanese EFL learners, indicating possible L1 interference.

The Study

Rationale

Questions remain about the kinds of fossilized errors. By examining the fossilized errors in two new corpora, (Monologic and Dialogic Corpus [MDC] 2019 and 2020) it would be possible to validate these preliminary findings and establish more consistent and reliable parameters of grammatical accuracy.

Research Questions

1. In comparing the two years of data, are there significant differences between the frequency of interlingual and intralingual fossilized errors?
2. In comparing the two years of data, are there significant differences between the two TOEIC groups regarding the frequency of fossilized errors?
3. Based on the two sets of data, do fossilized errors decrease significantly over an academic year? If so, which errors show the most improvement?

Participants and interviewing

There were 42 students who were interviewed for the first corpus MDC2019, and 29 for the second, MDC2020. For this study, 12 students were selected, six from the lower to intermediate proficiency range (210-450) and six from a higher TOEIC range (645-920). All of the participants were Japanese, aged 18 to 19, except for two foreign students who were Korean. The one outlier was a Japanese student who had lived in New Zealand for a number of years and had the highest TOEIC score of 985. University procedures and approval for the study was requested, granted, and followed, and all of the students agreed to be interviewed, to have their conversations transcribed and studied. Student consent was obtained, with the aims of the study being reviewed by a university committee beforehand. These participants were all engineering majors as the university is focused on this area of study. The sample size of the study is 12 students divided into two groups: high-proficiency group and low-proficiency group.

Students were called in one-by-one and in the interview and were given the background of the research study and permission forms in both Japanese and English.

Students were made aware that their monologues and dialogues were to be videotaped, transcribed, and used for research purposes. Participants knew they had the right to withdraw from the research once it started and that learning about their fluency and grammatical accuracy, it would benefit them in future interactions. Their names of the students were abbreviated in the final corpora that were uploaded to the research website.[3] Students were able to read the interview script out beforehand to avoid any lapses in comprehension that might impact the fluency data. The interview process began with them being asked to give a self-introduction monologue, which was then followed by a three-question dialogue with information about friends, family, and classes.

Corpora

42 Japanese students were asked to give a self-introduction monologue, which was then followed by a three-question dialogue in the MDC2019, whereas in MDC2020, there were 29 participants. The Monologic and Dialogic Corpus (MDC) 2019 has 20,368 words, and the MDC2020 has 16,997 words.

Data analysis

Data analysis involved an independent T-test was used for estimating the mean difference between the two groups of students in 2019 and 2020; the Mann-Whitney test was used for non-normally distributed independent variables. A paired T-test was used for estimating the mean difference between the two groups of students over the academic year 2019/2020 for normally distributed variables, whereas the Wilcoxon Signed-rank test was used for non-normally distributed variables. The continuous variables in the study were checked for normality using the Shapiro-Wilk test. All statistical analyses were performed in SPSS (version 25). Based on previous research (Long and Watanabe, 2020), fossilized errors were based on the following forms:

[3] Researcher's website: genderfluency.com

verb tense, verb agreement, verb usage, articles misuse, article omissions, prepositions, adjective/modifiers, phrasing and noun plurals.

Results

As for the first research question, interlingual errors were identified as including articles, plurals and prepositions since the Japanese do not have articles, plurals, and do rely on particles to connote placement and direction. Thus, errors relating to article usage and prepositions can be considered interlingual. Regarding significant differences between the frequency of interlingual and intralingual fossilized errors, a t-test showed no significant different $t(5) = .21$, $p < 0.844$ between these two kinds of errors.

As for the second and third research questions, results showed marginal improvement, if not an increase in error rates on most of the variables. In looking at the MDC2019 corpus, for the lower proficiency group, verb tense errors, verb agreement errors, verb usage errors, article deletions, preposition errors, adjective errors, adverb errors, general phrasing/wording, and nouns plurals tended to be fossilized, while for the higher proficiency group, preposition errors, adjective errors, general phrasing/wording, and nouns plurals were the most redundant errors.

In particular, descriptive statistics indicated that for the 15 participants for both corpora, that error-free clauses / 100 words decreased slightly while clauses with errors / 100 words increased by one additional clause. Global errors showed a significant decline, while local errors increased from 97 to 158 errors. For errors related to parts of speech, a t-test confirmed there was a significant difference (t (23) = 2.19366, $p < 0.0386$) between the two speech corpora with more error frequency occurring in the 2019 corpus. This data indicates that error formation remains high and that little awareness on the part of the student was taking place.

Table 1: Difference in grammar accuracy variables over the academic year 2019/2020 in the low-proficiency group

Group	Variable	Over the year	Mean	Mean difference	P-value
Lower	Total Errors	2019	14.8	-6.2	.048
		2020	21.0		
	Clauses with Errors/100	2019	3.9	.3	0.643
		2020	3.7		
	Clauses with Errors	2019	12.2	-4.0	0.125
		2020	16.2		
	Error Free Clauses/100	2019	15.0	6.6	0.048
		2020	8.4		
	Error Free Clauses	2019	42.2	19.5	0.012
		2020	22.7		
	Verb Tense Errors	2019	.8	-1.3	.082
		2020	2.2		
	Verb Agreement Errors	2019	3.7	.2	0.833
		2020	3.5		
	Verb Usage Errors	2019	1.0	-1.0	0.296
		2020	2.0		
	Articles Misuse	2019	.2	.2	0.363
		2020	.0		
	Article Deletions	2019	4.2	.5	0.831
		2020	3.7		
	Article Incorrect Insertion	2019	.0	0	0.0
		2020	.0		
	Preposition Errors	2019	2.7	.7	0.675
		2020	2.0		
	Adjective Errors	2019	.0	-.8	0.093
		2020	.8		
	Adverb Errors	2019	.0	-.3	0.175
		2020	.3		
	General Phrasing/wording	2019	1.0	-4.2	0.005
		2020	5.2		
	Nouns Plurals	2019	1.3	-.3	0.611
		2020	1.7		

Table 2: Difference in grammar accuracy variables over the academic year 2019/2020 in the high-proficiency group.

Group	Variable	Over the year	Mean	Mean difference	P-value
Higher	Total Errors	2019	17.7	1.0	0.882
		2020	16.7		
	Clauses with Errors/100	2019	3.1	.6	0.486
		2020	2.5		
	Clauses with Errors	2019	16.0	.7	0.912
		2020	15.3		
	Error Free Clauses/100	2019	10.2	.7	0.915
		2020	10.6		
	Error Free Clauses	2019	86.2	-22.5	0.363
		2020	108.7		
	Verb Tense Errors	2019	1.5	.7	0.484
		2020	.8		
	Verb Agreement Errors	2019	1.7	.8	0.185
		2020	.8		
	Verb Usage Errors	2019	1.7	.8	0.341
		2020	.8		
	Articles Misuse	2019	.7	.7	0.102
		2020	.0		
	Article Deletions	2019	4.8	3.0	0.091
		2020	1.8		
	Article Incorrect Insertion	2019	1.0	1.0	0.111
		2020	.0		
	Preposition Errors	2019	1.5	.2	0.872
		2020	1.3		
	Adjective Errors	2019	.0	-.8	0.259
		2020	.8		
	Adverb Errors	2019	.0	0	
		2020	.0		
	General Phrasing/wording	2019	3.0	-4.8	0.157
		2020	7.8		
	Nouns Plurals	2019	1.5	-.8	0.341
		2020	2.3		

Table 3. Phase 3 Analysis: Global / Local Errors and Fossilized Errors

	MDC2019 20,368 words		**MDC2020 16,997 words**	
	Total	%	Total	%
Fossilized Errors	266	1.31	120	0.71
Verb tense errors	14	0.07	5	0.03
Verb agreement errors	31	0.15	14	0.08
Verb usage errors	10	0.05	1	0.005
Article omissions (*the*)	51	0.25	23	0.14
Article omissions (*a*)	86	0.42	38	0.22
Preposition errors (*to*)	17	0.06	6	0.04
Preposition errors (*at*)	8	0.04	0	0
Preposition errors (*in*)	5	0.02	0	0
Prepositions errors (*around/under*)	0	0	0	0
Preposition errors (*f*or)	3	0.014	1	0.005
Preposition errors (*about*)	1	0.004	2	0.011
Prepositions errors (*with*)	5	0.02	1	0.005
Prepositions errors (*on*)	1	0.004	1	0.005
Prepositions errors (*from*)	0	0	3	0.02
Adjective / modifier errors	7	0.03	3	0.02
Possessive Pronoun errors	3	0.01	4	0.02
Phrasing errors (insertions/word order)	7	0.03	8	0.05
Possession not marked	8	0.04	2	0.011
Noun (Plural) errors	7	0.03	3	0.011

Note: A fossilized error is defined as an error that has been repeated three times in different transcripts.

Further investigation examined specific cases and examples of fossilized errors. Data revealed that for verb tense, students had specific problems with *choose/chose*, and *belong/belonged,* and for verb agreement students had problems with *like, dislikes, lives, works, and is/are.* As for verb usage, students had problems with infinitives and gerunds, *I want built, I was belong, my mother working*. For the MDC2019 corpus, for article deletions involving the article *the,* there were 52 cases whereas in the MDC2020 corpus, there were 23; likewise, for the omission of *a*, for the 2019 corpus, there were 86 cases and 38 cases in 2020.

Preposition errors focused on the use of *to* (2019, 17 cases; 2020, 6 cases), *of* (2019, 1 case, 2020, no cases), *at,* (2019, 8 cases; 2020 0 cases), *in* (2019, 5 cases; 2020 0 cases), *for* (2019, 3 cases; 2020 1 cases) (2019, 5 cases; 2020 1 case) *on* (2019, 1case; 2020 1 case), and *from* (2019, 0 cases, 2020 3 cases). In regard to adjectives, students had issues with comparatives and superlatives (*more old*) and usage (*little women*) along with the use of *many* (*many difficult*). Phrasing errors involved missing or inserted words / word order (MDC2019, 7 cases; MDC2020, 8 cases) along with problems with possession, marked by apostrophes (MDC2019, 8 cases; MDC2020, 2 cases). For these participants, errors with noun plurals were based on words *machine,* and the word *subject.* Thus, the most improvement that was shown related to verb tenses, verb agreement, verb usage, prepositions, and, to some degree noun plurals.

Discussion

The data confirms that fossilized errors tend to be based on verb agreement, articles (omissions based on *the* and *a*), prepositions, (*to, for, with*) adjectives, possessive pronouns, and phrasing. Concerning the types of errors that Japanese EFL learners often make, the data confirms previous research and the experience of many educators, e.g. (Bryant, 1984) that articles, verb tense, prepositions, modifiers, and subject-verb agreement are the most frequent fossilized errors made by Japanese EFL learners. This data also shows that not all fossilized errors are alike in regard to frequency, and semantic impact; teachers should take into account the level of difficulty of each kind of error, with phrasing being the most problematic. Demir (2019) noted "the effectiveness of any error correction method changes on the number of factors, instruction content, students' proficiency, motivation and, of course, the students linguistic background, so results can vary dramatically.

Thus, educators need to bypass the traditional way of grammar instruction of randomly addressing various forms in one chapter, and providing tasks, to one in which errors are systematically and continuously taught throughout the year, looking at ever-increasingly complex forms and usage. By relying on specific grammar strands and clusters (Byrd, 1997), fossilized errors could be substantially reduced. Teachers could then examine how grammatical forms cluster and impact meaning in a variety of communication, emails, speeches, dialogues, monologues, and in technical English. Specifically, clusters such as verb-phrase + prepositions combinations should be examined along with how nouns (plurals) affect verb agreement. Furthermore, teachers could provide various kinds of clusters of articles + adjectives + nouns function in dialogues and then in emails, as well as have students take on increasingly complex phrasing.

A series of developmental grammar correction tasks in a second-person roleplay is one innovative step that can help teachers to spot errors in the classroom. Such tasks would allow for students' answers to various questions, opinions, and ideas, so teachers can provide more relevant feedback that pertains to the students' own needs as they write and then rehearse their roleplays. Teachers will have to rely on various kinds of explicit and implicit learning mechanisms that require both copious input and output.

Nonetheless, it was clear from this study that many errors were being repeated several times. Educators should instead focus on the most common errors throughout the course, paying attention to a variety of contexts, again with increasing levels of complexity. It is also important for English teachers to realize the impact of L1 on EFL: teachers should be aware that prepositions in English, like particles in Japanese, take some time to understand and to use insofar that many are related to idiomatic usage. Further research could diversify data collection tools (incorporating online grammar checkers and dictation tools) and include different instructional contexts such as meaning-focused versus form-focused to test the effectiveness of various types of error correction across different contexts. More innovative tasks can include (a) sentence completions with increasingly longer and more complex syntax and punctuation marks, (b) having students select particular meanings based on a prompt in a second-person roleplay in which they are placed, and (c) identifying and correcting grammatical errors in dialogues and speeches.

Conclusion

This research examined university-level first-year Japanese EFL students to better understand the context in which they are making errors and the frequency over the course of an academic year. Data was collected from two corpora, the Monologic and Dialogic Corpus (MDC) 2019 has 20,368 words, and 42 subjects, and the second corpus MDC2020, which has 16,997 words and 29 participants. Errors in the 2019/2020 corpora were identified and then coded for frequency; results showed the following fossilized errors: articles deletions (92/94), prepositions (39/43) plurals (54/55), subject-verb agreement (85/46), and general wording (60/69). However, in looking at clauses with errors/100 words, there were 5.29 errors in the 2019 corpus, whereas, in the 2020 corpus, there was a slight improvement of 3.35 errors/100 words, indicating that marginal progress was made.

The data in this paper indicates that currently, students are seemingly unaware of the kinds of errors they are making in their spontaneous speech. Due to constraints that come with class sizes, educators are often ill-equipped to identify them and to provide real-time feedback to these students, thereby allowing many errors to become fossilized. In short, more innovative research needs to be made into error analysis, especially as to how errors become fossilized in the first place, the frequency of their occurrence, possible differences in the production of their oral and written expression, and which techniques are the most effective in addressing them. The results will make a significant contribution to the theoretical consciousness-raising applied linguistics and all language practitioners.

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Development and Validation of Questionnaire on Self-Regulated Learning Strategies in Online Learning Environment

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Abstract
Covid-19 has resulted in a sudden shift in education settings, from face-to-face to online learning sessions. In view of this major change, it is necessary to study students' self-regulation strategies in an online environment to enable the teachers to develop online materials that will guide students to become successful in their learning. This study aimed to develop and validate a questionnaire on students' self-regulated strategies in an online learning setting. The instrument was named questionnaire on self-regulated learning in an online learning environment (QSROLE). QSROLE consists of 17 items that describe the measure of students' self-regulation strategies in a digital learning environment. A total of 226 students served as respondents. The students' responses were based on a 4-point scale ranging from 1 (Strongly Disagree) to 4 (Strongly Agree). Results from the exploratory factor analysis provided evidence for the four-factor self-regulated learning strategies with KMO coefficient and Bartlett's Sphericity value of .905 and .000, respectively, and total variance of 58.207%. Further, internal reliability had an acceptable level based on the Cronbach's alpha coefficient of .840 for Factor 1 (Establishing Self-Study Strategies); .765 for Factor 2 (Managing Structured Learning Environment); .744 for Factor 3 (Exercising Time Management); and .612 for Factor 4 (Setting Online Learning Goals). Results indicate that QSROLE is an acceptable and valid measure of students' self-regulation in the online learning environment.

Keywords: Self-Regulated Learning Questionnaire, Learning Mathematics, Online Learning

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Introduction

The COVID-19 pandemic has changed the globe and has altered many aspects of human activities. Therefore, it resulted in profound effects on the economic, political, cultural, and even educational environments of societies worldwide. There has been a shift from traditional classes into online learning.

The universities in the Philippines had to adapt to the different socioeconomic status of the students. They cannot provide courses on a fully online modality as many Filipino students present many challenges since the reopening of classes due to lack of devices and unreliable internet services. These challenges lead to the promotion of flexible learning to education institutions, both private and public, in the country. The teachers transferred to alternative teaching modalities focusing on both synchronous and asynchronous based on the students' capacity.

Regardless, the rapid promotion of online development provides a supplement to a traditional educational format. The study of Barnard, Lan, To, Paton, and Lai (2009) identified the distinctive role of students' autonomy in the online learning environment. The students in this setting have the freedom to move from one learning matter to another without any limitations in terms of prearranged instruction or sequence. This relates to the self-regulation of students as one of the essential variables for the performance of online learning.

Barry Zimmerman, one of the most prolific researchers on self-regulated learning, defines self-regulation as not a mental ability nor academic skills but more of becoming aware of one's knowledge, motivation, and behavior so that the learner can employ that awareness applicably (Weimer, 2010). The students with self-regulation participate actively in their learning as they become responsible for their learning objectives and appropriate strategies to realize those objectives. That is, the student develops approaches to deal with their learning process.

Academic skills, such as expertise in mathematics, necessitate numerous hours of practice. Students need chances or opportunities to practice and to cultivate their learning strategies on their own. Empirical researches showed that Self-regulatory learning strategies was correlated with students' academic performance. The study Cleary et al. (2017) and Desoete et al. (2003) stated that the SRL intervention increases middle school students' mathematics success and performance. Similarly, Flavel (1971) mentioned that metacognition is one of the components of self-regulation. In the study of Stephens and Underwood (2008), they stated that self-regulation comprises not only regulating the learners' cognitive aspect but also their emotional and motivational practices.

Technology, depending on the types of delivery, plays a crucial role in students' learning progress. That is, when referring to self-regulation for online learning, the impact of technology has been taken into account instinctively. Compared to the conventional teacher-centered classroom setting, online learning is more student-centered, and students take on more responsibilities, especially in asynchronous learning environments.

In online mathematics education, the concept of self-regulated learning is also discussed. The study of Fung. et al. (2021) clearly supports the importance of online learning as a tool for all students of all ages to encourage mathematical progress. They stated that this new way of communicating with mathematics played a crucial role in engaging the students. In particular, students' mastery of mathematical concepts and skills involves students connecting and seeing the relationships of each information to create a deeper understanding (Haylock, 2010). In terms of efficient online classes, the online environment provides an environment to deliver mathematics programs where students will learn by themselves while communicating with their instructors.

However, when students do not have the same capacity to cope with the knowledge they are given or know how to learn with limited instruction, the educational activities in an autonomous learning setting can be daunting for the unprepared learner. If the students cannot self-regulate, the knowledge provided to them, most specifically in Mathematics, might not be adequate. In the online environment, the lack of students' self-regulation may misinterpret the autonomy in digital learning. Therefore, the researcher believed that it is important to study self-regulation in an online setting to allow students to succeed in learning mathematics. This may allow the students to regulate their learning as they utilize their strengths and improve their weaknesses. With this, there have been many attempts to explore how to measure students' self-regulated learning.

There are various ways in which self-regulated learning has been measured empirically. The Motivated Strategies for Learning Questionnaire (MSLQ) was developed to assess the types of learning strategies and students' academic motivation. However, Cho and Summers (2012) discussed that additional works are needed to use this instrument for distance learning as it was designed for face-to-face education. Barnard et al. (2009) addressed the need for measuring self-regulation in a blended learning environment. Their instrument is named Online Self-Regulated Learning Questionnaire (OSLQ) and comprises 24 items under six different factors; Goal setting, Environment Structuring, Task Strategies, Time Management, Help-Seeking, and Self-evaluation. This study also examined the relationship between self-regulated learning and academic performance in pure online courses. Similarly, Kocdar et al. (2018) aimed to measure self-regulation in self-paced, open, and distance learning environments. Their instrument involves five factors: goal setting, Help-Seeking, Self-study strategies, Managing physical and environment, and Effort regulation on a 30-item scale.

Nevertheless, it is also important to better understand students' SRL strategies in a flexible digital learning environment in learning mathematics. Since students learn not only in one setting but in an environment containing different possibilities covering the teaching and learning process; specification of the task, support in the learning process, and giving feedback (Schunk & Ertmer, 1999; Perry, Fisher, Caemmerer, Keith, & Poklar, 2015; Pérez-Álvarez, Maldonado-Mahauad, Sapunar-Opazo, & Pérez-Sanagustín,2017) may be assimilated either in synchronous or asynchronous online settings, as some of the online activities may be accessed with the Internet and some activities are for asynchronous or self-paced learning, the notion of learning self-regulation concentrates on the students' activities, planning, monitoring, and evaluating their learning (Stephens and Underwood 2008). The literature confirmed different attributes of learning self-regulation. These defined points enable the researchers to

expedite an instrument that will measure the learners' self-regulatory strategies in a flexible online learning environment.

In this regard, this research aims to develop and validate the Questionnaire on Self-Regulation in Online Learning Environment (QSROLE). This study was conducted to address the students' self-regulation strategies in learning mathematics under flexible online settings. This research aimed to measure the learners' self-regulated strategies in a flexible online mathematics course. With this, educators can promote self-regulation strategies and develop more comprehensive online students' programs in the flexible online learning environment.

Methods

This study aimed to validate a questionnaire to measure students' self-regulation in learning mathematics in a digital environment. The researchers used Exploratory Factor Analysis. This statistical method is used to increase the observed scale's reliability by classifying unfitting items removed from the instrument. The dimensionality of constructs is also identified by analyzing relations among the items (Yu & Richardson, 2016). Yong and Pearce (2013) mentioned that EFA is useful to recapitulate relationships and patterns in the data. The instruments' items were based on literature that defined the key attributes for supporting self-regulation in an online environment. Some selected items were adapted from the instruments developed by Barnard et al. (2009) and Kocdar et al. (2018).

Participants

Two hundred twenty-six students participated in this study, and their level of education included Basic Education (37.6%), Tertiary Level (54%), and Graduate School Level (8.4%). One hundred and sixty-two female students (71.7%) and sixty-four (64%) male students participated. The majority of the participating students in this study were between 18-20 years old (74.3%).

Concerning the number of hours allotted for online learning, 39.4% answered between 0.5-2 hours of studying. Therefore, from the descriptive statistics, one may conclude that most of the students are doing their activities both in synchronous and asynchronous systems.

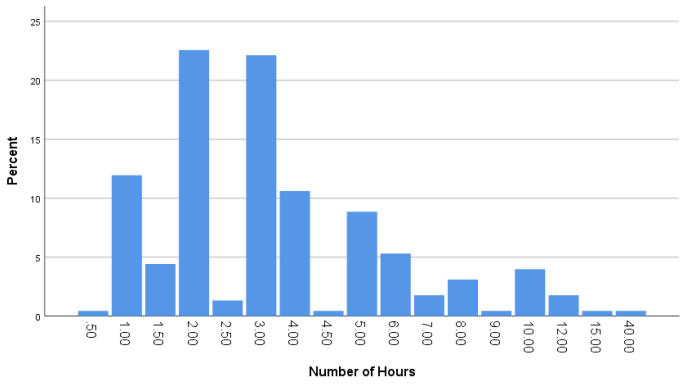

Figure 1: Number of Hours allotted for Online Learning in Mathematics

Measures

The Questionnaire on self-regulation in the online learning environment (QSROLE) is initially a thirty-item self-report measure specifically developed to measure the students' self-regulated strategies, emphasizing learning mathematics in a digital learning setting. The QSROLE is scored by a four-point Likert scale (4=Strongly Agree, 3=Agree, 2=Disagree, and 1= Strongly Disagree). A high score signifies a better evaluation of self-regulation in an online learning environment than low scores.

Research Question

The study set out to answer the following question:
What are the underlying dimensions of the Questionnaire on self-regulation in the online learning environment (QSROLE)?

Results

An Exploratory Factor Analysis was performed on the 30-items with a Promax Rotation using SPSS Version 25. A total of 226 students participated in the survey. There are no missing values from the gathered data.

The researchers run the initial analysis to obtain the eigenvalues for each factor in the data. The Kaiser-Meyer-Olkin (KMO) and Bartlett's test establishes if the obtained data are appropriate for the factor analysis. The KMO coefficient indicated whether the sample size was suitable. While Bartlett's test results, if found to be significant, denote that the obtained data set was suitable for Exploratory Factor Analysis.

The Promax Rotation is a non-orthogonal rotation that allows correlated factors. As a result of the initial rotation, eight obtained factors were 63.635% of the total variance. Then, the communalities lower than 0.40, and the cross-loadings with primary loadings lower than 0.20 than the secondary on the other factors were noted (Howard, 2015). The items excluded from the measures were 2nd,3rd, 4th, 5th, 6th,7th, 9th,18th, 22nd, 25th, 26th,27th,29th. The factor analysis again observed the changes where the KMO and Bartlett Sphericity significant values of the scale (four factors) then became .905 and .000, respectively, and the total variance was 58.207%. The Bartlett's test and the KMO value results are presented in Table 1.

Table 1: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.905
Bartlett's Test of Sphericity	Approx. Chi-Square	2842.733
	df	435
	Sig.	0.000

Meanwhile, the figure below shows that the breakpoint appeared after the 4th factor, hence this implies that there will be a four-factor scale.

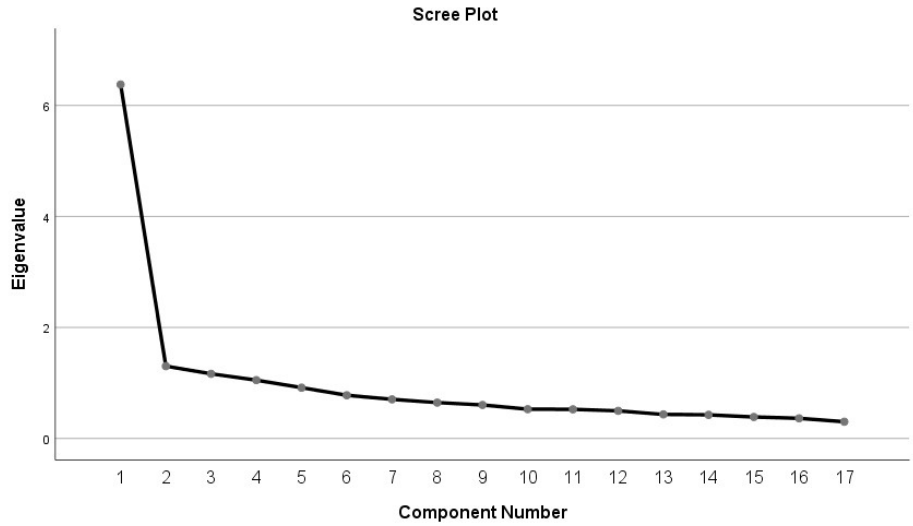

Figure 2: The Scree Plot indicating the number of factors

Table 2: Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings[a]
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	6.377	37.511	37.511	6.377	37.511	37.511	5.302
2	1.303	7.663	45.173	1.303	7.663	45.173	4.279
3	1.165	6.850	52.024	1.165	6.850	52.024	3.203
4	1.051	6.183	58.207	1.051	6.183	58.207	3.567
5	0.915	5.380	63.587				
6	0.778	4.577	68.164				
7	0.705	4.146	72.310				
8	0.646	3.799	76.109				
9	0.603	3.548	79.658				
10	0.527	3.102	82.760				
11	0.525	3.086	85.846				
12	0.497	2.925	88.770				
13	0.433	2.546	91.316				
14	0.425	2.501	93.818				
15	0.387	2.278	96.096				
16	0.363	2.134	98.230				
17	0.301	1.770	100.000				

Correspondingly, Table 2 shows that a four-factorial structure explained 58.207% of the total variance. Broadbent and Poon (2015) confirmed in SRL meta-analysis in online learning settings that academic achievement is strongly and positively related to SRL strategies. They have concluded that students with good Time Management, who are aware of their learning behaviour, who are logical thinkers in the class content, and who persevere in their comprehension of the course materials are more likely to succeed in the online learning world.

Moreover, Artino (2007) and Puzziferro (2008) revealed that Task value, Metacognition, Rehearsal, and Study environment were one of the predictors for self-regulated learning in online settings.

Hence, the identified four factors in the QSROLE were Establishing Self-Study Strategies, Managing Structured Learning Environment, Exercising Time Management, and Setting Online Learning Goal. The intercorrelations among their values and the distribution of 17 items across the four factors were presented in the table below.

Table 3: Rotation of the variables

	1 (Establishing Self-Study ...	2 (Managing Structured	3(Exercising Time Manage...	4(Setting Online Learning Goals)
21. I draw up draft of reading material to be able to organize my thoughts.	0.888			
16. I summarize my learning in the subjects to understand what I have learned from the lessons.	0.704			
24. I think of the questions on the subject while reading the material.	0.696			
28. I ask myself questions about what I am to study before I begin to learn.	0.686			
23. I organize my study time to accomplish my goals to the best of my ability.	0.652			
19. I have a regular place to study.	0.487			
30. I know when I need to learn more about something.	0.474			
15. I find someone who is knowledgeable in course content so that I can consult with him or her when I need help.		0.778		
12. I communicate with my classmates to find out what I am learning that is different from what they are learning.		0.740		
11. I choose the location where I study to avoid too much distraction.		0.716		

17. I choose a place with few distractions for studying for my online courses.	0.666		
14. I try to schedule the same time every day or every week to study for my online courses, and I observe the schedule.		0.871	
13. Although we don't have to attend daily classes, I still try to distribute my studying time evenly across days.		0.666	
10. I allocate extra studying time for my online courses because I know it is time-demanding.		0.526	
1. I set standards for my assignments in online courses.			0.814
8. I keep a high standard for my learning in my online courses.			0.708
20. I determine what I will ask before receiving help.			0.573

The researchers performed item analysis to identify the internal reliability of each four factors. Taber (2016) and Ahdika (2017) stated that reliability coefficients higher than 0.70 could be regarded as reasonable and adequate and 0.40-0.60 as quite reliable. The Cronbach's alpha coefficient of each factor in this study was found close to be .840 for Factor 1 (Establishing Self-Study Strategies); .765 for Factor 2 (Managing Structured Learning Environment); .744 for Factor 3 (Exercising Time Management); and .612 for Factor 4 (Setting Online Learning Goals). Considering the following coefficients, it was clear that the scale also had an acceptable level of reliability based on the factors.

Table 4: Cronbach's Alpha for Factor of the QSROLE

	Cronbach's alpha	Number of items
Establishing Self-Study Strategies	0.840	7
Managing Structured Learning Environment	0.765	4
Exercising Time Management	0.710	3
Setting Online Learning Goals	0.612	3

Conclusion

Online learning created an immense impact for Filipino students. Environmental and learning autonomy as a form of educational changes relates to support for students' self-regulatory ability. Considering the potential advantages of learning online, the assurance of the digital learning settings indicates a need to measure students' self-regulation in learning mathematics. This helps teachers develop online resources and materials that will guide learners to become effective in their online learning.

The study resulted in the Exploratory Factor Analysis, which gives a four-factor structure of the instrument measuring the students' self-regulation in the Online Learning Environment. Seventeen items have remained, and each factor has some acceptable reliabilities.

As a direction for future research, it is proposed to do this study with students from other universities across the country to overcome statistical sampling bias for further validation. The Confirmatory Factor Analysis is also recommended as the second phase of this instrument.

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Appendices

Questionnaire on Self Regulation in Online Learning Environment (QSROLE)

Establishing Self-Study Strategies

1. I summarize my learning in the subjects to understand what I have learned from the lessons.
2. I have a regular place to study.
3. I draw up draft of reading material to be able to organize my thoughts.
4. I organize my study time to accomplish my goals to the best of my ability.
5. I think of the questions on the subject while reading the material.
6. I ask myself questions about what I am to study before I begin to learn.
7. I know when I need to learn more about something.

Managing Structured Learning Environment

1. I choose the location where I study to avoid too much distraction.
2. I communicate with my classmates to find out what I am learning that is different from what they are learning.
3. I find someone who is knowledgeable in course content so that I can consult with him or her when I need help.
4. I choose a place with few distractions for studying for my online courses.

Exercising Time Management

1. I allocate extra studying time for my online courses because I know it is time-demanding.
2. Although we don't have to attend daily classes, I still try to distribute my studying time evenly across days.
3. I try to schedule the same time every day or every week to study for my online courses, and I observe the schedule.

Setting Online Learning Goals

1. I set standards for my assignments in online courses.
2. I keep a high standard for my learning in my online courses.
3. I determine what I will ask before receiving help.

A Correlational Investigation into Sub-skills of Reading Comprehension: Evidence from Thai-READS

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Abstract
A standardized test of English reading comprehension is typically well-constructed to permit a reliable classification of different achievers e.g., high, moderate and low. The Thai-READS or Thai Reading Evaluation and Decoding System is one of the tools used to trace the EFL undergraduate students' reading comprehension abilities. The test system of the Thai-READS had been designed to show the abilities of students in reading comprehension with three sub-skills, namely, Literal, Reorganization, and Inferential. The sub-skills have been proved to have correlation with each other but lack of tangible evidence has shown. However, it also has a strength to illustrate students' abilities in each sub-skill with three levels of difficulty e.g., low, moderate, and high. The need to take a closer look at relationships in different levels of difficulty in each sub-skill is a missing gap the area of language assessment. With the functional availability in the Thai-READS, therefore, this study aims to investigate correlations of three levels of difficulty within each sub-skill. This research was conducted with 190 English-majored undergraduate students at one public Thailand university in Bangkok. The main research instrument is the Thai-READS which was adapted for cultural-bias reduction. The participants took the Thai-READS via online system. The Pearson correlation was used to analyse the data. The results revealed that there were significant correlations between the three sub-skills. The three levels in Inferential sub-skill showed significant correlations. However, the three levels in Literal and Reorganization sub-skills had significant and insignificant correlations.

Keywords: Thai Reading Comprehension Evaluation and Decoding System (Thai-READS), Reading Comprehension, Literal, Reorganization, Inferential

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Introduction

Reading comprehension is considered as the vital component of the reading process (Gilakjani & Ahmadi, 2011). Several studies support great attention to assessing reading comprehension of the English language learners. Duke and Pearson (2009) raise the importance of reading comprehension explaining that both academic and professional success of an individual's life commonly relate to reading comprehension skills. In the process of reading comprehension, a writer encodes thought to language and a reader decodes language to thought. A current view of reading process perceives reading comprehension as a special kind of reading process (Jang, Dunlop, Park, & Van Der Boom, 2015). Having known to complicated process of comprehension, some theories perceive a wide-angle view of reading comprehension in goal term, while others try to distinguish them into different levels of separable sub-skills. Therefore, to expand our understanding of the students' abilities in reading comprehension with three sub-skills, this study will provide a fresh window to measure the undergraduates' English reading comprehension ability using a Thai version of READS (Thai-READS). With the functional availability in the Thai-READS, it aims to investigate correlations of three levels of difficulty within each sub-skill namely, literal, reorganization and inferential.

The findings of this study could inform whether the development of the Thai-READS could illustrate students' abilities in each sub-skill with three levels of difficulty e.g., low, moderate, and high as well as determine the relationships in the three different levels of difficulty in each sub-skill of reading comprehension.

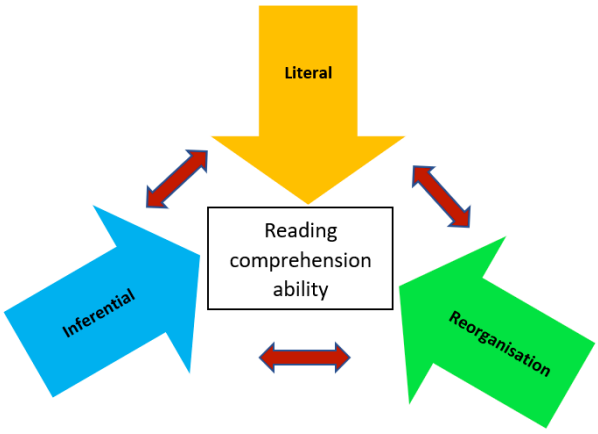

Figure 1: Correlations between Literal, Reorganization, and Inferential sub-skills in Reading Comprehension

Sub-skills of Reading Comprehension

The contribution in Benjamin Bloom and his associates' work in the Blooms Taxonomy, Barrett developed a taxonomy to analyze the cognitive and affective domains of reading comprehension. In terms of reading comprehension, the taxonomy developed by Barrett's (1968) assists EFL students to comprehend the text. According to Barrett (1968), five types of skill categories include (i) Literal, (ii) Reorganization, (iii) Inferential, (iv) Evaluation, and (v) Appreciation. They are very important for students to understand each genre of text. With regard to the objectives

of the study, however, the present study focuses on three sub-skills of reading comprehension which are (i) Literal; which concentrates on concepts and information unambiguously stated in the text, (ii) Reorganization; in which the reader is required to be able to evaluate, synthesize and establish concepts or information that are explicitly indicated in the text, and (iii) Inferential; in which the reader's ability to predict outcomes and interpret figurative language is also required at this level (Mohamed, Lin, & Ismail, 2010).

Research Objectives

The present study aims at determining correlations between Literal, Reorganization and Inferential sub-skills in reading comprehension as well as correlations between high, moderate and low levels in each sub-skill. This study is conducted with the main aim to provide answers for the following research questions.

Research Questions

Two main research questions (RQs) in this study include:
RQ1: Is there a statistically significant correlation between Literal, Reorganization and Inferential sub- skills in reading comprehension?
RQ2: Is there a statistically significant correlation between high, moderate and low levels in each sub- skill of reading comprehension?

Hypotheses

Null hypotheses (H_0) for the two corresponding research questions are formulated as follows:
$H_0$1: There is no statistically significant correlation between Literal, Reorganization and Inferential sub-skills in reading comprehension.
$H_0$2: There is no statistically significant correlation between high, moderate and low levels in each sub- skill of reading comprehension.

Research Methodology

The present study used quantitative research design to collect the participants' score in reading comprehension assessed by the Thai-READS. Descriptive statistics was used to present the participants' demographic information (i.e., gender, years of study, and age) while inferential statistics using the Pearson Correlation was used for the main data analysis to answer the two research questions and to decide whether reject or fail to reject the null hypotheses. The significant levels in the analysis of the Pearson Correlation were set at 0.05 and 0.01 respectively. Directions of correlation of two variables can be positive and negative with different levels of strength. Following Phakiti's (2014) criterion, there are seven levels of correlational analysis; 1.00-0.90 (Very Strong), 0.89-0.80 (Strong), 0.79-0.70 (Fairly Strong), 0.69-0.50 (Moderate), 0.49-0.30 (Fairly Weak), 0.29-0.20 (Weak), and 0.19-0.10 (Very Weak).

Participants

The participants were 190 English-majored undergraduate students in the Faculty of Liberal Arts at one public university in Bangkok, Thailand whom were chosen by

purposive sampling. There were 44 males (23.20%) and 146 females (76.80%) participating in the present study. They were made up of 58 first-year students (30.50%), 56 second-year students (29.50%), 58 third-year students (30.50%) as well as 18 fourth-year students (9.50%). Their average age at the period of data collection was 20 years old.

Research Instrument

The Thai-READS adapted by Khemanuwong, Mohamed, and Ismail (2018) was used to determine the Thai undergraduates' reading comprehension ability. It can be explained with three components of the Thai-READS– the encoder or the test instrument, the reading matrix and the decoder or the performance standard. The encoder comprises 60 multiple-choice questions to measure the test-takers' reading comprehension proficiency. The decoder determines the performance of the test-takers based on their given answers as shown in Figure 2.

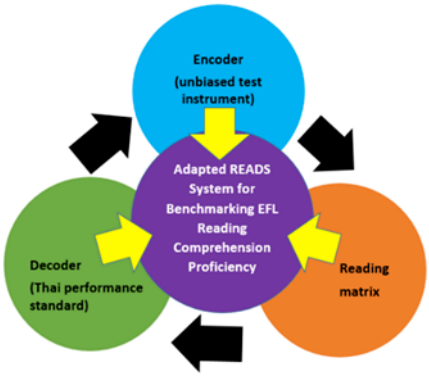

Figure 2: Thai Reading Evaluation and Decoding System (Thai-READS)

According to Boopathiraj and Chellamani (2013), questions in a test should indicate a level of difficulty. In the Thai-READS test, 60 questions are distributed proportionately with three difficulty levels, namely, easy (25%), average (50%) and difficult (25%) (Mok, 2000), as well as with three sub-skills, that is, literal, reorganization, and inferential. Moreover, they are incorporated in the Malaysian public examination to fulfill the requirements of reading comprehension section and are also based on Barrett's taxonomy of reading comprehension (Lim, Eng, & Mohamed, 2014). The study of Hui, Saeed, and Khemanuwong (2020) which used the Thai-READS to examine 751 Thai engineering freshmen suggested that the Thai-READS is applicable to assess university students' reading performance at any levels.

In line with the reading matrix, this component acts as a cross-reference for the analysis of the test-takers' reading comprehension ability in which the test-takers would be classified as "Below Standard" or "Academic Warning". The Thai-READS also could illustrate students' abilities in each sub-skill with three levels of difficulty (e.g., low, moderate, and high). By administering the test to the EFL students, the analysis of the reading comprehension ability could provide insights on which specific sub-skills of reading comprehension that the students would need to improve (Khemanuwong, Hui, Mohamed, Ismail, Saeed, & Uampittaya, 2020).

Data Collection Procedure

The onset of data collection, the researchers requested an official permission from the university and the participants' consent for their participation. The steps taken to ensure an ethical consideration in conducting this research. Before the participants took the test, the researchers conveyed a brief orientation session presenting the main purpose of the research. The participants were informed that their information was kept confidential and anonymous and used for research purpose. Anonymity was used in test results of the participants. During the test, the procedures in using the Thai-READS followed a guideline of time allocation in Mohamed et al.'s (2010) study which provided 70 minutes for test-takers to complete the test. One of different sets of the test was assigned randomly to each participant.

Research Findings

The first research question investigated whether there was a statistically significant correlation between the three sub-skills in reading comprehension. The results in Table 1 show the three sub-skills were significantly correlated with each other in positive directions. Correlations in literal sub-skill with reorganization sub-skill (r=0.251) and inferential sub-skills were r=0.251 (weak level) and r=0.301 (fairly weak level), p<0.01. Moreover, reorganization sub-skill showed moderate correlation with inferential sub-skill, r=0.504 (moderate level), p<0.01. Hence, the first null hypothesis was rejected.

Table 1: *Results of Correlations between the Three Sub-skills in the Thai-READS*

Sub-skills		Literal	Reorganization	Inferential
Literal	Pearson Correlation	1	0.251**	0.301**
	Sig. (2-tailed)		0.000	0.000
Reorganization	Pearson Correlation	0.251**	1	0.504**
	Sig. (2-tailed)	0.000		0.000
Inferential	Pearson Correlation	0.301**	0.504**	1
	Sig. (2-tailed)	0.000	0.000	

Note. ** Correlation is significant at the 0.01 level (2-tailed).

The second research question aimed to find a significant correlation in three levels in each sub-skill of reading comprehension. As shown in Table 2, the results indicate that there was no significant correlation in the three levels in Literal sub-skills. The findings showed that moderate and low levels in Literal sub-skill was significantly correlated in a positive direction, r=0.156 (very weak level), p<0.05. On the other hand, the results indicate that high and moderate levels (r=0.062), high and low levels (r=−0.005) in Literal sub-skill were not significantly correlated with each other, p>0.05.

Table 2: Results of Correlations between the Three Levels in Literal Sub-skill

Levels		High	Moderate	Low
High	Pearson Correlation	1	0.062	-0.005
	Sig. (2-tailed)		0.394	0.950
Moderate	Pearson Correlation	0.062	1	0.156*
	Sig. (2-tailed)	0.394		0.032
Low	Pearson Correlation	-0.005	0.156*	1
	Sig. (2-tailed)	0.950	0.032	

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

Furthermore, the results in Table 3 reveal that high and moderate levels (r=0.298), moderate and low levels (r=0.238) in Reorganization sub-skill were significantly correlated in a positive weak direction, p<0.01. In contrast, low and high levels (r=0.015) were not significantly correlated in Reorganization sub-skill, p>0.01.

Table 3: *Results of Correlations between the Three Levels in Reorganization Sub-skill*

Levels		High	Moderate	Low
High	Pearson Correlation	1	0.298**	0.015
	Sig. (2-tailed)		0.000	0.840
Moderate	Pearson Correlation	0.298**	1	0.238**
	Sig. (2-tailed)	0.000		0.001
Low	Pearson Correlation	0.015	0.238**	1
	Sig. (2-tailed)	0.840	0.001	

Note. ** Correlation is significant at the 0.01 level (2-tailed).

In Inferential sub-skill, the results in Table 4 show the three different levels were significantly correlated with each other in a positive direction; high and moderate (r=0.324; fairly weak level), low and high levels (r=0.295; weak level) as well as low and moderate levels (r=0.342; fairly weak level), p<0.01. To sum up the findings for the second research question, therefore, the second null hypothesis was also rejected.

Table 4: *Results of Correlations between the Three Levels in Inferential Sub-skill*

Levels		High	Moderate	Low
High	Pearson Correlation	1	0.324**	0.295**
	Sig. (2-tailed)		0.000	0.000
Moderate	Pearson Correlation	0.324**	1	0.342**
	Sig. (2-tailed)	0.000		0.000
Low	Pearson Correlation	0.295**	0.324**	1
	Sig. (2-tailed)	0.000	0.000	

Note. ** Correlation is significant at the 0.01 level (2-tailed).

Conclusion

The key findings in the present study imply the conclusion which is can be separated into two main viewpoints based on the two research questions. Firstly, three sub-skills of reading comprehension among the participants' scores were significantly correlated. Secondly, the three levels in each sub-skill were significantly and insignificantly correlated. That can infer that the participants who was able to give correct answer for high difficulty level items might not give the correct answers for moderate or low difficulty level items. Although this study was subject to the English-major participants, the findings of the study have implications for both assessing and diagnosing undergraduates' English reading comprehension abilities. The findings are useful not only undergraduates themselves to self-perceive their abilities but also lecturers to understand their learners' performance in English reading comprehension. This is hoped to bring up more effective teaching and learning in English language classroom in Thai higher education at university level. Different teaching strategies should be promoted to improve sub-skills of reading comprehension with different levels of difficulty. It is cautious to make a generalization of the findings to other learning contexts with general English language learners since the number of the participants in this study was small and they studied in English major. Thus, their familiarity with the exposure of English usage may affect their performance in reading comprehension.

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The Role of Administrators in Facilitating the Implementation of Tokkatsu in EJS: Learning from EJEP Trainees' Practices towards Egypt Vision 2030

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Official Conference Proceedings

Abstract
This proposal is part of an ongoing research that started in 2019 by an analysis of the first batch of trainees of Egypt-Japan Education Partnership (EJEP). It is a partnership for a professional development training program that was established between Egypt and Japan in 2016. This program is based on Japan's holistic educational curriculum model, known as "Tokkatsu" or literally translated to special activities. A comparison of the program's modifications and developments towards batches two and three was made in another research. Consequently, this research did a convenience purposeful sampling of batch two trainees to analyze how the EJEP program has contributed to cultivating the capacities of administrators. The research looked into the reports sent by those trainees before the training. This is to identify their practices and challenges while implementing *tokkatsu* within the new education system "Education 2.0". Also, the weekly reports that were submitted by the trainees during the training were investigated. Lastly, the research examined the new practices and initiatives these trainees have implemented upon their return to Egypt following EJEP to examine how the program is contributing to developing new methodologies and strategies through *tokkatsu*. Results showed new initiatives and collaboration between administrators and teachers, which has contributed to the implementation of new learning methodologies in teachers' practices acquired from EJEP. These new methodologies contributed to developing student's agency and enhancing a self-learning atmosphere. Students became more engaged in school life through *tokkatsu*. Moreover, a new professional learning community for teachers was created in the school.

Keywords: Agency, Collaboration, Inquiry, Reflection, Professional Learning Community

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Introduction

Educational development in Egypt has been neglected for decades due to several internal and external factors, which have led to the deterioration of the quality of education as a whole (Mostafa and Hambara, 2018 & Mostafa, 2021). It led to Egypt being placed out of world ranking in elementary education quality in 2014-2015 (Egypt's Ministry of Education, 2017). Realizing how crucial education is for building societies, Egypt has developed a new Sustainable Development Strategy (SDS): Egypt Vision 2030, and a new system of education called "Education 2.0" was initiated in 2014.

Under this new strategy, Egypt-Japan Education Partnership (EJEP) was established between Egypt and Japan in 2016 to build the capacities of the young Egyptians and promote peace, stability, development and prosperity in Egypt (JICA, 2017). An offshoot of the project is the establishment of Egypt-Japan Schools (EJS) in 2018[1]. These new schools adhere to the new national curriculum "Education 2.0" while incorporating the Japanese concept, known as *tokkatsu* or special activities. In EJEP, Egyptian teachers and principals of EJS will attend a four-week professional development training program at the University of Fukui, Department of Professional Development of Teachers. This training program focuses on Japan's holistic educational curriculum model, *tokkatsu*. The first batch of training started in early 2019, and we have received three batches of trainees so far.

EJEP is a professional development training program aiming to cultivate competencies and capacities of Egyptian teachers and principals to create and design new methodologies and techniques while implementing *tokkatsu* in EJS within the new system of education. The training is based on continuous co-inquiry and the establishment of professional learning communities of teachers. The key concept of co-inquiry learning approach is "learning by doing" and "project-based learning" which promote student's agency and longitudinal learning. During the training period, trainees visit many Japanese schools and kindergartens, and observe classes and activities. They inquire into how children learn by playing and doing, and they observe how children engage in activities independently and collaboratively and attain new discoveries by continuous co-inquiry and repeated trial and error. Furthermore, they look into how *tokkatsu* is implemented in subjects as well as activities. The implementation of *tokkatsu* is explicit in project-based learning where students decide on a theme, set a design for it, construct the approach, perform and reflect on their practice. This kind of learning promotes student's agency, collaboration and the spirit of longitudinal learning.

Trainees also observe the role of the teacher in facilitating the learning process of children and students. They look into the skills and capacities a teacher should have in order to create an inviting learning atmosphere for children and students. Moreover, the principal trainees look into how Japan's school principals are directly involved in the learning process of the students by creating a proper learning atmosphere in schools. It is the principal's duty to support the professional development of teachers by organizing professional development training courses at school which aim to cultivate teacher's competency and capacity. It is also the principal's duty to set the school plan and

[1] In 2018, Egypt established the first 35 EJS and distributed them in all prefectures. In 2019, 5 more schools were opened. Up to this point 43 schools have been established (Egypt's Ministry of Education).

coordinate the collaboration among school, home and social community. In addition, Teachers and principals observe lesson studies and participate in teachers' discussions after the lesson study to learn new approaches for creating co-inquiry-based professional learning communities in their respective schools.

This research aims to answer the following question: *how the program is contributing to developing new strategies for administrators to create a learning environment at school, and to support teachers' agency as well as students' agency by following new methodologies through tokkatsu.* An initial analysis of batch one trainees was made to examine how the training program met their needs (Mostafa, 2019). A comparison of the program's modifications and developments towards batches two and three was made (Mostafa, 2020) in another research. *Tokkatsu* is a new concept that has been introduced to Egypt through EJEP professional training program in 2019. Therefore, literature from Japan is the sole means of understanding *tokkatsu*. EJEP and the new system of education were launched a few years ago, therefore, the research is still premature in this field. The materials used in this research will rely mainly on the previous researches done by the author, and the analysis of the reports that were sent and shared by the trainees prior to, during and after the training.

Methodology

This study adopted a qualitative inductive content analysis approach as well as an online interview. During data analysis, the researcher looked into the old system of education and the new system of education "Education 2.0" (Mostafa and Hambara, 2018; Mostafa, 2021) in order to consider the differences and the changes that occurred in the new system in addition to the data gathered from EJEP participants.

The data was gathered from two EJEP administrators with whom the author had direct contact, even after the program in Fukui through social media and emails. Moreover, they are actively implementing projects related to EJEP. The final target administrator (Principal S) was chosen based on recommendations from the Project Management Unit (PMU) of EJS within the Ministry of Education, Egypt. The target administrator is a principal of one of EJS schools and a former trainee of batch two (2) that took place from June to July 2019. She graduated from the faculty of Education in 2000 with major is early childhood education. She worked as a kindergarten teacher and a vice principal for five years, and had conducted professional trainings for 2000 kindergarten teachers. She played active role in supporting and educating the teachers through the ministry of education and was assigned as EJS principal in 2018.

The study involves three stages. The first stage was looking into the principal's report prior to the training to identify the challenges as a principal of a school that implements *tokkatsu* in the new system of education "Education 2.0" for the first time. This report is submitted by all trainees before the training. It helps the University of Fukui staff members know the current situation of each trainee in their schools, and understand their needs. The report consists of three main questions; the practices they have done so far, the challenges they are currently facing, and their future prospect at their schools. The second stage was following the weekly reports that were submitted by the principal during the training to observe her comments and reflections on her practices and her future prospects as a principal. The third stage was analyzing the report that was sent after the training to look into her role as a principal in facilitating the implementation

of *tokkatsu*, and supporting the teachers to develop new methodologies and raise their capacity through school-based professional training.

Literature Review

Education in Egypt has deteriorated remarkably over the past decades as a result of socio-economic factors like low salaries of teachers, limited resources for professional development, overpopulated classrooms, among others. Such realities led to the spread of unqualified teachers which subsequently resulted in Egypt being ranked 141 of 140 countries in the world ranking in elementary education quality in TIMMS & PIRLS 2014-2015 (Mostafa and Hambara, 2018; Mostafa, 2021; Misr Alarabia, 2019; Alyoum Alsabe', 2017). For decades, the teacher was the center of the learning process in the classroom while students were mere receivers. This traditional way of cramming knowledge into students' minds changed schools from a learning place to a studying place. This traditional one-way method approach lacks the crucial components of the next century skills needed for students like interaction, collaboration and critical thinking.

The government of Egypt realized how crucial the situation is, and discerned the deficiencies in the educational organization in general. Hence, Egypt has developed a new Sustainable Development Strategy (SDS): Egypt Vision 2030 in 2014 as a fundamental reconstruction of the educational organization in order to address the current problems in different sectors, one of which is the education sector (Egypt Vision 2030). In the education sector, Egypt has started a transformation journey towards actualizing the 21st century skills by designing a new system of education called "Education 2.0". This new system embraces the modern approach that promotes student's agency in the classroom by using interactive methods. Table 1 shows the major transformation in the curriculum reform that occurred in light of the new system of education "Education 2.0". Egypt Vision 2030 towards actualizing the 21st century skills is aligned with the learning framework 2030 of the Organization for Economic Co-operation and Development (OECD).

Old System	New System
Knowledge Assuring	Skills Assuring
Broad Curricula	Deep Curricula
Feeding Education	Learner-centered Education
Separate Education Subjects	Multi-discipline Axes
Theoretical Education	Fun Education Linked to the Learner's Life
Hard (paper) Education Materials	Hard and Digital Education Materials
Exams Philosophy	Evaluation Philosophy

Table 1. *Curriculum Reform in Education 2.0*
Source: Special Activities [tokkatsu] Guidebook 2018

In the new curriculum reform, the student becomes the center of the learning process, and the aim of learning changes from knowledge absorption to raising and cultivating competencies and skills in students. Active learning which promotes students' agency through interaction and collaboration in the classroom will be utilized. Students will engage in various activities in an inviting atmosphere to enhance their creation, observation, critical thinking and problem-solving abilities. Table 2 shows the targeted

skills in light of "Education 2.0". The table includes the internationally approved 12 skills, in addition to 2 more skills (in bold) that distinguish the Egyptian education system.

Education Dimensions	Target Skills in Light of Education Dimensions (14 skills)			
Learn to be	Resilience	Communication	**Accountability**	Self-management
Learn to live	Participation	Sympathy	Respect Diversity	
Learn to work	Cooperation	Negotiation	**Productivity**	Decision Making
Learn to know	Critical Thinking	Creativity	Problem-solving	

Table 2. *Targeted Skills in Education 2.0*
Source: Special Activities [tokkatsu] Guidebook 2018

Japan's Special Activities "Tokkatsu": Definition and Application

The majority of the special activities *tokkatsu* that are linked to the current school activities in Japan, like graduation ceremony, sports day, field trips, etc. were introduced during the Meiji Era (1868-1912). After World War 2, Japan realized the important role *tokkatsu* plays in students' daily school life by fostering their non-subject educational side; in other words, their 'human side'. Hence, *tokkatsu* became acknowledged in the course of education in Japan, and the non-subject practices that are considered crucial to students' experiences in life were placed under *tokkatsu* (Takayanagi, 2017). According to the Course of Study in Japan (2017), *tokkatsu* aims to raise and nurture the quality and capacity in children who will build their society and future by working together as a team. *Tokkatsu* enhances children's autonomous and practical initiatives, and creates opportunities for children to express their good values and possibilities in front of each other, and engage in life problem-solving situations individually and with their peers.

Tokkatsu may be sometimes misinterpreted as referring to the extra-curricular activities, like fun day-trips. However, *Tokkatsu*, as a part of the school curriculum in Japan, contributes to nurturing the noncognitive skills of children as well as the cognitive "academic" subjects. Noncognitive skills refer to interpersonal skills, motivation, self-control, leadership, the ability to concentrate, etc. within the daily school activities like, cleaning, serving food, students' assembly, class instruction, among others (Tsuneyoshi, Sugita, Kusanagi, Takahashi, 2020). Therefore, *tokkatsu* has been recently gaining the attention and appreciation of many countries as a whole-school and a whole-child learning model.

Implementation of *Tokkatsu* in EJS before EJEP and the Rising Challenges (Learning from EJS Principal S's Report)

Tokkatsu was activated with the launch of EJS in 2018. However, as it is the case with any new concept when it is introduced, and due to the lack of knowledge and experience in the implementation of *tokkatsu*, schools faced many challenges. The first stage of the study was to look into principal S's report prior to the training to identify her challenges

as a principal while adopting the new concept of *tokkatsu* in her school. The analysis revealed big challenges on both the academic and the social sides. On the academic side, the teachers did not receive the proper training on *tokkatsu* and did not acquire the basic knowledge necessary to proceed with this new curriculum. The sole means they had was the *tokkatsu* guidebook issued by JICA as their reference. However, theoretical instructions should be accompanied by application and methodology. Therefore, they faced many problems, and this was reflected on children and their performance. She said, "Children were confused and did not know what was needed from them". *Tokkatsu* is a means to promote independent learning and collaboration between students with the least interference from the teacher. However, as the teachers did not know the proper means to create such an atmosphere and facilitate students' learning, students were hailed by instructions. This increased their confusion and limited their agency. The challenge that faced principal S was the lack of professional development training of teachers that was obviously reflected in their practice. Furthermore, she said, "The parents were always doubtful about the quality of education their children were getting". This is because the new education system does not involve a lot of homework. Instead, it focuses on student's participation in the classroom.

On the social side, the analysis revealed that the parents' uncooperative attitude towards school and their disapproval of some of the *tokkatsu* practices were major challenges. She said, "There was lack of knowledge and awareness on the new concept, and the parents did not receive proper briefing from the school." These were the underlying factors. As previously mentioned, *tokkatsu* is a way of life, and is known as a whole-child education approach. In Japan, students clean their own schools and serve themselves food as a part of their daily life education in school, this goes under *tokkatsu*. There are no maids for house-cleaning in Japan, therefore, children learn from an early age how to keep their living place clean and neat. On the contrary, the majority of the people in Egypt rely on maids for house-cleaning. There are always maids in schools for cleaning, even more there are cleaners for the streets. Under this social and cultural background, cleaning as a *tokkatsu* practice was faced with surprise and discomfort from the parents. They were against the idea of involving their children in school cleaning. Some of the parents felt it was humiliating, while others were worried about hygiene.

Another problem was the parents' refusal to volunteer or directly involve themselves with school activities. In Japan, parents are involved to a great deal in school life. For example, patrolling the children while they commute to school, serving in the school library, participating in school events, etc. This contribution strengthens the ties between the school and the community, and nurtures in children a sense of contribution to their community. In EJS, although it is considered a voluntary contribution, the school had to assign a number of hours for each parent to achieve fairness. In this social contribution, parents are asked to participate in some school events from the preparation day till the execution day. They may also be asked to contribute to other activities based on the needs of each school. Such a new practice was not welcomed by Egyptian parents; since normal national and international schools do not accommodate such a practice. Parents felt they were pushed and obliged against their will which led to the increase of the complaints.

Principal S's Learning Trajectory

The second stage of the study was following the weekly reports that were submitted by the principal during the training to observe her comments and reflections on her practices and her future prospects as a principal in her school. The reports revealed principal S's wide vision and capability to observe and analyze. Principal S observed some classes for the primary stage, and observed children's learning by playing in kindergarten. Her observation and analysis focused on two major axes: the student's axis and the teacher's axis. In the student's axis, she focused on co-inquiry, discovery and problem solving as the core for student's learning. Moreover, she repeated, "Students' collaboration and mutual respect are the keys to creating a successful learning environment in the classroom." During the primary school visit, she watched closely the development of the learning process of students in a science class through sharing and communication. She noticed how students were actively engaged, and how the learning was facilitated for them. She added, "The least interference from the teacher encouraged students to communicate with and learn from each other by sharing and comparing each other's work in order to find a solution for the problem in hand." Students were always keen to look at their work, find the problems and work on solving them by applying a repeated reflection-in-action process (Schon, 1987). In the kindergarten, she said, "Children were very organized and very motivated. Safe and easy-to-use materials were available for children to use however they want to broaden their thinking and engage them in more playing." She also noticed that during the reflection time, the children shared what they created and how they created them in front of each other. She added that children were organized in their talking and waited for their turns in an environment full of respect and excitement. All this reflects how *tokkatsu* is implemented and promoted in academic classes and not only in school events.

In the teacher's axis, Principal S's main focus was on the teacher's positive role in the classroom and how the teacher facilitates the learning process of the students, and creates an engaging learning atmosphere. Principal S emphasized that in all the classes she observed in primary school and the playing she saw in the kindergarten; the teacher did not dominate the learning nor the classroom. Good planning, time management and classroom management were the primary factors that promoted students' co-inquiry learning and enhanced students' motivation. Furthermore, in her report principal S wrote, "The teachers were resourceful and well-prepared, they supported the students when they needed help by providing some hints and clues to stimulate the students' curiousness. Repeated verbal and written reflection sessions at the end of the class or the activity promotes constant thinking and inquiry in students. It also gives the teacher an idea of the students' understanding and how he/she should develop the next class to deepen the students' learning."

Principal S looked into the student's learning process and the tools and approaches that were utilized to deepen and develop that learning. It was obvious that students were well-motivated and well-engaged in all the learning and the activities. Students worked in groups in most of the activities which strengthened their sense of responsibility and independent thinking to pursue any challenge. Principal S admired students' mutual respect and compromise to solve any problem. As originally a teacher with major in early childhood education and a current principal, principal S has longed for creating a learning environment that would contribute to realizing a comprehensive development

for children. In her report, she insisted on the importance of nurturing the skills and talents in children to provide them with the necessary tools to create and develop in the future. However, students would not be able to create or be motivated to challenge with anything new without the constant support from the teacher. Principal S noticed how the teachers in Japan provide the tools for students and let them utilize them by practicing different methods and approaches.

Future Prospect within an Applicable Action Plan

Principal S reflected into the current situation in her school in order to look for potentials and possibilities to start from. After discussing the strong points and the weak points in her school, she planned to design a professional development training for school teachers to develop their co-inquiry learning on *tokkatsu* and curriculum management, and to enforce the concept of learning by doing. This will be an initiative to start a community of practice where teachers can share and reflect on their practices and write their own practice records. Moreover, she also planned to hold some briefing sessions for the parents to explain the new concept of *tokkatsu* and its positive influence on children academically as well as socially.

Initiatives after EJEP towards Implementing New Approaches of *Tokkatsu*

The third stage in this research was to analyze the report that was sent by principal S after the EJEP training to look into her role as a principal in facilitating the implementation of *tokkatsu*, and supporting the teachers to develop new methodologies and raise their capacity through school-based professional training based on what she had acquired from the training.

The 'Academic Project' for Grade 1 as a New Approach towards Reflection

Project-based learning is one of the pedagogical approaches that supports the continuous learning of students and promotes agency. The attached primary and junior high school of the University of Fukui is a leading school in this student-centered approach. This school was the main destination among others where the practical part of the training was conducted. During the school visits, principal S observed the students' continuous learning through projects and how the projects were linked to the subjects. Inspired by this engaging method, principal S initiated a new academic project as a new approach towards reflection for grade 1 students during the last academic year. Since reflection is still a new concept for both teachers and students, this academic project is expected to be the start of the new reflection culture in the school.

In this project, students are divided into four groups of four different subjects: Arabic language, Maths, English, and Discover[2] according to their needs. Students of each group prepare some plays, conversations, and use a smart board to introduce some activities that are linked to their learning. During the preparation time, students involuntarily review all that they had learned during the first term to apply it into the activities they decided on. This project explicitly implements *tokkatsu* within students'

[2] Discover is a new branch that has been developed by the *Center for Curriculum and Instructional Materials Development* in Egypt for grades 1 to 3 in accordance with the new system of education 'Education 2.0'. It includes many interactive activities for students as an approach for *tokkatsu* in Egypt.

learning, and creates new methods for students to recall what they had learned and reflect upon it. This project enables students to take the initiative to decide on the activities they will do and enhances their agency and sense of responsibility. Moreover, it promotes communication and collaboration between students and deepens students' understanding of the subject. On the other hand, parents are invited to watch the students' performance. This is an approach from the principal to eliminate the parents' doubts about the insufficient learning of their children within the new system of education. This attempt was a successful approach towards building mutual understanding with the parents based on mutual confidence.

The Start of Reflective Sessions

"Reflection" is one of the main practices that EJEP focuses on as a tool for cultivating the capacities of teachers and administrators. Principal S observed and experienced different modes of reflection on different levels during the training. She noticed and learned the crucial role a principal plays to create a sustainable learning institution for students as well as teachers. Communities of Practice are groups of people who share a concern, a set of problems or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis (Wenger, 2002). Therefore, she started a weekly 45-minute reflective session of teachers and implemented it after the end of school day as an initial step towards establishing a professional learning community of teachers. In these sessions, teachers from different subjects and levels share students' learning and development and discuss new approaches to support those in need. They also share their concerns regarding the social attitudes of some students and the problems they face in their practices. Apart from this weekly formal assembly, teachers are free to discuss with each other any issue whenever and wherever they meet. This reflects the dynamic community the principal is cultivating at school by securing both a public space and a private space. These informal, backchannel discussions where teachers can share their visions and concerns in a more relaxed atmosphere, strengthen the relationship between community members, and are the key to successful meetings (Wenger, 2002). As a principal, S does not isolate herself from teachers' practices as the case in all the traditional schools in Egypt. She participates in the reflective sessions to support the teachers in this new challenge, to seek every possible measure to create a learning environment for both students and teachers, and to perceive the needs of teachers. She utilizes these reflective sessions as a practice-based professional learning and development of teachers to raise their capacity and performance by sharing and learning from each other's practices.

Furthermore, she initiated four supporting groups as a comprehensive development of the school professional learning community: 'Teachers' Professional Development Group' which discusses the teachers' needs and problems, 'School Management Group' which focuses on other groups' problems and how to solve them, '*Tokkatsu* Group' which deals with the school yearly plan and students' suggestions for learning, and lastly 'Physical and Health Group' which follows up on students' health condition and raises the awareness of health. Teachers choose where to go provided that each group should consist of teachers from different subjects and levels for a more comprehensive, collaborative and lively community. The teachers of these groups meet every day, while the principal participates in their meetings every other day.

Conclusion

Principal S has always desired to create a learning atmosphere that enables character education programs as well as academic education for children. *Tokkatsu* as a whole child model of education that aims to nurture the child as a whole being made that desire possible to realize.

By starting a professional learning community for teachers and project-based learning for reflection for students, S has proven that EJEP training program is contributing to developing new strategies and generating advanced measures for administrators to create a learning environment at school through *tokkatsu*, and to promote both teachers' and students' agency. She used what she learned from the program and modified it according to the current context at her school, which implies resilience and perception of her school's situation. The new approaches facilitated the implementation of *tokkatsu* by creating new possibilities for students to plan, organize and perform events that are linked to their subjects. Moreover, they also supported in creating a learning community for teachers where different-subject teachers collaborate, share and learn from each other. This learning community will raise the teacher's capacity to design new methods to incorporate *tokkatsu* within the subjects.

Principal S showed that the role of a principal is beyond monitoring teachers and paper work as the case in the majority of the traditional national schools in Egypt. She has proven that administrators play a crucial role in creating a learning atmosphere in schools for children and teachers, and facilitating the means for teachers to develop their capacities and skills.

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Indigenous Students' Storywork: Local-to-Global Transformative Learning and Growth

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Abstract
Storywork by four Indigenous post-secondary student mentees from Canada highlights their transformative co-learning experiences with community through a local-to-global field school. This program was funded by the Alberta Indigenous Mentorship in Health Innovation (AIM-HI) Network as a foundation for students to succeed in Indigenous health and community-based research. Mentees are undergraduate students from different post-secondary institutions/programs and various Indigenous communities including Cree, Dene and Métis. Mentors included 2 Elders (Blackfoot and Hawaiian) and professors (1 nursing and 2 medicine) from Métis, Blackfoot and hanai Hawaiian families. With respect for Indigenous oral tradition, mentees share their transformative experiences through digital storytelling. With the metaphor of plants, mentees describe their individual and collective growth from seed, to blooming and taking root with their identity. Opening hearts and minds to Indigenous ways of knowing inspired a strong cultural connection for engaging in academic studies and relational co-learning with Indigenous communities. Mentees learned relevant skills to support self-awareness/knowledge development, caregiving/self-care, compassion/self-compassion, and cultural growth through common humanity; these skills support their roles as resilient strong helpers, who are well-positioned to respectfully advance Indigenous ways of knowing in research to promote health with Indigenous Peoples. With an evolving impact beyond the duration of the field school, mentees share their learning journey and calls to action as emerging Indigenous Health Researchers.

Keywords: Indigenous Health Research, Mentorship, Transformative Learning

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Introduction

Storywork by four Indigenous Canadian post-secondary students/mentees highlights their transformative relational learning experiences with community through a local-to-global field school. We are called to begin this work with respect to our Indigenous teachings. While there is a westernized author acknowledgement at the end of this paper, we must honour our Indigenous protocols by first acknowledging the land, Elders, and our positionality in relationship to this project.

Land Acknowledgement

We humbly and respectfully acknowledge the ancestors, knowledge holders, and traditional territories where we live, work, and play. We acknowledge the Ainu and the Okinawan Indigenous Peoples of Japan where this journal is published. This acknowledgement is grounded in the United Nations Declaration of Rights for Indigenous Peoples (2007).

Elder Acknowledgement

Elders are valued for their contribution as "keepers of Indigenous Knowledge, dynamic ethical consultants, community protectors, and credible sources of information" (Flicker et al. cited by Kennedy, McGowan, & El Hussein, 2020, p. 2). With humble respect, we acknowledge the guidance and support of Hawaiian Kupuna Francine Makaona'ona Dudoit Tagupa (herein referred to as 'Aunty Fran') and Blackfoot Elders Randy Saa'kokoto Bottle and Anita Kakaoo'saki Eagle Bear. Their wisdom guides our ongoing understanding of Indigenous identity and responsibility to ourselves, family, and community.

Aunty Fran welcomed us to her Āina (land). She is Director of Native Hawaiian Healing at Waikiki Health, and is a traditional healer, nurse, and political activist who is recognized by the community given her significant support for Hawaiian culture and health. Development of this project was guided by Aunty Fran given her key role as the presiding Elder with seven previous local-to-global nursing field schools with Mount Royal University, noting years of collaboration with Canadian Indigenous Elders, knowledge holders, and agencies. Randy was the local Elder for this project given his outstanding contributions of elected representation, leadership, and support in preserving culture with Indigenous youth and communities; we are deeply grateful that Randy's wife Elder Anita Eagle Bear accompanied him to Hawai'i and shared her traditional, cultural and spiritual teachings. Together, they helped us to understand where we are from (local) so we may learn from a broader perspective (global). Co-learning with these distinguished Elders is a precious gift and we are truly humbled and grateful for their guidance.

In consultation with Elders, their contribution is acknowledged foremost in this paper. While co-authorship of this paper is attributed to the mentees and primary faculty mentors, the contribution of Elders is recognized well beyond authorship. The importance of formally acknowledging Elders' wisdom in the academy needs to be honoured with humility and respect to local Indigenous protocol, including consultation with the Elders on how they wish to be acknowledged (Kennedy et al., 2021).

Positionality

The student/mentee co-authors of this paper are Indigenous women from Canada who identify as Nehiyaw/Cree (Samantha and Jacey), Nehiyaw-Otipemisiwiskwew Cree/Métis (Jenna) and Dene (Taylor); this paper emphasizes storywork by these four mentees. We acknowledge the contribution of Nehiyaw-Otipemisiwiskwew Cree/Métis mentee, Nevada Ouellette, who was unable to continue with this project. Faculty/mentor co-authors are Métis (Cheryl) and Settler/Métis ancestry (Andrea), respectively from medicine and nursing disciplines; Andrea is hanai/traditionally adopted by Aunty Fran. We acknowledge the contribution of Blackfoot mentor and physician Lindsay Crowshoe. Relationality with ourselves, each other, Kupuna/Elders, mentors, the community, and all beings is of central importance to our emerging role as Indigenous Health Researchers. Relationality is a cornerstone to our process, focus, and the storywork shared in this paper.

Background

Project Overview

The Alberta Indigenous Mentorship in Health Innovation (AIM-HI) Network Local-to-Global Indigenous Service-Learning Field School was created to foster emerging Indigenous Health Research success with five Indigenous post-secondary students. The AIM-HI Network (Figure 1) is one of eight Canadian Institutes of Health Research (CIHR) funded Indigenous Mentorship Network Programs, with a mandate to support Indigenous graduate students engaged in health research. The AIM-HI Network specifically embraces an intergenerational, multi-layered, and cascading mentorship model, with a commitment to identifying supports for success and resilience of Indigenous learners and through wise mentorship practices.

Figure 1: AIM -HI logo

This specific project was inspired by AIM-HI academic mentor, Dr. Andrea Kennedy, and envisioned as a transformative learning experience incorporating personal and collaborative reflections on identity, event-based mentorship activities, and unique experiential learning in local-to-global contexts (i.e., Alberta, Canada and Hawaii, USA). Interested participants were invited to apply to the opportunity providing written materials to share more about themselves and their motivations and personal and career goals, which were explored further through virtual interviews. This project's objectives correspond to specific AIM-HI Network aims, including:

- Reorganize health research mentorship around cultural and community principles and values to address the dynamic, transactional facets of career development for Indigenous learners.
- Expand and enhance an intergenerational mentorship network among Indigenous mentees, in relation to Indigenous and non-Indigenous community and academic mentors, to build an inter-disciplinary community of practice committed to Indigenous health research.

Elder Consultation

Field school participants were selected in consultation with Aunty Fran, with a specific objective to include post-secondary learners located throughout Alberta, from diverse disciplines related to health research, and at varying levels of progress in their academic journey. Activities included virtual meetings, local (Calgary) in-person orientation weekend with ceremony, and discussions on selected literature and topics in preparation for the global (Hawaii) field school. This process helped to affirm the mentees' group identity as *`ohana* (family) to reflect their bond and connection that was developed and strengthened during this co-learning journey. In alignment with AIM-HI, the field school had five interconnected goals developed with Aunty Fran and based on Hawaiian teachings by Kupuna Pilahi Paki:

1. Akahai -Kindness: With kindness/compassion for self and others, build capacity for Indigenous Service Learning, Community Based Research, and Indigenous Health Research.
2. Lokahi -Unity & Harmony: Respectful engagement with Indigenous Knowledges by learning with Elders and knowledge holders and weaving Indigenous Knowledges with Western Knowledge through two-eyed seeing and co-learning.
3. Olu'olu -Agreeable: As pili `ohana/close family group, learn together and engage in storywork for collective knowledge generation.
4. Ha'aha'a – Humility: Advance cultural humility (process) for cultural safety (outcome) with all peoples and communities.
5. Ahonui – Patience & Perseverance: Develop resiliency skills to support daily efforts with passion, courage, purpose, hope and excellence.

Literature Review

The Canadian Institutes for Health Research (CIHR, 2020) acknowledges that holistic knowledge and relationality are integral to Indigenous health research. Indigenous health research methodologies are rooted in building and maintaining relationships and community collaboration (Ninomiya & Pollock, 2016, p. 34). When Indigenous health researchers are grounded in Indigenous ways of being, knowing, and doing, they are well positioned with the culturally appropriate means to identify and effectively address community-driven priorities and needs (Hyett et al., 2018, p. E618).

Indigenous health mentorship is vital to advance the field as there is currently disproportionate underrepresentation of trained and practicing Indigenous researchers. Approximately 13,000 health researchers are funded by the CIHR (CIHR, 2018), yet only 389 Indigenous Health researchers affiliated with a Canadian university are listed in the Indigenous Health Researchers Database (National Collaborating Centre for Indigenous Health [NCCIH], n.d.). This knowledge demonstrates a clear need for training and recruitment of Indigenous mentees and mentors in the field.

Blackfoot Elder Roy Bear Chief shared a wise teaching that "the responsibility of a researcher is to look-listen-learn as a lifelong journey" (Kennedy et al., 2020, p. 6). As opportunities continue to arise for Indigenous learners to participate in mentorship experiences, Indigenous Health Researchers will have the capacity to be strong-resilient helpers for their communities and beyond. With experiential knowledge "... eventually the student will discover that he or she is the possessor of a knowledge much broader, deeper, and more comprehensive than what is being taught in the classroom" (Deloria, 1999, p. 39).

This mentee-centred decolonization process within the academy is supported by transformative co-learning. We understand this relationality of mentees and knowledge development based on Mi'kmaw Elder Albert Marshall's teachings of Etuaptmumk/two-eyed seeing teaching which encourages respectful engagement with Western and Indigenous teachings as distinct systems (Marshall, Marshall & Bartlett, 2015; Marshall, 2018). This co-learning process helps mentees to navigate the Western academy while integrating Indigenous ways of knowing in a way that respects relationality with Indigenous communities (Kennedy et al., 2021) and supports integration of heart and minds (Gehl, 2012). Intergenerational mentorship supports critical learning skills that provide opportunity for growth (Livstrom et al., 2020, p. 13); this also highlights the importance of Elders to support the mentees' learning journey (Kennedy et al., 2020; Spence et al., 2018). We extend this understanding of two-eyed seeing through transformative learning theory based on deep self-reflection to guide intentional action and critical evaluation of the co-learning process (Mezirow, 1997).

Method

Transformative learning was informed by Indigenous scholarship of storywork (Whitinui, 2014) and relationality (Deloria, 1999). The principles of storywork and relationality connects the heart, mind, body, and spirit which has kept us on the path of Indigenous education and ways of knowing (Archibald, 2008).

Storywork

Storywork by the mentees highlights interconnected goals (see Project Overview) and Indigenous ways of being, knowing and doing which includes: Indigenous mentorship, transformative learning, Indigenous research methodology, and digital storytelling. Indigenous mentorship was a primary focus throughout the project. We learned together as *`ohana*. This created connections akin to family between the local and global Elders/Kupuna, AIM-HI mentors/Kumu, and students. Learning together was also inclusive of mentors' families and community partners. A significant part of developing mentorship relationships was respecting and honouring the vital role Elders have in guiding community engagement in relational learning (Kennedy et al., 2021). Honouring cultural protocols allowed us to foster humility, engage in transformative learning, and obtain holistic professional development. As emerging Indigenous Health Researchers, we are grateful for the privilege and gift of having many Indigenous mentors to guide and support us.

Relationality

Preparing for the project meant recognizing and identifying our own gifts that we will share with the community and each other. Literature, such as *Strong Helpers' Teachings: The Value of Indigenous Knowledges in the Helping Professions* (Baskin, 2016) and *Resilient*: *How to Grow an Unshakable Core of Calm, Strength and Happiness* (Hanson, 2018), informed and enhanced understanding of our resilient strong helper roles. We explored these works through online discussion boards and learned to engrain daily practice of resilience building exercises. Utilizing these practices, holistic health became foundational for preparation and encouraged integrated relationality within ourselves and among the *`ohana.*

Acknowledging our connections with the land, ancestral history, and identity was a part of this process. Thus, applying Indigenous research methodology of relationality was key in focusing our intention, responsibility and actions in a way that honours that we are all related (Deloria, 1999). We gained insight and deeper understanding of relationality through our shared experiences in the project. Through digital storytelling (Tsakoza et al., 2021), we honoured the gifts of those connections and relationships with an aloha circle opening and individual narratives detailing transformative learning experiences. Francis and Munson (2017) refer to "the centering of Indigenous knowledge and stories" as tribalography which is a means "... of positioning and validating Indigenous story by situating Indigenous stories as central components in a way that disrupts colonial binaries and allows for authentic dialogue and engagement" (p. 52). Sharing stories in this way, we honour and commemorate the gifts exchanged in the project by sharing the mentees' own words.

Relational Learning with Indigenous Communities

Mentees' evolving understanding of Indigenous service-learning shifted to relational learning with Indigenous communities; we maintained good relations with the land, the traditions, and the People by practicing "…humility, respect, honesty, and reciprocity…" (Kennedy et al., 2021, p. 1). Community partner relationships were developed over many years with Aunty Fran and mentor Andrea Kennedy through local-to-global nursing field schools (Spence et al., 2018). Honoured partners with the AIM-HI field school project include Waikiki Health (Aunty Fran, Director Native Hawaiian Healing), Prince Jonah Kuhio Elementary School (Lynn Kobayashi, Principal), Ho'oulu 'Āina- Kokua Kalihi Valley Comprehensive Family Services (Anakala/Uncle Scotty Garlough, Youth Coordinator), Lunalilo Care Home (Mike Warren, Director of Nursing), and the University of Hawai'i at Mānoa (Dr. Mapuana Antonio, Assistant Professor- Native Hawaiian & Indigenous Health Specialization Head). The experiences and relationships from being received by these hosts in their homelands, and the co-learning that emerged from reflection of these interactions, are shared through this manuscript from the perspectives of the Indigenous mentees.

Discussion

This unique experience by the Indigenous mentees presents key themes of their individual and collective growth ; this is reflected in the plant metaphor of a tree from seed to blooming, and is introduced in our poem "Keauhou - A New Beginning" (see Figure 2):

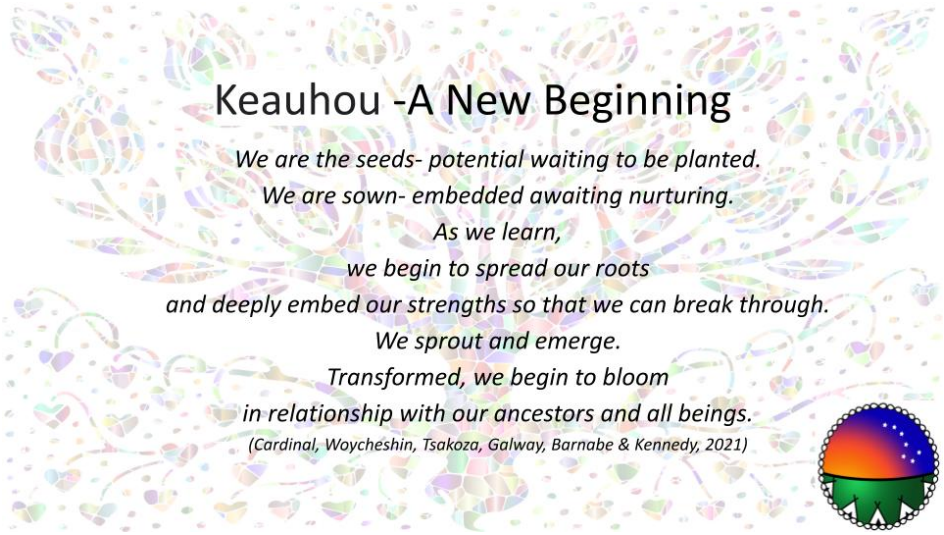

Figure 2: Keauhou - A New Beginning; Image: GDJ, 2021

Seeds in Soil

Just as seeds are full of potential and influenced by their environment, our growth throughout this project was nurtured by our willingness to learn. While we were open to the bridging of colonial and Indigenous worldviews, our indoctrinated colonial perspectives created challenges. The uncertainty of how we would overcome the colonial narrative held us in a vulnerable holding pattern. Researcher Brené Brown (2015) articulates vulnerability not as a weakness but as a measure of courage: "vulnerability is not winning or losing; it's having the courage to show up and be seen when we have no control over the outcome" (p. 4). Our commitment to learning how to adapt to the teachings from our Elders and practicing self-care and compassion enabled our *`ohana* to cultivate resilience which then led to growth. Progression during this journey was facilitated through the ongoing support of our mentors. Their guidance contributed to understanding ourselves on a deeper personal and spiritual level to embrace our identities as strong helpers and wahine/women.

Planting Roots

We started by learning from a local level. Germinating through self-discovery and resilience, we dug our roots into the earth so our presence as Indigenous women and emerging Indigenous Health Researchers could be established. Mentored by Indigenous Elders and knowledge holders, we were supported in understanding our relations to the land, self, and one another. Our firm rooting in our local identity allowed us to expand our thinking in a global context. Nourishing our identity required decolonizing our mind and embracing Indigenous ways of knowing. These roots created a strong support from which to grow. Reconciling our westernized colonial attitudes and backgrounds was a shared experience amongst our *`ohana*. These previous attitudes permeated our perception of research and initially hindered our ability to understand the nuances of Indigenous health research methodologies.

Sprouting/Breaking Through

We are seeds in soil that established roots in our learning experience. Steadily, our roots spread and deeply embedded our strengths in our identity as Indigenous People. Rooted firmly, we began to break through the surface. Co-learning in unison, we emerged upward as resilient strong helpers, supported by our core: relationality. From this, our connections and relationships branch out. Each branch represents our interconnectedness to the land that we walk on, to the land we visit, to the community, and to Indigenous knowledge keepers. We are connected to each other. Everything is connected.

Budding and Blooming

Nurtured by our mentors' guidance, we break through the surface. We are individuals, deeply connected as an *`ohana*. We are rooted and grow in the same soil. Much like how trees share nutrients in a root system, we too nurture and help each other grow through co-learning. We sprout and emerge as new growth, supported at the core by relationality. Connection and relationality form the basis from which we branch. Branching from the centre are relationships: with ourselves, the land, community, and Indigenous knowledge holders. Our branches support our growth from which our budding knowledge is shared.

As we grow and mature, our foliage develops. Each bud represents our profound learning achievements. Like a tree trunk, we endured weathering but we are stronger and adaptive as a result. In the process of transformative learning, our kuleana (responsibility and privilege) is to bloom but also share the beauty of our knowledge to advance and empower the next generation. Plants need continual care or they will wither. We continue to thrive through reciprocity, we will share our knowledge, and show up as strong resilient helpers. Caregiving is our kuleana for our future generations. Our mentors supported us, now we must take what we learned to hold this sacred space for future generations and nurture them to grow strong. Co-learning cultural information with Elders and knowledge holders is shown in this map (see Figure 3) as collaborative and reciprocal; this highlights the centrality of relationship with our selves, each other, the land, and community.

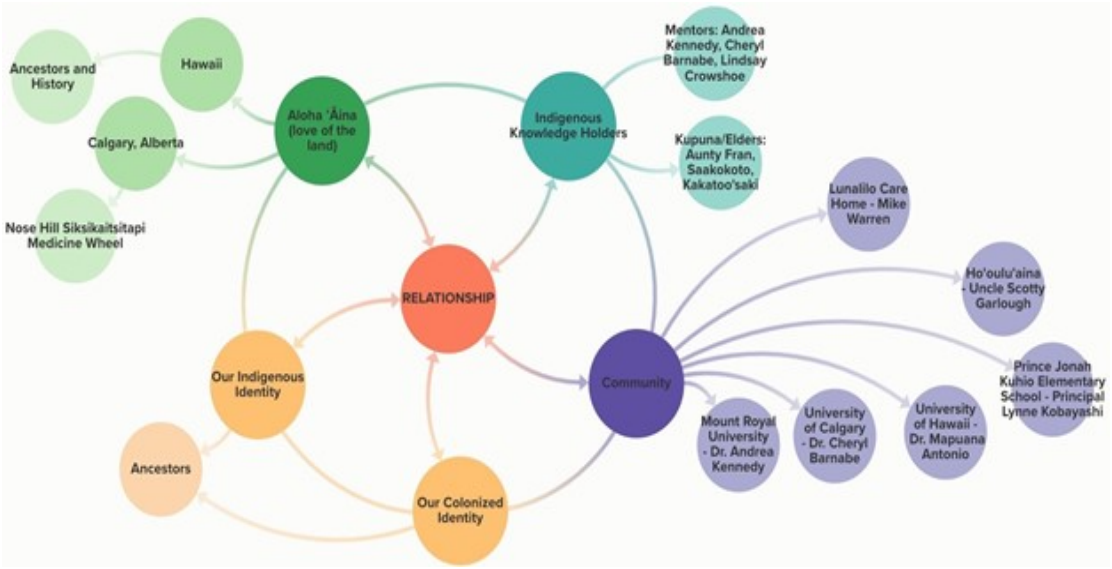

Figure 3: Relationality

Conclusion: Moving Forward

Each lesson gifted by the Elders, mentors, the land, and community members was learned in unison by the *`ohana* mentees. Words spoken by the Elders echoed resonance; different facets of the land illuminated, and our spirits became interconnected through Indigenous community interactions. While we experienced this project together as a collective, we each received lessons to guide our inward journey. Our eyes viewed the beauty in our lessons, surroundings and memories that evoked Indigenous ways of knowing; this connection of our heart and mind journeys (Gehl, 2012) honoured the Elders' teachings in ways that unfolded individual lessons to foster personal, academic, and cultural growth; our hearts opened in varying depths. Learning was experiential, in direct connection, in response and reflection with the immediate and holistic ecosystem (Battiste, 2013). An important part of this project focused on introspection to aid our *`ohana* in strengthening and discovering the gifts passed down from our ancestors (Bourque Bearskin et al., 2021). Deeper knowing of ourselves and the development of inner strengths humbly led us to acknowledging key lessons (see Figure 4) and responsibility in honouring the Indigenous value of relationality (Bourque Bearskin et al., 2021).

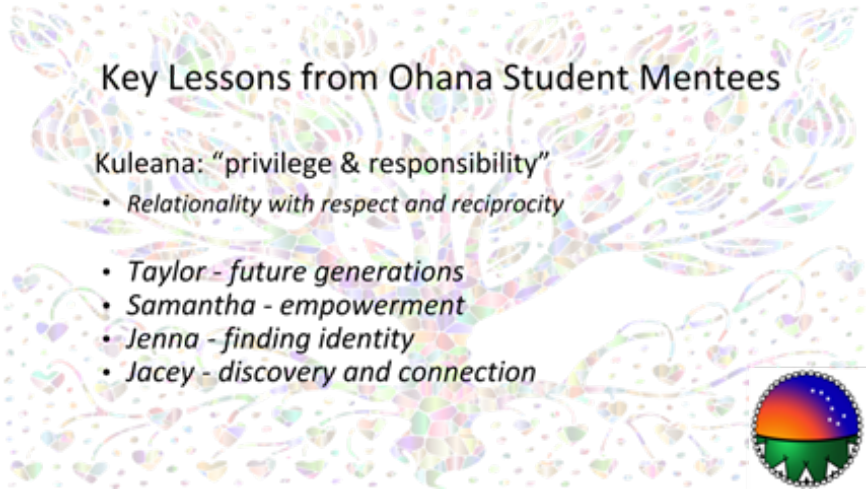

Figure 4: Key Lessons from `Ohana Student Mentees; Image: GDJ, 2021

The gifts we hold are not meant to hide away beneath fear and uncertainty, but instead are meant to be shared as strong helpers. We practiced our gifts by using them to support one another as each of us navigated through a new way of knowing; we strived to use our experiences to build resilience. Through two-eyed seeing (Marshall, Marshall & Bartlett, 2015; Marshall, 2018), we learned how to honour both Western and Indigenous ways of knowing as important lessons gifted to the *`ohana*. Our colonized worldview had to be acknowledged to nurture, decolonize, and discover the potential of our Indigenous ways of knowing (Battiste, 2013; Bourque Bearskin et al., 2021). While we are challenged in this process, rather than moving forward with anger, our decolonial actions are grounded in love/aloha and gentleness as we connect our heart and mind journey (Gehl, 2012). To mobilize relationality, connection, and community, it is prudent to passionately learn, honour, and respect all parts of our selves and acknowledge the co-learning responsibility of two-eyed seeing (Marshall, 2018). Just as we brought together our different lessons, we must bring together our different ways of knowing into action in harmony with Indigenous and non-Indigenous Peoples as a decolonial effort for the good of all people (Kennedy et al., 2021). *All my relations.*

Authors' Note

This work is dedicated to Hawaiian Kupuna Francine Dudoit Tagupa, Blackfoot Elders Randy Bottle and Anita Eagle Bear, along with our mentors, community agencies, families and communities who supported this transformative learning journey. Funding for this research project was generously provided by the Alberta Indigenous Mentorship in Health Innovation (AIM-HI) Network.

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Improving Grade 3 Students' Poetry Writing Skills Through Flipped Model of Instruction

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Abstract
The flipped model of instruction has been the focus of many researchers through the years due to its impact on students' academic performance. This action research study aims to uncover the pedagogical effects of applying the flipped classroom strategy to Grade 3 students' poetry writing skills. The researcher applied the triangulation technique where the data were analyzed through multiple resources to get more reliable information. A researcher-made test on concepts on poetry was given to the participants as the pretest and the post-test of the study, worksheets, quizzes, and Culminating Unit of Assessment (CUA) results were used for as a quantitative data, whereas questionnaire on students' perception of the program through G-form, interview results, poetry writing for their main output and researchers observations were used for the qualitative data gathering. The research participants were chosen purposively, coming from three sections in Grade 3 (n=74). To achieve this, a 4-week plan was designed to provide students with activities on poetry writing. The students received the flipped model of instruction, materials were given to them ahead of time through their Learning Management System (LMS) which is the Seesaw Application, moreover, this is a student self-paced learning. The researcher used descriptive statistics in interpreting the results of the pretest, the post-test, and the feedback forms for data analyses. The results indicated that there was a statistically significant difference in terms of the students' writing skills based on the data gathered, it also revealed that the students had a positive attitude towards the program.

Keywords: Flipped Model of Instruction, Poetry, Writing Skills, Online Distance Learning, Rhyme Scheme

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Introduction

The flipped model of instruction has been the focus of many researchers through the years due to its impact on students' academic performance. This action research study aims to uncover the pedagogical effects of applying the flipped classroom strategy to Grade 3 students' poetry writing skills.

"When a classroom is "flipped" students' homework is to read and watch online videos and other materials prepared by their teacher. Time in class is used for discussion of concepts, to work on gaps in learning to clear up the misunderstanding, and for the teacher to work more intensely with students who need additional instruction or support. Labs and other application of learning occur during class when the teacher is available to respond to questions, provide clarification as well as assist and support students." (Williamson,2012)

De La Salle Santiago Zobel School (DLSZ) is one of the institutions that started the academic year earlier than other schools in this new normal, geared with the online distance learning setup (ODL). The notion of a flipped model of instruction (FMI) has been part of the students learning environment for the past years, however, this setup will be a big challenge in terms of adjustment and adaptation to the students and to the teachers as well. For this reason, the study will custom this approach in an online distance learning environment and tries to uncover the potential benefits on the FMI by employing technology in improving their poetry writing skills.

Bergmann and Sams (2015) have researched the effects of the flipped model of instruction on student performance and achievement. According to them, the students wanted teachers to answer questions and help them when they didn't understand concepts. They found that students can easily catch up because they can access the materials online and watch lessons.

Thus, the advantages of this model show that this can be implemented as an alternative to traditional teaching methods to enhance students' poetry writing skills.

To mount the FMI, the students have a lower level of cognitive work the understanding and remembering (gaining knowledge) is done outside the classroom, whereas apply, analyze, evaluate and create (analyses, application, evaluations, etc.) are done inside the classroom (Figure. 1)

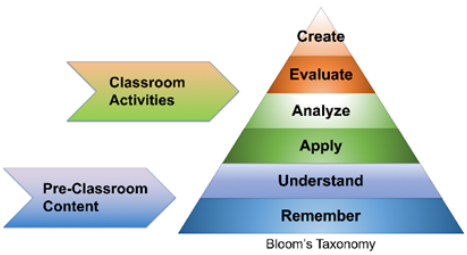

Figure 1: Blooms Taxonomy

"When we began flipping our classrooms, we quickly realized that we had stumbled on a framework that enables teachers to effectively personalize the education of each student—the goal of educators since the concept of individualized learning first appeared." Bergmann and Sams (2015).

The research questions are the following:
1. What are the students' prior knowledge of poetry writing?
2. What are the significant changes in students' poetry writing skills before and after the implementation of the flipped model of instruction?
3. What are the students' perceptions of the flipped model of instruction on poetry writing?

The research aims to improve your practice of teaching poetry writing skills to Grade 3 students, and improve as well the students' skills in writing poetry.

Methodology

Research Design

A descriptive mixed-method approach was utilized in this study, considering multiple sources of data for triangulation purposes.

Research Participants

The subjects of the study were 74 grade 3 students enrolled in the school year 2020-2021. The participants' ages ranged from 8 to 9. For research ethics, a letter of consent was signed by the parents upon enrollment.

Research Instruments

A questionnaire was employed and divided into two sections to examine the students' prior knowledge on poetry writing, it aims to assess the prior knowledge of poetry writing. Students were asked concepts questions in the first section, this was for items 1-7. For the second section, it consists of writing poetry following a rhyme scheme this was interpreted through the use of a 4-point rubric.

Data Gathering Procedure

Quantitative data sources were obtained from the researcher-made test on concepts on poetry as pretest and post-test, worksheets, quizzes, and Culminating Unit of Assessment (CUA) results. Whereas, questionnaires on students' perception of the program through G-forms, interview results, poetry writing for their main output, and researcher's observations were the sources for qualitative data.

Data Analysis

SPSS was used for statistical analysis. A descriptive mixed-method approach was utilized for all the items.

Results and Discussion

The flipped model proved to be efficient based on the results of the research, the school could utilize it more effectively. The implications/ recommendations from the action research may help educators steer as to how they can implement the flipped model of instruction to improve students' poetry writing skills in an online distance learning setup. With the online distance learning set-up, what will be the impact of the flipped model of instruction on students' poetry writing skills. The flipped model of instruction has been introduced a few years ago and not a lot of research has been carried out especially on its effectiveness in improving students' poetry writing skills in an online distance learning setup, this study can fulfill this gap.

Moreover, the independent variable was the FMI and the dependent variable was poetry writing skills. The mean difference from comparing the pretest and post-test is 1.97. With the mean of 13. 92, it shows that the R1: students do have prior knowledge of poetry writing, the frequency results with the use of a graph show that it was skewed to the right. R2: There is a significant difference, as a result, using a sample t-test, the skewness and kurtosis values are analyzed. The skewness in the pretest is -.728, the post-test is -1.234. The kurtosis, pretest result is -.700 while the post-test result is .825. As these values are between -1 and + 1, it can be said that the presumption of normality has been met. (Table 1)

Statistics

		students' pretest score	students' posttest score
N	Valid	74	74
	Missing	5	5
Mean		13.92	15.89
Std. Deviation		5.001	3.454
Skewness		-.728	-1.234
Std. Error of Skewness		.279	.279
Kurtosis		-.700	.825
Std. Error of Kurtosis		.552	.552

Table 1: Pretest and Posttest

For figure 2, the result shows that the students' pretest results were high, this means that they have prior knowledge of the concept questions asked.

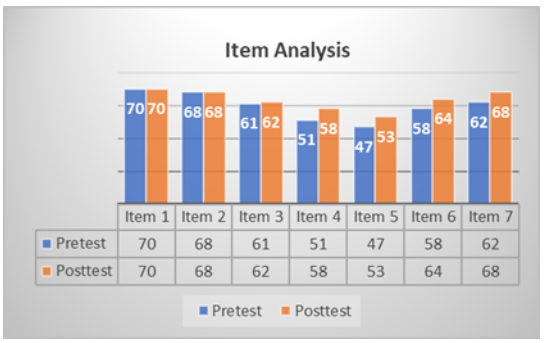

Figure 2: Item Analysis Pretest and Posttest

For table 2, it shows the rubric that the research to grade the students' Main Output. As part of the students' Performance Task for the first term, the researcher asked the students to write quatrain poetry about Climate Change which was the theme for their poetry writing in line with Dr. Byron Miller, Dr. Socorro Aguja, Dr. Maricar Prudente's project Global Education on Climate Change.

CRITERIA	4	3	2	1
Organization	The ideas in the poem are well-organized and easy to follow.	The ideas are simple yet easy to follow.	Some ideas are irrelevant but still understandable	The poem is disorganized and hard to understand.

Table 2: Rubric for the Main Output

Students were asked if they like the flipped classroom. R3: The response is overwhelmingly positive. Perhaps, results may be attributed to the exposure of students to a different approach to learning. Focus group data were examined through content analysis. In the analysis process, the data were examined by the researcher and the results were compared. In this context, the data were coded manually, At the end of the focus group interview analysis, the data were supported with observation results and meaningful results were attempted to generate.

According to Bergmann and Sams (2014), students 'engagement in the flipped classroom is not just about using videos. It is also about replacing a passive learning approach with a more active learning and collaborative approach in the classroom. Those adopting the flipped model of instruction are likely to see the classroom atmosphere begin to change because of the greater focus on interactive learning; for example, there is more time for classroom activities such as brainstorming, peer discussion, group discussion, and other more interactive learning activities. (Morevec, Williams, Aguilar-Roca, & O'Dowd, 2010)

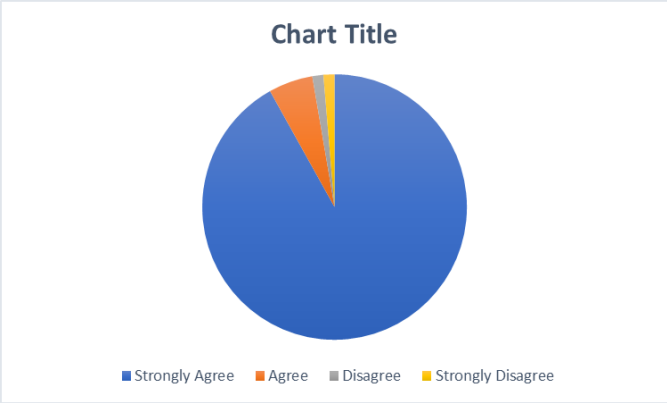

Figure 3: Shows the results on the survey statement: I would like to have another flipped lesson in the next term.

In summary, the survey results seem to suggest that technology is one of the factors of interest in the pedagogical benefits of the flipped model of instruction. According to Zainuddin & Halili (2016) for technology to lead to positive learning changes, it must be presented in the right way. Lockwood and Esselstein (2013) said that if teachers explain how videos will be used in the flipped classroom at the initial stage of the course, students will have a basic understanding of the flipped classroom concept

and its intention thus, students might enhance their motivation to participate in their learning. In general, students may be less motivated to engage in activities or a pedagogical approach if they do not have a clear rationale for doing so (Van der Meer, 2012)

Implications

The research strongly recommends having a session to explain the flipped model of instruction to the students and to the parents before implementing it. Add more videos especially to the students who needed more materials to understand the lesson. Give badges to those who watch the videos, read materials for the asynchronous session to monitor if the students are doing the assigned tasks. More interactive activities for the students for the synchronous sessions. Divide the class into groups/ have breakout sessions for cycle 2.

The flipped model of instruction engaged and motivated the participants in the synchronous and asynchronous activities, they were able to respond to the tasks more effectively. Although the study was short–term, it provided further evidence of the effect of the flipped model of instruction on students' poetry writing skills.

Conclusions

The flipped model proved to be efficient based on the results of the research, the school could utilize it more effectively. The action research may help educators steer as to how they can implement the flipped model of instruction to improve students' poetry writing skills in an online distance learning setup. With the online distance learning set-up, what will be the impact of the flipped model of instruction on students' poetry writing skills. The flipped model of instruction has been introduced a few years ago and not a lot of research has been carried out especially on its effectiveness in improving students' poetry writing skills in an online distance learning setup, this study can fulfill this gap.

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English for Graduation: The Development of an Innovative Japanese University Program Connecting ESP Courses with Graduation Seminar Topics

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Abstract
The increasing importance of English as a global language as well as the recent attention to the merits of the integration of language learning with knowledge/content construction has led to the necessity for the inclusion of courses to satisfy these requirements. With this in mind, the authors' university asked them to develop an ESP program that would enable students to study content related to their graduation seminar subjects in English. They researched and developed new content-based English courses on topics seminar professors identified as important with the aim of providing students with the critical thinking as well as language skills necessary to discuss their graduation thesis topics in English. This paper will explain the process of constructing this new program including a needs analysis to determine specific topics for the new content English courses and the resulting fourteen content English courses divided into two categories: Comparative Cultural Studies and Intercultural Communication. Important caveats will be outlined. For example, overcoming perceived institutional barriers often occuring with the implementation of new programs; in this case the necessity to make the courses accessible to all third and fourth year students of various English language proficiency. The logistics involved in the successful resolution of this situation will be discussed.

Keywords: English for Specific Purposes (ESP), Program Development, Collaboration

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Introduction

Part of the Japanese national education agenda is to promote internationalization by empowering students to enter the global community (Taguchi, 2014). Moreover, the Japanese government has been strongly pushing to promote Japan as an international tourist destination in recent years (Osumi, 2016). Thus, English language skills are becoming ever more important in both the workplace and daily life in Japan. Unfortunately, students generally do not possess functional English language skills because English related to their needs or interests is not typically taught at the high school or university level. Therefore, to accomplish the aims of internationalization, Japanese students need to develop functional English language skills that will help them navigate real world situations. In an effort to help students attain these skills, more and more Japanese universities are beginning to offer specialized courses with the goal of providing students with pragmatic competence in English (Taguchi, 2014). Similar to the linguistic challenges facing students, Japanese professors also have challenges when teaching content courses in English though (Bradford, 2015). As a result, English for specific purposes (ESP) and content and language integrated learning (CLIL) have become buzzwords in Japan as the government and universities look to promote learning practical skills that will enable students to join the global community. Like other universities across Japan, the authors' institution has become interested in introducing ESP courses into its curriculum. Throughout its history, the authors' university, which is located in the heart of Tokyo, has aimed to promote independence and to keep up with the changing world. The university's Faculty of Foreign Studies also has long established relationships with universities in other countries and a strong tradition of encouraging students to study abroad. The proposed establishment of ESP courses within the Faculty of Foreign studies is one of the ways the university is keeping these goals in mind, and continuing to educate students to think critically about the world around them and to enter the workforce with a well-rounded education that prepared them to succeed in the global community. The establishment of ESP courses has been discussed at the university in recent years, and in the 2020 academic year, the process of developing such courses began in earnest. This paper details the planning for introducing English for specific purposes (ESP) courses into the English language curriculum in the 2021 academic year.

What is English for Specific Purposes (ESP)

The ability to communicate in English is vital for professional success internationally as well as in local settings (Basturkmen, 2006). This necessity has become paramount, particularly with the increase of virtual communication for business and education during the COVID19 Pandemic. As a result, ESP has become increasingly relevant for English learners in non-English speaking countries. ESP is a learner-centered approach to teaching English as an additional language. It focuses on developing practical language skills and communicative competence in specific disciplines such as medicine, shipping, business, IT, and engineering (Dudley-Evans & St. John,1998). Resulting from the demand for English in work settings and the necessity for tailored English programs ESP focuses on occupation/learner needs (Belcher, 2006) by teaching language skills using content altered to meet the needs of the learner and the requirements of their profession.

Hutchinson and Waters (1987) define ESP as "an approach to language learning which is based on learner needs. The foundation of all ESP is the simple question: Why does the learner need to learn a foreign language? ... ESP, then, is an approach to language teaching in which all decisions as to content and method are based on the learner's reason for learning" (p. 19). There is no prescribed teaching methodology or materials in ESP, which permits the freedom and flexibility for the needs of the targeted learners to be dealt with appropriately. Coffey (1985) succinctly describes ESP as a "quick and economical" method of using the English language for efficient communication in employment or for the intention of academic learning.

ESP vs. English for General Purposes

University English classes in non-English speaking countries such as Japan tend to focus on English for general purposes (EGP) rather than focusing in students' interests or English needs. As a result, they do not spark interest in language learning because students do not make a connection between the language being learned and real-life situations (Guo, 2012). While EGP courses might offer learners the opportunity become proficient in the language, ESP classes or programs are in direct contrast to EGP courses because they are:

1. Designed to meet the specific needs of the learners.
2. Related in content (themes and topics) to disciplines or specific occupations.
3. Use authentic work-specific academic materials.
4. Promote cultural awareness and seek to improve intercultural competency.
5. Deliver intermediate and advanced level language training.

Generally, the learner enrolled in an ESP course is an adult and is expected to have had the opportunity to study basic English language skills prior to starting the course. As Lorenzo (2005) comments ESP focuses on teaching language in context rather than on grammar and general English skills. In other words, ESP focuses on the task, specific vocabulary, and communication as opposed to the mechanics of grammar and syntax. Therefore, it is considered more appropriate for learners at intermediate English level (Paltridge & Starfield, 2013) than for lower level learners.

Another major difference between EGP courses and ESP is that in ESP, learners are generally learners in a position where they will need English language skills to communicate professionally or to be able to perform job-related tasks (Basturkmen, 2006). This necessity may be considered as a built in motivational tool that serves as a driving factor behind ESP (Lorenzo, 2005). Students in ESP classes are generally aware of the purpose(s) for the English they are learning, and having already oriented their education toward a specific field, whether in post-secondary education or in occupational settings, view their English training as complementing this orientation. This is in direct contrast to most general English courses where often the reason for studying the language may be unclear (Hutchison & Waters, 1987). ESP allows learners to take advantage of their prior subject knowledge enabling them to ascertain a real-world context for the vocabulary and structures they are learning (Paltridge & Starfield, 2013). In the case of the authors' university, the subjects of the ESP courses will align with students' third and fourth year graduation seminar topics. As described below, planning an ESP curriculum requires many steps to ensure the courses meet institutional requirements, the stakeholders' needs are addressed and the courses succeed.

Planning a New ESP Program

The authors' university began talking about establishing an ESP program several years ago when the university president began to promote "B's Vision," which is a plan to offer students the chance to learn both EGP and ESP. The aims of B's Vision is to help students improve their practical English skills and to motivate them to learn English because they will develop the skills to communicate in English in a variety of situations, including those related to their academic and future career interests.

To begin developing the ESP program, faculty members with ESP/CLIL and English for academic purposes (EAP) backgrounds were hired to help transform the curriculum and develop new courses connected to the implementation of B's Vision. In April 2020, a General English Education Committee was established. Within the committee a team of four professors consisting of the ESP/CLIL and EAP specialists, a member of the International Liberal Arts program, and a member of the International Business program was created to undertake the planning and implementation of ESP courses at the university. The ESP/CLIL and EAP specialists were familiar with the concept of ESP as well as curriculum and course design. The faculty members from the International Liberal Arts and International Business programs were also integral to the team because they had worked at the university for many years, and therefore knew the process for making and approving curriculum proposals as well as challenges that might arise when planning curriculum changes. They also had long established connections with the graduation seminar professors in the Faculty of Foreign Studies, which helped create a bridge between the English language professors and the content professors.

Next, the ESP team needed to tackle which level of study the new courses would be introduced at. While the university president had indicated that he would like students to be introduced to ESP early in their university career, the ESP team determined that the best way to begin introducing ESP into the curriculum would be to connect the third year content-based English (CBE) courses, which are currently offered to the graduation seminar topics that are taught in Japanese. Connecting CBE content with seminar content was a logical choice because many of the seminar teachers wanted their students to be able to communicate in English about the topics they study in relation to their graduation theses. Making this connection would also help ease the introduction of ESP because the ESP team would not need to go through the lengthy process of seeking approval to add new courses to the curriculum. Instead, existing courses would simply be renamed and the course content changed to meet the seminar student needs. After the new CBE courses are established, the ESP team will begin to investigate the best way to introduce ESP to first and second grade students at the university, which will eventually become part of the proposed Communication Masters Series that will encompass EGP, English for business purposes, EAP, ESP, and English communication for sustainable development goals (SDGs). Thus, completing the implementation of B's Vision.

One important factor in creating new courses is the ability to change the curriculum to more suit learner needs, including a broad focus course design (Dudley-Evens & St. John, 1998). In other words, the new ESP courses require both understanding the students' English language needs as well as cooperation from faculty, curriculum coordinators, and administrators at the university. Since preparation of an ESP program should include an analysis of the stakeholders' needs (Long, 2005; Hutchison & Waters,

1987), carrying out a needs analysis was paramount for the planning and implementation of the new ESP courses. Therefore, the first step in the ESP project after deciding which courses would focus on ESP was to determine the needs and expectations of the seminar professors and the students. To conduct the needs analysis, the ESP team created an online survey to determine the topics covered in the graduation seminar courses and the types of English communication the seminar professors wanted their students to learn related to those topics. Purposeful Interviews (Cresswell, 2015) were also conducted to gain deeper insights into student needs and faculty expectations of the proposed ESP courses. Finally, department and Faculty Level meetings were held to discuss the results of the needs analysis and determine the viability of creating ESP courses that taught English content related to the graduation seminar topics. Results of the needs analysis showed the seminar topics relate to international issues, information is often in English, students need skills necessary to interact in English with the topics, and there was a feeling that connecting skills to engage with content in English would help students meet the university's TOEIC Test graduation requirement. After analyzing the topics the seminar professors listed on the survey, the ESP team created fourteen new course titles that will become the topics of the new CBE/ESP classes: American Studies, British Studies, Japanese Studies, Children's Studies, Gender, Political Science. SDGs for International Cooperation, Race, Tourism, Economics, Organizational Behavior, Cross-Cultural Management, Information Science, and SDGs for Business. The international nature of these topics reflect the focus of the seminar classes as well as the university's aim of developing globally minded citizens.

Creating New CBE/ESP Classes

Once the English needs were determined, the ESP team was tasked with creating courses to cover the ESP topics. Previously, the aforementioned CBE classes taught content in English, but they were not directly tied to the overall curriculum and goals of the Faculty of Foreign Languages, nor were they taught by content specialists. Also, even though these courses were a required part of third year English language studies in the university's curriculum, students needed a TOEIC score of 400 or above to enter them. Thus, some students were not able to enter the CBE courses. Therefore, the new CBE/ESP courses were divided into lower and higher levels for each topic, which will allow all of the third year students in the university to study content English related to their graduation seminar courses.

Another factor in creating the new courses was to encourage communication and collaboration between the ESP and seminar professors. As a means to encourage collaboration, the ESP team received approval to reschedule the CBE/ESP classes so they would correspond with the seminar class day. This will also help create a sense of 'parallel with experience' (Belcher, 2006) for the students. In other words, moving the classes to the same day the seminar classes are taught serves three purposes.The students can learn content related to their seminars in English as well as their seminar topic on the same day, thus reinforcing both the language and content they were being taught. The students' motivation to learn English might also be enhanced because they would be able to connect content being taught in Japanese with their new English skills from the CBE courses. Finally, the part-time CBE teachers would be on campus on the same day as the seminar professors. Therefore, the opportunity for collaboration between content professors and ESP teachers would be enhanced.

Conclusion

This paper outlined the impetus for and planning curriculum changes to introduce ESP at a Japanese university as a means to motivate students and promote higher level practical English language skills. The ESP team spent the 2020 academic year planning the changes, preparing the courses, and hiring new instructors to implement the courses in the 2021 academic year. They also planned an online ESP Symposium featuring two well-known ESP practitioners in Japan to introduce both ESP and the new courses to the wider community both inside and outside their university. Fully understanding that the new courses will need to be revised during and after their first year depending on student interest, the connection of the ESP contents to the graduation seminar topics, and student ability to learn Content-English as well as practical skills to engage with the content, the ESP team will monitor the instruction and devise methods to promote interaction between the ESP and seminar professors. When students and professors can return to the university after the pandemic, the ESP team plans to create an ESP space at the university where graduation seminar and ESP professors can meet to collaborate on course contents, share materials, and otherwise help each other find ways to meet the students' content English needs. Finally, the ESP team will continue to hold ESP Symposia to discuss the progress of ESP and implementing courses that connect to B's Vision, new research into content-based English instruction, and the future of ESP courses at the university.

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Effective e-Learning for a Global Workforce: Designing with Cultural Competency

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Abstract
Multinational corporations are designing e-learning for a global workforce, yet little is known about factors being considered during design or overall training effectiveness. Contemporary research indicates that the success of e-learning for a global audience requires cultural competence during design. Therefore, this research examined how a multinational corporation considered cultural competence when designing e-learning for a global workforce. Based on a review of the literature on designing e-learning, cultural competence, and training effectiveness, an online survey was distributed to Learning and Development (L&D) professionals working for a multinational corporation. The survey was developed to investigate these professionals' use of cultural competence when designing e-learning training and to determine their perceptions of its effectiveness. The overall results of the survey suggest the organization considered cultural competencies when designing e-learning but there was room for improvement. Interpersonal standards, relating to awareness and understanding of employees working in countries foreign to the organization's home country, scored lowest. Additionally, when surveyed about the efficiency of e-learning for a global workforce, L&D professionals' overall rating was neutral with a wide range in rankings, suggesting a lack of consistency in e-learning training. The information provided may assist L&D professionals working for a multinational corporation with improving training efficiency of e-learning designed for a global workforce and provide a reference to improve the consideration of cultural competence when designing e-learning.

Keywords: Cultural Competence, Training Efficiency, Global Workforce, Multinational Organization

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Introduction

The transition to digitalized environments has allowed multinational corporations to work faster, hire the best people, and expand into new regions worldwide. One of the benefits of digitalization is having immediate access to real-time information. Events occurring on one side of the globe might instantly affect businesses on the other. Zoom, a video conferencing multinational organization, provides a prime example of this with its ability to respond quickly and adjust business practice in response to the COVID pandemic (Gallagher, 2020). In the first week of March 2020, Zoom began offering free accounts to educators prior to the shelter in place order. The availability of information from countries like China and Italy allowed Zoom to respond and adjust business activities in the U.S. for greater success. As a result, Zoom's stock has jumped 386% since March 2020 (Zoom video Communications Inc, ZM, n.d.). However, information is only as useful as the people using it, which requires skilled individuals. For organizations to sustain a competitive advantage, skilled individuals who can interpret information, develop strategies, and implement said strategies are necessary (Bulut & Culta, 2010). Organizations recognizing this have aligned internal departments to the idea, including Learning and Development (L&D) departments. L&D professionals have been tasked with employee development, which Bulut and Culta (2010) describe as systemic activities leading to improved skills, knowledge, and behavior in order to perform job-related tasks. As a result, L&D organizations employ instructional designers who are charged with developing relevant and engaging courses. In recent years, many organizations have created electronic learning (e-learning) to provide content to a global workforce; however, little is known about how this e-learning is designed and its effectiveness.

Literature Review

In order to effective, cultural-based e-learning, three areas of literature were reviewed: understanding cultural competence, designing for a global workforce, and measuring training effectiveness. With regard to cultural competence, a significant challenge of e-learning is a lack of considering the diversity of learners, an area not often addressed by instructional designers (Woodley, 2017). Research conducted by Overall (2009) analyzed the use of a cultural competence model in a professional setting. Cultural competence refers to understanding and respecting differences in culture and addressing issues of disparity among diverse populations. Overall's cultural competence model identified three critical domains necessary to understand and appreciate diverse cultural groups and underserved populations: cognitive, environmental, and interpersonal. Within each domain are actionable standards that can measure an organization's cultural competence. Figure 1 illustrates Overall's cultural competence model. L&D professionals can apply this model to determine the extent to which cultural competencies are considered when designing e-learning.

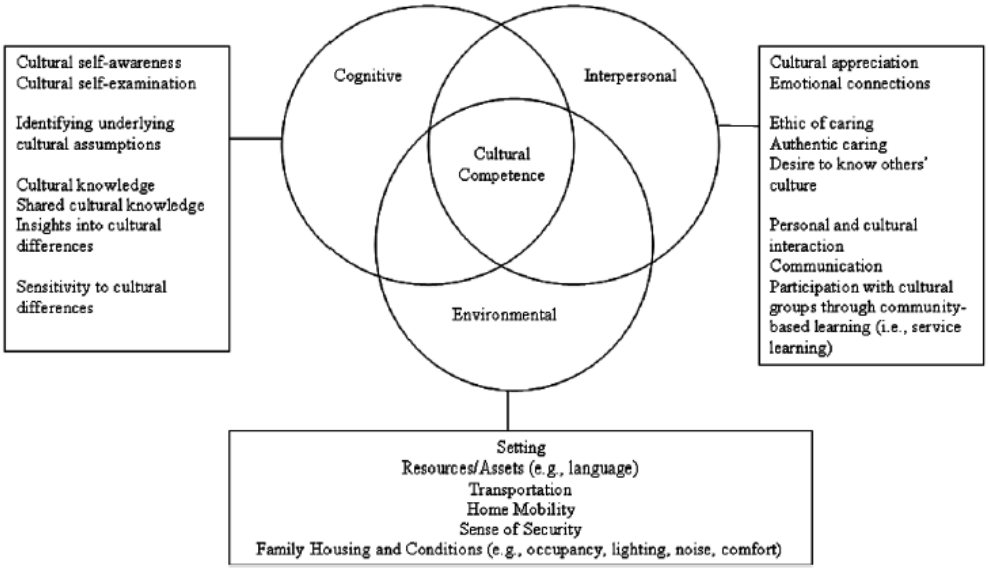

Figure 1: Cultural competence model.

In addition to cultural competence, literature on designing e-learning for a global workforce was reviewed. One study (McLaughlin, 2009) identified three key themes for effective design: self-efficacy, accessibility, and cultural sensitivity. Self-efficacy encourages employees to take ownership in their training, accessibility concerns using technologies to address challenges of language, information and support, while cultural sensitivity refers to an awareness of learners' socio-cultural backgrounds and abilities (McLaughlin, 2009). Woodley (2017) identified technical aptitude as a consideration for e-learning design, where L&D professionals working for multinational corporations conduct thorough audience analysis for different regions or countries. This process of audience analysis is included in many design frameworks including the ADDIE, SAM, and Dick and Carey design models (Instructional Design Models, n.d.). Last, Hawks and Judd (2020) offered strategies for developing global e-learning, including the use of Open Educational Resources (OER) and sourcing a local subject matter expert (SME).

Finally, in addition to cultural competence and global workforce design, measuring training effectiveness is a significant objective for multinational corporations. A benchmark report on corporate L&D trends that surveyed 660 L&D professionals from 55 different countries showed training efficiency to be amongst the top goals for the field (Little, 2016). Determining training effectiveness varies for each organization. A manufacturing organization may define training effectiveness through job application and output quantity, whereas a medical device organization may rely on employee signatures. However, appropriately measuring effectiveness may require analysis of organizational training culture. Beinicke and Kyndt's (2020) research on maximizing training effectiveness in corporate settings identified four factors that may be most relevant to training efficiency: (a) support from managers, (b) positive and negative consequences, (c) phases of exercise, and (d) meaningful feedback.

Methodology

A survey was developed to assess L&D professionals' perceptions of the use of cultural competence when designing e-learning and to collect data on how multinational corporations design e-learning for a global workforce. This study asked the following questions: (a) which cultural competencies are L&D professionals working for a multinational organization considering when designing e-learning for a global workforce and (b) what are the perceptions of L&D professionals working for a multinational organization on the effectiveness of e-learning created for a global workforce? Using google forms, the survey was divided into seven sections:

1. Demographics of L&D professional
2. Data about the corporation
3. How e-learning is designed
4. The cognitive domain of cultural competence
5. The interpersonal domain of cultural competence
6. The environmental domain of cultural competence
7. Perception on training efficiency

To gather demographics about the surveyor, organization, and available resources, 15 open-ended and multiple-choice questions were included in sections one to three. In sections four through seven, 19 questions were created using a 5-point Likert-scale to determine cultural competence in designing e-learning and training efficiency. The 5-point Likert-scale ranged from never (1) to always (5). Cultural competence questionnaires derived from Overall's (2009) cultural competency model and training efficiency questionnaires derived from Beinicke and Kyndt's (2020) research findings on maximizing training effectiveness in corporate e-learning.

The target audience for the survey were L&D professionals who work for a multinational corporation. The authors used LinkedIn, a professional social networking platform, to recruit survey participants. The survey was available for eight days in December 2020. Surveys were anonymous and data received were analyzed statistically.

Results

The survey was conducted over eight days asynchronously and feedback was anonymous. Overall, data were collected from 14 survey participants. Thirteen of the respondents self-identified as an L&D professional while 1 respondent did not identify as an L&D professional and was therefore excluded from the results. The data were divided into three parts: (a) demographics, (b) cultural competence, and (c) training effectiveness. The demographics showed the average years of experience amongst survey participants was 9 working in L&D as either a manager, instructional designer, specialist, or coordinator. When asked if a current role directly influences how e-learning is designed, 100% of the participants answered yes. The respondents represented various industries, including technology, bio-medical, food and beverage, finance, and surgical robotics. Among the 13 respondents, 30 languages were identified as being used when designing e-learning. All respondents indicated they worked for an organization designing e-learning internally within the organization. All of the respondents also indicated using a learning management system and an authoring tool

to create and track e-learning. However, when asked if they were provided with opportunities to learn cultural competence, 46% of respondents answered no.

Survey results regarding cultural competence are provided below in Tables 1, 2, and 3, with mean, median, mode, and range indicated. Mean ratings with values of 1 and 2 were considered negative, 3 neutral, and 4 and 5 positive.

Standards of the Cognitive Domain	Mean	Median	Mode	Range
(1) Self-Awareness: *Understands their job role and responsibilities*	4.08	4	5	2
(2) Cultural Knowledge: *Understands the culture of their team, division, and worksite*	4.15	4	4	2
(3) Shared cultural knowledge: *Understands company-wide culture*	4.08	4	4	2
(4) Insights into cultural differences: *Understands cultural differences of employees working abroad*	3.00	3	2	4
(5) Sensitivity to cultural differences: *Able to customize design base on cultural differences*	3.15	3	4	4
Overall: *Cognitive domain of cultural competence*	3.69			

Table 1: Survey results of the cognitive domain of cultural competence.

There were 5 standards within the cognitive domain (Table 1) of cultural competence. The overall mean of the cognitive domain was 3.69 which is just above neutral.

Standards of the Environmental Domain	Mean	Median	Mode	Range
(1) Language Barriers: *Support language issues by providing solutions*	3.23	3	4	4
(2) Access to technology: *Considers the technology needed to perform the e-learning and can support learners with the tools needed.*	4.08	4	4	2
(3) E-Learning Usability: *Learners ability to complete the e-learning with ease*	3.85	4	4	3
(4) Sense of Security: *Learners are comfortable participating in the e-learning.*	4.00	4	5	3
(5) Training Support: *Having someone immediately available to address challenges or requests for help.*	3.77	4	4	3
Overall: *Environmental domain of cultural competence*	3.78			

Table 2: Survey results of the environmental domain of cultural competence.

There were 5 standards within the environmental domain (Table 2) of cultural competence. The overall mean of the environmental domain was the highest among all the domains at 3.78.

Standards of the Interpersonal Domain	Mean	Median	Mode	Range
(1) Cultural appreciation: *Advocate for employees based outside your home country*	3.31	4	4	4
(2) Desire to know other cultures: *Invest time into learning about co-workers based outside your home country.*	3.31	4	4	4
(3) Interact with employees: *Specifically, those based outside your home country.*	3.54	4	4	4
(4) Build Community: *with employees based outside your home country.*	3.38	4	4	4
Overall: Interpersonal domain of cultural competence	3.38			

Table 3: Survey results of the interpersonal domain of cultural competence.

There were 4 standards within the interpersonal domain (Table 3) of cultural competence. The overall mean of the interpersonal domain was 3.38 which was the lowest among the domains.

The final section of the survey data was training effectiveness. Using Beinicke and Kyndt's (2020) research findings on maximizing training effectiveness in corporate e-learning, six criteria were used to analyze whether L&D professionals perceived e-learning for a global workforce as efficient. A yes or no questionnaire was used to measure criteria one and two, while a 5-point Likert-scale ranging between never (1) and always (5) was used to measure criteria three to six. Criterion one showed that 92% of organizations included a quiz in their e-learning, while criterion two showed only 67% solicited feedback from learners. Results from criteria three to six are shown in Table 4.

	Mean	Median	Mode	Range
(3) On average, learners are able to retain information provided through e-learning.	3.38	4	4	2
(4) On average, managers support employees with e-learning	3.00	3	3	3
(5) On average, learners are aware of the positive and negative consequences for completing or not completing e-learning	3.54	4	4	3
(6) Learners receive analytically meaningful feedback	3.00	3	3	3
Overall training effectiveness	3.23			

Table 4: Criteria of training effectiveness.

The overall training effectiveness of e-learning designed for a global audience was 3.23, just about neutral.

Conclusion

The overall perception rating of L&D professionals regarding the consideration of cultural competence in designing e-learning for a global workforce (Tables 1, 2, and 3) had a mean slightly above neutral (3.64) with five standards receiving a mean at 4 or above and nine standards with a mean equal to or greater than 3 and less than 4. As for

overall training efficiency (Table 4), L&D professionals' ratings were slightly neutral (3.23) as well, with all activities receiving a mean of equal to or greater than 3 and less than 4. These data suggest a lack of consistency for both the consideration of cultural competence in design as well as the efficiency of the e-learning training.

L&D professionals' rating of the cognitive domains (Table 1) were mixed between positive (standards one, two, and three) and neutral (standards four and five). Unlike positive rated standards, neutral standards asked participants to consider employees working abroad. Furthermore, neutral standards ranges showed L&D professionals' responses were spread across all five rank choices. These two findings suggest providing insight and sensitivity to cultural differences as areas of organizational improvement for L&D professionals.

The standards in the environmental domain (Table 2) varied between tools, atmosphere of learning, and human support. Access to technology had the highest mean standard with the lowest range which suggested an overall positive perception of technology by L&D professionals. Language barriers were the opposite, having the lowest mean with the highest range, suggesting a broad spectrum in performance among organizations when addressing language issues and an area for improvement.

The interpersonal domain (Table 3) of cultural competence received the lowest overall mean (3.38) with all standards' means in the neutral rank. Interpersonal domain standards required L&D professionals to consider employees working outside the organizations home country. Similarly, standards from the cognitive and environmental domains that asked L&D professionals to consider employees outside the organizations home country also had means in the neutral rank with a wide range of four. These findings suggest areas of improvement for organizations to begin considering cultural competence when designing e-learning. The results of the training effectiveness survey (Table 4) show an overall mean of 3.23 and all four criteria in the neutral rank. Since participants were asked to share perceptions of training provided, neutral rankings also indicate inconsistency and concern with the effectiveness of the training.

Overall means in all three domains of cultural competency were in the neutral rank and ranges tended to be broad. This suggests organizations were considering cultural competence at different levels and perhaps future research should more specifically focus on scale. Additionally, L&D professionals perceived training effectiveness of e-learning for a global workforce as neutral. Organizations should be doing a better job in this area.

Overall, this study provides insight on cultural competence and training effectiveness in a multinational corporation. The significance of this study is threefold:

1. It provides data regarding the current use of cultural competence when multinational organizations design e-learning for a global audience;
2. It provides a glimpse to how L&D professionals perceive training effectiveness of e-learning for a global audience; and
3. It provides a reference for analyzing cultural competence and training effectiveness when creating e-learning for a global workforce.

The demographics provided suggest multinational corporations have the tools necessary to create and track e-learning. All L&D participants confirmed having a

learning management system and an authoring tool to create e-learning. Furthermore, access to the interpersonal domain's technology standard received a positive rating with a low range rating. This suggests that the process in how e-learning is created could benefit from considering cultural competence for some organizations.

Recruiting participants exclusively through LinkedIn and the small sample size were limitations of the study. In addition, there is a need for future research. For example, a grander scale for the study would be beneficial. This could be accomplished by promoting the survey to a broader audience. Additionally, adjusting the research to determine the scale of use of cultural competence could prove illuminating. Finally, designing a study to explore the relationship between training efficiency for a global workforce and the use of cultural competence when designing e-learning is recommended.

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The Reset Framework: Examining Critical Factors in Parent-Child Math Participation

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Abstract
Research has shown that parent-child engagement in math activities has a significant positive impact on children's mathematics achievement. Yet, studies also show that parents' mathematics engagement with their young children is largely limited or uninformed. As evidence mounts supporting the importance of kindergarten math-readiness and its role in the future success of students, it is critical that researchers study the ways in which the home numeracy environment (HNE) shapes children's math knowledge in the early years. The present study, through a digital survey and semi-structured interviews, used the RESET Framework (*Role, Expectations, Skills, Efficacy, Time*) to examine the HNEs of 23 parents of four and five-year-old children. The RESET Framework is a new tool that allows for critical examination of the factors that most influence the math-activity participation of parents, and how these different factors may interact with one another to impact parent-child math activity. The results of this study provide researchers with new tools and approaches for studying the HNE, potentially leading to the creation of better parent-engagement programs, increases in parent-child math activity, and higher math achievement for children - especially for those children most at risk for lack of school-readiness.

Keywords: Home Numeracy Environment, School Readiness, Early Childhood Mathematics, Parent Child Interactions, Parent Engagement, Parent Expectations, Early Mathematics

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Introduction

Education stakeholders have worked diligently to help parents understand the importance of the Home Literacy Environment. Unfortunately, awareness-building around the importance of the Home Numeracy Environment (HNE) has been largely ineffective (Blevins-Knabe, 2016). As a result, many parents who support the literacy development of their children may engage with them very little through math. Several studies have shown that parental engagement with children through math has a significant positive impact on students' mathematics achievement, and that the more parents interact with their children through mathematics, and through specific kinds of activities in particular, the more such interactions may lead to improved mathematics outcomes for children (Berkowitz et al., 2015; Gunderson & Levine, 2011; Huntsinger, Jose, Liaw, &Ching, 1997; LeFevre, Clark, & Stringer, 2002; LeFevre et al., 2009; Levine et al., 2010; Niklas & Schneider, 2014; Manolitsis et al., 2013). Yet, studies have also shown that parents' mathematics engagement with their young children is limited, especially when compared to parent-child interactions through literacy (Blevins-Knabe, 2016; Blevins-Knabe & Musun-Miller, 1996; Cannon & Ginsberg, 2008; Musun-Miller & Blevins-Knabe, 1998; Skwarchuk, 2009). Moreover, research on the HNE has been hampered by a lack of validated tools and instruments, common terms and definitions, and best practices in researching this topic (Blevins-Knabe, 2016).

Key Competencies in Early Childhood Mathematics

A number of studies have confirmed the relationship between early math competencies and later school achievement (Claessens & Engel, 2013; Duncan et al., 2007; Nguyen et al., 2016). Significantly, a longitudinal study (n = 781) done by Nguyen and colleagues (2016) found that certain preschool mathematics competences are more predictive of overall fifth grade mathematics achievement, with counting and cardinality competencies being the strongest predictors. Furthermore, specific advanced counting and cardinality competencies (Table 1) were much more predictive of later achievement than basic counting and cardinality competencies.

A Comparison of Simple vs. Advanced Number Concepts and Skills
Adapted from Betts & Son (2020), based on the research of Nguyen et al., (2016)

Math Concepts and Skills	Description & Examples
Simple Number Concepts and Skills	• ***Count sequence***: Child recited the count sequence (eventually up to 10 and beyond: "1…2…3…4…5" • ***Numeral recognition***: Child can recognize and all the numerals from 1 to 10 • ***Count all (one group):*** Given a collection of items within 10, child can count them and label the set: "1…2…3…4…5… there are five pennies!"
Advanced Number Concepts and Skills	• ***Count sequence:*** The child can recite the count sequence beyond 10 and up to 20 (or beyond): "11…12…13…14…15…16" • ***Count all together (two or more groups):*** given two (or more) small groups of items, the child can use counting to determine how many there are altogether, e.g., "You have 2 gummies and 3 fish crackers, how many snacks do you have in all?" • ***Count forward (or backward) from any number:*** Given a starting number other than 1, the child can count forward (or backward), e.g., "Let's start counting from 5, what comes next? 5…6…7…8…9…" • ***Count on (or count back):*** Given the total quantity of one group, the child can count forward to "count on" another group, e.g., "There are three jellybeans in my jar, an now these other jelly beans make…4…5…6…7 total!"

Table 1: Simple vs. Advanced Number Skills and Concepts

Differences in Mathematics Knowledge at School Entry

Children begin school with a wide range of experiences and prior knowledge. Unfortunately, many children begin kindergarten without the requisite knowledge needed to take full advantage of the formal math learning that school has to offer (Betts et al., 2020; Claessens & Engel, 2013, Jordan & Levin, 2009). Consequently, many children are unable to master key math competencies during the kindergarten year, leaving them unprepared for subsequent grades. These disparities in children's math readiness may result from differences in the HNE, primarily "*differences in characteristics of parents, namely their cognitions, practices, and language about math*" (Elliot & Bachman, 2018, p.3).

Development of the RESET Framework

To understand the impact of parents, Hoover-Dempsey and Sandler (1997) developed a model identifying several factors that influence parental involvement, including parent perceptions of their role, sense of efficacy, and invitations to be involved (e.g., from the teacher, school, or the child). This model has evolved to include parents' perceived life context, with particular attention paid to parent perceptions of available time and energy, as well as their own skills and knowledge (Walker et al., 2005). Other research has shown that parental expectations of the child's learning is another important factor influencing parent involvement (DeFlorio & Beliokoff, 2014; Kleemans et al., 2012; Missall et al., 2015; Segers, Kleemans, & Verhoeven, 2015; Skwarchuk et al., 2014). Using this research, the author created the RESET Framework with the domains of *Role, Efficacy, Skills, Expectations,* and *Time*, to integrate these key factors in a meaningful way. The RESET Framework can be used to examine parent involvement in any area of their child's education. However, for this study RESET domains have been specifically defined to reflect math engagement (Table 2).

RESET Dimensions	RESET Framework Scale	
Role: *influenced by parents' early experiences with learning math, their own parents, school, and societal influences. It is socially constructed and may change in response to changing social conditions or efforts (by parent or outside groups, like an intervention program) to alter it.*	**R**	1 2 3 4 Uninvolved — Involved
Expectations: *influenced by parent perceptions of the value of mathematics, it's role in the life of the parent and future life of the child, and their understanding/ awareness of early childhood mathematics.*	**E**	1 2 3 4 Math Unimportant — Math Very Important
Skills & Knowledge: *Parents' perceptions of their own math skills and knowledge impact the ways in which they choose to interact with their children, the types of skills and concepts the emphasize, the expectations they have for their children's math development.*	**S**	1 2 3 4 Low Skills/Knowledge — High Skills/Knowledge
Efficacy: *Parents' perceptions of their own self-efficacy is related to their belief in their ability to successful support the math development of their child. It is influenced by their perceptions of math skills and knowledge and influences their expectations and modes of math engagement.*	**E**	1 2 3 4 Lacks Confidence — Confident
Time & Energy*: Parent engagement in shared math activity is influenced by their perceptions of the time and energy available to participate.*	**T**	1 2 3 4 Unavailable — Available

Table 2: The RESET Framework is informed by the work of Hoover-Dempsey & Sandler (1997), Walker and colleagues (2005), and others. It is hypothesized that patterns of parent perceptions along the RESET dimensions may relate to the mathematical activity participation of parents.

Purpose of this Study

The purpose of this study is to examine the factors that influence parental decisions around interacting with their young children through mathematics, and to test the RESET Framework as a tool for examining the involvement of parents. Specific research questions explored were:

1. How do parents vary in terms of their perceptions of *Role, Expectations, Skills, Efficacy,* and *Time (RESET)?*

2. What patterns or trends emerge among groups of parents in relationship to the RESET domains?

3. What relationships exist between parent perceptions along RESET and parents' self-reports of shared math activity?

Methods & Procedures

Study Design. This exploratory mixed-methods study was reviewed and approved by the University of Buffalo's Institutional Review Board (IRB) for research and employed both a digital survey and a semi-structured interview with individual parents (Figure 1). Parent surveys and interviews were conducted in July of 2019 at the offices of Age of Learning, Inc. (AofL), where the author is an employee. AofL funded sample recruitment, made research staff, facilities and tools available (e.g., interview room, video equipment, etc.) and provided a modest gratuity ($100 Visa gift card) to each parent for their participation. Other than this support, AofL had no role in this study.

Participants. The sample for this study consisted of 23 parents of 4-5-year-old children who had not yet begun Kindergarten. The sample was provided by a panel creation firm, Innovate MR, using their nationwide database. Innovate MR recruited a diverse sample of parents with at least one 4-5-year child who had not yet started formal Kindergarten from the Los Angeles, southern California area in the United States (Table 3).

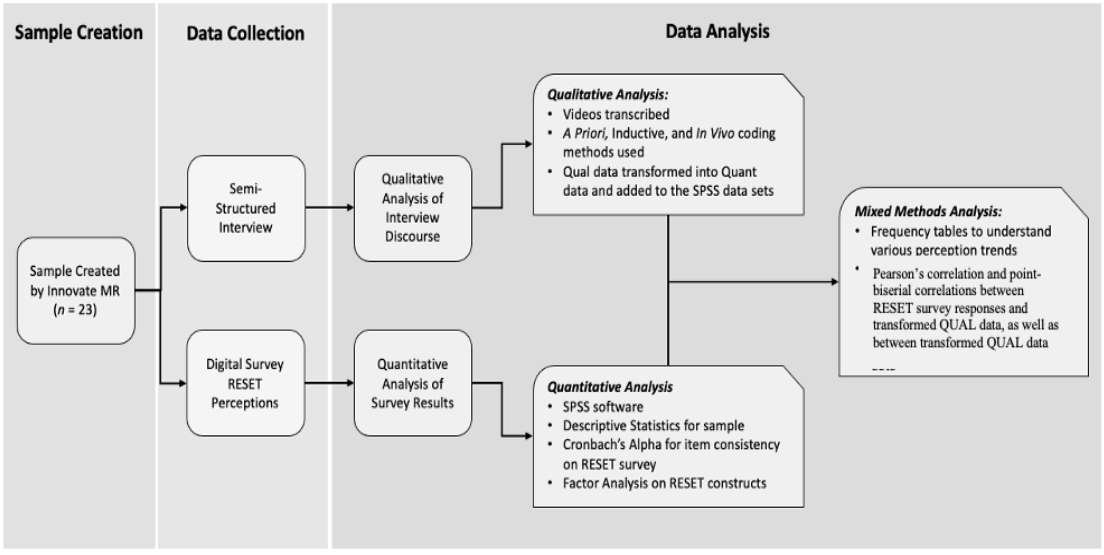

Figure 1: Study Design

Demographic Data for Sample

Demographic Categories	Frequency	Valid Percentage
Gender		
Female	17	73.9
Male	6	26.1
Age		
18-24 yo	1	4.3
25-34 yo	7	30.4
35-44 yo	14	60.9
45-54 yo	1	4.3
Ethnicity		
White	7	30.4
African American	5	21.7
LatinX	8	34.8
Multi-Racial	3	13.0
Education Level		
Some Highschool	1	4.3
Highschool Graduate	2	8.7
Vocational/Technical	4	17.4
Some College	6	26.1
Bachelor's Degree	8	34.8
Graduate Degree	2	8.7
Income Level		
$25,000 - $49,999	8	34.8
$50,000 - $74,999	5	21.7
$75,000 - $99,999	3	13.0
$100,000 - $149,999	4	17.4
$150,000 - $199,999	2	8.7
$200,000 or more	1	4.3
Employment		
Fulltime Stay-at-Home	5	21.7
Employed Part Time	7	30.4
Employed Fulltime	10	43.5
Student	1	4.3
Marital Status		
Single / Divorced / Never Married	7	30.4
Married of Living with Partner	16	69.6

Table 3: Demographics of the Sample

The Digital Survey. The digital survey included three sections: (1) the RESET survey, which included five items per domain, rated using a four-point Likert scale (Figure 2) (2) math activity items, where parents indicated whether or not they engaged in listed math activities (Figure 3), and (3) demographic information, where parents provided additional demographic information about themselves (e.g., education and income levels, marital status, ethnicity, and home language, etc.).

RESET Survey Items

Strongly Disagree (1), Disagree (2), Agree (3), Strongly Agree (4)

Role:

1. It is important for me to talk to my child about math.
2. It's my job as a parent to help my child become a better reader.
3. All parents should push their children to do well in math.
4. It is important for me as a parent to help my child with math.
5. It's my job as a parent to help teach my child new math skills.

Expectations

6. Doing well in math is as important as doing well in reading.
7. It is important to me that my child does well in math.
8. I want my child's teacher to let me know how my child is doing in math in school.
9. Doing well in math leads to success in school and life.
10. I expect my child to do well in math.

Skills

11. I have the math knowledge and skills I need to help my child with math.
12. It is easy for me to learn new math skills
13. I struggled to learn math as a student.
14. I sometimes struggle to do math related tasks in my life.
15. I did well in math when I was a student.

Efficacy:

16. I sometimes feel anxious when helping my child with learning math.
17. I am confident that I can help my child learn math as he or she grows.
18. Sometimes I am nervous when my child asks me questions about math.
19. I feel uneasy when I have to solve a tough math problem.
20. I am confident that I know how to help when my child struggles with math.

Time:

21. I spend time every week doing math activities with my child.
22. I have time to play games with my child.
23. I wish I had more time and energy to play games with my child.
24. I am able to spend time most days doing math activities with my child.
25. I have the energy needed to help my child with his/her learning.

Figure 2: Items arranged by RESET domain. These items were arranged randomly in the survey and were accompanied by a 4pt Likert scale that parents used to rate the strength of their agreement with each statement.

Please check all statements below that are true about your family and home environment:

1. We are able to provide math related toys in our home (e.g., cut out puzzles, shapes, etc.)
2. I often help my child count out groups of up to 5 items (e.g., counting raisins, etc.)
3. Together with my child, we often count aloud to 10 in the correct order
4. I point out shapes in the environment for my child to see (e.g., "look, that plate is a circle.")
5. Together with my child, we sometimes count aloud backwards from 10
6. Together with my child, we sometimes count aloud to 20 in the correct order
7. I help my children learn the names of the written numbers 1 through 10
8. I help my child add up small numbers (e.g., I have 2, you have 3, that's 5 in all!)
9. I often play simple boardgames with my child (e.g., Candyland, etc.)
10. I often play simple card games like Go Fish or Old Maid, with my child

Check all statements below that describe words and ideas you use when talking to your child:

11. I use words like big or small to describe size
12. I use words like more, less, and the same when comparing groups of objects
13. I talk to my child about time concepts like morning and night
14. I use words like after, before, next, later, and soon to describe time relationships
15. I use words like bigger, smaller, longer, and taller to compare things
16. I use words like on top, below, left, and right to describe physical locations
17. I use words like first, second, third and so on to describe positions
18. I'm not sure what words I'm using with my children

Figure 3: MAPP (math activity participation of parents) items from the RESET survey

The Interview. The interview was divided into two parts. Part 1 focused on open-ended questions designed to let parents speak spontaneously about their perceptions of their parental role, their expectations of their child's math performance, their own math skills and knowledge, their confidence (efficacy) in supporting their child's math development, and their perceptions of available time and energy to support the math learning of their child. Part 2 asked parents to elaborate on the types of shared math activities they typically engage in with their child, and to evaluate pairs of common math activities to indicate which one they would more likely do with their child (Figure 4).

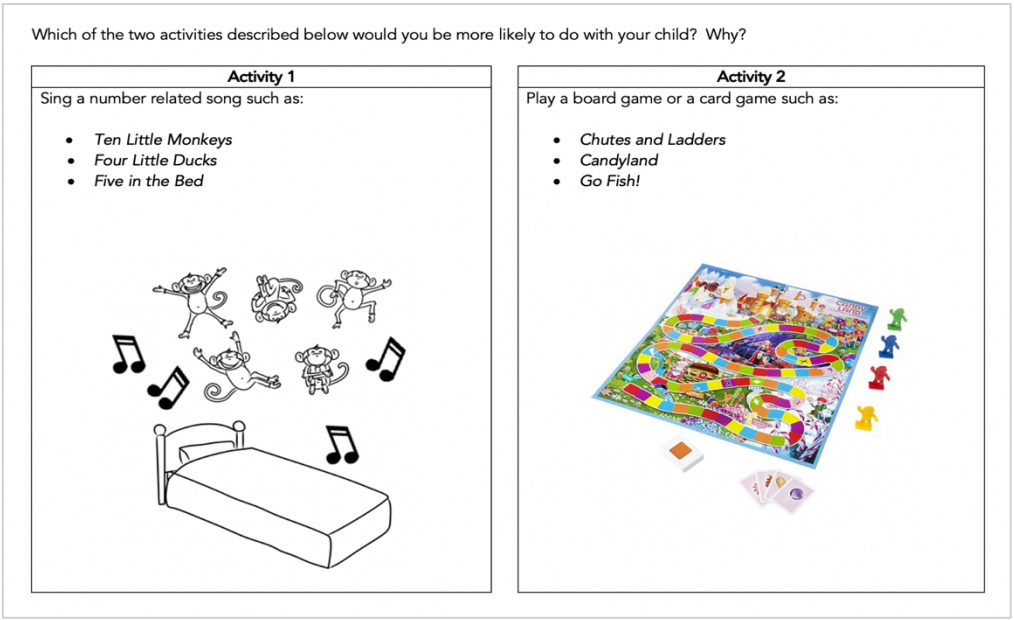

Figure 4: An example of the types of "activity pairs" that parents were shown during the interview.

RESET Domain	Subcode	Description
ROLE		
Level of Responsibility and Accountability.	Proactive	• Saw themselves as responsible for "teaching" their child mathematics.
	Active	• Saw themselves as responsible for actively "partnering" with the child's teacher.
	Passive	• Saw themselves as responsible for **"**encouraging**"** the child, but not actively involved in teaching.
EXPECTATIONS		
Outcome Focus.	Performance Focused	• Focused on "high achievement," "good grades," and being "best in class"
	Effort Focused	• Focused on "putting in hard work," "never giving up," and persisting until they "get it"
	Emotion Focused	• Focused on the child feeling "good about math," "enjoying math," "having confidence," "having fun"
Knowledge of Early Childhood Math.	Simple Number Skills	• Count sequence to 10, recognizing numerals to 10, count all to 10, etc.
	Variety of Concepts/Skills	• Simple number skills as well as some geometry and measurement, spatial understanding and some advanced concepts (below)
	Advanced Number Skills	• Simple number skills as well as count beyond 10 (20, or to 100), count on, count together, count forward or backward from any number
SKILLS		
Parent perceptions of their own math knowledge and skills.	"Strong"	• Believed themselves to have strong math skills, advanced courses in high school and college
	"Good"	• Believed themselves to have good math skills, and capable of handling the mathematics in their lives
	"Ok"	• Believed themselves to have sufficient math skills to get through life, but felt as if low skills had limited their choices
	"Weak"	• Believed themselves to have weak math skills that severely limited their choices and options in their everyday lives
EFFICACY		
Parent levels of math anxiety impacting their perceptions of self-efficacy.	Intense	• When discussing their experience with math, used words like *hate, terrified, scary, overwhelmed, damaging, intimidating*
	Serious	• When discussing their experience with math, used words like *anxious, inadequate, embarrassed, insecure, worried, struggling, lost*
	Moderate	• When discussing their experience with math, used words like *confused, frustrated,* and feelings of negativity toward math
	Mild	• When discussing their experience with math, used words like *difficult, challenging,* and expressed feeling occasional nervousness
	Unspecified	• Did not use any of the above language during the interview when describing their feelings about or experience with math
TIME		
Factors parents perceived to be impacting their time and energy.	Time & Energy Saving Activities	• Parents described needing activities that were convenient to everyday life, family routines, that were active for active children
	Engagement & Interest	• Parents described wanting activities that were of interest to both family and child, so that they took less energy (battling with child) to engage
	Children/Siblings in Home	• Parents described numerous challenges that arose from the presence of siblings in the home (e.g., other children's needs for attention, or activities and schedules of other children in the home making it difficult to make time, or have the energy, to engage in math with their 4-5-year-old child)

Table 3: Subthemes that emerged during qualitative coding

Data Collection and Analysis

Survey data were collected digitally and then analyzed using SPSS software. Internal consistency of the items for each RESET domain were examined using Cronbach's alpha. Interviews were video-recorded and then transcribed using Transperfect software. Video transcriptions and detailed researcher notes were analyzed using categorical strategies to confirm *a priori* themes (i.e., RESET), as well as to identify emergent themes. While RESET was used as a broader hypothesis, many sub-themes emerged within the five RESET domains as a result of this analysis (Table 4). Qualitative data were then transformed into quantitative data using dummy or ranked

codes, or transformed using categorical strategies. These data were then compared each other and with the survey data using various statistical tests, including frequencies and tests of correlations (e.g., Pearson's correlation, point-biserial).

Results

Reliability of RESET survey items was assessed using Cronbach's alpha. Unreliable items were removed to increase Cronbach's alpha for each domain, with final values equal to: *Role* $\alpha = 0.609$; *Expectations* $\alpha = 0.537$*; Skills* $\alpha = 0.922$*; Efficacy* $\alpha = 0.790$*; Time* $\alpha = 0.737$. Parent responses for each RESET domain were averaged to achieve a mean score for each individual domain. These means were examined for patterns and trends and mapped onto individual and collective graphs for visualization purposes (Figures 5, 6, 7).

Graphs of RESET means were also examined for trends and patterns across all parents in the sample, collectively (Figure 6). Though the group of 23 parents was diverse, all parents shared high perceptions of their parental *Role* related to helping their child develop mathematically, with means ranging from 3.0 to 4.0. Parents also shared high *Expectations* for their children, ranging from 3.0 to 4.0, with the exception of one parent. Conversely, parents' perceptions of their own math *Skills* and knowledge, as well as their personal sense of *Efficacy* to confidently support their children's mathematical development, were far more widely dispersed, ranging from 1.2 to 4.0 for *Skills* and from 1.6 to 4.0 for *Efficacy*. Finally, parent perceptions of *Time* and energy available to support their children's mathematics development also varied to some degree.

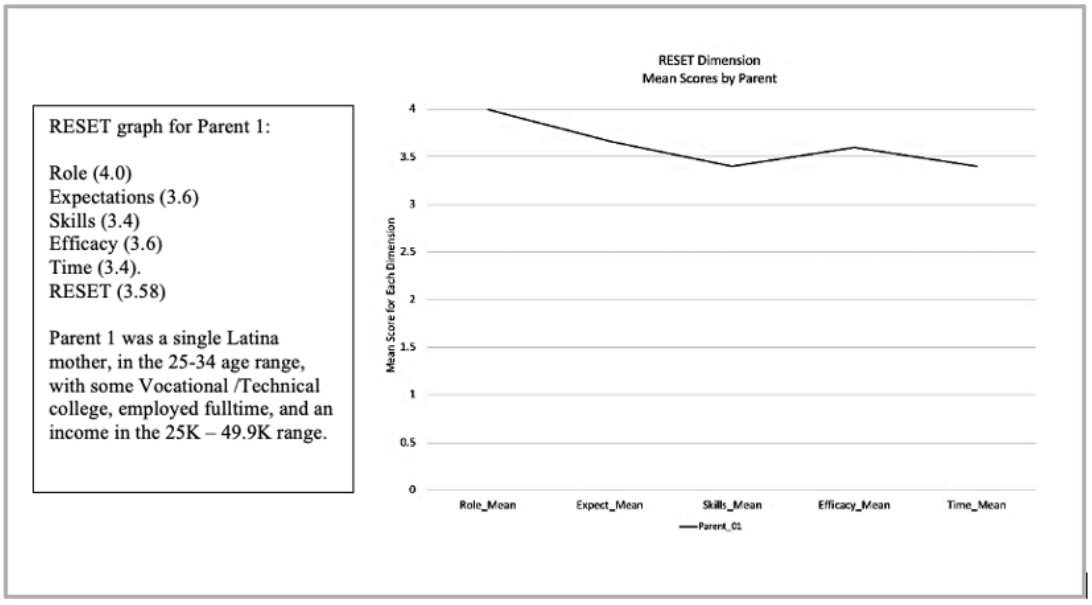

Figure 5: Parent 1 RESET graph

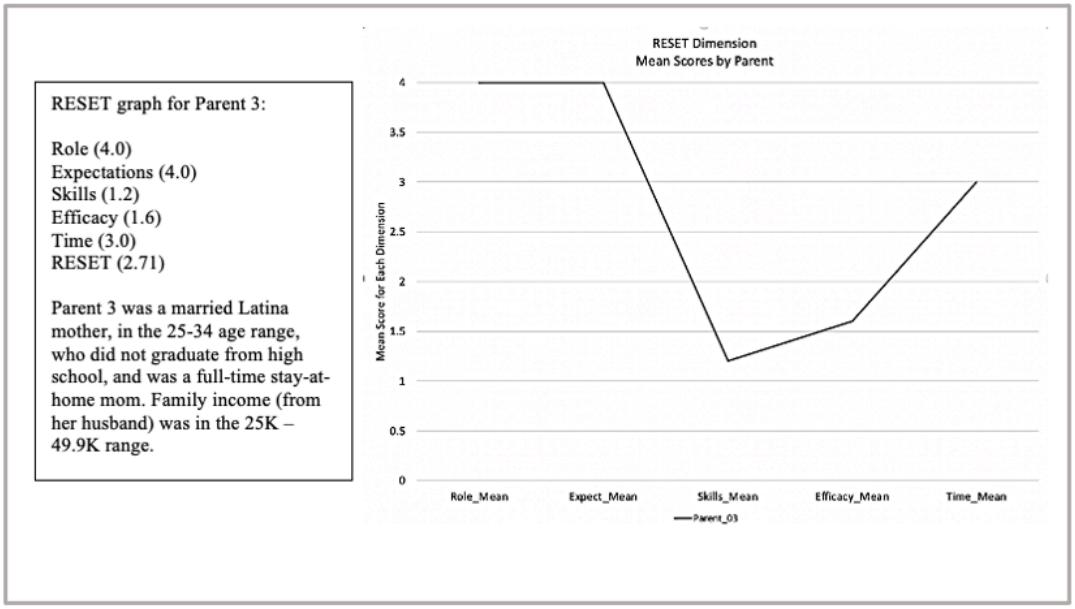

Figure 6: Parent 3 RESET graph

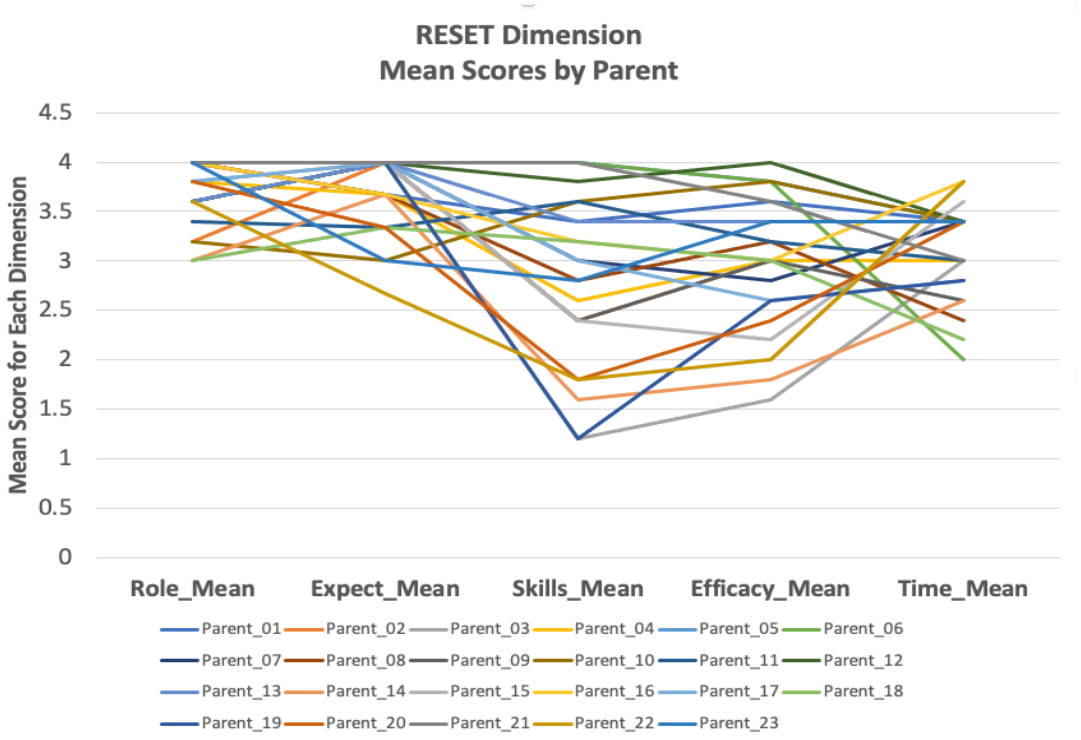

Figure 7: RESET Graph for the entire sample of parents

Role

Parent responses on the RESET survey demonstrated that parents generally perceived themselves to have an involved *Role* in supporting their child's math learning. However, conceptions of "involvement" differed from parent to parent.

By far the largest group of parents in this sample were categorized as *Proactive* parents (47.8 %). These parents exhibited a high degree of personal responsibility for their children's math learning. They proactively taught and reinforced various math concepts

and skills, partnered with preschool or prekindergarten teachers, and showed their children that they valued mathematics learning and deemed it important.

Parents grouped into the *Active* category (26.1%), exhibited a moderate sense of personal responsibility and accountability. *Active* parents were willing to step in as needed, especially if they felt their child needed help, was struggling, or needed more practice. These parents looked more to the child's preschool or prekindergarten teachers for guidance and were happy to follow the teachers' lead by ensuring that their child completed assignments or activities.

Passive parents (26.1%) exhibited a low sense of personal responsibility. They were much less focused on math learning, and more focused on supporting and encouraging their child's efforts. They described a much less active role in helping their children learn math, instead relying on teachers and the environment to expose their children to math concepts. Parents in this group were more likely to lean on math toys (e.g., puzzles, blocks), but not explicitly use such resources to build their children's math knowledge. They were also more likely to depend on older children to help out the 4-5-year-old child with math concepts and skills.

Expectations

Parents' *Expectations* were categorized as *Performance Focused, Effort Focused,* and *Emotion Focused,* or some combination of the three. *Performance-Focused* parents (17.4%) expected their children to exhibit high achievement, earn "good grades," and be "top of their class." *Effort-Focused* parents (17.4%) expected their children to "put in the hard work," to "never give up," and to "keep trying until [they] get it." *Emotion-Focused* parents (26.1%) centered their expectations around the feelings they hoped their child would develop for math, which parents described as "feeling good about math," or viewing math as something they could "have fun" or "enjoy" doing. Parents in the *Emotion-Focused* category further expressed the hope that their children would not "hate math" or be "afraid of math." Other parents expressed a combination of expectations (Figure 7). Overall, parents considered developing positive emotional connections to mathematics a priority.

Parents' understanding of early childhood mathematics was limited and could be categorized into three distinct categories: *Simple Number Skills* (34.8%); *Variety of Concepts and Skills* (47.8%); *Advanced Concepts and Skills* (17.4%) (Table 5). Few parents in this sample had clear ideas of which mathematics skills and knowledge were critical for young children. Only the *Advanced* group were engaging in activities involving key math competencies most predictive of later success in mathematics (Nguyen et al., 2016). In other words, 82.6% of the parents in this sample were *not* engaging in these advanced skills. A small exception to this were a few parents in the *Varied* group who mentioned a couple of advanced skills, but were not engaging in them with any regularity.

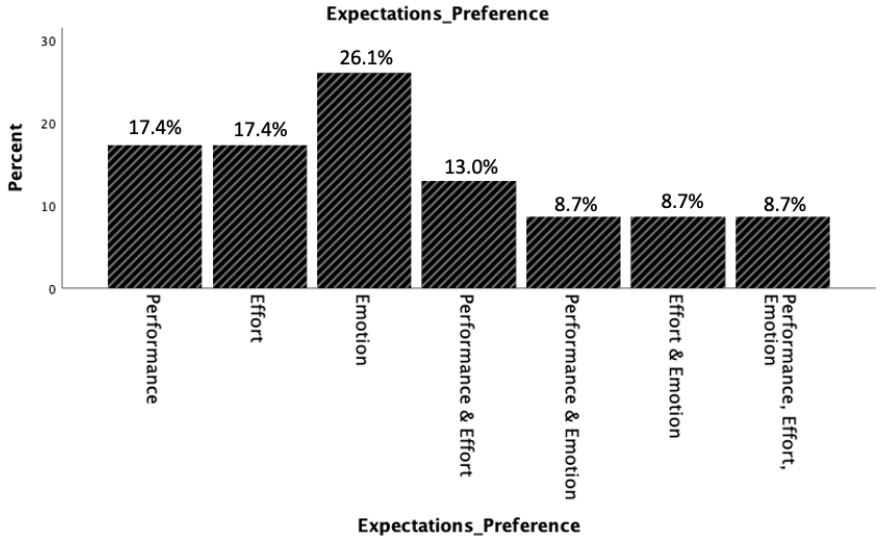

Figure 8: Frequency of various parental performance expectations

Expectations Group	Characteristics	Examples of Activity Types
Simple Number Skills	• Numeral recognition to 10 • Numeral writing to 10 • Count sequence to 10 • Count all to 10 • On occasion these activities might move beyond ten to count to twenty, but not often	• Flash Cards • Worksheets / Workbooks • Counting objects (e.g., fingers, blocks, snacks, etc.) • Singing simple number songs like "One, Two, Buckle My Shoe"
Variety of Concepts & Skills	• Includes most or all of the simple number skills (listed above) • Varied types of measurement • Shape recognition and composition • Sorting by attribute • Visual Spatial activities • Some advanced number skills	• Following a recipe while baking (e.g., 1 cup, 3 tablespoons, 1 teaspoon, etc.) • Counting up coins from a piggy bank (e.g., 10 pennies, 5 nickels, etc.) • Looking for shapes while walking or driving • Playing games like Jenga, or playing with puzzles & blocks
Advanced Number Skills	• All of the simple number skills (listed previously) • Some variety of other math concepts and skills (listed previously) • Advanced counting beyond 10, 20, and often up to 100 • Simple addition and subtraction concepts • Strategy use (e.g., count on, count forward, count backward, etc.)	• Joining or separating groups of objects, as in combining toys, or snacks, etc. • Counting backward when playing a game like "Hide and Seek" or "Tag" • Keeping score during sports like basketball (counting by 2s) • Playing board games (subitization and quick addition with double dice) • Playing card games like War (quickly compare more or less)

Table 4: Types of parental expectations related to early childhood mathematics skills and knowledge

Skills

Parents described their own math skills as *Strong* (17.4%), *Good* (26.1%), *Ok* (21.7 %), or *Weak* (34.8%), suggesting that over half the parents in this sample did not feel confident in their own math skills and knowledge. Parents who described themselves as having *Strong* math skills had higher Skills_Mean scores on the RESET survey (r = 0.492, $p < 0.5$), while no correlations existed for parents who felt they either had *OK* or *Good* math skills. However, there was a highly significantly *negatively* correlated with the Skills_Mean scores on the RESET survey (r = - 0.714, $p < 0.000$). Meaning, there

seemed to be a mismatch for parents who expressed their skills as "weak" in the interview and how they ranked their skills on the survey.

Efficacy

Parents' perceptions of efficacy were closely tied to their feelings of confidence in their math abilities as well as their knowledge of how children develop mathematically. Parents generally had low content knowledge regarding the most important mathematical concepts their children should be learning at this age. Parent perceptions were coded according to the intensity of the language they used to describe their feelings related to mathematics— learning math, doing math, or teaching math to their children (Table 6). Parents' language indicated varying degrees of math anxiety, ranging from expressing "mild discomfort" to feeling "terrified." Over a quarter of the parents (26.1%) did not explicitly express any perceptions of math anxiety through their interview commentary. We cannot conclude from this, however, that these parents were or were not math anxious, only that they did not speak of it in the interview.

Nearly 75 percent of parents in this sample expressed having some level of math anxiety, ranging from mild to intense. Moreover, parent perceptions of math anxiety were highly significantly negatively correlated with parent perceptions of math skills shared in the interview (r = - 0.609, $p < 0.01$). In other words, parents who perceived themselves has having higher levels of math anxiety were more likely to describe themselves as having lower math skills and knowledge. In addition, parent perceptions of math anxiety were highly significantly negatively correlated with parent Efficacy_Means on the RESET survey (r = - 0.603, $p < 0.001$). Meaning, parents who expressed higher perceptions of math anxiety were more likely to rate themselves lower on the *Efficacy* survey items, and vice versa. Lastly, there was a highly significant positive correlation between parents who expressed higher levels of *Math Anxiety* and *Emotion-Focused Expectations* (r = 0.560, $p < 0.001$).

Parent Perceptions of Math Anxiety

Parent Expression of Math Anxiety	Percentage of Parents	Description
Intense	13.0%	• Parent used words such as *hate, terrified, scary, overwhelmed, damaging, intimidating* • Expressed worry that their anxiety was affecting or "damaging" their child • Shared that math anxiety was impacting their everyday lives
Serious	34.8%	• Parent used words such as *anxious, inadequate, embarrassed, insecure, lack confidence, worried, struggling, lost* • Expressed feeling a lack of confidence, or feeling lost
Moderate	17.4%	• Parent used words such as *confused, frustrated* • Expressed feelings of negativity toward math, lacking understanding
Mild	8.7%	• Parent used words such as *difficult, challenging* • Expressed feeling occasional nervousness at times when doing math or helping with math
Unspecified	26.1%	• Parents who did not describe any feelings that were associated with math anxiety • These parents could potentially have math anxiety but did not provide commentary on it.

Table 5: Parents were grouped by level of math anxiety according to the intensity of the language used to describe their feelings.

Time

Parents admitted honestly that finding the time and energy to "do activities" with their children was a challenge. They frequently mentioned wanting *time and energy saving activities* that were "convenient" to everyday living, or that were easily integrated into their family "routines." Parents also mentioned wanting suggestions for math activities that were "more active" or "hands-on" for their children.

Parents were concerned with the *engagement and interest* of their children in math activities. They shared that when their children were not interested in doing an activity it became a battle that caused frustration, wasted time, and ultimately sapped the energy of both the parent and the child. Conversely, a few parents felt that some activities "you just have to do" for "your own good." These sentiments were most often expressed in relation to more formal math activities such as worksheets and flashcards – though some parents did perceive flashcards as "fun." The "fun" of a formal activity seemed to be tied to the parent's ability to transform it into a "game." For example, some parents shared that they pretend to "play school" with flashcards or worksheets.

Parents with *more children in the home*, and more elementary age children in particular (under age 11), expressed having less time and energy for shared math activity with their children. There was a modest negative correlation between the Time_Mean from the RESET survey and children under 11 ($r = -0.400$, $p = 0.059$), meaning parents with more young children felt like they had less time. Additionally, parents who expressed a desire for more "convenient" activities were modestly positively correlated with having children under the age of 11 ($r = 0.399$, $p = 0.60$). While not significant, with a larger sample these relationships might become significant.

Math Activity Participation of Parents

Parents reported engaging shared math activities in varying degrees of frequency. Their self-reports of activity frequency were categorized as *daily*, *weekly*, or *monthly*. These levels of frequency were compared to parents' Time_Means on the RESET survey, as well as other data collected during the interviews. Parents who perceived themselves as having more time were engaging in formal math activities such as worksheets and flashcards ($r = 0.517$, $p < 0.05$), but were engaging in math activities less frequently ($r = -0.484$, $p < 0.05$). Conversely, parents who engaged in more informal activities reported higher levels of activity frequency ($r = 0.438$, $p < 0.05$). Surprisingly, parents who expressed having very little time and energy reported engaging in shared math activity more frequently with a modest, though not significant, positive correlation ($r = .397$, $p = 0.061$).

Math Activity Participation of Parents (MAPP)

Activity Type	Description	Examples
Formal Activities	Activities that have learning mathematics as the explicit, stated, or primary goal.	• Worksheets • Workbooks • Flashcards • Counting with manipulatives
Informal Activities	Activities that do not have math learning as an explicit goal, but where the math is embedded or integrated naturally within the activity itself.	• Boardgames • Card games • Hopscotch • Keeping score during sports • Setting the table • Shopping
Visual-Spatial Activities	Activities specifically related to visual-spatial reasoning, that were *not* being explicitly used to teach or reinforce other math concepts or skills.	• Blocks (e.g., Legos, Megabloks, wood blocks) • Puzzles (e.g., cut-out wood puzzles, jigsaw, etc.) • Games (e.g., Jenga)

Table 6: Math Activity Participation of Parents (MAPP)

Parent-child shared math activity was categorized as *Formal*, *Informal*, or *Visual-Spatial* (Table 7). *Visual-Spatial* activities were categorized separately to account for the ubiquitous presence of blocks and puzzles in most homes, and to allow for a more critical examination of the other two categories. Analyses showed that *Informal* activities were highly significantly negatively correlated with the *Simple Number Skills* approach (r = - 0.554, $p < 0.001$), while significantly positively correlated with the *Advanced Number Skills* approach ($r = 0.503$, $p < 0.05$). In other words, parents who engaged in more *Informal* activities were more likely to expose their children to more advanced number concepts (Tables 1, 5). Additionally, *Visual-Spatial* activities were negatively correlated with the *Simple Number Skills* (r = - 0.517, $p < 0.05$), meaning parents who engaged in more *Visual Spatial* activities were also less likely to focus on simple number skills, but rather a wider variety of math content.

Discussion

Parent involvement in their children's early math learning is vital if we hope to ensure that all children begin kindergarten ready to learn. The RESET Framework, used in this study, provided a mechanism for examining parent perceptions of the factors that most impact parent involvement, and resulted in a number of key findings: (1) parents want to be more involved but need more guidance, (2) parents do not understand what early childhood math is or should be, (3) parents lack awareness of the math learning opportunities in their lives, and (4) parent perceptions of low skills and math anxiety impact their behavior around shared math activity.

Parents want to be more involved but need more guidance

The parents in this sample expressed, at times, an almost desperate desire for more guidance and help in supporting their children's math learning needs. They were eager to be more involved but were uncertain of the best ways to do so. This is consistent with prior research that has shown that parents believe they have a role to play but may still consider mathematics instruction more the domain of the school (Clements &

Sarama, 2014; Sonnenschein et al., 2005). Parents' desire for more guidance, and reliance upon preschool and prekindergarten teachers for that guidance, is complicated by the high prevalence of early childhood educators who lack deep expertise in the area of early childhood mathematics, or who may not be exposing their students to enough mathematics in the classroom (Clements & Sarama, 2014; Early et al., 2010; Li, 2020; Tudge & Doucet, 2004; Winton et al., 2005). Teachers who lack this expertise place both children and families at a disadvantage (Li, 2020), for if teachers are not well-prepared, they are ill-equipped to help parents. As a result, parents who depend on preschool and prekindergarten teachers for meaningful guidance may not receive the support they need.

Parents do not understand what early childhood math is or should be

This study revealed that parents do not have much understanding of the breadth or depth of early childhood mathematics that young children should be exposed to, which may cause them to narrowly focus on simple or varied skills, instead of more critically important advanced number skills (Table 7). This is consistent with earlier findings such as Cannon and Ginsburg (2008) who found that "many parents (74.19%) explicitly stated that they were uncertain about early mathematics learning and teaching. Parents admitted to simply not knowing what mathematics their children could or should learn or how to help them learn it" (p. 252). This uncertainty may further contribute to some parents' perceptions that mathematics should be taught in school rather than at home, undervaluing the critical role of the parent.

Furthermore, parents who are unsure of how to support their children's math learning are likely to engage in math activities that "look" like math, such as workbooks, flashcards, and simple counting activities (Muir, 2012; Muir, 2018). Unfortunately, these types of formal math activities are more likely to emphasize simple number concepts, rather than advanced number concepts. The present study found that parent-child engagement through more informal activities, *not* formal activities, were significantly correlated with exposure to more advanced number concepts—a critical finding—as advanced number concepts are associated with higher degrees of school readiness and later achievement (Claessens & Engel, 2013; Kleemans et al., 2018; Nguyen et al., 2016).

Parents lack awareness of the math learning opportunities in their lives

Parents in this study felt challenged to find opportunities for integrating mathematics engagement and play into their daily lives. This may be a consequence of their limited knowledge of early childhood mathematics; if parents do not know what early childhood math is, they will have difficulty "noticing" opportunities for math learning. As evidence of this, the interview included a review of various common informal math activities (e.g., helping to set the table, playing common card games, sharing snacks fairly), yet many seemed new or unfamiliar to parents.

Parents expressed a desire to make math a part of their daily living but did not necessarily want to conform to some new math activity schedule. Instead, they were eager for more activities that could fit in with daily living. The present study revealed a relationship between the frequency of parent-child shared math activity and engagement in informal activities – a relationship that was not present for formal

activities. Even when parents reported having more time and energy available to spend on shared math activity with their children, those parents who favored formal math activities engaged in shared math activity less frequently. This indicates that when math is organically made part of their lives, parents and children engage in math more frequently, and on more critical skills as well.

Parents' perceptions of low skills and math anxiety impact their behavior

A majority of parents in this study (74%) expressed varying degrees of math anxiety from mild to intense, with nearly half of parents feeling seriously or intensely anxious when confronted with math-related activity. These feelings significantly correlated with parent perceptions of low math skills and knowledge. In addition, several parents with more extreme levels of math anxiety expressed concern over "passing" their anxiety to their children—a concern that is justified, as intergenerational effects of math anxiety have been documented in the literature (Herts et al., 2019; Levine, Gibson, & Berkowitz, 2019).

A more pressing concern is that math anxious parents are less effective in supporting their children's math development (Herts et al., 2019; Berkowitz et al., 2015). Several studies have found that shared math activity involving math anxious parents can negatively impact children's math achievement (Eason et al., 2017; Herts et al., 2019; Maloney et al., 2015).

Other studies have pointed to relationships between parents' negative feelings about mathematics, math anxiety, and lower math expectations for children (e.g., Levine, Gibson, & Berkowitz, 2019; Rozek et al., 2017). The high prevalence of math anxiety among the parents in this study, and the seeming preference of parents for the simple and varied number approaches may hint at this relationship. Parents may feel more confident when engaging in simpler activities, and hesitant or uncomfortable when exploring more advanced concepts that may provoke anxiety. This leads to lower expectations for children in terms of what math concepts and skill parents expose them to.

Limitations

Several limitations exist for this study. The small sample size limits the strength of the correlations and makes it difficult to generalize to the broader population. *Volunteer bias* may also be a factor, given that parents who are more likely to volunteer may over-represent parents who are more involved in their children's educational development in general. *Social desirability* bias is also a concern when examining parents' perceptions of their parenting beliefs, values, and practices. Parents want to portray themselves as "good parents," and may not be forthcoming if doing so might result in them being judged. Lastly, all parents in this study were *geographically homogenous,* hailing from the greater Los Angeles area of California in the United States. It is possible that parents from other geographical areas might show different patterns of perceptions across the five RESET domains.

Areas for Future Research

The data gathered here will be instrumental in guiding the development of a new, more robust, RESET survey. The interview provided an abundance of qualitative that can be

used to inform more specific questions and items on a revised RESET survey that can capture information at scale. As such, an area for future research would be to use a revised RESET survey with a much larger sample of parents ($n > 500$). Doing so might further illuminate patterns within subgroups of parents, empowering the design of parent engagement programs that are better aligned with parents' individual needs and contexts. The more we understand the commonalities and differences in and among parent subgroups, the better we can plan for specific use cases, allowing for more diverse, adaptable, and personalized parent engagement programs. Further areas of research include using the RESET Framework to examine support mechanisms between early childhood teachers and parents (e.g., do parents' RESET perceptions change as a result of intervention?), and to explore how the RESET Framework can be applied in other parent support programs.

Conclusion

The findings of this study suggest that stakeholders should consider designing parent engagement programs that (1) capitalize on parent eagerness to be involved and play an active role in their child's math development, (2) make the most of parents limited time and energy, and (3) account for the likelihood of low parent math skills, efficacy, and the presence of math anxiety. A possible approach that stakeholders might take would be to provide program features that help parents develop an understanding of the critical competencies of early childhood mathematics, as well as easy-to-implement, everyday strategies that parents can use to help their children develop those competencies while building positive emotional connections to mathematics.

The present study has contributed to the body of literature on the HNE in a number of ways. The use of the RESET Framework has illuminated complex relationships between key factors that influence parents' perceptions and behaviors related to supporting the math development of their young children. Findings from this study confirm several findings of previous research such as parents' uncertainty around early childhood mathematics, their desire for more guidance and activities that fit naturally within their lives, and the influence of low parent math skills and math anxiety on parenting practices. However, the RESET Framework helps to push our understanding beyond individual findings to consider how these findings work together in tandem.

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Development and Integration of Freely Available Technology into Online STEM Courses to Create a Proctored Environment During Exams

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Abstract
The current coronavirus pandemic has left many universities and their instructors in a sudden requirement of online education. For small private universities this creates an even more precarious situation as funds for online proctors or the purchase of software for online assessment monitoring is frequently insufficient. In addition, online assessments for STEM courses are often like the homework, notes, or textbook making a proctored environment in these courses a necessity. This virtual presentation presents the experiences of a Chemistry professor who has implemented an online instructional methodology that utilizes freely available technology allowing verification and real-time proctoring of online assessments. The presenter has observed a dramatically reduced degree of academic dishonesty in his fully online General and advanced Analytical Chemistry courses over a two-semester period. The developed online proctoring methodology incorporates the direct use of students' smartphones and devices during online assessments. Instructor prepared videos that visually illustrate an "online assessment rubric" and how students may meet the rubric by fully showing their "workspace" when taking an online assessment appear to play a major role in the successful implementation of this methodology with an objective that includes the prevention of academic dishonesty. In this presentation advantages of the flipped classroom format, daily proctored quizzes, use of document camera, multiple screens, and breakout sessions will also be shared. Evidence of academic dishonesty, its prevention, along with mistakes and best practices in creating a viable proctored academic environment when using Webex, Teams, and Blackboard will be shared in this presentation.

Keywords: Testing, Proctored Tests, Distance Education, Online Education, Curriculum, Internet, Pedagogical Strategies

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I. Introduction

This paper through an active-research study suggests an effective online assessment method to proctor synchronous online courses with roughly twenty students. It was designed by a Chemistry professor who has been teaching via flipped classroom instruction for the past ten years. Like myself, many professors at public and private universities and colleges have been thrust into the realm of online instruction due to the Covid-19 pandemic. Use of Zoom and other video conferencing software have made the transition to online lecture portion of the course while not smooth at least manageable. After a brief learning curve, skills and experience gained from f2f instruction directly benefit the transition to synchronous (i.e. the course is taught at specific days and times) online instruction when using video conferencing software. However, the transition to online assessments from experience has been fraught with difficulties and inconsistencies in not only the creation of online assessments but also enforcement of academic integrity in the online course. This is especially true with universities such as mine that do not purchase academic integrity commercial tools such as Respondus software. In such a situation, it is an unwritten directive of the instructor to create online assessments and insure student academic integrity in his or her online courses. To achieve this directive an extensive search for guidance from the best practices found in literature, advice from a learning management system, and accrediting agency guidelines were investigated. Herein lies the inherent problem this paper attempts to address: in the absence of university financial support how can a f2f instructor create online assessments (especially in a problem-based STEM course) while upholding academic integrity of students? The solution presented in this paper consists of an online assessment routine (OAR) which was followed religiously during all daily quizzes and exams in a synchronous (i.e. all students meet at the same time) online format of instruction. The online courses consisted of introductory and advanced Chemistry courses of roughly twenty students in each course.

II. Prevalence of online cheating

The lack of student academic integrity manifests itself both online and in the f2f classroom. Watson and Sottile (2010) performed a study of 635 undergraduate and graduate students:

- 33% admitted to cheating in online classes
- 32% admitted to cheating in traditional classes
- 2% of online students were caught cheating
- 5% of students in a traditional class were caught cheating

Grijalva et al. (2002) essentially agree with Sottile in that typical data indicates students are no more likely to cheat online than in a f2f classroom. However, from personal observation this appears to not be the case in my transition to fully online instruction in both introductory and advanced synchronous online chemistry courses over the past two years. The opportunities to cheat in the online classroom are simply much more abundant in comparison to a f2f classroom with the instructor's eyes upon you the entire time. Just in the past semester I have observed four students cheating during online assessments and in addition have received a private chat message that was meant for a student. These are only a few of the instances of academic dishonesty I was able to observe, it is unknown how many instances of academic dishonesty I failed to observe in this timeframe. While cheating does occur

in the f2f class I believe it impacts student learning in a more damaging way in the online classroom due to a multitude of opportune moments for academically dishonest acts to occur simply because the instructor's eyes are not present upon the student.

III. Creating an online environment that upholds academic integrity of its students

In the beginning of the pandemic in early 2020 many instructors like myself were thrust into a realm of online instruction. Video conferencing software in combination with synchronous offering of an online course has allowed the lecture component of f2f instruction to transition rather smoothly to online instruction. The only hurdles being a learning curve on incorporating multiple cameras including a document camera for students to be able to ask and watch problems being solved by the instructor. However, the creation of online assessments that uphold academic integrity is extremely difficult and a task with which there is little guidance. Guidance was sought from an accrediting agency, best practices from literature, and a learning management system for practical advice in creating online assessments that uphold academic integrity in an online STEM course.

A. Guidance from university

Due to declining enrollment and resulting absence of funds, my university offered no financial support in the area of purchased tools and protocols to prevent online cheating. This lack of attention may simply be since no such effort is deemed necessary by the accrediting agency, the Southern Association of Colleges and Schools Commission on Colleges (SACSOC). SACSOC distance education policy states the minimum requirement for accreditation on this issue is a username and password.

B. Guidance from literature

It is difficult to find in the literature practical non time-intensive best practices to thwart online cheating. Much is like Cluskey et al. (2010) who proposed eight "control procedures" which are mostly common sense, practical, and good practices that would be beneficial in f2f or online instruction. Suggestions included clear communication and common exam controls. Prince et al. (2009) essentially found that more proctoring with well-trained proctors was their recommendation for an improved online environment. Wellman (2005) and Ramaiah, P. (2014) wrote that proctored environments were far superior to un-proctored online testing. Harmon et al. (2010) suggest for online courses with multiple choice exams that instructors modify their assessment design to aggressively use "strategic question shuffling tactics."

C. Guidance from a learning management system (LMS)

Discussions with our LMS, Blackboard, technical support provided the following best practices to prevent online cheating. These practices included:

- Question Sets
- Test Availability Settings
- Due Date

- Show Test Results and Feedback to Students
- Randomize Answer Distractors
- Randomize Question Order
- Deliver Questions One-at-a-Time
- Prohibit Backtracking
- Password Protection
- Timed Auto submission

Initial attempts at reducing online cheating in my online Chemistry courses included all these recommended attributes from our LMS. This effort required many intensive hours and highly detailed work to create the pools of questions required to fulfill these recommendations. In the end the question pools had several errors. Realize with Chemistry assessments sub and superscripts are common. Scientific notation is also a necessity with extremely large and small mathematical answers. Units are also an important component of chemistry exams. Typical LMS's cannot accept scientific notation or units as numerical answers. Nor can they offer scientific notation ranges as answer choices. An additional complexity with an LMS is that question pools are separate entities in different sections of the same course. Therefore, when an error is found that same error must be attended to independently in each separate course's question pool. Errors resulted in regrading of online exams. This resulted in students who had previously received points erroneously becoming frustrated and upset. In the end, the exhaustive preparation efforts to meet the LMS recommendations stated above resulted in a high degree of student dissatisfaction and frustration with the randomized, question pool, online created assessments. Compare this student experience to that of a typical f2f exam student experience. During a f2f Chemistry exam all students take the same exam at the same time. Question pools, randomization, and other complexities are not used or needed. The reason for that is the instructor's eyes are upon the students taking the f2f exam. In order to create an online environment that allows a typical f2f exam to be given, the instructor's eyes must be present on the student, their workspace, and their screen during the entire assessment. A solution to this dilemma is the online assessment routine (OAR) presented in this paper.

D. Online assessment routine (OAR)

The OAR affords the instructor to give the same exam to all students at the same time and proctor all students just like during a typical f2f exam with essentially the only difference being the instructor cannot "walk around the room" so to speak to monitor student workspaces for illegitimate behavior. During online assessments the instructor must always be able to each students' hands, workspace in front and surrounding each student, and each see student's computer screen being used to take the exam. This proctored assessment environment does not include viewing each student's face. The reason for this is two-fold. The act of a student logging into the course to take an assessment identifies the student through submission of their username and password according to SACSOC as a minimum method of student identity verification as stated earlier. The second reason a student's face cannot be seen is because the webcam is not being used by the instructor to proctor the exam. Instead a student's smartphone or smart device allows the instructor to proctor the entire assessment event.

Below is the developed OAR provided to students which includes technology and software requirements. It also includes what students can and cannot do during an online assessment.

"online assessment routine (OAR)

- *Please note that every Webex class period is recorded. Recordings are used for academic integrity both during and after online assessments. At the discretion of the instructor academic penalties may range from a friendly warning to grade penalization. Understand upon review of a recording, penalization may occur after a grade has been posted in Blackboard. During an online assessment student may not wear smart watches. The instructor proctors all online exams. At the discretion of the instructor, the instructor may interrupt a student if any element of the rubric appears to not be followed. Students are expected to start the exam and quizzes on time. Late starts may be penalized up to 3 points per minute late. The start time commences after the code has been provided by the instructor. This encourages class to finish on time. Like a typical face to face class period, students are reminded to visit the restroom before class starts.*

- *Each student must have reliable internet with ample bandwidth (perform an internet speed test and you should have roughly a minimum of 30Mbps download and 20Mbps upload speeds).*

- *Each student must have their own quiet place to work.*

- *Each student must have their own (i.e. independent from other students during a Webex meeting) pc/laptop with a working webcam.*

- *Each student must have their own smart phone or smart device like an iPad with a working camera.*

- *Each student must have operational software (Webex Meetings, Microsoft Teams, Outlook, and Word) installed on their laptop/pc and on their smart phone/device.*

- *When taking an online quiz each student enters the Webex meeting using their phone or smart device and continuously shares video of their workspace with the camera while simultaneously taking the quiz on Blackboard with their laptop/pc. Upon completion of the quiz and in order to fully receive participation/attendance points associated with the assignment students must use their pc/laptop for the remainder of the Webex meeting sharing video through the pc/laptop webcam and/or continued sharing their workspace video feed with their smart device.*

- *When taking an online exam each student enters the Webex meeting using their phone or smart device and continuously shares video of their workspace with the camera while simultaneously taking the exam on Blackboard with their laptop/pc. Upon completion of the exam, each student uploads their exam work to Blackboard.*

- *The workspace is the region where the student is writing along with the screen of the laptop/pc which the assessment is being taken. The region where the student is writing may contain the following: writing instrument, eraser, instructor assigned calculator, three blank pieces of paper, periodic table removed from course manual (with no writing on front or back), and instructor permitted equation sheet(s) from the manual (with no writing on front or back.) The course manual or any other papers may not be present in the workspace. Please ensure student hands and the laptop/pc screen where the assessment is being taken is shown continuously in the video feed. Students do not need to show their face, head, etc. but should take care to never leave their video feed during an online assessment. Please see the introductory video for visual examples including step by step procedures to create the requested workspace video feed."*

The online assessment routine (OAR) is detailed and rather lengthy hence a video short was created to allow students to visualize the OAR in action. The video conferencing software Webex was chosen over Microsoft Teams because of the on/off control of the private chat feature in Webex. In order to turn off private chat during assessments with Microsoft Teams private chat would have to be turned off for all Teams for an entire organization. Zoom was also not chosen but for privacy concerns. Mills-Senn (2015) found that students often struggle with unfamiliar technology which makes training all the more important. Hence, before the semester starts the OAR is provided to students along with an extra credit OAR practice opportunity. This opportunity also serves as a meet and greet for the students and instructor. In addition, students are informed well in advance that the first day of class will have an online assessment in which the OAR will be enforced. This first day assessment consists of a simple question for example stating a date of birth with the sole purpose of allowing the instructor an opportunity to provide feedback to the student as to the degree with which each student is fulfilling the OAR during the initial assessment.

IV. Conclusions

Over the past two years the grade distributions of f2f and my online Chemistry courses when using the OAR are essentially indistinguishable. Whether use of the OAR has decreased cheating is simply not possible to measure. However, use of the OAR has allowed the direct use of f2f exams in my online Chemistry courses without affecting course grade distributions. Possible shortcomings where a student could cheat while following the OAR include:

- a student could "pin" another student's video feed and see their answers; however, this may be seen by the proctor and would also be recorded,
- a student could have a 2nd screen outside of their video feed and this 2nd screen is used to view pictures, internet search results, communicate with other students, etc.

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Problem-Based Learning Increases STEM Interest for High School Students and Instructors

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Abstract
The goal of Project STEMulate, a National Science Foundation ITEST study (DRL 1657625), was to develop, implement, and evaluate a program that fosters success in STEM for underserved and underrepresented high school students. The project was implemented at three sites of the Department of Education Upward Bound Program in Hawai`i. Project STEMulate delivered teacher training on Problem-Based Learning curriculum to ensure students were motivated and empowered, and to support STEM-related postsecondary educational success of Hawaiian and Pacific Islander students. A critical design goal of the program was to introduce teaching and learning strategies and processes that were more relevant to underrepresented youth populations than those offered in typical high schools to provide opportunities and to increase participation in the STEM study and career trajectory, something all too often out of mind and scope of these students. This study reports on three years of mixed methods summer academy data on both student and teacher learning outcomes. Teacher dispositions, evidenced through data from interviews, observations, and multi-point surveys improved in a majority of the dimensions, including teaching inquiry-based approaches, integrating technology, and STEM career knowledge and awareness. Student motivation, Science self-efficacy, and STEM career interest, evidenced from similar data sources, increased as well. Finally, we discuss the larger implications of extending this work to impact similar populations elsewhere of isolated, under-resourced and under-exposed youth with these proven strategies.

Keywords: STEM, Career, Underrepresented, Youth, Self-Efficacy, Problem-based Learning

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Introduction

The primary goals of Project STEMulate, a three-year National Science Foundation funded STEM teaching and learning project were to develop, implement, and evaluate a program that fosters STEM learning and career opportunities for underserved and underrepresented high school students. The project was implemented at three island sites of the Department of Education Upward Bound Program in Hawai`i. Project STEMulate delivers teacher training on Problem-Based Learning curriculum to ensure students are motivated and empowered, and to support STEM-related postsecondary educational success of Hawaiian and Pacific Islander students.

Need for Increasing Interest in STEM

With the ever-growing concern for the future of the United States economy and workforce, the attention of policy makers, educators and researchers is increasingly focused on enhancing STEM education in the United States (NSB, 2010). Despite the extended focus on stimulating students, particularly underrepresented minorities (Allen-Ramdial, & Campbell, 2014), only 9.6% of minority male and 3.0% minority females pursue engineering careers (Malcom-Piqueux, & Malcom, 2013). Worldwide, U.S. students are falling behind, as per Programme for International Student Assessment (PISA), a global benchmark for measuring STEM proficiency, U.S. 8th graders ranked 36th in math and 19th in science, out of 79 in 2018 (OECD, 2019). Nationally, Hawai`i students tested among the lowest in the nation in math and science (National Center for Education Statistics, 2016). Despite Hawai`i students' modest gains in math on the 2015 NAEP (National Center for Education Statistics, 2016), high school students on Maui score lower than the state averages in math and science (Hawai`i Department of Education, 2015). Moreover, low-income students, both nationally and locally, score lower on achievement tests (Hawai`i Department of Education, 2011; Plucker, Burroughs, & Song, 2010) with the achievement gap widening between low-income and high-income students.

Research on the pipeline to STEM fields and careers indicates that early exposure to inquiry, reasoning, and problem-solving skills in STEM stimulates student learning and interest in pursuing an eventual STEM-related degree (Dejarnette, 2012). In search of an explanation for what ignites and retains students' interest in STEM, many programs have been envisioned and developed from K-12 to college and at the graduate level, and several have explored strategies for attracting students to STEM. Several programs (such as Project STEMulate) have been implemented through funding from federal agencies or corporate entities. Goals have been varied, covering a wide range of purposes such as assessing how to retain college students in their STEM field, how to motivate and encourage middle or high school students to enrol in STEM programs, or how to provide K-12 teachers with STEM education and professional development. Meanwhile, other researches (Mathers, Goktogen, Rankin, & Anderson, 2012) have emphasized the hands-on experiences that will engage and inspire students toward STEM careers. Although some researchers focus on an earlier start on the educational pathways toward STEM fields and have identified elementary school students as the best targets mainly because they have more time to build competence in STEM (Alumbaugh, 2015; Cantu, 2011; Isabelle & Valle, 2016), others have concentrated on middle and high school students (Tai, Liu, Maltese & Fan, 2006). High school is a critical time for providing positive experiences that

engage students in STEM activities since it is the time when they are beginning to consider possible career pathways (Hansen, 2011).

Problem-Based Learning (PBL)

To spark student interest in STEM and to prepare them for the STEM workforce, Project STEMulate provided students with challenging PBL hands-on activities and guidance to solve real-world problems. Research shows that PBL can be used with students of any age and skill level (Lockhart & Le Doux, 2005). Significantly, results of several high school PBL studies suggest that PBL may be as or more effective than traditional instructional approaches (Mergendoller, Maxwell, & Bellisimo, 2006; Savery, 2006), especially with low-income students (Cuevas, Lee, Hart, & Deaktor, 2005; Gallagher & Gallagher, 2013). Meta-analyses findings point to the fact that PBL exceeds traditional learning methods for teaching critical thinking, communication, collaboration, and applying knowledge to real world situations (Darling-Hammond et al., 2009; Strobel, & van Barnevel, 2009; Walker & Leary, 2009). STEM-focused PBL summer programs have also been shown to increase STEM career aspirations (Lam, 2005; Zhe et al., 2010). The results of a five-year study (Lam et al., 2005) showed significant increases in GPA and STEM self-efficacy, decreases in anxiety towards math and sciences, and the high degree of student enrolment in STEM degree programs following high school graduation. Project STEMulate research is much needed (a) because PBL curriculum is only offered at few schools (Atkinson & Mayo, 2014), (b) much of the research on PBL at high school level lacks structure and identification of what works for whom (Atkinson & Mayo, 2014; Ravitz, 2009), and (c) there is a lack of appropriate teacher training (Asghar et al., 2012). PBL teachers focus on creating an active, integrated, self-directed, and collaborative student-centred environment (Ertmer & Simons, 2006) and teachers who engage with the PBL approach enhance their pedagogical content knowledge (Walker & Leary, 2009).

Theoretical Framework

The social cognitive career theory (SCCT) as articulated by Lent, Brown, & Hackett (1994), and driven from Bandura (1986) guided this study. SCCT suggests that self-efficacy and interest play unique roles in career choice (Armstrong & Vogel, 2009; Betz & Borgen, 2010; Byars-Winston, Estrada, Howard, Davis, & Zalapa, 2010; Donnay & Borgen, 1999; Lent et al, 2010; Silvia, 2003; Tracey, 2010; Tracey & Hopkins, 2001), and individuals develop interest in activities in which they believe they can perform well. Furthermore, previous research has shown self-efficacy to be positively related to student academic performance, that self-efficacy in science impacts student selection of science-related activities (Britner & Pajares 2006; Parker et al. 2014; Richardson et al. 2012), and that self-efficacy and interest in STEM are strongly related (LaForce, Noble, & Blackwell, 2017; Maltese and Tai, 2011). As a result, individuals' personal, academic, and career goals are consistent with their interest, self-efficacy, and the outcomes they expect to achieve (Sheu et al., 2010). In other words, the development of interests is primarily on the basis of beliefs about self-efficacy and expected outcomes. If people believe they can do something well, it encourages further participation in that activity. Thus, SCCT hypothesizes that career interests and personal goals involve a process that includes performance, self-efficacy, and outcome expectations.

Study Design

The two primary research questions guiding this study were:

- How did the PBL approach impact teachers to move from teacher-centred to student-centred teaching during Project STEMulate?
- Was STEM PBL a strategy as modeled in Project STEMulate an effective way to sustain and enhance students' interest in STEM careers?

Participants

The program was implemented for three consecutive years with a different cohort of teachers and students each year. Professional development occurred in the spring of each year followed by the summer academy for the youth. Each year a group of 25 teachers representing the Hawaiian Islands of Maui, Oahu, and Hawai`i participated in the professional development, which was conducted primarily online with an opening and closing weekend in-person meeting. Through an application process, nine teachers (three for each designated Project STEMulate site) were then selected to lead the summer academies (the other 16 teachers supplemented their skillsets with PBL methods and strategies, but not as part of the STEMulate program). A site instructional team consisted of a science, a mathematics, and an English or writing teacher.

Students were selected from a pool of Upward Bound (UB) program participants. Upward Bound, a U. S. Department of Education program, provides fundamental support to participants in their preparation for college entrance, and performance, as well as opportunities to succeed in pursuit of higher education. The program serves high school students from low-income families and those from families in which neither parent holds a bachelor's degree. While the typical UB summer programs offer a variety of academic activities, STEM-related courses are often weak; Project STEMulate sought to fill this niche.

Teacher Professional Development (PD)

Professional development was delivered online over six weeks each year with a new assignment provided, countered and completed each week. Hawai`i, like other remote locations (e.g. Alaska) has a long history using distance learning methods and technologies and educators are accustomed to, and even expect these modes, so there was little effort for uptake or acclimatization one might expect in more tightly connected urban communities. The PD course began and ended with an in-person workshop in Maui. Weekly content modules focused entirely on developing and cultivating strategies and techniques of problem-based learning, where rather than be told how and what to learn from textbooks or traditional resources, students explore a subject by working in groups to solve an open-ended problem.

In STEMulate, the problems were STEM-focused with an emphasis on actual environment challenges facing Hawai`i, including erosion, energy, clean water, conflicts with large telescope installations and ocean acidification. These topics, while of interest to scientists everywhere, were of particular interest and relevance to native Hawaiian students. When possible, teachers were able to pilot units or components of PBL instruction in their (non-STEMulate) spring semester science courses, which

helped prepare them for the summer academies**.** Teachers also learned how to help students identify relevant problems, brainstorm conjectures, research approaches, and potential solutions. For many, this was a departure from business-as-usual, as one teacher commented,

"At first I thought it would be very difficult, I mean we are required to cover this kind of material from the textbook and I didn't think my students would be able to come up with solutions, it was all new to me."

Student Knowledge Acquisition

The summer academy provided students at each site with the same material and strategies. Students were engaged in daily classes and sessions that helped them identify and research a problem, explore and develop solutions, collect data, and present findings to the entire Institute body in a formal scientific symposium. In some cases students built physical models of their proposed solutions to demonstrate efficacy. Students collaborated, typically in small groups (four or five-person), learned how to collect, test, and analyze data; how to develop a compelling argument through communication skills, and how to compose and present results in a public forum. In addition to the increased science and literacy skills (geological, atmospheric, oceanic, biological, data collection and validation, hypothesis testing, statistics) students also learned useful soft skills of communication, argumentation, public speaking, and collective problem-solving, all at the forefront of today's and tomorrow's STEM field demands.

Sites

The program was developed and managed by a team at University of Hawai`i, Maui College. Three concurrent summer residential Upward Bound (UB) programs for participating youth took place each year at affiliated university campuses in Maui (Maui College), Oahu (Windward Community College) and Hawai`i (Hilo Community College), all as part of the regular UB summer academy. Project STEMulate provided STEM learning experiences as part of student programs.

Sites, all being Hawaiian Islands, naturally shared common geological, environmental, and socioeconomic factors. However, each site's choice of problem topic was related to the island's community interests. For example, with Maui's concern for clean energy and as a leading voice for Hawai`i Clean Energy Initiative (HCEI) to become carbon neutral by 2045, students in that group researched energy alternatives. On Hilo, the *Thirty Meter Telescope*, to be built on Mauna Kea, a source of controversy and friction between the scientific community and those who place high cultural and spiritual value on the mountain and her role in their culture, provided students with a relevant problem.

Data Collection

Common to other research projects, and particularly those supported by NSF, Project STEMulate included separate educational research and program evaluation components. The research team focused on student outcomes, engaged in mixed methods of data collection including pre and post surveys, focus groups, inventory

analysis, and site observations. The evaluation focused primarily on project fidelity and teacher outcomes. A total of 287 students (148 in project STEMulate and 139 in comparison group) participated in this program over the three years. Nine teachers completed surveys and interviews each year for a total of 27 over the three years. Researchers conducted site visits each spring and during the summers in years 1 & 2; in year 3, as a result of COVID-19 pandemic, all data collection and visits were conducted online.

Measures and Instruments

Student instruments included: 1) Science Self-Efficacy; 2) Science Motivation, and 3) STEM Career Interest. Instruments used with teachers included: 1) Science Self-Efficacy (STEBI), pre-post prompted interviews with teachers, and site observations. Selected measures were based on earlier reviews of the effects and impacts of these measures.

The STEBI-B

This instrument measured teachers' science teaching self-efficacy (STSE). The STEBI-B is used most frequently and has demonstrated reliability and construct validity (Riggs and Enochs, 1990), has 25 Likert scale items on two subscales: Personal Science Teaching Efficacy Belief (PSTE) and Science Teaching Outcome Expectancy (STOE), where the PSTE measures the degree that teachers believe they can impact student achievement in science, and the STOE exhibits teachers' beliefs on the factors affecting student science achievement.

Findings/Results

Teacher Data

STEBI

Teacher STEBI data showed improvements pre-post each year as well as increased growth from one year to the next, however none met the threshold for significance. The STEBI was administered at three points: Time 1 was prior to the PBL course; Time 2 was at the conclusion of the PD course; Time 3 was at the conclusion of the summer program. For an analysis of the 25 items, and because the instrument utilizes intentional redundancy throughout, we clustered the items into two categories: those items related to how the program improved science instruction, and how the program improved overall teaching. For example, an item about improving science instruction was *I understand science concepts well enough to be effective in teaching elementary science.* An item about improving overall instruction was *Even when I try very hard, I don't teach science as well as I do most subjects.* These two categories proved helpful in communicating findings to stakeholders and teachers in particular, rather than address the gains on a per-item basis.

The mean of the gains increased each year, suggesting the program design was robust and implementation became more efficient with each annual cycle. The first year of the program saw gains at very small increments (0.04 point) and did not include a midpoint reading, the second year at 0.19, and the third and final year at 0.29. The

greatest gains each year were between Time 2 and Time 3 suggesting teachers learned most through application of their skills with students.

Cohort (Year)	Pre-Mid	Mid-Post	Pre-Post
Cohort 1	NA	NA	0.04
Cohort 2	0.18	0.23	0.16
Cohort 3	0.26	0.25	0.38
Mean gain between time points	0.22	0.24	0.19

Table 1: Means of annual gains, both clusters

Consistent throughout each year, the largest gains were for the items on how teachers improved their science instruction, as compared to items on how teachers improved their overall teaching. Note there were no mid-point data for the first year (Cohort 1).

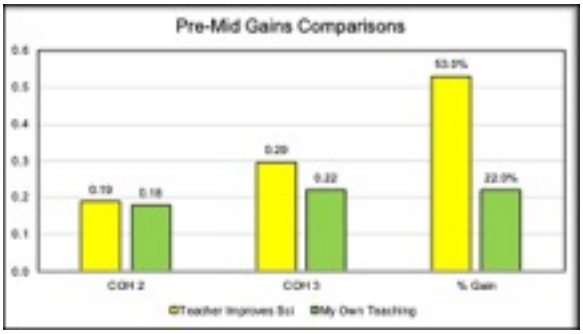

Figure 1: Pre-Mid point gain comparisons: Cohort 2 and Cohort 3

Gains for teachers improving science instruction advanced 53% from year 2 to year 3 while gains for teachers improving their overall teaching increased 22%. For midpoint to post readings, gains within each year were higher for item clusters on teachers improving science instruction, with the differences between year 2 and 3 showing a 43% increase but a 24% drop for gains in improving overall teaching.

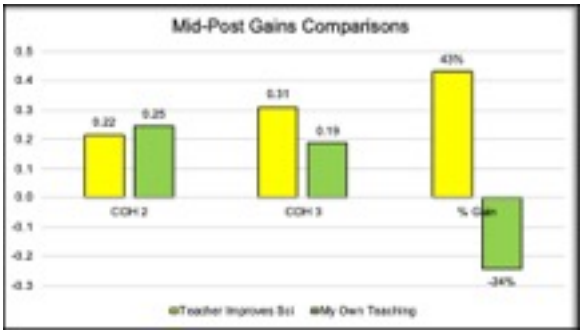

Figure 2: Mid-Post point gain comparisons: Cohort 2 and Cohort 3

For the pre-to-post readings, every cluster showed an increase each year, with a greater gain each year than the previous year, pointing to program improvement over time.

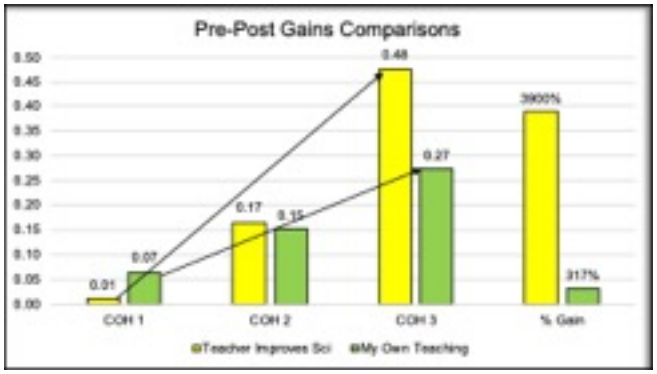

Figure 3: Pre-Post point gain comparisons: Cohorts 1-2-3

The pre-post gains of Cohort 3 in how STEMulate improved teachers' science instruction showed a (technically) 3900% increase over Cohort 1 (Cohort 1 showed a minimal 0.01 pre-post gain) and a 317% increase in improvement of overall teaching. Though the data might be skewed to reflect the commonly rocky first implementation year, the key takeaway is the improvement over time each year in all item clusters.

Student Data

Science Self-Efficacy (SSE), and Science Motivation (SM)

The overall scale averages derived from a scale defining students' self-confidence in their science abilities and skills, and their motivation toward learning science. Science efficacy items were partially adapted from the STEM Career Interest Survey, Science Section (Kier, Blanchard, Osborne, & Albert, 2013), and science motivation items were adapted from the ROSE Questionnaire (Schreiner & Sjøberg, 2004). Both used a 5-point Likert scale and achieved high internal consistency at pre and post conditions (SSE Pre = 0.74; SSE Post = 0.81), and (SM Pre = 0.81; SM Post = 0.83).

The level of science self-efficacy and motivation was calculated each year at the beginning and end of the summer academy. SSE data showed significant improvements from pre-to-post each year for both STEMulate and the comparison group. As Figure 4 displays, STEMulate data exhibited a higher SSE score gain from pre-to-post survey (which is a testimony to the program design). This was consistent with the teachers' STEBI data demonstrating greatest teacher learning occurred through application of teachers' skills in a PBL environment where their role was emphasized as a facilitator and activator for learning.

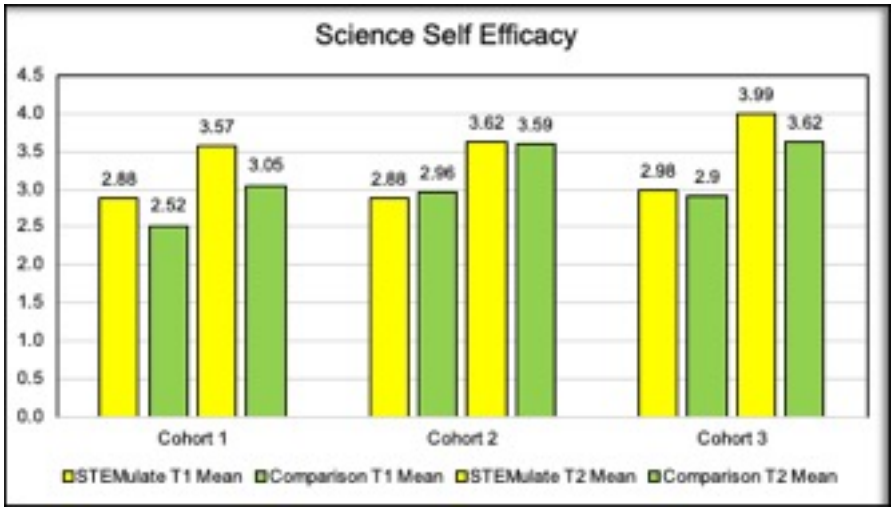

Figure 4: Science Self-Efficacy mean score from pre-to-post data over three cohorts

Figure 5 displays three-year mean scores for students' science motivation from pre- to post. Although a gain pattern was observed for each year from pre- to post-data, Cohort 2 demonstrated the lowest gain (0.18).

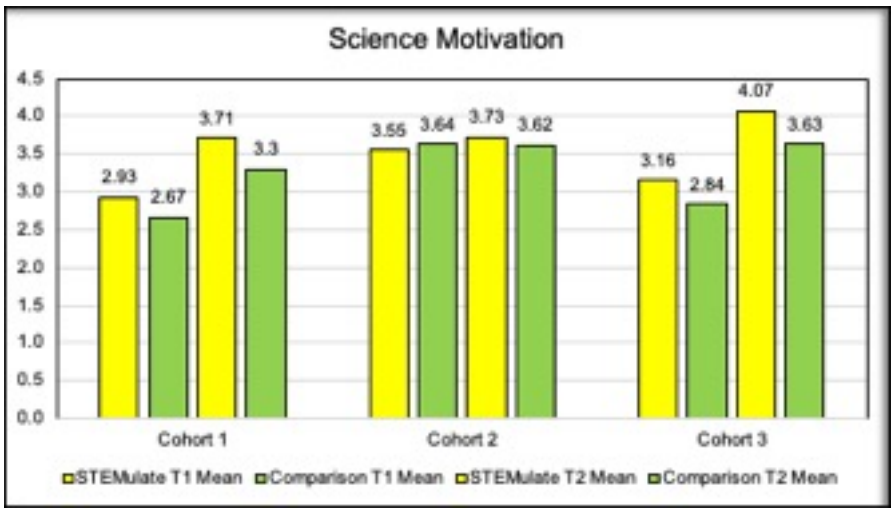

Figure 5: Science Motivation mean score from pre-to-post-data over three cohorts

For further examination, a paired-samples t-test was also conducted to evaluate the impact of the intervention on students' science self-efficacy (SSE) and science motivation (SM) scores. In Cohort 1, there was a statistically significant increase in SSE score from pre (M=2.88, SD= .50) to post survey (M=3.57, SD= .71), t (63) = 24.48, p<.001 (2-tailed). The mean increase was .69 with a 95% confidence interval ranging from .64 to .75. The eta squared statistic (.91) indicated a large effect size (see Table 2, Appendix A). The same statistically significant increase in SSE score from pre-to-post survey with large effect sizes were also observed for SSE cohort 2 and cohort 3.

The pattern for a statistically significant increase in science motivation score from pre-to-post survey, and for Cohort 1 and Cohort 3, was consistent with the SSE pattern. However, the data for Cohort 2 science motivation, even with a nominal gain (0.18) was barely significant (p= 0.044).

STEM Career Interest (SCI)

Career Interest was assessed using the 12-item STEM Career Interest Questionnaire (Cronbach's alpha =.78-.94) adopted from Tyler-Wood, Knezek, and Christensen (2010). The SCI has three subscales that measure student perception of a supportive environment for pursuing a career in science (Interest), their desire in pursuing educational opportunities that would lead to a career in science (Intent), and their perceived importance of a science career overall (Importance). A number of parallel analyses were conducted to determine the extent to which the SCI documents the effects of project STEMulate on students' career attitudes. First, the internal consistency of the SCI for the pre and post survey was calculated for each cohort and the range of Cronbach's alpha was very high at .85 to .96.

As Table 3 shows, the level of STEM career interest among high school students was low at the beginning of each summer academy and increased by the end of the summer. Although the mean increased for both groups after the program, the paired-samples t-test was statistically significant for the career interest score of the STEMulate students. These results align with previous research (Christensen & Knezek, 2017) stating that engagement in hands-on PBL activities will increase interest in a STEM career.

	Pre-Mean	Post-Mean
Cohort 1	2.96	3.58
Cohort 2	2.73	3.48
Cohort 3	3.63	3.88

Table 3: Pre- and post- Means of STEM Career Interest for the STEMulate students

Furthermore, Table 4 (Appendix B) demonstrated gains in all parts of the SCI for STEMulate students with most being statistically significant at $p<.001$ except for cohort 3 where $p<.05$ was applicable to totals, parts 1 and 2, and part 3 was not significant. A closer look at the comparison data in the same Table reveals a smaller gain for that group at a higher significant level.

To identify the impact of science self-efficacy and motivation on the STEM career interest, regression analyses were conducted that allowed to confidently determine the influence of these variables and to establish which variable mattered most. The initial regression analyses results indicated that students' SSE and SM scores significantly predicted their STEM career interest (SCI) ($p < .001$) for all three cohorts. With a multiple regression analysis, (a) the overall regression model for cohort 1 was significant, $F (2, 55) = 110.29$, $p <.001$, $R2 = .786$, and the overall saturated model explained 78.6% of the variance in students' STEM career interest; (b) the overall regression model for cohort 2 was significant, $F (2, 60) = 148.98$, $p <.001$, $R2 = .844$, and the overall saturated model explained 84.4% of the variance in students' STEM career interest, and (c) the overall regression model for cohort 3 was significant, F (2,

27) = 79.98, p <.001, R2 = .856, and the overall saturated model explained 85.6% of the variance in students' STEM career interest.

Discussion

Findings related to research questions suggested positive outcomes, supporting the primary goal of developing a program that fosters success in STEM for underserved and underrepresented high-school students through Problem-Based-Learning instructional strategies.

Research Question: How did the PBL approach impact teachers to move from teacher-centred to student-centred teaching during Project STEMulate?

Positive gains from data analyses suggest as teachers shifted toward a student-centered STEM PBL approach, their science teaching, and overall teaching practices improved. These gains increased each year, pointing to both traction of the processes over time, but also a more efficient and effective program delivery as the program evolved.

Research Question: Is the use of STEM PBL strategy as used in Project STEMulate an effective way to sustain and enhance students' learning?

Positive gains in student scores in science self-efficacy and motivation suggested the PBL strategy was successful and effective in sustaining and enhancing student learning. Prior research supported PBL learning as impacting student's recognition and selection of STEM careers (Christensen & Knezek, 2017; LaForce, Noble, & Blackwell, 2017). This study, framed by social cognitive career theory (SCCT), advocated for self-efficacy to play unique role in career choices. Results indicated an increase in science self-efficacy and science motivation scores, a validation that with hands-on exploration and problem-solving and search for solutions to a real-world problem, students developed interest in activities they performed and believed they could perform them well. This study aligned with previous research that self-efficacy in science impacts student selection of science-related activities (Britner & Pajares 2006; Parker et al. 2014; Richardson et al. 2012), and showed strong association with their interest in STEM (LaForce, Noble, & Blackwell, 2017; Maltese and Tai, 2011). Also, it illustrated that students' career goals were consistent with their science self-efficacy, and motivation (Sheu et al., 2010). These results implied that participation in Project STEMulate positively affected students' career interests and personal goals, consistent with the SCCT. Overall, though gains were observed in STEM career interest for all participating high school students, those participating in the STEMulate program showed a consistent significant gain over the three years. These results support previous research (Christensen & Knezek, 2017) stating that engagement in hands-on PBL activities will increase interest in a STEM career.

The move from a teacher-centred approach using established curriculum, textbooks, and problem sets, common to high school science classes in Hawai`i (and elsewhere) to student-based learning where participants explored carefully selected problems and developed solutions through scientific processes resulted in three significant outcomes: 1) Increase in student interest in STEM, 2) Introduction of STEM career opportunities, and 3) Improved teacher knowledge and skills in STEM instruction.

Even as several studies have identified teacher reluctance to embrace PBL for a variety of reasons, including curriculum standards (Liu et al, 2012; Pagander L, Read, 2014;Subramanian, 2014), lack of training (Asghar et al., 2012), and discomfort with the unstructured PBL method (Asghar, 2012; Nowak, 2017), our study documents that a student-centred environment benefits both teachers and students by engaging teachers with the PBL approach that enhances their pedagogical content knowledge (Walker & Leary, 2009), and by creating an active, integrated, self-directed, and collaborative learning (Ertmer & Simons, 2006) for the students.

Conclusion

Through focused and rigorous teacher professional development and a carefully designed summer program that tapped into student interest and motivation, the departure from traditional classroom learning methods exemplified in Project STEMulate helped meet the program goal of increasing participation in STEM learning and career trajectory, helping to bridge the gap for underrepresented students. The project has shown traction and efficacy as a replicable model, and would very likely succeed in many other contexts that share the socioeconomic and cultural factors that have proven barriers for access to STEM learning. This work will add to the knowledge base and calls for additional studies that will validate and refine research on improving STEM learning opportunities for underserved populations and communities everywhere.

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Appendices

Appendix A

					95% CI			
		Mean Difference	df	t-value	Lower	Upper	Sig. (2-tailed)	Effect size (Eta squared)
SSE	Cohort 1	0.69	63	24.48	0.64	0.75	<.001	0.91
	Cohort 2	0.73	38	6.48	0.5	0.96	<.001	0.53
	Cohort 3	1.01	24	11.23	0.83	1.2	<.001	0.84
SM	Cohort 1	0.77	62	12.99	0.65	0.89	<.001	0.73
	Cohort 2	0.18	38	2.08	0.05	0.36	0.044	0.1
	Cohort 3	0.91	24	9.9	0.72	1.09	<.001	0.84

Table 2: Paired Sample t-test analysis of science self-efficacy and motivation scores over three cohorts

Appendix B

					95% CI		
		Mean Difference	df	t-value	Lower	Upper	Sig. (2-tailed)
Cohort 1 STEMulate SCI	SCI Total	0.6	62	9.4	0.48	0.73	<.001
	SCI P1: Interest	0.62	62	6.91	0.44	0.8	<.001
	SCI P2: Intent	0.41	62	5.07	0.25	0.57	<.001
	SCI P3: Importance	0.92	62	13.66	0.78	1.05	<.001
Cohort 1 Comparison SCI	SCI Total	0.37	48	6.48	2.26	0.49	<.001
	SCI P1: Interest	0.22	48	2.5	0.04	0.4	0.016
	SCI P2: Intent	0.21	48	2.48	0.04	0.38	0.017

	SCI P3: Importance	0.84	48	11.1	0.69	0.99	<.001
Cohort 2 STEMulate SCI	SCI Total	0.73	38	6.82	0.51	0.95	<.001
	SCI P1: Interest	0.65	38	5.72	0.42	0.88	<.001
	SCI P2: Intent	0.66	38	4.64	0.37	0.95	<.001
	SCI P3: Importance	0.96	38	7.52	0.7	1.22	<.001
Cohort 2 Comparison SCI	SCI Total	0.54	22	3.61	0.23	0.85	<.001
	SCI P1: Interest	0.35	22	1.63	-0.09	0.79	NO
	SCI P2: Intent	0.45	22	2.72	0.1	0.8	0.013
	SCI P3: Importance	0.94	22	6.26	0.63	1.25	<.001
Cohort 3 STEMulate SCI	SCI Total	0.25	24	2.35	0.03	0.48	0.027
	SCI P1: Interest	0.34	24	2.23	0.02	0.66	0.036
	SCI P2: Intent	0.33	24	2.56	0.06	0.59	0.017
	SCI P3: Importance	0.01	24	0.116	-0.22	0.25	No
Cohort 3 Comparison SCI	SCI Total	0.14	29	1.66	-0.033	0.32	No
	SCI P1: Interest	0.2	29	2.18	0.01	0.39	0.037
	SCI P2: Intent	0.19	29	1.71	-0.04	0.41	0.098
	SCI P3: Importance	-0.01	29	-0.085	-0.28	0.25	No

Table 4: Paired Sample t-test analysis of STEM career interest scores over three cohorts

A Case Study of Educational Program Integrating Fashion and SDGs: Collaborating with ASPIRE, the U.N. Affiliated College Student-Driven Organization

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Abstract
This paper describes the educational outcomes qualitatively about the educational program, "Cherish, Enjoy, and Develop oneself" in one of the Japanese university classes as a case study. This program aims that students acquire the sense of sustainability to achieve Sustainable Development Goals (SDGs) by the United Nations and improving self-efficacy to solve one of the problems of Japanese youngers, less self-confidence, through considering the issues around fashion business and clothes. United Nation's affiliated student-driven organization, ASPIRE, collaborates with the instructor of this course to develop and manage the program as one of the unique characteristics of this study. This case study shows that participant students recognized the role of clothes as a part of the important factors for identifying themselves and background of familiar things such as clothing based on their written opinions and their group activities.

Keywords: College Education, Educational Development, Program Development, Sdgs, Fashion, Case Study

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Introduction

This research aims to identify educational outcomes on the educational program, "Cherish, Enjoy, and Develop oneself" to college students in Japan. This educational program intends to contribute to acquiring the mind of sustainability, knowledge, skills, and values of these students by considering fashion and clothes. It also focuses on developing a sense of sustainability by promoting SDGs in the international community. Higher education institutions are responsible for fostering their students to have a mind of sustainability in this globalized society. However, the concept of sustainability is difficult to understand for college students and makes them lose the passion for considering sustainability and SDGs sometimes for sustaining to understand sustainability and how reasonable is an essential factor to think about it.

The reasons of focusing on the fashion business and clothing in this educational program are these industries affect huge environmental burden with the violation of human rights to workers as the United Nations launched an initiative of UN Alliance for Sustainable Fashion to foster sustainable development. A lot of Japanese college students do not have enough chances to know this problem even everyone wears clothes every day. In the aspect of a personal matter, fashion can have self-confidence by putting on clothes because wearing is one of the important factors to make their identity and contribute to acquiring a feeling of self-esteem by creating their own style.

This educational program also intends to foster the younger Japanese generation's self-esteem because the low level of self-approval is one of Japan's most significant social problems. World Happiness Report (2019) examines that Japan ranked 58th in 156 countries and "Freedom to make life choices" is 64th while "Generosity" is 92nd. Between 2005-2008 and 2016-2018 rankings, Japan decreased percentages even though almost 60% of countries improved their situation. Moreover, the Cabinet Office, Government of Japan operates one survey, Awareness survey on youth in Japan and other countries. This survey aims to gather information about the Japanese youth to check and revise the national policies. Only 10% of Japanese youngers response as "I agree" to the question "I am satisfied with myself" while other countries are at least 30% or more (Cabinet Office, 2018). The self-esteem of younger Japanese is also crucial in sustaining the country to find a solution for the extremely highly aging society.

This educational program focuses on considering the fashion as anchored on the influence of psychological processes on wearers (Adam and Galinsky, 2012). One of the research shows that positive psychological influences by fashion and clothes. Furthermore, to think about sustainability and related social issues through learning fashion and its businesses. By taking this educational program, students may acquire such things as developing personality/autonomy, improving happiness, self-efficacy, and generosity. Respecting others and themselves, and having a mind for taking care of a thing. Fostering imagination and creativity, Changing a purchasing behavior to sustainable and valuable, Endurance to media and SNS.

"Cherish, Enjoy, and Develop oneself" is developed by collaborative efforts with the Student's organization, ASPIRE: Action by Students to Promote Innovation and Reform through Education. ASPIRE is a student branch of the United Nations Academic Impacts (UNAI), which is an initiative to fostering relationships between

higher education institutions all over the world by the Department of Global Communications by the United Nations. ASPIRE intends to contribute to achieving the United Nations' goals, such as Sustainable Development Goals, as in college students' perspective. ASPIRE personifies the saying, "Sharing a Culture of Intellectual Social Responsibility." It connects student organizations and individuals to global opportunities through the United Nations, educational and academic institutions, and civil society groups that focus on the UNAI initiative.

Yamazaki and Haseyama (2020) clarify that the educational impacts of self-directed/students-oriented extracurricular activities in the higher education institution such as the ASPIRE and identify the possibilities of acquiring opportunities to apply transformative competencies as suggested by "the Student Agency" in OECD (Organization for Economic Co-operation and Development) Learning Compass 2030. The OECD Future of Education and Skills 2030 proposes the OECD Learning Compass 2030, a learning framework that aims to help students navigate future well-being. (OECD 2019). In the OECD Learning Compass 2030, Creating new value, Reconciling tensions & dilemmas, and Taking responsibility, 3 types of competencies are defined as the Transformative competencies. This research shows the validity of participating ASPIRE students for creating an educational program to understand the concept of sustainability and self-esteem of the Japanese younger generation through thinking of fashion and wearing clothes.

Method

"Cherish, Enjoy, and Develop oneself" organized as a part of the course of "Human Understanding (Education and society)" in one of the Christian based universities in Japan. This course was provided to college students due to collaborative efforts with the United Nations' Department of Global Communications. 44 students took this course, and most students from freshmen (30 students) in the 2020 fall semester. 5 times (100mins * 5) classes consisted of 2 times watching movies with homework about the contents and discussion twice and with a wrap-up session. All classes provided a virtual classroom by Zoom due to the affection of COVID-19. This university applied a virtual classroom system by Zoom from April 2020. Almost all students are used to the online class setting.

This educational program separates 3 parts, watching movies, discussing/considering these movies, and wrapping up these activities to understand the whole program. One of the movies is" Dior and I" (Tcheng, 2015) is the movie that the story of Christian Dior, one of the biggest privileged fashion companies, and focuses on its designer, Raf Simon. It shows highly professional works around fashion business processes as a part of the art. This program regards this movie as a bright side of the fashion industry and a possibility of how people can have passion and feeling of cherishing even just clothing materials. Japan has a unique culture in fashion, such as Kawaii (cute in English) and Cool. These words are quite popular while talking about clothes, especially for the younger generation. That tendency points out that Japanese fashion culture strongly focuses on external elements rather than self-expression and art. "Dior and I" provide some perspectives that clothing materials influence not only looks but also personality, and clothes can be a target as having strong passion.

Class (100mins in each)	Procedures	Contents
1st	Watching "Dior and I"	**Watching a movie, "Dior and I" and answering on a small test to check to understand the content and preparation for the next task.**
2nd	Discussion / individual work (1)	**Students can choose group-discussion / individual work. Questions are the same for both.** 1. " Dior and I" depicts the world of advanced professions, including Couturier. What do you think about this way of working and the economy? 2.Do you find the clothing called "ready-to-wear" attractive? 3. Is there any differences in the image of fashion between your daily life and in the movie? 4.Can beauty be bought with money? 5.Can fashion improve one's life? 6.What is the role of fashion and clothing in " Cherish, Enjoy, and Develop oneself "?
3rd	Watching "The True Cost"	**Watching a movie, "The True Cost" and answering on a small test to check to understand the content and preparation for the next task.**
4th	Discussion / individual work (2)	**Students can choose group-discussion / individual work. Questions are the same for both.** 1. How to increase an attachment to clothes by fast-fashion industries? 2. Even extremely low wage works contribute to sustaining the life of people in poverty. How to transform the working circumstance without a losing job for them? 3. In the movie, the way of advertising in the recent fast-fashion business is questioned. Think about what you would make if you want to create an advertisement that would convey the appeal of fast fashion and prevent excessive consumption. 4.When the maximum revenue value is 10 (distributing 9 for the owner and 1 for the worker in the movie), suppose how much allocation do you think is appropriate if you are the owner of this company?
5th	Wrap-up session	**All students participate in group-discussion.** 1. Is there any differences between self-awareness by ①oneself and/or ②by inspiring others to recognize on their own. 2.Sharing your educational/cultural experiences and opinions to discovering the moment of developing yourself.

Table1: Procedures of"Cherish, Enjoy, and Develop oneself"

On the other hand, "The True Cost" (Morgan, 2015) tackles issues and problems, especially in the fast-fashion business. ZARA and H&M are famous examples of this situation. Almost all college students know them and even have experiences to buy

something from. This documentary movie exposes the dark side of the fashion business, such as violations of human rights and workers' environment, and negatively affected the natural environment. Students may have an opportunity to know how different the meaning of fashion and clothes in contrasted 2 movies, “Dior and I” and “The True Cost” even though these movies focus on the same things, fashion business and industries. The idea of sustainability is an essential part of sustaining a better future in our society and higher education institutions have a responsibility to foster their students to contribute sustainable development. Besides that, even in the educational program, “Cherish, Enjoy, and Develop oneself,” must focus on negative aspects of fashion and clothing materials, pointing out “The True Cost” to understand workers' situation in poor circumstances. These problems suggesting by the movie are not one of a few examples in the world. The negative impacts of the fashion industry on our society become more significant factors in achieving SDGs or not. Human rights issues such as extremely low-income with too long hours work, gender discrimination, low forcing workers harmful conditions, and damage to natural environment and recourses are recently revealed. As one of the evidence of this trend, the United Nations launched a UN Alliance for Sustainable Fashion in 2019.

Students in the class can choose to participate in group-work activity or work individually based on their own favorite way to understand the issues. Zoom, a virtual classroom setting, makes it easier to create such a circumstance. Whether students learn the things group-based or individual based, everyone allows to read the outcomes and make comments on Moodle online.

In the final section of this educational program, students focus on “develop oneself” based on learning experiences from class number 1 to 4. This section aims to recognize the role of fashion as a part of self-awareness. All of the participants have an opportunity to take a group discussion as concluding this educational program.

The student body called ASPIRE, an affiliate under the United Nations Department of Global Communications, contribute to create and manage this educational program, Cherish, Enjoy, and Develop oneself”. 3 ASPIRE students support organizing this educational program in this class by making a time for questions and answers and giving some suggestions to students who attend the lecture while 10 of ASPIRE members work for developing this program.

Result

This educational program asks what kinds of things participant students learned after the end of this educational program. The Japanese younger generation is very familiar with mass consumption. Especially in fashion items, almost all of them did not have a mind to have clothes sustainably—one of the reasons supposed to be public relations from fashion industries through SNS. SNS gives thousands of useful information while spreading fake information tremendously. However, almost all students in this class realized the importance of wearing a long time with cherish and joy for everyone, not only for students themselves but also for designers, workers, and every person related to the fashion business, to create a sustainable society. Furthermore, they also find what people wear is an expression of who people are. Some of them explain that this program gives a first time to consider clothes as a part of functional items to make the personality of themselves.

Japan is one of the countries where huge dealing with pressure to conform to the social norm. Many Japanese college students struggle to choose what kind of clothes they are wearing in their university because almost all of them have a uniform before entering college. Not being noticeable while following fashion trends is an important issue to live their college life successfully. In this Japanese circumstance, this educational program allows them to think about the fashion items more freedom to express themselves through clothes while considering sustainability to our world. This educational program is also supposed to have a possibility to contribute to improving the retention of college students In this context.

Some students point out that changing consumers' practice is a crucial factor to foster changing the fashion business's attitude. The consumer can have the power when they make choices to get clothes from clothing companies eager to contribute to sustainable development. That practice is still not an ordinary thing in Japan even though the movement is beginning the last couple of years as Japanese society takes on the mind to SDGs. Moreover, others also mention that respecting others is one of the essential factors to developing oneself in this program because that must be the beginning of developing one own characteristic and personality.

Discussion

It seemed to attain this educational program's goal at least the course in this term even though there must be more cases. It organized research for identifying the outcomes from this educational program, including from a quantitative perspective. It is to be one way to consider improving self-efficacy and a mind of sustainability for college students by applying the issues around wearing clothes that is a very usual thing for everyone. Making a familiar approach such as clothing and fashion to achieve sustainable development with fostering self-confidence is one of the crucial factors consisting this educational program. Online classroom situations may also affect outcomes in both ways, positively/negatively. Online education is a relatively new phenomenon in Japanese higher education institutions. There is not apparent consideration about the educational impacts of online education. Hence, "Cherish, Enjoy, and Develop oneself" requires more research to identify the educational outcomes.

Conclusions

Our world is struggling to achieve the SDGs by COVID-19, and the pandemic influences every aspect of our life. To get clothes from fashion business industries, each student's economic gap and financial strain may affect their clothes choices even they have interested in. On the other hand, some people realize the importance of sustainable development and question too highly economical society with limiting various activities by the pandemic of coronavirus. Improving their own self-efficacy while considering sustainable development, such as aiming this educational program, is very important in higher education institutions.

Moreover, this research has a space to analyze learning outcomes focusing on students who participate as a program developer such as a student of ASPIRE. They contributed to creating this educational program with research activities such as gathering information and articles about fashion and sustainable development. That might be a

learning curve for them in a different perspective of general students in this class because developing an educational program is challenging work with a fruitful learning opportunity.

Acknowledgement

This educational program was created by collaborative efforts with a student-body, ASPIRE. The author would like to thank K. Amemiya gave full supports to create this program, and the leader of ASPIRE, Y. Tobisawa, who helped the instructor by managing classroom activities and evaluating educational outcomes from students in the class. One of the students as a non-ASPIRE member, A. Takekawa, also facilitated classroom activities to improve the student's discussion quality.

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Sounds and Sippy Cups: New Approaches to Pre-Literacy in Adaptive Game-Based Learning for Young Children

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Abstract
Multiple professions and fields of study are dedicated to young learners and the key experiences they need to succeed. Academics across psychology, neuroscience, linguistics, and educational research seek answers to key questions about how children learn to read. Practitioners across public K-12 schools, preschools, private educational institutions, and community organizations seek paths to reading success with individual groups of children. Despite immense efforts, the disconnect between research and practice has greatly limited the tangible outcomes for learners. Measures of reading ability across the United Stated yield consistently disappointing. This paper discusses an iterative cycle of research-informed design – called learning engineering – used to create digital game-based learning experiences for young learners in *My Reading Academy*. *My Reading Academy* is an adaptive game-based learn-to-read program that is grounded in the science of reading and cognitive development research. A deep dive into phoneme awareness instruction will be used to demonstrate the processes by which instructional design can produce engaging experiences with meaningful learning outcomes. Successful mastery of phonemic awareness skills, a key predictor of future reading performance, can change the overall learning trajectory and academic success of young learners. Rooted in robust research (both academic literature and via direct interactions with learners, teachers, and families), the development of *My Reading Academy* is also refined with insights from learning analytics and user research. This powerful connection between science and practice has the potential to build a foundation for academic achievement and life-long learning.

Keywords: Phonological Awareness, Phonemic Awareness, Digital Learning, Digital Games, Research-informed Design, Adaptive Instructional Systems, Learning Engineering, Game-based Learning, Early Literacy, Reading Instruction, Early Childhood Education

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Introduction

Decades of research from interdisciplinary fields such as developmental psychology, developmental linguistics, cognitive psychology, neuroscience, and educational research have yielded tremendous insights into the process of learning to read (i.e., Gough & Tunmer, 1986; Scarborough, 2001; Ehri, 1996; Kilpatrick, 2015). The mechanisms of reading have been observed, tested, and documented, producing reliable models of reading acquisition and proven guidelines for effective instructional practices. Though scientific consensus exists on the causes of reading successes and failures, that has not translated into practices and interventions that have ensured success for all students. Only about one-third of fourth graders in the United States formally demonstrate the ability to read with accuracy, understanding, and fluency (de Brey et al, 2019). Performance is even more troubling when you consider that the average score for students from historically disadvantage ethnic backgrounds and those living with fewer economic resources are consistently lower than their White, middle- and upper-class peers. Seidenberg (2018) attributed lackluster literacy success to the disconnect between the science of reading and educational practice. He describes an educator culture that either resists new ideas and suggestions from academia or, to meet the constant high-pressure calls for educational innovation, accepts underdeveloped new theories too quickly (Seidenberg, 2013, 2018). Educators are often skeptical of conclusions developed by academics due to a belief that studies cannot account for the intangible dynamics of a specific classroom (Coles, 2000). Many educators trust their own observations despite the limitations that this approach entails.

Connecting scientific understanding of the reading process to the learning experiences of students is crucial. Reading success in the early years of formal schooling is a predictor of later academic achievement (Duncan et al., 2007), as well as a predictor of positive mental and physical health, financial, and social outcomes in adult life (Ritchie & Bates, 2013; Schweinhart et al., 2005). We cannot entrust the instruction of such high-stakes content to intuition, habit, or the status quo (Weinstein, Sumeracki, & Caviglioli, 2019). A partnership between science and practice is the path to greater reading outcomes for students.

Components of Early Reading Instruction

Reading instruction in the English language may be uniquely challenging (Spencer & Hanley, 2003). Linguistically, English has a “deep” or “opaque” orthography with layers of rules and conditions impacting the correspondence between sounds and letter (Miller, 2019). This creates a steep learning curve in the early reading phase as novice readers build a critical mass of sound-spelling correspondences. For example, in a comparison of five- and six-year-old schoolchildren learning to read Welsh, an orthographically “shallow” language, and others learning to read English, Spencer and Hanley (2003) found the children learning Welsh demonstrated significantly greater proficiency reading words and nonsense words. During their second year of formal schooling, the Welsh readers largely mastered the full system of Welsh sound-spelling correspondences while the English readers had additional correspondences and sight words to learn. In another study (Hanley, 2004) of Welsh and English students in their sixth year of formal instruction, the impact of the more challenging orthography in early learning showed itself most prominently in the performance of struggling English readers. While successful English readers had mastered word-reading, the lowest

performing 25% of English readers had not yet acquired sufficient word reading skills. Despite these results, the steep learning curve in the early reading phases of English reading is not insurmountable. Singapore and Canada (with the exception of Quebec) conduct instruction in English yet maintain consistently high performance in international measures of reading (Schleicher, 2019).

It is important to note, however, that word reading is only one element of the full cognitive task of reading. Consider the simple view of reading (Gough & Tunmer, 1986) which identifies two processes involved in reading: word recognition and language comprehension. While this model is simple, it encompasses the nuanced blending of several distinct components. Word recognition requires increasingly automatic blending of several elements--phonological awareness and phonological skills, letter-sound knowledge, orthographic knowledge, and sight word memory (Kilpatrick, 2015). Once mastered, the automaticity of word reading can mask its complexity. The language comprehension elements including background knowledge, text knowledge, attention and comprehension monitoring, vocabulary knowledge, and language skills (Kilpatrick, 2015) combine to form the second process. Automaticity is *not* the goal for language comprehension elements. Instead, readers become increasingly strategic and sophisticated in their use of language comprehension elements.

Phonological Awareness and Phonemic Awareness

This paper focuses on one key strand within the complex task of reading: the essential, foundational skills of phonological awareness. Phonological awareness describes the awareness of sounds and sound structures in spoken language (Bradley & Bryant, 1983; Kenner, et.al, 2017). Two factors impact the complexity of phonological awareness tasks—the size of the sound units and the type of manipulation of the sounds (Yopp & Yopp, 2009). Traditionally, phonological awareness tasks are organized by complexity, and progress from large units to individual sounds (i.e., words to syllables to onset-rime units to individual sounds). Tasks also move from recognition of sound units to increasingly sophisticated manipulation of sound units (i.e., identify, blend, segment, delete, substitute) (see Figure 1). Phonemic awareness describes the set of phonological awareness skills that involve recognition and manipulation of individual sounds called phonemes.

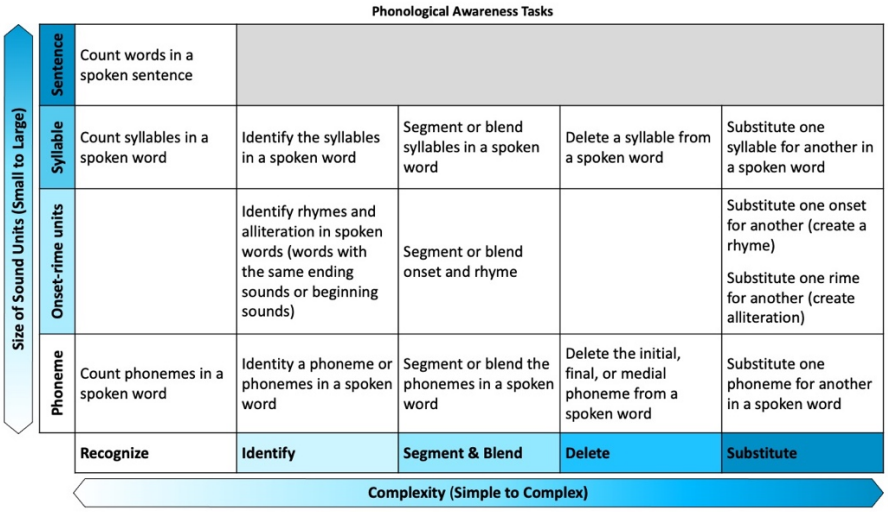

Figure 1: Phonological Awareness Tasks Organized by Complexity

For context, it is important to know that phonemic awareness is part of the suite of early reading skills. The National Reading Panel identified phonemic awareness as one of "The Big 5," the essential components of reading and reading instruction (Figure 2).

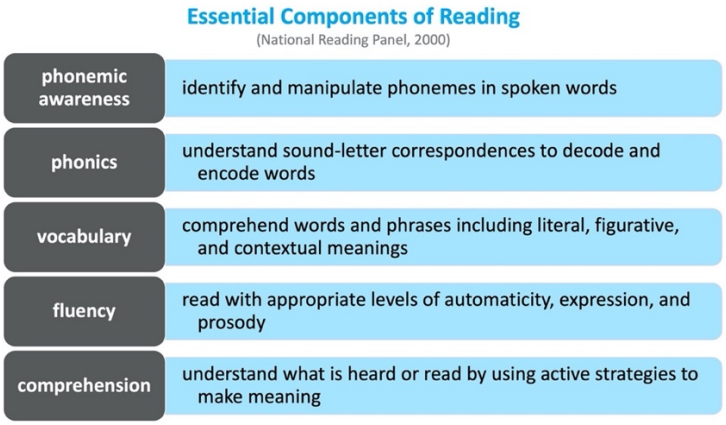

Figure 2: Essential Components of Reading (National Reading Panel, 2000)

Phonics instruction and practice is what many learners and families think of as the first step in early reading (Anderson, 2007). Hearing a young learner recognize letter names and sounds is visible, traditional, and satisfying. Decades of research has established phonemic awareness as a necessary predecessor to phonics success (Juel, C., 1988; Moats, 2014; National Reading Panel, 2000). Before young learners can accurately connect sounds to letters, they must engage deeply with sounds. Grounding pedagogy in evidence-based research protects instructional design from common misconceptions like this one (Hindman, 2020; Moats, 1999 and 2014; Seidenberg, 2013).

Across multiple studies in different contexts, phonemic awareness has emerged as the strongest predictor of later reading success in children both with (Mather, 2012; Clayton, et.al, 2020; Scarborough, 1989) and without (e.g., Anthony & Lonigan, 2004; Clayton, et.al, 2020; Stanovich, 1986) learning disabilities. Direct instruction of phonemic manipulation tasks has been shown to improve students' ability to perform the tasks accurately and automatically, but also prepares them for phonics and

orthographic tasks (Kilpatrick, 2015; National Reading Panel, 2000). It is wise, therefore, to invest in research to confirm and refine our understanding of children's capabilities and development in this area and to use that research to design instructional experiences that meet the needs of all learners.

Another common misconception is that early reading skills are easy, and comprehension is hard (Seidenberg, 2013). Because word reading skills become increasingly automatic, they can become hard to observe. Accomplished readers tend to consciously attend to language comprehension skills and strategies. We look to a robust collection of literature to learn that early reading skills, such as phonemic awareness, require systematic and explicit instruction (Moats, 1999, 2014; Yopp & Yopp, 2009). Phonemic manipulation stands out as the most effective way to teach foundational phonological awareness skills (Kilpatrick, 2015; Moats, 2014). Well-crafted phonemic awareness experiences provide learners with practice recognizing and manipulating phonemes in spoken words through identifying rhymes and alliteration, isolating single phonemes, blending phonemes, segmenting phonemes, deleting a phoneme to form a new spoken word, and substituting one phoneme for another.

Tasks should generally be organized from large to small, in terms of sound units, and from simple to complex in terms of manipulation tasks (see Figure 1) and in accordance with the physical and cognitive development of learners. Long-standing theories surrounding phonological awareness development have posited that of all the phonological components, phonemic awareness develops last in the sequence (Anthony, Lonigan, Driscoll, Phillips, and Burgess, 2003; Goswami, 1990). This places phonemic awareness relatively late in the sequence of early childhood instruction, specifically during formal preschool years. Traditionally, learners engage in formal phonemic awareness activities starting in kindergarten or prekindergarten only after receiving instruction in the other phonological awareness tasks. Although there is a large body of empirical evidence to-date regarding the late development of phonemic awareness (e.g., Carroll, et.al, 2003; Liberman, et.al, 1974; Lonigan et al., 1998; Wackerle-Hollman et. al., 2015), recent work by Kenner and colleagues (2017) asserts an alternative theory. It may be that, because traditional phonemic awareness tasks are productive, and not receptive, we may be overlooking the actual phonemic awareness capabilities of very young children. In an innovative study with 2 and 3-year-old children, Kenner and colleagues (2017) found evidence for receptive blending phonemic awareness abilities in children as young as 2.5-years-old with final-phoneme discrimination trials. This alternative theory suggests there are opportunities for meaningful phonemic awareness experiences during the toddler years, prior to preschool instruction.

Playfulness is another key element of phonemic awareness instruction (Griffith & Olson, 1992). Play is central to children's development and learning (Dietze & Kashin, 2011; Hirsh-Pasek, Golinkoff, & Eyer, 2004). Both the nature of the content and the developmental stages of the typical learners shape best play-based practices. Phonemic awareness, and more broadly phonological awareness, requires learners to attend to small changes in sound. Rhythm, movement, song, and repetition can help sounds and changes in sounds stand out (Optiz, 2000; Yopp & Yopp, 2000, 2009). Effective phonemic awareness experiences include singing, chanting, "hunting" for sounds, and manipulating phonemes to create nonsense words. Learners can enjoy the silliness of mixing up a phoneme in their name or satisfaction of predicting the last word of

rhyming verse. Such playful experiences provide the mechanisms through which game-based learning occurs (Barab, Thomas, Dodge, Carteaux, & Tuzun, 2005). Designers of game-based learning have a unique opportunity to leverage play in their designs by fostering meaningful and engaging interactions for children (Hirsh-Pasek et al., 2015; Plass, Homer, & Kinzer, 2015; Rothschild, 2015). This is the core of well-designed environments for teaching and learning (NAEYC, 2012; Kervin, 2016; Lieberman et al., 2009).

Digital games can be used to bring dynamic and individualized phonemic awareness experiences to young learners. Games sustain engagement and motivation by providing interactivity, adaptive challenges, and ongoing feedback (Bransford, Brown, Cocking et al., 2000; Gee, 2003; Shute, 2008; Rupp, Gushta, Mislevy, & Shaffer, 2010). In games, learners are presented with a series of well-ordered problems and receive just-in-time feedback that correspond to each learner's level, effort, and demonstration to support growing mastery (Gee, 2007). Such integrated, formative assessment in games provides useful feedback *during* the learning process, in contrast to a summative assessment conducted at the end of an instruction sequence to evaluate cumulative learning (Shute & Kim, 2014). Formative assessment enables ongoing feedback cycles and customized learner difficulty levels, cultivating long-term engagement and appropriate challenge. Such game elements can further promote perseverance by encouraging children to embrace challenges and use mistakes to learn, making them a perfect mix of desirable difficulties that maximize long-term retention (Kornell & Bjork, 2008)

Additionally, digital games empower instructional designers to gather actionable data by monitoring and measuring learner actions (Lieberman, et al., 2009). Game interactions produce rich performance data, which can include time spent on specific tasks, types of errors made, and responses to in-game feedback and remediation. Frameworks based on evidence-centered design (Mislevy, Almond, & Lucas, 2003) can guide the work of generating evidence about learning from data in game-based learning contexts (Shute, 2011). This enables game events to be interpreted directly in terms of learning objectives and competency types (Shute & Kim, 2014). As children play, the data can be used to make real-time adjustments to the level of difficulty or the types of scaffolds offered the learner. Ongoing adjustments to the game experience and content work to keep learners in their zone of proximal development, the state just beyond their current abilities, and maximize efficiency of learning (Bodrova et al., 2013; Koster, 2014; Vysotsky, 1978). This is an instance in which practice can inform research. Traditional research often relies on averages and patterns across learner populations, while practice (and some forms of action research) focuses on the data of single individuals (Molenaar, 2013; Rose et al, 2013). Digital games and their data collection tools can be used to measure and address learner variability.

Phonemic Awareness Instruction through Digital Game Play

Three of the four authors on this paper are part of the learning design team at Age of Learning, Inc., a producer of digital learning content for young children. Committed to the partnership of science and practice to create digital programs that produce learning outcomes for young children at scale, the learning design teams at Age of Learning employ a cycle of research-informed design and development called "learning engineering." An interdisciplinary team of experts, including learning scientists,

instructional designers, curriculum specialists, artists, engineers, and game designers, works together to design, build, test, and refine digital activities based on these research-informed hypotheses.

Learning engineering, originally introduced by Herbert Simon (1967), has recently been formalized as "a process and practice that applies the learning sciences using human-centered engineering design methodologies and data-informed decision making to support learners and their development" (ICICLE, 2019). Figure 3 illustrates Age of Learning's learning engineering (LE) framework. The LE team applies learning sciences research to inform pedagogy and initial design, and uses design-based research methodologies (Wang & Hannafin, 2005; van den Akker, 1999), evidence-centered design (Mislevy, Almond, & Lucas, 2003), and learning analytics (Baker & Siemens, 2014) to drive learning outcomes.

This research-informed design process begins with defining the scope and hypothesized trajectories of learning objectives, in other words, a sequence made of granular learning goals (Baker & Smit, 2018; Simon, 1995) (see Figure 3). Based on a review of the literature and best practices in instruction, LE team members work in collaboration to develop interactive learning activities designed to help learners achieve the desired learning outcomes. These activities are then tested with children, data are gathered and analyzed, insights are developed, and the learning activity is redesigned, thus beginning the iterative design cycle anew. Research thus informs not only the pedagogy of the initial design (Design Based Research Collective, 2003; Laurel, 2003), but subsequent designs as well.

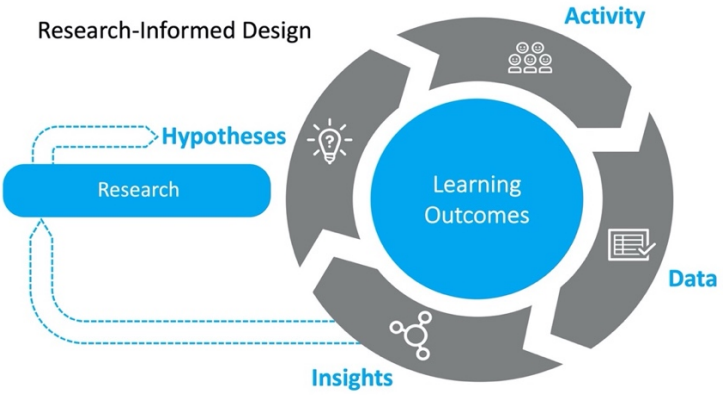

Figure 3: Age of Learning's learning engineering process

The LE team at Age of Learning used this iterative cycle of research-informed design to create a mastery-based adaptive, digital, game-based reading program called *My Reading Academy*. Grounded in the science of reading and cognitive development research, this program delivers explicit and systematic phonemic awareness and phonics instruction, paired with rich reading and language experiences. *My Reading Academy* includes learning games, reading experiences, and instructional videos (Figure 4).

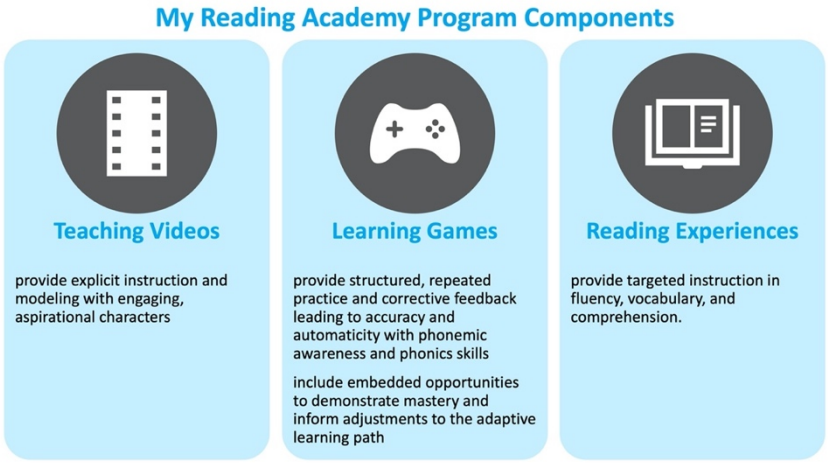

Figure 4: *My Reading Academy* Program Components

Learning outcomes for *My Reading Academy* are expressed in the form of specific learning objectives. Learning objectives are singular units of learning distilled to their most granular level. Each learning objective states something the learner will be able to do or something the learn will know (e.g., Learner understands that spoken words are composed of individual phonemes. Learner can identify a single phoneme within a spoken word.). Creating clear, singular objectives enable curriculum designers to sequence learning effectively and adjust sequencing in response to learner variability (Stavrou & Koutselini, 2016).

In this way, learning trajectories are made adaptive and responsive to the wide-ranging needs of learners as they acquire foundational literacy skills. Hypothetical learning trajectories through the content can be determined based on what the child (1) already knows, (2) needs to learn, and (3) needs to see next in order to keep them in their zone of proximal development (Simon, 1997). The actual learning trajectory for each individual learner is refined dynamically as learner performance is analyzed by the program. A learner who demonstrates the need for additional practice or instruction in predecessor skills, may engage with more instruction content and spend more time addressing each learning objective. A learner that demonstrates mastery will skip activities. Most learners will ebb and flow as different skills are presented. Game-based learning methodologies (Gee, 2007) provide an efficient and engaging way guide them to automaticity and accuracy. In the end, demonstrable mastery is the learning outcome for all.

Once a working prototype of a game activity is available, learning and data scientists define the data to be collected from game play. The game-based learning activities are made available to learners, and their game play data are captured and analyzed. Learning and data scientists use the data to develop new insights about how real-world learners in their varied, specific environments are learning. The resulting findings lead to insights that inform how the interdisciplinary team refines its original hypotheses and continue this cycle again and again, constantly iterating and revising.

As a model of the curriculum design, here we explore one phonemic awareness game in-depth. *Sound Hound* is a set of experiences in which teaching videos and different levels of game play guide learners to achieve the following phonemic awareness learning objectives:

- Learner understands that spoken words are composed of individual phonemes.
- Learner understands that each phoneme in a spoken word has a position within the word (i.e., initial/medial/final).
- Learner can identify a single phoneme within a spoken word (i.e., initial/medial/final).
- Learner can segment a spoken word into its component phonemes.

Sound Hound, and other phonemic awareness games in *My Reading Academy*, include digital manipulatives called *blurts*. These dynamic manipulatives allow learners to visualize phonemes, move them around, and link them together to form words. Blurts have no letters or symbols ensuring a singular focus on sound, not phonics. Figure 5 presents images from a teaching video in which blurts are used to show the sounds in the word *moon* (/'mu:n/).

Figure 5: Images of Blurts Used in *Sound Hound* Teaching Video

During the first level of *Sound Hound* game play, learners must first feed the "sound hound" a bone (see Figure 6). A spoken single-syllable word is presented to the learner through voice over, then its onset and rime are pronounced separately. The learner is prompted to listen for the first phoneme in the word and select the blurt that "says" the targeted phoneme. Learners tap each blurt to hear its sound, then choose one to place in the first slot on the sound hound. If the correct blurt is chosen, the learner succeeds and practices with a different word in the next round. If the incorrect blurt is chosen, the blurts playfully gasp and wrong-answer feedback is provided. The word and its onset and rime are repeated with greater emphasis on the first phoneme and the learner is prompted to try again. If another incorrect choice is made, additional support is provided. The word is repeated, both onset and rime are repeated, and then the onset is provided again in isolation. The learner is then guided to tap the correct blurb. The round ends successfully, and data about the learner's correct and/or incorrect choices are collected.

Figure 6: Image of *Sound Hound* Game Play

The next levels of *Sound Hound* require learners to identify the blurt that sounds the final phoneme, then medial phoneme in words presented via voiceover. Later levels require learners to segment out the sounds in a consonant-vowel-consonant word and accurately sequence three blurts to recreate the word. Each round of each level includes two opportunities for support in the form of wrong-answer feedback ensuring that each round ends successfully.

Game play includes embedded opportunities to assess learners' growing skills. Every tap and drag a learner performs is recorded and those data are used to evaluate their developing proficiency and inform adaptivity. Both formative and summative data are needed to create an effective response to learner variability. Learner performance during regular game play provides formative data. It measures learners' immediate responses to the instruction provided in the teaching video and in the heavily scaffolded early levels of the games. Summative data are collected through "boss level" play. In the boss levels of each game, all scaffolds are pulled away and learners are able to show what they can do. Summative data are used to create and constantly adjust the learning trajectory for each learner.

Early Results and Next Steps

My Reading Academy has been available to young learners in various forms for nearly a year. To date over 1.6 million children, majority of them ages 4 – 7, have used the program. Upon entering *My Reading Academy*, learners take a short series of diagnostic pretests that assess their early literacy abilities at a granular skill level to place them appropriately into the system. One of assessed skills is phoneme segmentation. In this pretest, learners hear a recording of spoken word and are shown a picture representation of the word (i.e., "bug"). They are prompted to recreate the word by placing blurts representing each phoneme in order. To pass the pretest, children must correctly sequence the phonemes at least 4 out of the 5 words presented. Most learners have found this pretest difficult; only 20% of those who attempted it passed. Of the 48,788 children who did not perform well on the phonemic segmentation pretest, then progressed through the program to reach the *Sound Hound* phonemic awareness game, a large majority (83%) demonstrated mastery on the *Sound Hound* boss level after median 2.35 hours of practice (Mean = 3 hours, SD = 2.16) in *My Reading Academy* altogether. This is a promising result, suggesting that targeted instruction and adaptive practice with *My Reading Academy* can dramatically accelerate phonemic awareness development in young children.

Demonstrable mastery of key early reading skills is the goal for every learner—the paths to that goal are dynamic and customized for each learner. Figure 7 shows the path of a sample 4.5-year-old from her *My Reading Academy* pretest experience, in which she demonstrated no phoneme segmentation skill, through her demonstration of mastery in boss levels of the *Sound Hound* game. The learner engaged in varied instruction, practice, and levels of scaffolding—phonemic awareness experiences interspersed with other word reading skill experiences and language comprehension skill experiences—for five hours (across 73 activities) prior to demonstrating mastery.

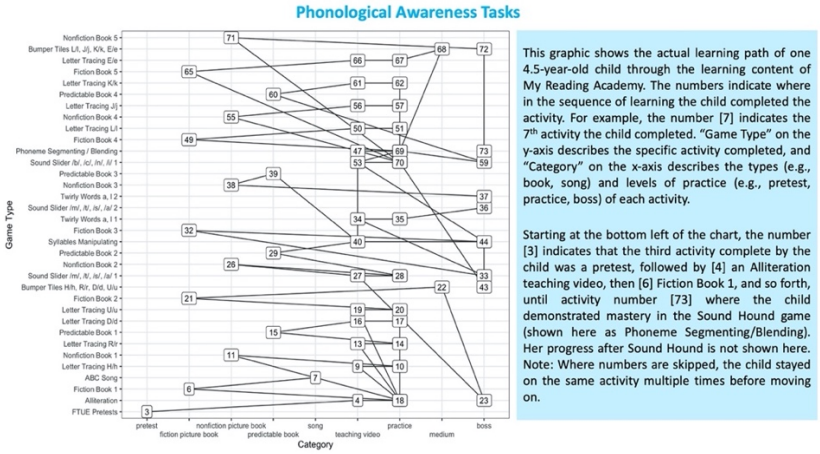

Figure 7: A 4.5-year-old's journey in *My Reading Academy*.

The cycle of research-informed design continues. The learning engineering team at Age of Learning is actively observing the performance and behaviors of learners in-game. Plans for continued research and refinement include several projects rooted in learning analytics and direct interaction with learners, teachers, and families. Research questions include the following:

- What does pretest performance reveal about the phonemic awareness skills of learners across different ages (e.g., a 4-year-old vs. A 6-year-old) as they enter the *My Reading Academy* system?
- How might the pretest sequence, mechanics, or content be adjusted to more accurately measure phonemic awareness skills?
- How might the pretest sequence, mechanics, or content be adjusted to measure receptive phonemic awareness abilities including those of toddlers revealed by the work of Kenner and colleagues (2017)?
- How can My Reading Academy teaching videos and digital game experiences be refined to more efficiently guide learners to demonstrable mastery of phonemic awareness tasks?

Conclusion

Reading is both complex and essential. Effective instruction of key early literacy skills is built upon deep understandings of both learners and content. Research-informed design requires interdisciplinary collaboration, clear learning objectives, and responsiveness.

Interdisciplinary Collaboration: Partnering across the fields of educational research, curriculum, engineering, art, game design, data analytics, and learning sciences, the

Age of Learning, Inc. team builds and tests research-based hypotheses about high-impact learning outcomes. They gather reliable data and respond with a range of tools (instructional changes, changes to game mechanics, artistic changes, etc.).

Clear Learning Objectives: Broad learning outcomes are distilled down very specific learning objectives that describe concepts, principles, skills, and data embedded within a learning, the team built *My Reading Academy* with small, focused activities. These activities are sequenced and customized to create highly differentiated learning trajectories for a variety of learners.

Responsiveness: The cyclical nature of research-informed design is essential. Practitioners must be willing and able to respond to new data gathered from literature or from direct interaction with learners. Hypotheses are constantly corrected, refined, or confirm. This nimble approach results in a product that is increasingly effective for an increasing broad swath of learners.

By bridging the gap between research and practice, practitioners are better equipped to meet the instructional needs of all learners (Seidenberg, 2013, 2018). Through systematic instruction across the elements of reading, including the high-impact skills of phonological awareness and phonemic awareness, young learners can be equipped for long-term success (Moats, 1999; National Reading Panel, 2000). Grounded in the science of reading and informed by the in-game performance of learners, *My Reading Academy* has the potential to provide effective instruction and adaptive learning trajectories to guide young learners to master the essential skills of early literacy at scale.

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Fostering Learner Autonomy through Personalized Project-Based Learning

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Abstract
Learner autonomy is crucial to the success of foreign language teaching and learning. Although it is defined differently, the essence of learner autonomy is to engage students in the autonomous learning process. In Defense Language Institute Foreign Language Center (DLIFLC), project-based learning is mainly integrated into post-basic language programs to enhance learner autonomy by involving learners into a myriad of teacher-directed language projects. The greatest challenge, however, is the students' resistance to participate in the projects due to lack of personal connection with the projects. This paper proposes that project-based learning be coupled with personalized learning to encourage personalized projects for students. Unlike teacher-directed projects, personalized projects invite students to design and carry out their own projects, enabling students to bring relevance to the project work and to take ownership of their learning. This paper focuses on characterizing personalized project-based learning first, and then outlines a five step framework to practicing personalized project-based learning.

Keywords: Learner Autonomy, Personalized Project-Based Learning, Teacher-Directed Projects, Personalized Projects

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Introduction

The concept of learner autonomy was put forward as a result of the educational promotion of student-centered learning. Holec (1979) first defined learner autonomy as "the ability to take charge of one's own learning" (p.3). Following Holec's classic definition, many other scholars attempted to explain the concept from different perspectives. Little (1991) characterized learner autonomy as "essentially a matter of the learner's psychological relation to the process and content of learning – a capacity for detachment, critical reflection, decision-making, and independent action (p.4). Godwin-Jones (2011) described it as "the skills and mindset that can lead to successful self-guided language study" (p.4). According to Benson (2013), this term encompassed the following: (1) situations where learners study on their own; (2) skills that can be learned to achieve self-directed learning; (3) capacity that can be unlocked; (4) learner's responsibility to take charge of learning; (5) freedom to choose and direct their own learning. In essence, learner autonomy entails a robust ongoing process rather than a static trait.

With the role of learner autonomy being increasingly emphasized in language learning, Nunan (1997) proposed a model to facilitate learner autonomy in five different levels, which can be summarized as (1) Level 1 Awareness: Learners are made aware of the pedagogical goals and learning content; (2) Level 2 Involvement: Learners are given opportunities to select the learning goals aligning with their own learning needs; (3) Level 3 Intervention: Learners are involved in selecting learning materials, learning methods and techniques, and in monitoring their own learning progress; (4) Level 4 Creation: Learners establish their own learning objectives and determine their learning pathways; (5) Level 5 Transcendence: Learners connect what they have learned in the classroom with the real world and beyond. Empirical studies indicated that structured instruction allowing for more choices and supporting students to make independent decisions can have a positive impact on learner autonomy (Chan, 2000). Deci et al (1991) discovered that autonomous students may elicit more autonomy support and demand fewer controlling behaviors from the teachers compared with highly dependent students. Therefore, a well-structured curriculum, which calls for more choices and independent decisions on the part of the students, coupled with teachers that mainly serve the role of facilitators or counselors can help promote learner autonomy.

Previous research also investigated on some instructional strategies such as blogging, portfolios, journaling, and project-based learning in fostering learner autonomy (Dam, 1995; Kamberi, 2013; Lee, 2011; Roh & Kim, 2019; Rostom, 2019). Inspired by the previous studies, this paper proposes personalized project-based learning, which gives students the voice and choice in designing the language projects in accordance with their strengths, needs, and interests to support learner autonomy. It focuses on outlining a five-step framework in the project planning and implementation process.

Background of the Present Study

In my organization Defense Language Institute Foreign Language Center (DLIFLC), project-based learning (PBL) is advocated to be integrated into the post-basic language programs to foster learner autonomy. The mission of DLIFLC is to provide culturally-based foreign language education and training for military students, and to

eventually help them become proficient linguists, language analysts, and other language-enabled professionals. The post-basic language programs are intended for those who have already graduated from their two-year residency language studies in the basic programs and have achieved a 2/2/2 or $2^+/2^+/2$ in reading, listening, and speaking in the Defense Language Proficiency Test (DLPT)[1]. According to Interagency Language Roundtable (ILR)[2] scale descriptions, students with 2/2/2 or $2^+/2^+/2$ DLPT score indicate that they have limited working proficiency, or limited working proficiency plus. The major goal for the post-basic language programs is to maintain students' language proficiency level and potentially bring them to the next level, which is level 3, general professional proficiency. Most refresher courses in the post-basic language programs last for six weeks, with the topics ranging from geography, culture, politics, economy, science and technology, to military. A majority of the military students need to come back for the refresher courses on a yearly basis.

In the refresher course programs, a multitude of language projects are woven into the course activities. Students are required to work on daily projects requesting them to conduct online research on assigned topics and then to present their findings, and weekly small-scale projects such as roundtable meetings and panel discussions where students are grouped into different teams to state their own opinions on certain issues. For each course, there is also a large-scale final project asking students to deliver a 30-minute oral presentation.

Through years of teaching, we have noticed that often times when the projects were implemented in those courses, it was basically teachers who did much of the heavy lifting in the learning process. They identified the project topics, or the challenging questions and problems, specified the scope, timeline, and content of the projects, and stipulated the forms of the end products. Once the projects are mapped out, they are assigned for each and every individual student. At its very core, the project-based learning is essentially the teacher-directed learning and students are mainly required to conduct the language projects according to the teachers' specific and detailed requirements. Students' different language proficiency levels, interests, strengths, and learning needs are often neglected, or even disregarded. Furthermore, there is a conflict between the one-size-fits-all projects and student individuality. Students, especially those who come back to study for the same course, have to deal with the same projects and thus find those projects boring, isolating, and frustrating. They are forced to work on the projects in case not to fail in the course. This, in turn, also poses many problems common to the teachers, namely, students' lack of interests, complaints, negativity, or even resistance towards the projects. In this situation, PBL failed to play its intended role in the learning process.

Therefore, the question is how can language projects be leveraged in a better way to foster student autonomy? This paper intends to provide a tentative solution to this

[1] Defense Language Proficiency Test (DLPT) is administered on a regular basis for military linguists. It is intended to assess the reading and listening proficiency levels in the target language. An Oral Proficiency Interview (OPI) is conducted to assess the listening proficiency levels.

[2] Interagency Language Roundtable (ILR) descriptions characterize language proficiency in six "base levels" and "plus levels" from 0 to 5. The six "base levels" describe different degrees of controls of functions and accuracy in the target language, with 0 being the lowest level and 5 being the highest level. As supplementary to the "base levels", the "plus levels" indicate that one's proficiency level exceeds the base skill level but does not meet the criteria for the next "base level".

question and suggests that project-based learning be coupled with personalized learning so as to tailor the language projects to each individual student and enable student voice and choice in the project initiation and completion process.

Characterizing Personalized PBL

Personalization is everywhere in our life. If we pause and ponder, we will realize that we are getting more and more personalized services: Amazon is recommending products to us based on our browsing and shopping history, and YouTube is suggesting shows to us according to our likes and dislikes. Personalized learning is introduced to education as a result of the national push to design teaching and learning centering around students' academic needs and personal interests. Personalized learning is defined as "tailoring learning for each student's strengths, needs and interests—including enabling student voice and choice in what, how, when and where they learn—to provide flexibility and supports to ensure mastery of the highest standards possible" (iNACOL, n. d.).

With its root dating back to the idea of experiential learning or action-based learning advocated by John Dewey in the early 20th century, PBL, as its name suggests, orchestrates learning on the basis of projects (Du & Han, 2013; Petersen & Nassaji, 2016). PBL in the classroom is defined as "a teaching method in which students gain knowledge and skills by working for an extended period of time to investigate and respond to an authentic, engaging, and complex question, problem, or challenge" (Buck Institute for Education [BIE], n. d.). Thomas (2000) identified five criteria for the projects in PBL: "centrality, driving question, constructive investigation, autonomy, and realism" (p.3). That means PBL projects are derived from real-world questions or problems which involve students to construct their own knowledge and drive their content learning.

Personalized PBL, by marrying PBL and personalized learning, has been greatly advocated during the past few years to further enhance the effectiveness of PBL and promote personalized learning (McBeth, 2017). So far, there is no unified definition for personalized PBL, but the main tenet behind this approach is to provide students with a personalized project learning experience that allows them to become self-directed learners while also covering important curriculum content. We suggest that personalized PBL encompass the following four essential components.

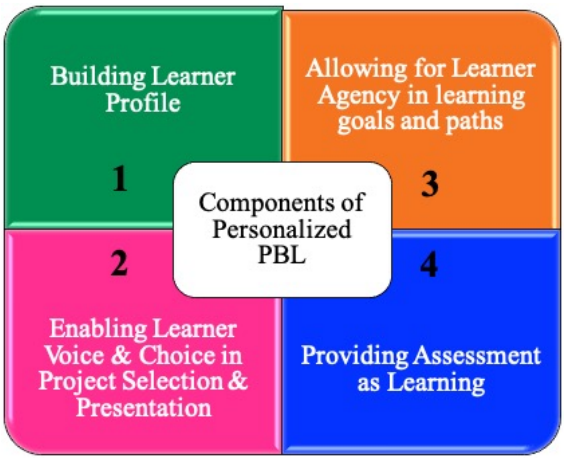

Figure 1: Four Essential Components of Personalized PBL

The first component gives a deep understanding of each learner and is used to plan a customized project-based learning. The second and the third components allow learners to incorporate their personal ideas, beliefs, and choices in selecting and presenting the projects, and to determine project learning trajectories. Meanwhile, the teachers can also provide scaffoldings and consultations to help students provide benchmark and commitment to learning. The fourth component implies that learners need to reflect, self-assess, and peer assess throughout the learning process.

Unlike the teacher-directed PBL, with personalized PBL, students are given the free rein to come up with their own driving questions, establish their learning objectives, manage their project progression, create their own projects, and choose the format to present their projects. They are no longer passive participants, but rather, they are put into the driver's seat. Throughout personalized PBL process, students may play multiple roles as demonstrated in the following table.

Roles	Descriptions
Decision-maker	Students define what they want to learn, why they want to learn, and how they want to learn through personalized projects. They will also determine the format to present their projects.
Planner	Students map out the necessary steps involved to complete the projects, set the priorities, and consider the duration for the project.
Researcher	Students carry out a structured and systematic investigation into their project topics. They analyze their findings to develop their own opinions.
Designer	Students culminate in a tangible product to demonstrate their learning.
Presenter & Facilitator	Students present their final projects to the audience and facilitate in-depth discussion while presenting the projects.
Mentor	Students share their expert knowledge they have gained on certain subject matters during the project learning process and contribute to the learning of the whole class.
Evaluator	Students peer assess, self-assess, and reflect on the learning process to set new goals for future learning.

Table 1: Student Roles in Personalized PBL

On the other hand, teachers mainly serve the roles of a guide and an advisor. Instead of designing the projects for students, under the approach of personalized PBL, teachers design the projects with students. Prior to project design process, teachers coach students in creating effective driving questions and determine their learning objectives. During the project design process, teachers scaffold students to crystalize their project plans. At the same time, teachers also involve in frequent formative assessments to ensure that students stay on the right track. Table 2 below shows the changed learning environment under personalized PBL compared with teacher-directed PBL.

Teacher-directed PBL	Personalized PBL
Predetermined and unified learning objectives for all students	Students determine their own learning objectives based on their learning needs
Rigid project topics, timeline, and	Students have more freedom to select the

presentation formats	project topics, and determine the pace and presentation formats for their projects
The teacher has all the answers to the challenging questions in the projects	Students engage in inquiry-based learning to seek answers to the questions
Teacher assessment for learning takes place when students present their projects	Assessment throughout the process takes on many forms such as self-assessment, peer assessment, and teacher assessment
Students are extrinsically motivated due to fear of failure in the course	Students are intrinsically motivated
Students are passive learners to fulfill the teacher's requirements	Students take control of their own learning

Table 2: Personalized PBL Compared to Teacher-directed PBL

Five Steps to Practicing Personalized PBL

Based on our teaching experience, there are five steps involved in carrying out personalized PBL in a foreign language class.

Step 1: Students develop their own driving questions and learning objectives under the guidance of teachers

There are several ways teachers can help students with this step. For example, teachers can guide students to probe into the topics of their interests if they have already developed some in the culture of the target language. If not, teachers can encourage students to conduct a comparative study by linking their interests in their culture with those of the target language. If one student is highly interested in the pirates in his own culture, his interest and prior knowledge about the pirates would take him into a joyful ride to look into the pirates in the culture of the target language. Another plausible way is through student reflection which is a starting point for students to continue and expand learning. A sample reflection sheet is provided below.

Self-reflection Sheet

What is the top area of my interest?	
What is the ONE topic that I'd like to explore most?	
What have I already known about this topic (bullet point)?	
What do I want to learn more about this topic (bullet point)?	
How can they benefit me and my peers?	
What do I need to do to learn more about this topic?	
What difficulties will potentially occur during my learning?	
How will I overcome the difficulties?	

Figure 2: Sample Reflection Sheet

Step 2: Students establish the project framework.

In order to establish the project framework, students need to plan out the specific and detailed steps, conduct research, and collect information. Teachers can coach students to create a storyboard and to outline the blueprint for the project. Teachers also need to schedule "meet time" with students during this step so as to address their questions or concerns, to give "just-in-time" instructions and to run formative assessments about students' project progression.

Step 3: Students create a tangible product based on the project framework.

PBL is typically characterized by the culmination of products by students. Students can use their imagination and creativity to create their products. The products can take on various forms, such as videos, audios, PowerPoint presentations, posters, infographics, and so on. Similar to the previous step, teachers can assist students in their problems, provide guidance and instruction, as well as conduct formative assessments about students' projects.

Step 4: Students share their products with the class.

In a foreign language class, this normally involves student presentation. Teachers need to provide a rubric for both the presenters and the audience so that they know clearly what they are expected of them. The rubric needs to be specific, measurable, attainable and reasonable based on the curriculum requirements and the skills students are fostered. Teachers also need to facilitate the whole process of student presentation.

Step 5: Student reflect on their personalized PBL process.

Although this may be the last step, it is a critical step in personalized PBL. This step allows students to take a moment to ponder over the whole learning process. The purpose is to engage students in reflecting on their own actions and constructing meaning from their learning experiences. To fulfill this purpose, it is very important for teachers to guide students' reflections, otherwise students would be caught in bewilderment, having no ideas of what they are supposed to do. Below is a sample for prompting questions to guide student reflection.

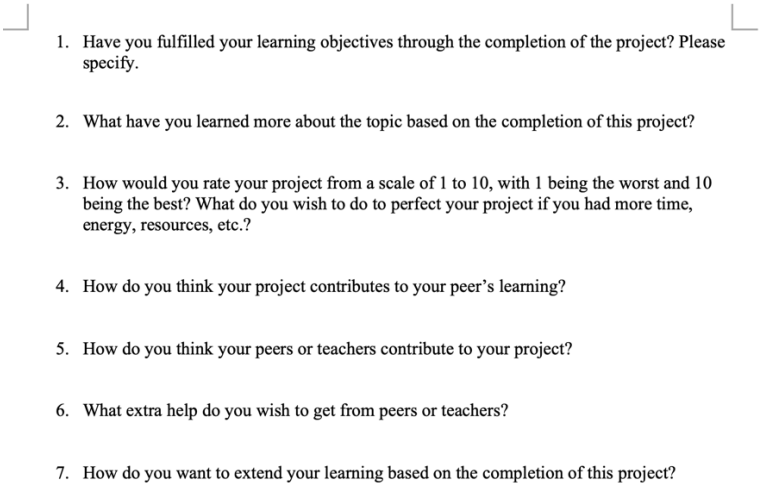
1. Have you fulfilled your learning objectives through the completion of the project? Please specify.
2. What have you learned more about the topic based on the completion of this project?
3. How would you rate your project from a scale of 1 to 10, with 1 being the worst and 10 being the best? What do you wish to do to perfect your project if you had more time, energy, resources, etc.?
4. How do you think your project contributes to your peer's learning?
5. How do you think your peers or teachers contribute to your project?
6. What extra help do you wish to get from peers or teachers?
7. How do you want to extend your learning based on the completion of this project?

Figure 3: Sample Prompting Questions for Student Reflection

Conclusion

Personalized PBL personalizes students' project-based learning experience by allowing them to choose, design and create their own projects that align with their interests, strengths and needs. It enables students to move beyond the traditional projects standardized by teachers and to come up with their unique projects representing their learning achievement and individuality. It helps resolve the predicament foreign language teachers face in the traditional teacher-directed PBL model. According to our observations, personalized PBL brings about some benefits in the learning process. To start with, student engagement and involvement are enhanced. In personalized PBL, students do not solely rely on teachers to tell them what project they need to work on, instead, they look for their own projects based on their interests, strengths, and needs. Additionally, personalized PBL allows students to become reflective learners. It starts with reflection, and takes a step further to expand the learning. It is believed that students can eventually take ownership of their learning and gradually evolve into being more autonomous in their learning with personalized PBL. Throughout the learning process, students engage in the process of problem solving, inquiry-based learning, and content-based learning. This also allows them to hone their 21st century skills such as critical thinking, creativity, technology literacy, etc.. Meanwhile, it also renders them an opportunity to integrate and interdisciplinary knowledge.

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Emergency Remote Teaching a New Curriculum during a Pandemic

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Abstract
The COVID-19 outbreaks worldwide, led the academic institutions to entirely cancel face-to-face teaching including laboratories and other learning experiences as a step against the risk posed by the virus. Alternatively, various measures were initiated by the higher education providers to implement social isolation and online or remote teaching was adopted with rapid curriculum transformation. The online delivery is more convenient, as it can provide a vibrant and dynamic teaching and learning environment. However, due to limited time constraint, the curriculum transformation was anticipated to occur rapidly without sufficient preparation. Therefore, in this paper, the concept of the emergency remote teaching (ERT) including its application and evaluation is thoroughly discussed. The application of the ERT at an University of Technology in South Africa has been considered. This study draws on the CIPP evaluation model to assess the effectiveness of the adopted model, and qualitative data were collected online taking samples of students from a particular curriculum which was a new qualification that started this year. Besides, questionnaire responses via google forms, experiences, beliefs, and challenges encountered by the educator and students on the emergency remote teaching were used and analysed. In addition, students' attendance and module nature were considered to evaluate the students' participation in the online classes. The collected information was analysed, and based on the outcomes, recommendations were given to serve as an input for future strategies and to improve the performance of teaching learning activities during similar circumstances.

Keywords: Curriculum, Clothing and Textile, Educational Institution, Advanced Diploma, Remote teaching, Pandemic, COVID19, Blackboard, ERT

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Introduction

After the outbreak of COVID 19 in December 2019, the World Health Organisation declared COVID 19 as a global pandemic around March 2020 (WHO, 2020). To abate and ward off its outspread, countries around the world adopted strict protocols like lockdowns and social distancing and others choose herd immunity. This gave rise to options like work from home (WFH), flexi-working hours or some organisations deciding to close instead of spreading the infections. These conventions were adopted by educational institutions as well where it forced them to function remotely and to encourage the implementation of emergency remote teaching. Reports suggest around 1.5 billion learners of all ages globally were affected due to the closure of educational institutions like schools and universities owing to COVID 19 (UNESCO, 2020a; UNICEF, 2020). With the pace of spread of the COVID 19 virus, universities had to decide to move all courses online. This provided very little time for teaching staff to collect their materials from the campus and at the same time the students had to return home before local restrictions apply and before residences close. There was great anxiety and uncertainty when ERT carried on fully online both in the minds of students and educators. This pandemic has pushed many educational institutions globally to transform their lecture room based courses into online mode in an astounding moment of time.

In response to this global crisis, emergency remote teaching (ERT) was put in place. This mode of teaching is not only about uploading pedagogic content, instead it's a mode of learning that imparts learners agency, responsibility, pliability and possible options. It rather is a fusion that needs prudent planning and crafting to create a healthy and efficient learning environment. This emergency remote teaching was considered an interim solution to an instant problem (Golden, 2020). Academics and course coordinators were in a dire need of an emergency curriculum which would help them make informed decisions and formulate course content and assessments in times of crisis.

Against this backdrop, the study presented here was to understand the impact of an emergency remote teaching of a new curriculum and making sure that the course was effective and attainable especially when it's a new qualification without stressing the students and academics in any manner. The study provides a perception into the students experience in their first remotely taught online course and their viewpoint towards content, design of the course, mode of delivery and assessment. Precisely, the study investigates two research questions: (1) What are the major impacts of students towards our curriculum design and implementation? (2) What can be concluded from students' feedback to transform and modify our future curriculum?

Literature

The global crisis has deranged the centuries-old educational institutions curricula through various facets. This global emergency led to governments to place various protocols and preventive measures in order to curb the spread of the virus. This led to closure of educational institutions like schools and higher education institutions. The cessation began a sudden disturbance of the academic calendar both for students and academics. Ultimately, it gave rise to remote teaching, learning and assessments to ensure continuity for students (Evans et. al, 2020). Even though such interventions

using online platforms are not new, yet it requires time, effort, collaboration and planning in order to bring about an effective and efficient pedagogical approach (Longhurst et. al, 2020). This doesn't only involve preparing content apart from the fact that academics new to learn or refresh online teaching technological skills, tips and tricks. Most academics had to jump into this bandwagon overnight due to this pandemic and didn't really have a choice but to transform from a well-crafted years of face-to-face practice to moving teaching and learning online. The move to remote mode of teaching is presumably having a lesser effect on students' adjustment and transformation when it comes to using remote teaching platforms. This is because of the fact that most students belong to the "millennial cohort" with extraordinary online and social media skills, that warrant them to undertake a smoother metamorphosis to the world of remote teaching than their educators (Barry et. al., 2016; Pickering and Swinnerton, 2019).

As the spread of the virus evolved around the world, the majority of academic institutions responded diversely. This meant the curriculums were converted to an online platform by the educators, with the use of digital tools and learning management systems. The key focus is not just on online pedagogy but also on converting the curriculum to an online space. This conversion procedure is a real test for institutional dexterity (Wu, 2020). However, the significant challenges unfolded with alternate modes of delivery, especially those associated with expeditious digitalisation of curriculum. The eternal question here is: is the higher education sector well prepared for the upcoming digital era (Houlden and Veletsianos, 2020)?

Research Design

This research paper aims to focus on the adopted ERT model used at a clothing and textile technology department in a University of Technology in South Africa following the shutdown of physical classes due to the pandemic outbreak. The paper included students who enrolled for a new qualification that was run for the very first time, in the department which was equivalent to a B.Tech qualification. This qualification as nationally known is "Advanced Diploma", which is a new qualification to be adopted nationally by all other higher education institutions, as was approved by the Dept of Higher Education. The one on which the research has been carried out is named as "Advanced Diploma in Clothing and Textile Technology". The subject and content taught within the qualification is first of its kind taught within the department, where the focus was on current and future knowledge, trends and practices. The embraced model for ERT was assessed by using the CIPP evaluation model in terms of context, input, process and product output. Qualitative data were gathered via google forms with focus on questions around mode of teaching, curriculum design and implementation. The questions also emphasized on students' feedback to improve, revise and reform the curriculum.

Methodology

Analysis of Emergency Remote Teaching (ERT)

A qualitative estimation and gauging in an engineering faculty within a department of clothing and textile technology at an University of Technology is particularly considered to assess the quality of remote teaching. The research was conducted by

means of analysis of data for remote teaching for almost close to a year based on students experience. Synchronous mode of learning was considered as the students registered for the qualification were in-service or working individuals. Synchronous learning is a well-constructed learning approach, where the courses are time lined on remote platforms which were executed through institutional learner management system i.e. Blackboard. Fairly similar to asynchronous mode was email, where students could contact the lecturer directly for any queries on a one-on-one basis. There were around 15 students who registered for the qualification, however two of them dropped out due to difficulties that arose around COVID 19. All the other students actively participated in the scheduled live sessions via Blackboard and their involvement was more over emails. So synchronous mode worked for them in an effective manner.

The analysis conducted in this paper was designed based on the fact that:- all students who form part of the research had proper devices mainly laptops, they were available at the time of crisis, had almost no or minimal technical issues and that they were sound and healthy. The students name and personal information was kept anonymous at all times. The students didn't have to fill up their name and email address while filling up the google forms. Furthermore, the survey was collected as part of ERT and that the data was collected in the course of the year, through a range of surveys in the form of beginning, mid-year and year-end feedback surveys. The various aspects of the CIPP model is explained in the form of students' responses.

Context Evaluation (C)

According to Stufflebeam and Coryn (2014), context evaluation is defined as assessment of needs, problems, opportunities and problems which can be addressed in a particular environment. For the present paper, the context was gauged using student data from the feedback collected.

As can be seen in Figure 1, most of the students were in agreement that the lecturer/s stimulated interest in the new course. The course provided students access to materials via Blackboard and live sessions through Blackboard collaborate, where students were able to access the session recordings again and again to synthesize their knowledge. Transition from traditional face-to-face to remote teaching and learning bridges the gap between typical and recent advanced technologies, which proves beneficial for both students and educators.

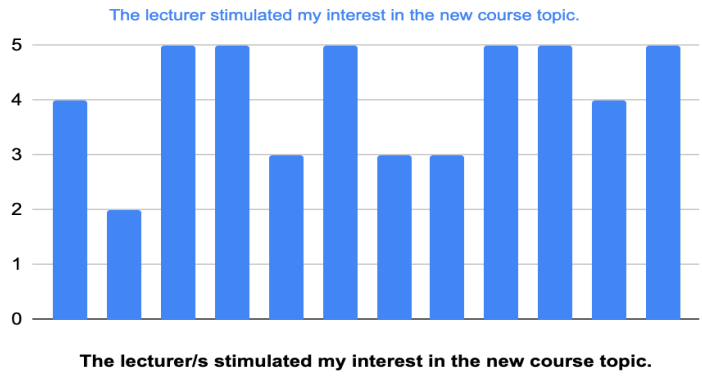

Figure 1: Stimulation of Interest in the Topic

The next question that was asked, if the students were explained of their expectations from the course as shown in Figure 2. To this, close to 90% of the class agreed that their expectations were met. As one of the main focal points was around curriculum redesign, the currently prepared curriculum to suit remote teaching was meeting and addressing student needs. There were very few of the students who either disagreed or were unsure, that might be due to various reasons like for instance students living in remote locations, difficulties in accessing online sessions and data and connectivity issues.

Figure 2: Course Expectations as a Student

Figure 3 highlights the questions that were asked to students via the use of Likert scale, i.e. if the lecturer/s were responsive to them. The responses received were all quite positive, which proves that the students were happy with the engagement and interaction amongst students and educators. This may be attributed due to the availability of online platforms which allowed both student and lecturer to reach out and gain feedback quickly with focus on individual attention. Therefore it shows that the adopted ERT was satisfactory.

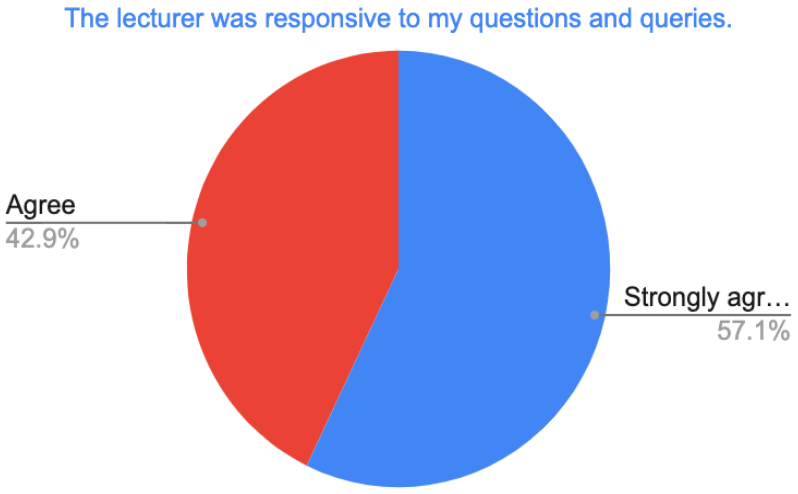

Figure 3: Lecturer's Responsiveness

Input evaluation

Input evaluation was meant to impart information with regard to the sources that can be used to execute ERT during COVID19. These requirements were put under three main sections namely:
Hardware requirements (Laptop/ computer/ tablet/ cell phone and internet availability)
Software (web-based tools in this case Blackboard)

Learning materials and resources (online mobile content, library access and access to similar research platforms)

Aimed at assessing the effectiveness of ERT, students' feedback were gathered in terms of the adopted LMS, Blackboard, which was not only used for content uploading but also for live sessions, assessments and feedback. In the two figures below (Figure 1 & Figure 2), students ensured that they were having access to content in various forms e.g. powerpoint presentation, terms and definitions, case studies, audio and video clips, similar resource materials etc. And also agreed on the usage and utility of blackboard and how it contributed towards participating in discussion forums. In general, the majority of students found this helpful and helped them in synchronous learning.

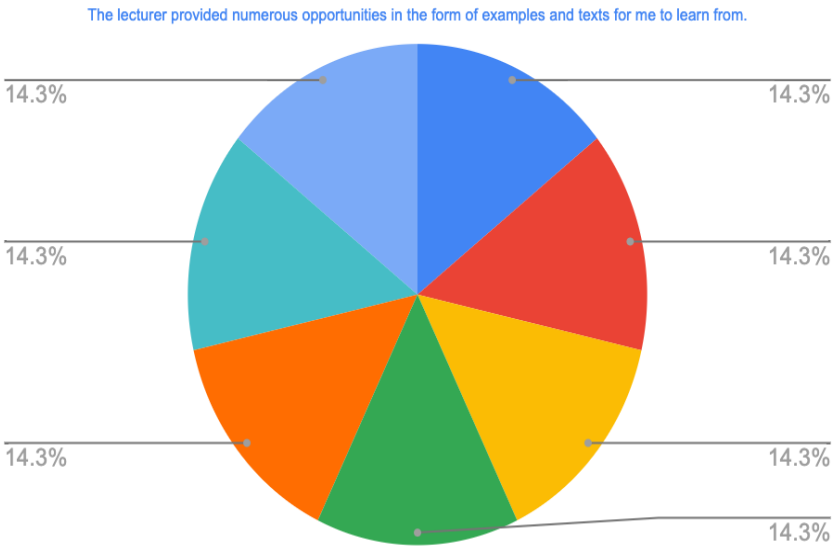

Figure 4: Availability of content in various forms

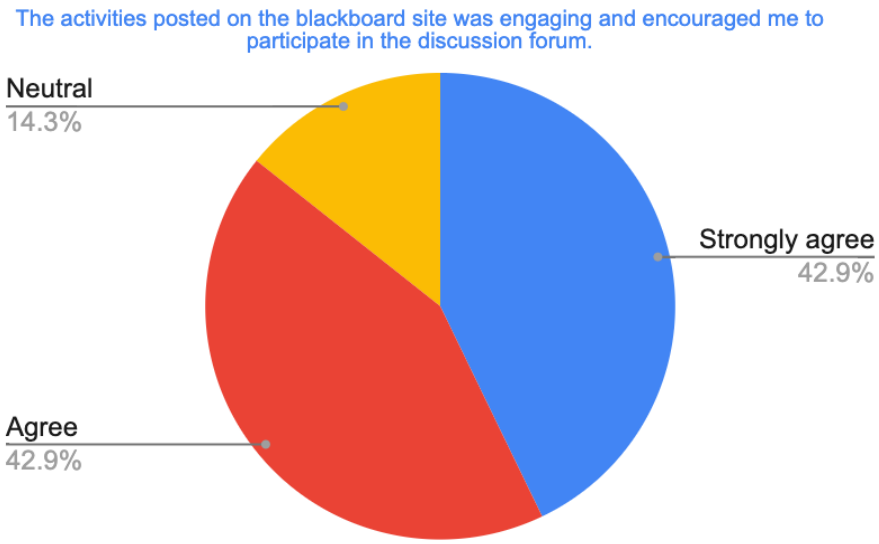

Figure 5: Usage of blackboard as an LMS

Process Evaluation

Process evaluation is about needing a methodical perspective to attain good quality teaching and learning. This is normally obtained by evaluation of modules, projects and assessments. In the present paper, assessments were carried out through blackboard, a web-based LMS, where a particular assignment with a set deadline is provided before time. On uploading or completing their task via the LMS, an email confirmation is sent to both parties which also acts as evidence. Submission is received at the lecturer's end and is marked and finally the student gets his/her feedback.

Students in general appreciated this mode of assessment submission and module availability. However, there were positive responses when it came to laboratory activities, as they were face-to-face and involved hands-on-experience. Overall, students indicated their satisfaction in the course. Figure 6 and Figure 7 highlight this.

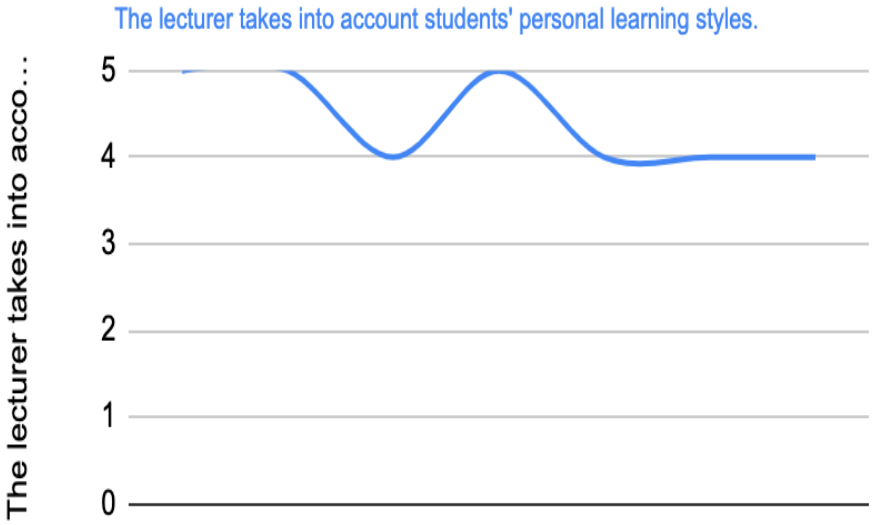

Figure 6: Focus on Personal Learning Style

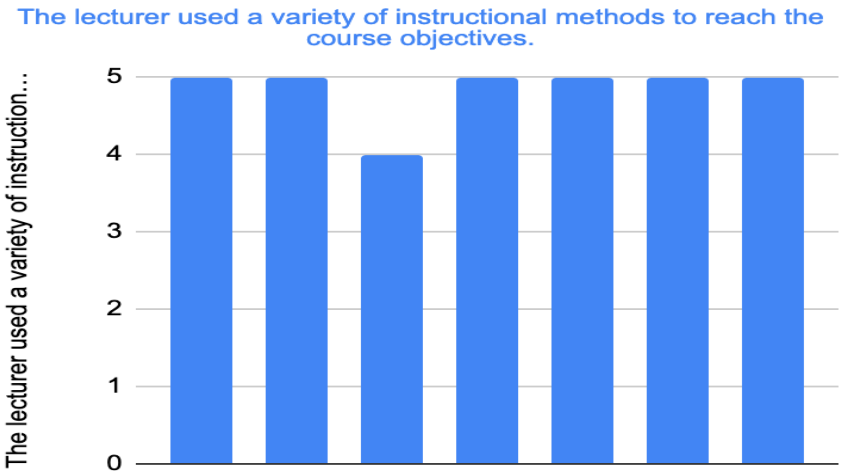

Figure 7: Use of Instructional Methods

Product Evaluation

Product evaluation estimates the after-effect of an adopted technology or procedure which will help in minimizing errors and mistakes for the next time besides fulfilling and addressing the needs as per the feedback provided. Cornock (2020) mentioned that product evaluation for ERT is not important. That's because this was done at a staggering speed in a very short timeframe. Hence the ERT evaluation should focus on context, input, and process and not product (Hodges et al, 2020).

In the figures below i.e. Figure 8,9 and 10, students have shared their feedback and experiences while completing the qualification. It emphasizes on all the aspects of the CIPP model. It reflects their understanding and knowledge gained through the course. However, the converse students brought up certain facts which they felt affected their performance and focus towards the course like working and studying was not always easy, needed more focus on practical's, and seamless communication to make the process smoother.

What was your experience of getting to know the new courses like product development, smart and sustainable textile, supply chain, etc?
Interesting, to learn about new products and more about each subject that I was not aware of
The only subject I enjoyed was supply chain. Everything else was ok. I think there's room to have learnt more in other areas. Research me
It was an eye opening and it showed me the importance of the innovation that goes into clothing
Fun and educational because I've gained new knowledge about the industry.
It was an interesting experience to learn about new things and better understand things that I've learned before.
It was good, but time was an issue. Work is so hectic
It was new and interesting
The course provided insight to sustainability on a greater scale.
Learning the whole process of supply chain from logistics to inbound and outbound transportation.
Very interesting I wish I was introduced in the early stages of my career.
Should the pendamic have been non existence maybe the process would have been smoother.
Interesting as some things were relatively new.

Figure 8: Experience of the New Course

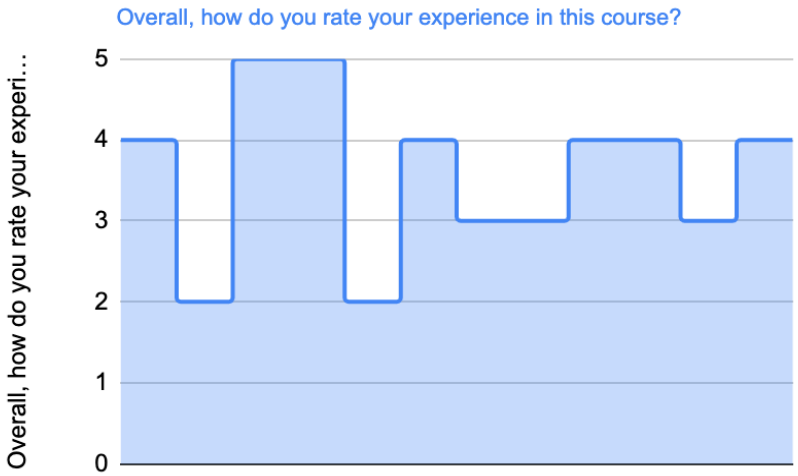

Figure 9: Rating of the New Course/ Qualification

L
What are your suggestions for improving the course? What did you feel could be done better?
Better communication between lecturers and students, clear instructions on work given
Firstly, a student guide is essential in my opinion or atleast some sort of communication as to what we'd be ta
I thnk we need to do a lot of practical in each subject I. E we need to make it practical
Learner's should receive a schedule/ time table to plan their time.
Lecturers should communicate more effectively with each other and students to avoid any confusion. At many
Give the learners a layout of the term so that they know what to expect. There need to be Clearer communica
Lecturers must communicate with students always and also communicate between themselves to make it eas
Better flow of communication between lectures and students. The course work must be more structured.
Everything was fine for me.
The communication between lectures to integrate modules more effectively and efficiently.
Communication at all levels,to avoid pressure and adequately combined decision making from the lectures.
Students understanding on course content

Figure 10: Course Feedback for Future Improvement

Product evaluation focuses on understanding the effect of ERT on student's engagement and if the pre-desired objectives of ERT were met. The end result of this survey showcased that the majority of students respected and valued the fact that the ERT model was carried on instead of suspending the course and the teaching and learning process during COVID 19. Although some felt that if they could have had the lecture physically then it would have been a different experience, being a new qualification, the adopted ERT successfully solved the purpose for the year 2020. Along with the distraction that COVID 19 caused to the educational institutions, there are a few winners that have emerged during this crisis. Firstly, ERT grants ample opportunity to students to become self-learners and critical thinkers. Secondly, it compels both students and educators to be at par with technology and it's usage. Lastly, it encourages the educators to upgrade their teaching and learning skills through adopting various teaching and learning courses, web tools, social media platforms, etc which will have an enormous influence on students' skills and attitudes.

Challenges – ERT Implementation

With the onset of ERT due to the pandemic in the educational institutions came with certain challenges. It impacted both students and educators in various ways as well as the content. The educators need to be well trained in order to attain academic creativity to interact with learners and stimulate them in their learning. There are many freely available resource learning materials that can be used as part of their learning to further enhance their skills. Challenges around assessments have been seen as a hindrance both for students and educators. The onus therefore is on the educator as they are the ones who assess students individually or in groups to obtain the necessary outcomes.

Students should possess the pre-requisite learning skills, capacity for self-learning, ability to communicate effectively, and seek for support if and when required. Students should also have to the capability to learn and interact with peers through virtual platforms. While the content should be in a standard format and structure for ease of understanding and that it should be simple and well organized in order to be reachable to all the students. It should be in a medium which is easily accessible. The usage of live sessions posed many challenges for educators. The live sessions weren't used previously, hence it might in a way affect the teaching and learning outcomes and the quality of teaching (Wang et. al, 2020). Educators and/or students might have difficulty connecting from home, where they might face the burden of home-schooling or childcare which might affect their teaching and learning process.

The implemented ERT in an UoT in South Africa within the department of clothing and textile technology had good responses from students. However, with these comes challenges that need to be brought into attention. The educator/s mode of contact with students was through emails and LMS Blackboard. There were still gaps where students won't respond back to the educators' messages or emails. And that may be due to various reasons: network and connectivity issues, personal reasons, limited data access, load shedding, etc as highlighted by few students in Figure 11.

What were some of the challenges you experienced?
Understanding some segments of assignments given, deadlines for assigments
Network problem
Previously answered
Poor time management
Nothing comes to mind right now. This has been an extraordinary year which has required us to adapt to new ways of learning and living. Given the current circumstances of many, I'
Although it wasn't a major challenge, traveling while class was ongoing was something I had to adapt to but it was a sacrifice that I am willing to make as online classes are more cor

Figure 11: Challenges Experienced in the Course/ Qualification

On another note, the students within the Advanced Diploma qualification in clothing and textile technology come from diverse locations. There are students who are neither working nor are based in an urban location, therefore they have limited data access or interrupted data services. Although the adopted mode of ERT abolishes this as there are recordings of sessions, still students who have missed out a live session

felt that they needed attention. Many times in the face-to-face sessions, there were tutors available who could assist their peers or juniors when the need arises which wasn't possible via ERT.

In conclusion, the ERT worked well for the new curriculum of the new qualification, not only this but the students were satisfied with the teaching and learning strategies adopted during the pandemic.

Fortuity and Learnings for the Future

One of the main positive aspects in adopting ERT is that the curriculum redesigned and content created can always be used in future. For instance the prepared content can be used in the current year 2021, the chances of carrying on ERT mode of teaching and learning are very high. Further, along with content, assessments were also moved online which will act as a question bank and educators can take this opportunity to automatically select, assign and later mark those questions which will minimize their academic workload. The pandemic sort of acted as an eye opener to universities which is also very apt during this time where the fourth industrial revolution is being talked about and implemented everywhere, to upgrade and prepare universities for the future. This sudden adoption and implementation of online teaching has and will prepare students to have good collaborative and communication skills, to be good self-learners and be resilient at the same time. It also prepared students to find out innovative ways to show team working skills. Some students even mentioned how beneficial it was to study and learn while at home or at work, through live sessions and don't having to travel to the university campus by investing extra time and effort.

Limitations of the Study

One of the good positives about this study was getting a good response from almost all the students within the qualification, irrespective of where they were located. This shows students' perspectives towards ERT. As last year was the first year for the new qualification, there were probably less students that enrolled for the course. Higher number of students could have responded more diversely. Although the course offered full time and part time programs, yet the students registered only for full-time programs, else the response would have been different. The questionnaire didn't cover questions around the mental health of students during these difficult times.

Conclusion

The swift shift to ERT due to COVID19 has created disruptions for educational institutions. This disruption wasn't only limited at the educational level but also to the normal lives of people. It was a reality for universities around the world in terms of readiness both for students and educators, flexibility and adaptability. If seen from the brighter side, it serves as a change agent which has prepared all of us for similar times of crisis. As Lederman (2020) says, forthcoming normalisation of the current emergency remote teaching does not necessarily mean extending the limitations placed upon face-t0-face teaching, instead it refers to strategies that frame the prevalent adoption of online learning under COVID19 as a pathway to a new conventional rather than an emergency response. Therefore, it can be proclaimed that,

even though ERT has been introduced as an emergency adoption to protect the community, it will eventually bring about a change in the learning landscape of schools and higher education institutions. As much as the students were content with their exposure to ERT, it is vital that students' needs and wants are carefully addressed in future.

While designing and creating online content and structures in ERT, being obvious and precise about what is being done, will ensure accessibility for students. Providing feedback on their experience in the online platforms will encourage them to perform well and communicate well.

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Response and Reflection on COVID-19: The case of Japan and a University

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Abstract
The COVID-19 pandemic has significantly disrupted higher education worldwide. In this regard, multiple issues have emerged that affect the stakeholders, including school administrators, staff, faculties, students, and their parents. Facing tremendous changes, it is imperative to ensure that the quality and equality of education remain unaffected, to create an effective and supportive educational environment. This study reports the experience of a small private university in Japan. During the spring semester of 2020, the school employed three modes of instruction, namely home assignments, online classes, and face-to-face. These modes were adopted in response to the threat posed by COVID-19 and is a departure from solely face-to-face instruction practiced earlier. Descriptions of each type of instruction, including its aims and planning, implementation, and evaluation phases are presented. The survey was conducted on 200 students to reveal their perceptions, experiences, and difficulties during the semester. The survey data were entered in SPSS for descriptive approaches as well as correlational analysis. The ultimate goal of this study is to identify the major challenges faced by universities and to propose possible solutions through information sharing. Amidst the uncertainty over when the pandemic would end, there is an increasing necessity for the reconceptualization of higher education. Furthermore, it is crucial to build a sustainable education model for the future with the innovation and cooperation of the stakeholders. It is hoped that this study will aid in developing a better understanding of the current situation and lead to the formulation of constructive measures.

Keywords: Higher Education, COVID-19, Online Instruction

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Introduction

According to Johns Hopkins University & School of Medicine, 91,669,273 COVID-19 cases have been reported in the world as of January 13. This pandemic has gained momentum day by day and shows no signs of slowing down. At the beginning, when the pandemic started spreading globally, the situation forced most governments globally to close schools and other educational institutions in an attempt to control the spread.

Likewise, the Japanese government requested the closure of all public primary and secondary schools on February 17, 2020 and the private schools were also followed the government request. On April 7, the government declared a state of emergency, under which almost all schools remained closed and students were assigned home-based learning. Some schools provided online classes, while others provided take-home assignments. After the government lifted the state of emergency on May 25, these schools resumed classes. However, universities in Japan had different experiences than the primary and secondary schools did. This study will first provide an overview of the response in higher education to the COVID-19 situation in Japan, followed by the presentation of the current case study.

There have been various studies related to COVID-19 published by international organizations such as the United Nations (UN), Organization for Economic Co-operation and Development (OECD), and United Nations Educational, Scientific and Cultural Organization (UNESCO). They report the impact of COVID-19 in terms of health problems, the economy, environment, and society, as well as the education. Other global organizations, such as the International Association of Universities (IAU), Salesforce org., IPSOS, and The Chronicle of Higher Education have focused especially on higher education globally, reporting government responses, instructional reactions, and students' experiences. The above-mentioned studies used survey methods to examine the conditions of higher institutions and their students. Although these global studies have provided limited information on Japan, the Ministry of Education, Culture, Sports, Science and Technology (MEXT) has also published various reports involving surveys, discussion groups, and interviews to gain a picture of the nation's condition. Meanwhile individual universities have conducted their own surveys (Tokyo University, Waseda University, Ritumeikan University, etc.), examining their students' academic work, daily lives, and physical and mental health. Although the topic itself is still new to the field, numerous studies of higher education during the COVID-19 pandemic have been published.

A review of the above-mentioned studies found that comparisons of two surveys of the same population at different times remain very limited. Moreover, there are as yet no studies focusing on English online instruction. Therefore, this study also aims to present the case of online English instruction at a small private university, including survey results. The current study involves two surveys, one administered in the spring semester and the other in the fall semester, to the same sample population. It is intended to reveal students' perceptions and experience of online English instruction. As mentioned, this area of research is in an early stage; therefore, we believe that up-to-date specific information will help show a clear picture of the field, allowing us to identify the issues and challenges that English education faces. Ultimately, using such information would lead to proposals for effective measurement as well as

building new educational models, not only for English instruction but also for higher education in general.

Purpose of the Study

There are two purposes of this study. First, the study surveys the response of higher education to the COVID-19 pandemic in Japan. Second, this study presents the case of a small private university, including survey results.

Methods

To achieve the first purpose, a review of recent literatures and documents issued by MEXT was performed.

For the second purpose, the survey was administered as described below.

Students' surveys were conducted at the ends of the spring and fall semesters.

Aim: To reveal students' experiences and perceptions of online English instruction

Methods: Survey questionnaires were prepared using Microsoft Forms. of the questionnaire comprised 55 questions, including 2 background information questions, 51 multiple-choice questions scored on a 5-point Likert scale, and 2 open-ended (like/dislike) questions in the spring and 3 more multiple-choice questions added for the fall semester.

Sample: The participants comprised 94 1st-year students and 78 2nd-year students in the spring, and 101 1st-year students and 77 2nd-year students in the fall.

Analysis: The survey data were entered in SPSS for descriptive and correlational analyses.

The presentation of this study follows the manner in which two purposes are explained.

Purpose 1. Overview of the Reaction to COVID-19 in Higher Education in Japan

First, we provide an overview of the responses to and reflections on on higher education in Japan with regard to the COVID 19 pandemic.

Although the COVID 19 pandemic had a great impact on higher education in Japan, the responses of universities were different from those of primary and secondly schools in Japan.

There are 781 universities in Japan, 80% of which are private. All universities are under the jurisdiction of MEXT, which has overall control, imposing more restrictive regulations than the U.S. or other European countries although MEXT has been expanding universities' autonomy since in the middle of 1980's. However, the pandemic forced MEXT to shift from the traditional routine and regulations, allowing the decision regarding starting time or forms of instructions to be made by individual

universities. Meanwhile, it relaxed regulations over online and other remote lectures. MEXT also allocates a supplementary budget for individual institutions and students, ensuring learning opportunities and setting up an environment for distance learning classes.

At almost all schools in Japan, including universities, the school year starts in April. However, in the 2020 fiscal year, around 90% of universities postponed the start of regular classes and reinvented the learning environment, implementing some forms of distance learning.

The followed two charts show the transition in the forms of instructions at higher education from May to July.

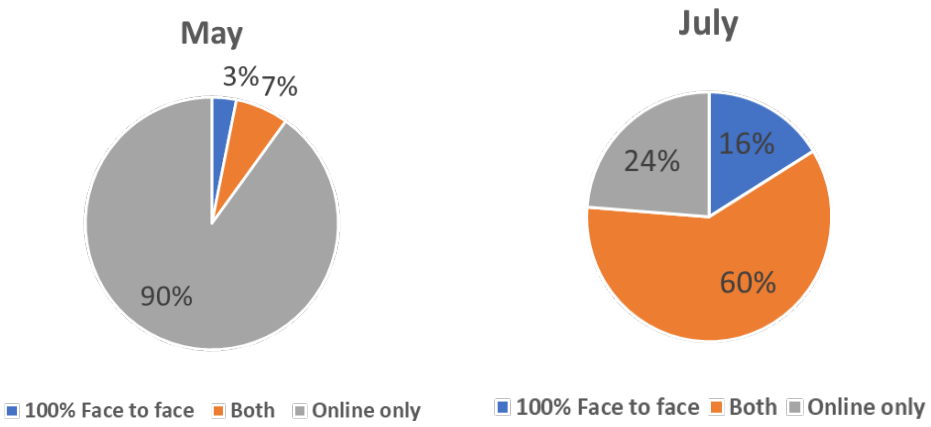

Figure 1: Forms of Instructions

Source: MEXT

As shown in Figure 1, in May 90% of universities used only distance learning, while 7% used both distance and face-to-face instruction and 3% only face-to-face instruction. In July, when the state of emergency was lifted, 24% remained distance learning only, 60% used both forms of instruction, and 16% resumed regular classes.

MEXT conducted a survey in August, asking universities about their fall plans.

About 56% reported more than 50% face-to-face instruction, while the rest (377 universities) reported less than 50%. In fact, as MEXT has been encouraging individual universities to offer about 50% face-to-face classes, MEXT focused on these 377 universities with less than 50% face-to-face classes and checked their status in October, finding that 49.6% (187 universities) remained at less than 50% face-to-face instruction. The majority of these are located in the Tokyo metropolitan area and neighboring prefectures, reporting a large number of COVID-19 cases. Although MEXT issued a warning that these universities that did not achieve a 50% level would be announced in public, this regulation came in for criticism from the field, and 160 of these 187 universities defended their instruction management, claiming that they obtained students' approval to continue online classes, as shown by surveys.

Purpose 2. The Case of the Studied University (Health Science University)

Health Science University is a small private university in the prefecture neighboring Tokyo to the west. It has two majors: health science, for students wishing to become physical therapists, occupational therapists, and social workers; and nursing. The total number of students is around 1,200.

Usually, the school year starts in April, but this year the university only had three school days at the very beginning of April, during which the first-year student orientation, course guidance for individual majors and years of study, PC setting support and technical training for distance learning, textbook sales, and instructions for online registrations were provided. The school then started distance learning for the first semester. During April and May, home-based learning was implemented. Every week, instructors sent a guideline for the lesson, overview, goals, content explanation, and assignments. The assignments were to be submitted a week later, and the instructor then sent feedback to the students by the next class. Each session was designed to cover 90 minutes of class plus pre- or post-self-study period.

During this period, the university provided faculty training for online instruction using Microsoft TEAMS. Individual instructors had to make syllabus modifications which would fit with distance learning during the first semester. At the same time, the university set the risk management framework to ensure students' health and the quality of education as well as minimizing the impact of the pandemic.

After the state of emergency was lifted on May 25, the school started providing interactive online classes using Teams software, while some classes resumed as face-to-face instructions. The university provided limited face-to-face instruction to minimize the risk of infection. Occasional orientations for students of each major at different years, classes involving practical training and upper-level seminars, and final examinations were held as face-to-face classes.

In the fall semester, in consideration of the numbers of students and the unavailability of classrooms meeting the requirements of the risk management framework, a combination of online instructions and face-to-face instruction was inevitable. However, there were increases in face-to-face instruction in some subject areas that involve practical training, upper-level seminars, and national examination preparations.

English Instruction

English I and II for the first- and second-year students are required courses. They consist of content-based ESP (English for Specific Purpose) using an original ESP textbook. Activities include vocabulary and expression learning, reading, listening, writing and grammar practice. There are 15 sessions (90 minutes) per semester. Normally these sessions are held in the form of face-to face instruction. However, in 2020, the form of instruction in English was shifted to online classes.

Online English Instruction

First, a syllabus change was made to adjust for the emergency situation. Basically, the aims, contents, and grading system remained the same. However, each session emphasized feedback to ensure interactive instruction. Besides feedback, posing questions to all students, asking questions of individual students, providing frequent comments on students' responses, actively using mail and chat functions, and encouraging pair or group activities were also emphasized to enhance the interactive nature. Questions and comments were accepted in any time during and outside class and instructors responded as soon as possible. The recording function was also used so that students who were absent from the session or who needed clarification of the contents could review the recording at any time.

The following describes the routine of each session:

1. The preparation assignment for each session, which included completing vocabulary sheets or answering pre-reading questions before class, was provided. Before instruction started, students could ask any questions regarding the assignment via mail or chat.
2. Instruction is conducted. During the session, frequent use of PowerPoint, handouts (supplemental materials, including vocabulary sheets and exercises, preparation for quizzes, and study sheets for the final exams), in class quizzes for each unit and quiz feedbacks were provided. Different types of group or pair activities for discussion and working materials such as writing or reading questions were also provided. Students are allowed to send chats or mails in anytime during the class and responses are made promptly.
3. Homework is assigned. Students review the content and submit review questions online, and complete it by the following session.

The following modifications for the fall sessions were made after reviewing the spring survey:

- ✓ More frequent use of PowerPoint
- ✓ More frequent distributions of handouts
- ✓ More group/pair activities
- ✓ Increased feedback for individual students
- ✓ Clarification of the grading system and information for individual students' up-to-date scores so that students could understand their academic achievement up to that point.

Survey results

This section presents the study results under the following four points:

1. Perceptions of online instruction (satisfaction, understanding, environment/health issues)
2. Perceptions of materials and software functions used through online instruction (PowerPoint, handouts, video recording, screenshots, notetaking, chat/mail)
3. Perceptions of activities (chat, pair- group work) and workload (self-study amount, attitudes)
4. Perception of face-to-face instruction

1. Perceptions of Online Instruction (Satisfaction, Understanding, Environment / Health Issues)

First, students were asked if they are satisfied with online instruction, and the results are shown in Figure 3.

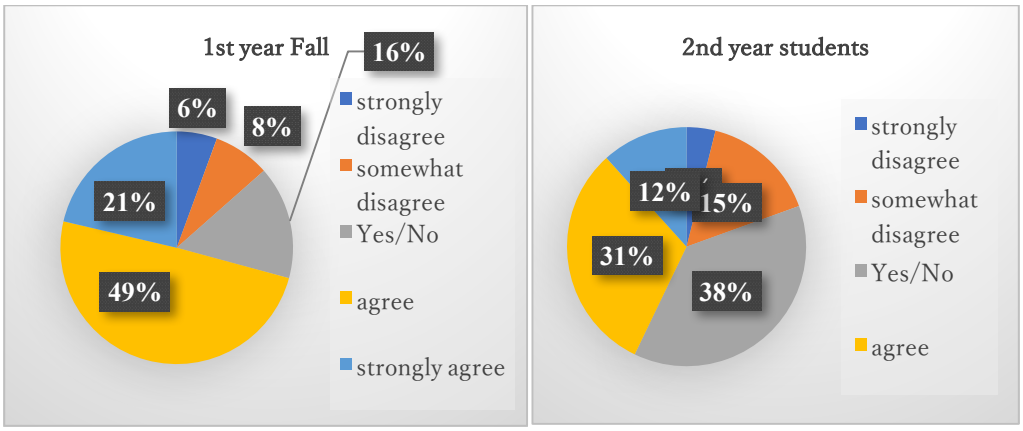

Figure 2: Satisfaction of Online English Instruction

As indicated in Figure 2, over 70% of the first-year students and 34% of the second-year students reported being satisfied with the instruction, while 13% of the first-year and 19% of the second-year students were not satisfied with it.

Moreover, the first-year students satisfied with the instruction increased from spring to fall.

Regarding students' level of understanding, many agreed that the instruction was easy to understand, and increases were shown from spring to fall.

To examine the relationship between the level of satisfaction and understanding, correlational analysis was performed for the first-year students (Table 1) and second-year students (Table 2).

		satisfaction	understanding
satisfaction	Pearson correlation	1	.216*
	Sig. (2tails)		.030
	N	101	101

* p < .005

Table 1: Correlational analysis of the levels of satisfaction and understanding (1st-year students)

		Satisfaction 2	Understanding 2
satisfaction 2	Pearson correlation	1	.164
	Sig. (2tails)		.147
	N	80	80

Table 2: Correlational analysis of the levels of satisfaction and understanding (2nd-year students)

A weak correlation (.216, $p < .005$) was found between the levels of satisfaction and understanding only among the first-year students.

Students were asked if they experienced stress in their Internet environment; 38% of first-year and 39% of second-year students reported experiencing some stress. Students also responded about their health conditions in relation to online classes, and more than half (64%) of the students had some kind of health problems, such as eye fatigue, headaches, backaches, and stiff shoulders.

In order to examine these factors, a correlational analysis of students' satisfaction, IT environment, and health problems was performed. The results for 1st and 2nd-year students are given in Tables 3 and 4, respectively.

		satisfaction	environment	health
satisfaction	Pearson correlation	1	-.414**	-.216*
	Sig. (2tails)		.000	.030
	N	101	101	101
environment	Pearson correlation	-.414**	1	.488**
	Sig. (2tails)	.000		.000
	N	101	101	101

** $p < .001$* $p < .005$

Table 3: Correlational analysis of the levels of satisfaction, IT environment, and health (1st-year students)

		satisfaction 2	environment 2	health 2
satisfaction 2	Pearson correlation	1	-.386**	-.228*
	Sig. (2tails)		.000	.042
	N	80	80	80
environment 2	Pearson correlation	-.386**	1	.432**
	Sig. (2tails)	.000		.000
	N	80	80	80

** $p < .001$* $p < .005$

Table 4: Correlational analysis of the levels of satisfaction, IT environment, and health (2nd-year students)

As evidenced, a moderate negative correlation ($-.414$, $p < .001$ for the first-years and $-.386$, $p < .001$ for the second-years) was also found between satisfaction and environment. A weak negative correlation ($-.216$, $p < .005$ for the first-year students; $-.228$, $p < .005$ for the second-year students) was found between satisfaction and health. Students with higher satisfaction reported less frustration with their IT environment and better health conditions. Moreover, a moderate correlation (.488, $p < .001$ for the first-year students; .432, $p < .001$ for the second-year students) was found between the environment and health.

2. Perceptions of Materials and Software Functions Used in Online Instruction (Powerpoints, Handouts, Video Recording, Screenshots, Notetaking, Chat/Mail)

When students are asked about the use of PowerPoint, most students agreed on the usefulness of PowerPoint, and an increase from spring to fall is evident in this graph. In terms of the students' perception on the handouts provided as supplemental materials in class, 64% of the first-year and 36% of the second-year students felt that handouts were useful.

Next, students' responses regarding the functions of TEAM software are explained.

Figure 3 shows students' use of the recording.

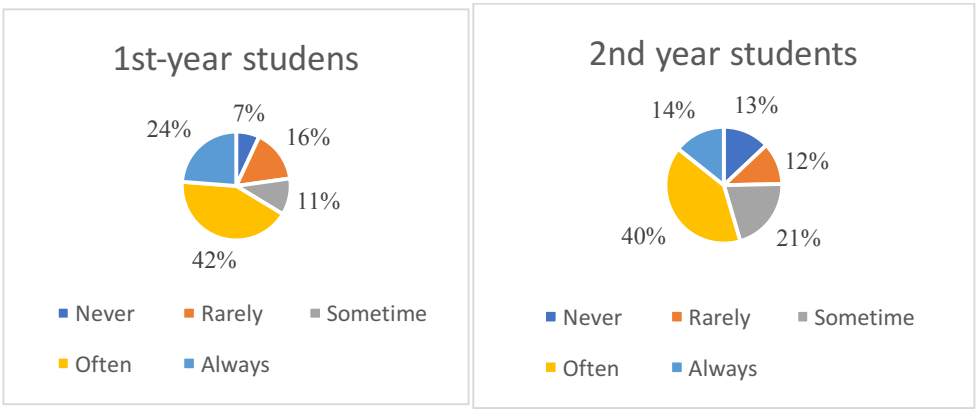

Figure 3: Use of Recording Function

66% of the first-year students and 54% of the second-year students reported that they always or often used the recording function. In terms of screen shots, 41% of the first-year students and 51% of the second-year students always or often used screen shots. It was also found that such use of screen shots increased from spring to fall.

Next, responses on note-taking activities are presented. Among the second-year students, less than 5% always take notes and less than 25% often take notes. On the other hand, over one-quarter of the second-year students and one-third of the first-year students never or rarely take notes. When we examine the changes from spring to fall, we find that the number of students who always take notes decreased in both years.

The presumption was made that the more students use screen shots or recording, the less they take notes. In order to examine this, a correlation analysis was made of these three factors. Table 5 present the results for the first-year students and Table 6 for the second-year students.

		video	note	screen
video	Pearson correlation	1	.205*	.186
	Sig. (2tails)		.040	.062
	N	101	101	101
note	Pearson correlation	.205*	1	-.014
	Sig. (2tails)	.040		.887
	N	101	101	101

* p < .005

Table 5: Correlational Analysis of Video Recording, Note-Taking, and Screen Shots. (First-Year Students)

		video 2	note 2	screen 2
video 2	Pearson correlation	1	-.149	.057
	Sig. (2tails)		.188	.613
	N	80	80	80
note 2	Pearson correlation	-.149	1	-.042
	Sig. (2tails)	.188		.711
	N	80	80	80

Table 6: Correlational Analysis of Video Recording, Note-Taking, and Screen Shots. (Second-Year Students)

A weak correlation (.205, $p < .005$) between recording and note-taking was found only for first-year students, which means that those who review the recordings more often take notes.

Regarding the chat function, students use chat to send messages or questions during and outside class, and 68% of the first-year and 46% of the second-year students consider the chat functions useful. It was also found that compared to the spring survey, more first-year students felt the usefulness of the chat function in the fall, suggesting that the first-year students became more comfortable sending messages than in the spring, when they might have felt more anxiety.

3. Perceptions of Activities (Pair/Group Work) and Workload (Self-Study Amount, Attitudes)

Pair or group work

In the spring survey, about 45% of first-year students did not want group work, while 66% of the second-year students claimed that they disliked group activity, although only a few group or pair activities were implemented in spring semester. Despite their dislike of group work, more group activities using various Teams functions were implemented in the fall. The fall survey found that 74% liked the group activities while 10% disliked them among first-year students, and 48% of the second-year students liked the group activities and 23% disliked them.

Workload (self-study)

Students were asked if they spent more time on self-study than during previous English instructions (in the case of the first-year students, “previous learning” meant English in high school); 47% of first-year and 50% of second-year students believed that their self-study time had increased. In terms of their attitudes toward self-study, 52% of the first-year and 40% of the second-year students believed that their self-study attitudes had improved.

4. Perception of Face-to-Face Instruction

Figure 4 shows students’ wish for face-to-face instruction, indicating that 40% of the first-year students and 34% of the second-year students wished to move to face-to face instruction while the others were ambivalent or against such a shift.

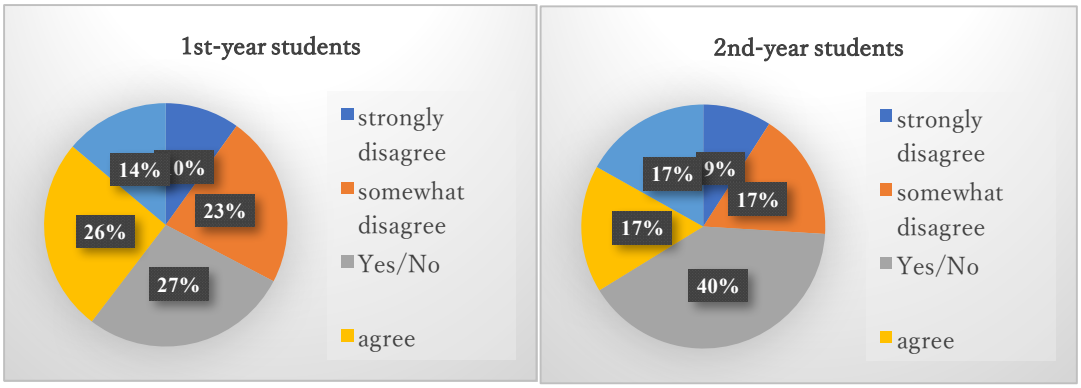

Figure 4: Students' Wish to Shift to Face-to-Face Instruction

Conclusions

Main findings

The followed are the main findings:
1. Most students were satisfied with online English lessons
2. About one-third of the students did not wish to move to face-to-face instruction.
3. Students' self-study hours were increased and their attitudes toward self-study were also improved.
4. Some experienced technical difficulties as well as health problems such as backache and eye fatigue in online lessons, which are correlated with students' level of satisfaction.
5. Students frequently use the functions of recording, screen shots, and chat.
6. One-third of the students never or rarely took notes during class hours.
7. Students perceived the chat function, handouts, and PowerPoint as useful.
8. Students felt PowerPoint (providing written materials) and handouts to be useful.
9. The majority of students indicated liking group or pair work activities.

Limitations and Implications of the Study

Limitation of the study

Since the current study is a case study involving a limited number of students (N < 200 for each survey), the study or correlation analysis may not be generalizable. However, it should be noted that the findings of the current study are in general agreement with the results of surveys conducted in previous studies with much larger sizes.

Implication

To ensure successful interactive instruction, instructors should be competent not only in the subject area but also in IT technics. Skills and knowledge of online instruction, including software applications becomes critical. Such skills and knowledge should be constantly brushed up and instructors should keep up to date with software technologies. Therefore, on-going training for instructors is inevitable. At the same time, instructors should react to and reflect upon the situations arising in class. Monitoring students' reactions, responding to students' questions and concerns, and providing effective feedback at appropriate times are all important. Continuous review

and evaluation of their strategies, materials, and students' reactions are necessary, and being flexible for necessary modifications is also important.

Meanwhile, it is crucial to build students' sense of responsibility for their learning and sense of participation for learning in online instruction. In on-demand classes in which pre-recorded instructions are provided, students are likely to be passive learners. On the other hand, interactive online instruction encourages students to be active learners when the following points are attained: Providing pre-and post-assignments, posing questions during class, providing timely, appropriate, and frequent feedback, having students work more actively through pair or group activities, and providing quizzes and feedback all help students to build a strong sense of responsibility and participation that can be expected to increase their motivation for further learning.

It is also important to reduce students' anxiety and stress, which may stem from the Internet environment, health conditions, and lack of understanding. This study found that some students feel stress in their Internet environment, while others report health problems. Meanwhile, some students wish for all contents and instructors' responses to be presented in written form using PowerPoint. Instructors should be sensitive to individual needs, as students may face different needs or difficulties in dealing with online instruction.

Recording the session is recommended. Such recording helps not only students but also instructors. The current study found that many students make use of recordings for review, especially before quizzes and examinations. Such recording also helps absentees to learn materials on their own. Meanwhile, recording would provide great opportunities for instructors to review and reflect on their own instructional methods and for learning students' reaction.

At the moment, there are no signs that the pandemic will recede; therefore, it is critical to make efforts to accommodate to the current condition. It can be said that higher education is now facing a critical phase for survival and for providing quality education. There is an increasing need for reconceptualization, creating sustainable models to adjust to the new normal during and after COVID-19. With reliable and variable data and information sharing, more accurate pictures of higher education in various contexts can be revealed, which will lead to the actualization of an effective model. The innovation and cooperation of stakeholders in the field are urged.

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Gap Design as a New Tool for Learning and Assessment

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Official Conference Proceedings

Abstract
The attempt was to stimulate positive provocation in learners to think and create alternative approaches to deal with real-life problems. The study involved learners of the end second-semester of the Master in Hospital Administration program. The research problem was to analyze the gaps in that program's curriculum and the competencies of faculty as per the contemporary requirements. Based on an extensive investigation on student-centered learning and the framework method of qualitative analysis a code matrix for gap design was done. It was found that our gap design method qualified as an effective and innovative teaching-learning tool. It stimulated multi-disciplinary insights, joyful learning, and intellectual exchanges. The process involved a curated flipped classroom design with 40 students in 9 groups. Each group was assigned a faculty mentor and a unique industry problem based on field survey and validation. The final assessment of group projects provided the basis of gap analysis in learning and teaching. A prototype gap design tool called 'assessmend' was conceptualized and deployed over the internet for feedback and practice on continuous improvement on learner engagement and curriculum update using the tool got implemented.

Keywords: Pedagogy, Higher Education, Framework Method, Problem-Based Learning, Capstone Project, Flip Learning, Gap Design

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Introduction

The Problem

The end-semester assessment tasks and the rubric of the evaluation were not something that learners were self-motivated to look forward to. Rather, they took it as part of compliance for receiving their grades and for moving on to the next semester. On the other side, teachers continued with their previous practices of evaluation. In our study case with the Master of Hospital Administration program in our University, it was found that the teaching-learning curriculum has been very slow in responding to the changing industry demands and the emerging skills, and smart healthcare technologies. As a result of which both learners and teachers are unable to update themselves to the new realities. Given that situation, the research questions were, how to bring more purpose and joy in the teaching, learning, and assessment? and thereby, not only provisioning more student-centered fluidity in syllabi but also applying the high order thinking skills for problem-solving.

Study on the Need for Student-Centered Models

A crucial task was to provide innovative education for students who would enter the labor market in the future. Higher education has to raise its competitiveness and promote the development of society in the long term (Crosling et.al, 2015). The need was for flexible, effective, active, and student-centered teaching (Nouri, 2016). Else, it was increasingly difficult for students to fully engage in educational practices, which led to a superficial understanding of disciplinary knowledge **(**Guo, 2020; Briggs, 1979; Gagne & Driscoll, 1988). Besides, universities, and research universities, in particular, were more focused on the cultivation of students' research skills rather than professional skills or transferable skills. It resulted in the widening of the gap between what students learn at the university and what they need in the workplace (Holmes, 2012). To change that situation, project-based learning was an attractive proposition (Chen & Yang, 2019) to address the need for real problem-solving and knowledge construction in authentic professional contexts. Besides, fostering students' innovation by supporting their autonomy during learning tasks (Martín et.al., 2017). There were differences between project and problem based learning in terms of the different types of tasks and role of the instructor that would be required. For example, the former, dealt with the application of knowledge, the latter, with the construction of knowledge (Braßler, 2016; Helle, 2006).

Study on Inquiry-Based Learning

In light of our problem, various learning theories and methods of teaching that showed positive results were studied. The inquiry was described as a teaching method that combined student-centered, hands-on activities with discovery (Uno, 1990). Furthermore, it was found that students' attitudes changed after using the inquiry learning model (Suwondo & Wulandari, 2013). Importantly, the educator acted as a facilitator of the learning activity, promoting student discussion and providing guidance rather than directing the activity (Herron, 2009; Uno, 1990; Wood, 2009). Based on the principles of the scientific method, in inquiry-based learning students observed a phenomenon, synthesized research questions, tested their questions in a repeatable manner, and finally analyzed and communicated their findings (Uno, 1990;

Weaver et.al., 2008). And, many different roles of a teacher were the means to achieve the desired learning outcomes (Strauch, 2014). The emphasis on knowledge-in-use showed an increased awareness by educators, learning scientists, policymakers, and the public of the facilities required by global citizens in the 21st-Century (Miller, 2019). Various literature studied around that concept (NRC, 2012; NRC, 2007; Kulgemeyer, 2014; PISA, 2014; OECD, 2016, Blanchette, 2010, Peterson, 2009, Chen, 2011, Sharan, 2010, Illeris, 2000) revealed how students were able to work with authentic problems, data synthesis, evaluation and development of solutions under curated learning environments. It was found that inquiry-based promoted deeper learning. Such design-based research methods (Barab & Squire, 2004) were able to test the curricular system materials (Sandoval, 2014). The learners were interested to pick complex problems (Schneider et al., 2016) and it was found that they were motivated to sustain their investigations throughout their period of study and emanated new insights (Krajcik & Czerniak, 2018). A high level of student satisfaction and a significant improvement in student learning outcomes were found under the project and problem-based activities, where learning was directed by the student with the educator providing a supportive role (Smallhorn et.al, 2015). The level of input from the educator depended on the level of inquiry. Building friendships with peers facilitated a sense of belonging which improved engagement and contributed to better learning outcomes and increased retention (Larmar & Ingamells, 2010; Lowe & Cook, 2003) while responding to real-world questions or challenges through an extended inquiry process.

Study on Affecting Factors

One of the affecting factors for low learning outcomes was found to be the learning models (Andrini, 2016) that were responsible for student's lack of motivation for inquiries. Such models affected the emotional and intellectual abilities of students in acquiring knowledge and impaired the purpose of education to choose and determine methods of teaching or to provide a conducive learning environment. The 21st-century learners require to survive and compete in the global community, therefore, education should not adversely affect critical thinking, effective communication, technology-readiness, fluidity, open learning environment, and innovation (Suto, 2013). Rather, learners have to be allowed to hone their skills and knowledge as per their choices (Trna, et.al., 2012). On the flip side, the use of inquiry learning methods affected the monopoly of teachers (Sund & Trowbridge, 1973).

Study on Flipped Learning

The flipped classroom was defined as a "pedagogical approach, in which, direct instruction moves from the group learning space to the individual learning space, and the resulting group space is transformed into a dynamic, interactive learning environment where the educator guides students as they apply concepts and engage creatively in the subject matter" (The Flipped Learning Network, 2014). Flipped Learning allowed for a variety of learning modes; educators often physically rearranged their learning spaces to accommodate a lesson or unit, to support either group work or independent study. They created flexible spaces in which students chose when and where they learn. Flipped Learning model deliberately shifted instruction to a learner-centered approach, where in-class time was dedicated to exploring topics in greater depth and creating rich learning opportunities (Bergmann

& Sams, 2012; Dunn, 2014). Moreover, the model allowed students to learn at their own pace, it encouraged students to actively engage with lecture material, and teachers got expanded opportunities to interact (Gilboy, 2015; Betihavas, 2015). Its flexible and blended student-centered learning strategies mitigated the limitations of the transmittal model of education (Betihavas et. al, 2015) and addressed several challenges of traditional ways of teaching with active learning strategies employing higher levels of Bloom's taxonomy (Krathwohl, 2002). For instance, (McLaughlin, 2013; Davies, 2013) compared three different instructional strategies in an information systems spreadsheet course, and showed that students attending the flipped classroom course also were more satisfied with the learning environment compared to the other treatment groups. Several studies reported that students enjoyed learning at their own pace and preferred flipped classrooms over traditional approaches (Larson & Yamamoto, 2013; McLaughlin, 2014; Gilboy, 2015). As a result, students were found to be actively involved in exploring new learning beyond the curriculum.

Methodology

Step 1

The environment for problem-based learning using a flipped classroom model was designed. 40 students of Master of Hospital Administration of end second-semester of 2018-20 batch were put in 9 groups, where each group had a mix of high, medium, and low-grade achievers. Each such group was assigned problem areas and was guided and tasked to obtain problems from industries relevant to their assigned problem areas. Each group had one faculty mentor for proper elucidation and validation of the problem. This step got completed in 45 days. The mentors facilitated their respective groups to acquire knowledge, skills, and data relevant to solving the problems.

Step 2

3-day flip classroom activity was conducted. For that, a big hall was specially arranged for group-activity with provisioning of all requisite infrastructure support along with food and refreshments for all the 3 days of problem-solving activity. The faculty mentors and other faculty members were only allowed to visit during the stipulated zero-hours to interact with groups. The groups were mandated to work on all possible alternative approaches towards solving their problems within the 3 days, similar to a hackathon event.

Step 3

Evaluation and feedback of group-wise presentations were held. The evaluation board comprised groups' faculty mentors and representatives from healthcare institutions from where the problems were sourced. Based on an agreed rubric the final scores were assigned to the groups that indicated the extent of - critical thinking, out-of-box ideas, innovation, the feasibility of solution approach, reasoning, and the quality of presentation. Finally, as per the given template, the groups submitted their reports

with needful omission and commission along with their feedback that helped us to measure the outcome.

Step 4

The above activities were documented as a video for later analysis of group-learning behavior and its customized replication and use by our other departments. A short educational video was also made available on YouTube (iSoOeCWEaGA) in that regard.

Step 5

Gap design in learning and teaching was done using the 'theme-category-code-description-label' framework method for qualitative analysis (Gale et.al., 2013). The body of knowledge in and around the semester courses was framed under a category-code-description structure. All the codes were labeled corresponding to the applicable Bloom's taxonomy levels (Anderson et.al., 2001) that included the curriculum and outside the curriculum codes, which were used for solving the problem, referred to in our framework as the theme. (see Appendices). Finally, the mapping of the codes was done under each of the themes as tabulated under (Table 1). It was required to understand the efficacy of teaching-learning for solving the real problems.

RESULTS

The results showed the use of codes for solving the problems, T1-9 (Table 1), and the relative use of code-clusters (Figure 1). Moreover, the scores obtained for each group were beyond our expectations.

Table 1: Code-Label Mapping with Theme

Theme (T1-T9)	Code-Label Mapping	Score %age
Medical Equipment Marketing (X-Ray Machine)	SP02, SP06, HP01, HP05, HP12, HP15, MM02, MM04, MM05, MM07, MM10,RM01,RM02,RM03, RM04, RM05, RM06, RM07, RM08,RM10,IS01,IS08	71.3
Health Care Education	SP01, SP02, SP03, SP04, HP14, HP15, HP21, HP22, OT01, S09, IS10, QM02, QM05, RM01, RM02, RM03, RM04, RM05, RM06, RM07, RM08, RM10	88.7
Financial Allocation & Utilization in a Government Hospital	SP03, SP04, HP02, HP04, HP07, HP08, HP11, HP14, HP16, HP17, HP19, OT02, RM01, RM02, RM03, RM04, RM05, RM06,RM07, RM08, RM10, IS03, IS04	87.5
Bio-Medical Waste-Handling and Disposal in a Private Hospital	SP02, SP03, SP04, SP16, SP17, SP18, SP19, SP20, SP21, SP22, SP23, MM03, QM02, QM06, HP14, P15, HP18, HP19, HP21, RM01, RM02, RM03 RM04,RM05,RM06,RM07,RM08,RM10,IS04	87.1
Procurement Management of Medicine in a Super-speciality Government Hospital	SP01, SP02, SP03, SP05, SP06, SP08, SP09, SP12, SP13, SP14, MM03, MM04, MM05 MM06, MM07, MM09, MM10, HP06, HP07, HP08, HP12, HP18, HP21, HP23, RM01, RM02, RM03,RM04,RM05,RM06,RM07,RM08,RM10,IS04	87.3

A Project Report on Bio-Medical Waste Related Challenges at a Government Hospital	SP02, SP03, SP04, SP16, SP17, SP18, SP19, SP20, SP21, SP22, SP23, MM03, QM02, QM06, HP14, HP15, HP18, HP19, HP21, RM01, RM02, RM03 RM04,RM05,RM06,RM07,RM08,RM10,IS04	87.2
Ward Management of a Community Health Centre	SP01, SP02, SP03, SP04, SP09, SP13, SP14, SP20, MM02, MM04, MM09, QM01, HP03, HP04, HP06 HP07, HP08, HP13, HP15, HP18, HP19, HP21, HP23, OT02, OT03, OT04, OT05, OT06, RM01, RM02,RM03,RM04,RM05,RM06,RM07,RM08,RM10,IS09, IS10	85.3
Ambulance Service - An Attempt for Betterment	SP01,SP02,SP09,SP13,SP14,MM03, QM03,QM06,HP01,HP02,HP18,HP21,IS04,IS09,IS10,RM01,R M02,RM03,RM04,RM05,RM06, RM07,RM08,RM10	89.2
Child Marriage and Early Pregnancy- A barrier to Maternal Health	SP01, SP02, SP03, SP04, SP09, QM01, HP04, HP15, HP18, HP21, OT01, OT03, OT04, OT05, OT06, OT08,OT09,RM01,RM02,RM03,RM04,RM05,RM06, RM07,RM08,RM10,IS09,IS10	88.6

The codes marked in color (Table 1) highlighted that students had employed concepts beyond their taught lessons. As a result of which the motivation for our healthcare management teachers was for additional learning of new codes CI01-15 (see Appendices) to direct their teaching around real problems.

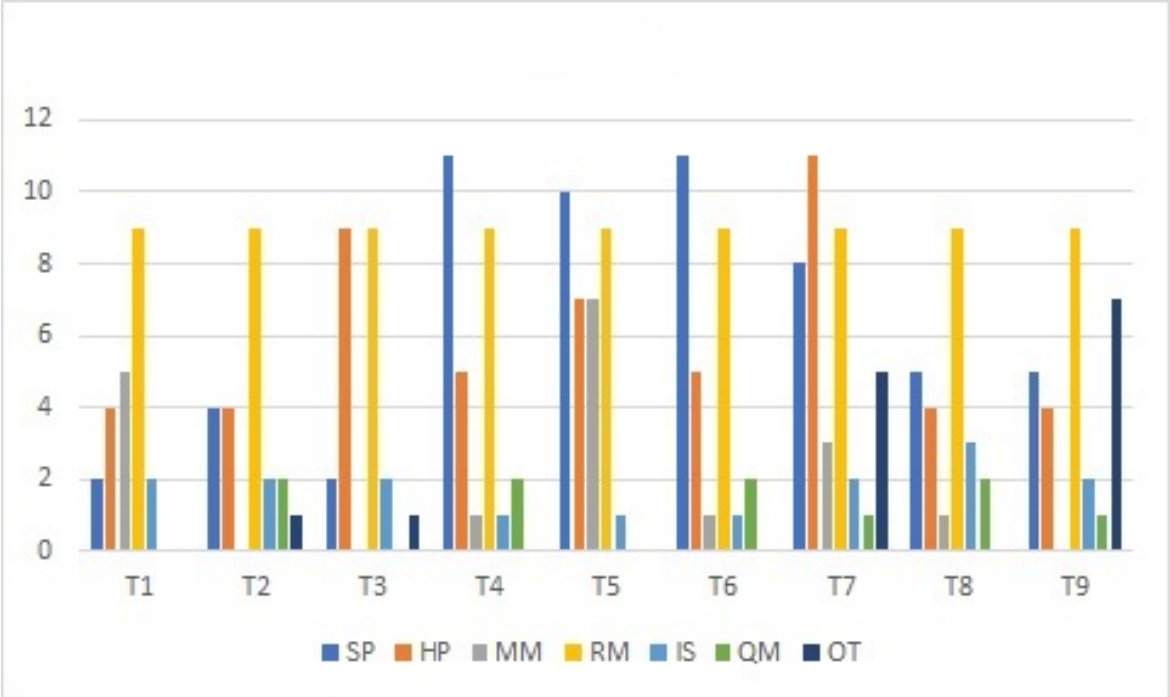

Figure 1: Theme-Wise Use of Learning

The above figure depicted the extent of use of the second semester's taught courses – SP (Hospital Support Services), HP (Hospital Planning), MM (Materials Management), RM (Research Methodology & Quantitative Methods), IS (Health Management Information System), QM (Quality Management) and also the involvement of OT (Others) concepts beyond those (see Appendices). The following tables (Table 2 and Table 3) were the self-assessed results on faculty competency gaps

on OT codes and their 6 chosen competencies, from CI01-15, for improved teaching and continuous curriculum update

Table 2: Mentor-Assessed Competency-Gap on a Scale of 3 on OT Codes

Faculty Mentor	OT01	OT02	OT03	OT04	OT05	OT06	OT07	OT08	OT09	Net Score
1	2:3	1:3	3:3	3:3	3:3	3:3	2:3	2:3	2:3	2.33
2	2:3	1:3	3:3	3:3	3:3	3:3	2:3	3:3	3:3	2.56
3	3:3	2:3	2:3	2:3	2:3	2:3	2:3	2:3	2:3	2.11
4	3:3	1:3	3:3	3:3	2:3	3:3	3:3	1:3	3:3	2.44
5	2:3	1:3	2:3	1:3	2:3	2:3	2:3	2:3	2:3	1.78

Table 3: Mentor-Assessed Competency-Gap on a Scale of 3 on CI Codes

Faculty Mentor	6 Required Competencies Chosen from CI01-15 codes						Net Score
1	CI01	CI02	CI03	CI06	CI08	CI15	1.25
	1:3	2:3	1:3	1.5:3	1:3	1:3	
2	CI01	CI04	CI05	CI06	CI07	CI15	1.41
	1:3	2:3	2.5:3	1:3	1:3	1:3	
3	CI05	CI08	CI09	CI10	CI12	CI15	1.16
	1:3	1:3	1:3	2:3	1:3	1:3	
4	CI01	CI05	CI11	CI12	CI14	CI15	1.66
	1:3	2.5:3	1:3	2:3	2:3	1.5:3	
5	CI04	CI08	CI12	CI13	CI14	C115	1.16
	2:3	1:3	1:3	1.5:3	1:3	0.5:3	

Conclusions and Discussion

Our research was able to validate the findings of the literature studied and was able to answer the research questions. We inferred that our gap design model would contribute to the widening and deepening of learning in higher education. The learners will be able to joyfully relate with not only the taught knowledge and skills but also be able to explore new knowledge and skills while in the proposed model's process of designing solutions for real-life problems related to their program of study. It will lead to useful insights to continuously update, especially the professional program's curriculum in line with the contemporary requirements, and thereby pave the way for multi-disciplinary learning. The only limitation of the said model will be that it will erode a lot of time from the end-semester routine classes to devote to fieldwork and might hamper the completion of taught lessons on time. However, with the inclusion of digital space, faculty members can take their classes online and learners can even go through their missed lessons in an asynchronous mode. That way, no learner will be left out.

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Appendices

The Code Glossary

Appendix A

Label	Code	Bloom's Level
A.	CURRICULAR COVERAGE	
SP01	Health Care Process	L2-L5
SP02	Services in a Hospital	L2-L4
SP03	Components of Hospital	L2-L4
SP04	Classification of Hospitals	L1-L5
SP05	Clinical Laboratory	L1-L2
SP06	Diagnostic Radiology	L1-L2
SP07	Hospital Laundry	L2
SP08	Central Sterilization and Supply Department	L2
SP09	Safety & Security	L2
SP10	Blood Transfusion Centre and Blood Bank	L1-L2
SP11	Nursing Service Administration	L2
SP12	Medical Records Department	L2-L3
SP13	Outpatient Services	L2
SP14	Day Care Services	L2
SP15	Food Services Department	L2
SP16	Bio-Medical Waste Management	L2-L4
SP17	Medical Waste	L2
SP18	Waste Treatment Process Categories	L2
SP19	Hazard associated with poor Hospital Waste Management	L2-L3
SP20	Survey of BMW	L2-L4
SP21	Types of costs involved in BMW	L2-L3
SP22	Waste Team Training	L2-L3
SP23	BMW(Management & Handling)	L2-L5
MM01	Material Forecasting	L2-L3
MM02	Material Requirement Planning and budgeting and controlling	L2-L3
MM03	Logistics	L2
MM04	Purchase Cycle	L2
MM05	Inventory	L2
MM06	EOQ Model	L4
MM07	Vendor Management	L2-L4
MM08	Law of Contracts	L2
MM09	Storage and Stores Accounting	L1-L2
MM10	Inspection & Quality Control	L4
QM01	Quality Manual	L2-L3
QM02	Medical Audits	L2-L4
QM03	Quality Assessment	L2-L3
QM04	Quality Assurance	L2-L4
QM05	Techniques and tools in Quality Management	L2-L3
QM06	Assurance Procedures- Demming's Principle, Juran's Trilogy, Kaizen, Philip Crosby,s Principles, Quality Circle-	L2-L3
HP01	Demand Estimation- Hospital Equipment Planning	L2-L3
HP02	Utilization Index	L2-L3
HP03	Listing of common medical equipment used in hospital	L3-L5
HP04	Selection Guidelines cost and quality control planning	L2-L4

HP05	Tendering	L2
HP06	Procurement	L2
HP07	Method of payment	L2
HP08	Letter of credit	L2
HP09	Import documentation	L2
HP10	Buyback Policies	L2
HP11	Profit Projection	L2-L4
HP12	Codification and classification of equipment	L2-L4
HP13	Occupancy and bed ratios	L3-L5
HP14	Hospital Construction	L2
HP15	Regionalization	L2
HP16	Size of the site selection	L2
HP17	Preparing project report	L2-L3
HP18	Medical ethics	L2-L4
HP19	Hospital accreditation	L2-L5
HP20	Accreditation standards for extended care facilities	L2-L4
HP21	Infection Control	L2
HP22	Mortuary Services	L2
HP23	Manpower Planning	L2-L4
IS01	E-commerce/E-business	L2
IS02	Decision Support system	L2
IS03	Basics of Commercial Software like SAP, Oracle Apps	L2
IS04	Database Management System	L2-L3
IS05	Data Warehousing and Data Mining	L2
IS06	Multidimensional Modeling	L2
IS07	Online Analytical Process	L2
IS08	Online Transaction Processing	L2
IS09	Health Information Management	L2-L4
IS10	Health System Research	L2-L4
RM01	Methodology	L2-L4
RM02	Research Problems	L2-L4
RM03	Literature Review	L2-L4
RM04	Research Design	L4-L6
RM05	Sampling Fundamentals	L2-L4
RM06	Measurement and Scaling Techniques	L2-L4
RM07	Methods of Data Collection	L2-L4
RM08	Processing and Analysis of Data	L2-L3
RM09	Testing tools/criteria	L3-L5
RM10	Concept of Statistics	L2-L5

Appendix B

B.	OUTSIDE CURRICULAR COVERAGE – GAP 1 (Curricular Learning)	
OT01	HealthCare Education System	L2-L4
OT02	Financial System	L2-L4
OT03	Community Health Centre(CHC)	L2-L4
OT04	CHC Staffing Issues	L2-L4
OT05	CHC Problems	L2-L4
OT06	CHC Patient Issues	L2-L4
OT07	Ambulance Service	L2-L4
OT08	Child Marriage	L2
OT09	Early Pregnancy	L2

Appendix C

C	OUTSIDE TAUGHT COMPETENCIES – GAP 2 (Curricular Teaching)	
CI01	Big Data Analytics	L1-L2
CI02	Media Management	L1-L2
CI03	Behavioral Psychology	L1-L2
CI04	Public Health	L1-L3
CI05	Quality Standards	L4-L6
CI06	Digital Communication	L3-L6
CI07	Consumer Psychology	L3-L5
CI08	Health Care Automation	L2-L4
CI09	Hospital Architecture Software	L2-L4
CI10	Problem-Based Inquiry	L4-L6
CI11	Referral Services	L2-L4
CI12	AI, Expert Systems, Telemedicine and associated for Digital Healthcare	L1-L4
CI13	Healthcare Insurance and Security	L2-L3
CI14	Advanced Research Methods	L3-L5
CI15	Sustainable Development and Goals (Focus on SDG 3)	L1-L5

Appendix D: INDEX

Label	Subject Area Category		Bloom's Level No.	Learning Level
SP	Hospital Support Services		1	Remembering
MM	Materials Management		2	Understanding
QM	Quality Management		3	Applying
HP	Hospital Planning		4	Analyzing
IS	Healthcare Management Information System		5	Evaluating
RM	Research Methodology & Quantitative Methods		6	Creating
OT	Others (Gap in taught lessons)			
CI	Competency (Gap in teachers)			

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From Tacit Knowledge to Explicit – Taken for Granted Pedagogical Practices Made Visible

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Abstract
Learning by Developing (LbD), is a pedagogical strategy of Laurea University of Applied Sciences for almost 15 years. It is based on authentic co-operation between teachers, students and working life partners. In practice, LbD means that Laurea students are studying in working life projects. Theoretical framework in the article is based on LbD, Tacit Knowledge and the SECI-model. Long use of the LbD model has resulted in documented research as well as numerous unwritten practices. Those teachers that have specialized in LbD pedagogy have formed informal knowledge community. They share experiences, practical ways of implementing the model and furthermore develop the theoretical model as well. In the spring 2020, our team was preparing the online course of LbD for university teachers globally about how to implement LbD in practise. The article tells a story of what we discovered when we formalized and made visible tacit knowledge of LbD and many practices associated with the LbD pedagogy. We noted that the basic steps of the LbD model are easy to communicate and make visible. When we dived deeper into LbD practices and details it became harder even for seasoned expert to express things clearly. Tacit knowledge was unearthed through dialogue. Dialogue-like working required an atmosphere of trust, lack of hierarchies, lack of defensiveness on part of the expert and persons with mixed level of expertise so that there was both dumb questions and room to ask them.

Keywords: Learning by Developing, Working Life Co-Operation, Working Life Project, Tacit Knowledge, SECI Model

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Introduction

The integration of education and working life is recognized as a world-wide challenge. The integration has been highlighted e.g. in the European Union and the European Parliament has called on Member States to promote cooperation between working life and educational institutions in order to get better-trained and more work-life ready students to enter the labor market (European Parliament, 2017). The European Community has declared that higher education institutions (HEI) should co-operate tightly in many ways with working life organisations. According to the new Education Plan of the European Commission HEI should play a wider role in local and regional development e.g. co-operate and develop strategies with cities, businesses and the voluntary sector (European Commission, 2017).

In Finland, higher education is based on a dual model, in which, higher education is provided by Science Universities and Universities of Applied Sciences (UAS). UASs are focused on working life development and education. Science Universities are focused on scientific research and education. In the Universities of Applied Sciences Act, the practical mission of UAS is written as follows**;** Section 4: Universities of Applied Sciences shall also implement applied research, development and innovation activities and artistic activities that serve education in UAS, and also promote industry, business and regional development and regenerate the industrial structure of the region.

In the future educational institutions and working life co-operation will be one of the "key" activities of HEIs. The report "Osaaminen 2035" (Competence 2035), published by the Finnish National Agency of Education (2019), emphasises integrating education to work and workplaces. Integration of workplaces and education develops both organization and the individuals. The Competence 2035 report conclusions emphasises customer-oriented service development competence and recognition of sustainable development as two of the most important future competences.

Laurea University of Applied Sciences (Laurea) has been practicing a working life connected education model, Learning by Developing (LbD), for almost 15 years. This pedagogical strategy is based on authentic co-operation between Laurea staff, students and working life partners. LbD is usually implemented in co-creation projects with students and working life partners (Ojasalo, 2018).

Long use of the LbD model has resulted in documented research as well as numerous unwritten practices in applying the model. According to our experience, those teachers that have specialized in LbD have formed an informal "community of practice" that share experiences and develop the theoretical model as well as practical ways of implementing the model further.

This article describes how we formalised and made explicit many practices and tools associated with LbD pedagogy that we discovered during a project. In the Spring 2020 we were preparing an online course for university teachers globally about implementing LbD in practice. The basic steps of the LbD model at a general level are easy to communicate and make visible. However, when we dived deeper into practices we began to discover that there are things that are easy to express and things

that, even for an expert, require a long time and a substantial amount of application before they have been properly understood.

Learning by Developing Model

Learning by Developing (LbD), a pedagogical strategy of Laurea University of Applied Sciences, was launched in 2007 (Raij, 2014). LbD has been integrated to all education fields in Laurea and nowadays it can be referred to as action model. Laurea is operating in six different campuses, with different locations and fields of education in the Uusimaa region Laurea provides bachelor and master level studies as daytime, blended learning and online education. (Laurea, 2020). According to Laurea, LbD is included as practical actions in all fields of education, and levels (Laurea, 2020**)** as well as quality criteria by always involving the LbD in the learning (Laurea Quality Handbook, 2020).

According to Laurea Quality Handbook (2020) LbD means that learning always involves a co-operation partner organization or/and RDI-project. Raij (2018) notices that due to focusing on LbD in very early stage of Univeristy´s pedagogical development, Laurea has also build trust-based networks with regional actors.

The theoretical characters of the LbD are presented in figure 1 (Raij, 2014). Partnership means co-operation with working life, students and teachers. Genuine working life connection brings authenticity.A research oriented approach refers to studying within the context of higher education. Experimental nature can be understood in different ways e.g. experiences with given meanings constructing competences. Experiencing can also be inspected on the basis of processes that lead to new forms of action. Learning by Developing is value driven and takes a more holistic outlook on students than would be the case where real life projects are the focus. (Raij, 2014).

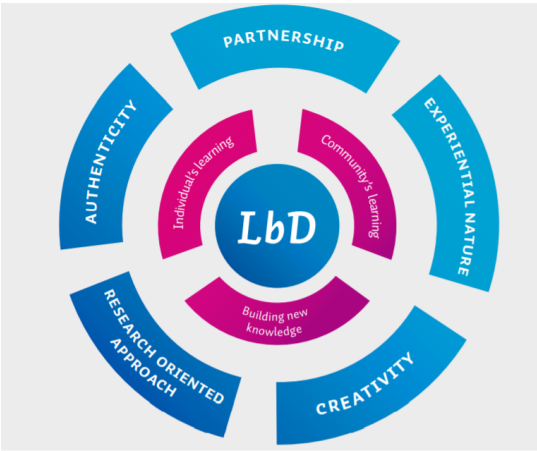

Figure 1: The Characteristics of the Lbd Model (Raij, 2014).

According to many LbD articles, using the LbD action model creates several benefits, Dickinson (2017) concluded that business students got a better understanding of business reality when implementing projects with a working life partner by using LbD. Aalto, Jaakkola, Tallgren & Uusitalo (2019) interviewed graduated students and found out, that by studying using the LbD method, students´ strengthened soft skills

such as; team work skills, responsibility, communication skills, self-direction and leadership skills.

Tacit Knowledge

The concept of tacit knowledge was originally introduced by philosopher Michael Polanyi in 1958 (2005).

Grandinetti (2014) analyses Polanyi´s views of tacit knowledge in the following way, in introducing the" Tacit Dimension" Polanyi said that he would reconsider human knowledge by starting from the fact that we can know more than we can tell. For Polanyi, tacit knowing is an unconscious process. This view is entirely consistent with the traditions of cognitive psychology studies according to which the terms "unconscious knowledge", "implicit knowledge" and "tacit knowledge" are synonymous (although the first is used more frequently than the others). Examples of unconscious knowledge often mentioned by cognitive psychologists include riding a bicycle and recognizing faces.

Furthermore, Bennet (1978) interprets Polanyi´s writing as follows: to Polanyi, the tacit dimension is the presupposition of all knowledge and of all activity. Within any act of comprehension, Polanyi argues, there is both a focal awareness and a sub subsidiary awareness. The object of focal (conscious) awareness is that of which a person might have explicit knowledge. In addition, a person may achieve this knowledge only by virtue of the clues provided by things of which we have subsidiary or tacit awareness. Moreover, Bennet has made notes of Polanyi ´s interpretation that at any moment whatever explicit knowledge a person may enjoy is achieved only through the tacit use of still other knowledge and capacities. It´s not possible to formalize all knowledge. Impersonal and fully explicit knowledge is thus an illusory goal.

Polanyi gives an example of how the difference between our speech and our thoughts varies and can be divided into different categories of cases (Polanyi 2005):

1. The ineffable domain, which is the area where the tacit predominates to the extent that articulation is virtually impossible
2. The area where the tacit component can be communicated so that the tacit is co-extensive with the of which it carries the meaning
3. The area in which the tacit and the formal fall apart since the person does not know, or quite know, what she/he is talking about. There are two totally different cases of this. The first being an ineptitude of speech and the other being symbolic operations that outrun our understanding

According to Oğuz & Şengün´s (2011) review of the literature they argue that in most cases, the literature uses tacit knowledge and "knowing-how" interchangeably. However, this position results in leaving aside a crucial aspect of tacit knowing for the sake of reaching a manageable conceptual structure. Their view seems to be based on the same notion as Polanyi´s that knowledge and knower are ontologically connected, which disappears when the modern usage of tacit knowledge ignores the knower.

Kogut & Zander (1992) rephrase Polanyi´s comment stating that organizations know more than what their contracts say. For them the knowledge of the firm (such as

operating rules and customer data bank) is relatively observable, but organizations know more than these operating rules and customer data banks can demonstrate.

Lazaric, Mangolte & Massue (2003) have studied the French steel industry and more specifically blast furnace operations. According to them, blast furnace related knowledge is still largely empirical in its form, thereby increasing both the difficulties associated with its generalisation and the degree of uncertainty in process control. For Lazaric et. al (2003,1830): "Articulation paves the way for codification and can only be achieved by making the relevant practices explicit within different "communities of practice"".

Nonaka & von Krogh (2009) define explicit knowledge by pointing out that explicit knowledge has a universal character, supporting the capacity to act across contexts. For example knowledge that is captured in drawings and writing is explicit. They further explain that explicit knowledge is accessible through consciousness and differs from tacit knowledge that is tied e.g. to the senses, intuition, unarticulated mental models, or implicit rules of thumb. Nonaka and Von Krogh (2009) state that tacit knowledge is rooted in action, procedures, routines, commitment, ideals, values and emotions.

Nonaka, Toyama, Konno (2000) argue that since knowledge is created in social interactions amongst individuals and organisations, it is inherently dynamic in nature. Knowledge is also context-specific and is dependent on particular time and space. Without connection to the context, it is just information, not knowledge. According to Liew (2013), data comprises of recorded symbols, whereas information is a message that contains relevant meaning and knowledge is the cognition, capacity to act and understanding that resides or is contained within the mind.

SECI Model

Nonaka, Toyama, Konno (2000) presented an illustration of their SECI process. SECI is an acronym that stands for socialisation, externalisation, combination and internalisation. Nonaka et al state that these represent the four modes of knowledge conversion. According to them knowledge in organisations is created through the interactions between explicit and tacit knowledge. They call the interaction between the two types of knowledge as knowledge conversion.

The SECI process consist of four modes of knowledge conversion (see below figure 2). An organisation creates knowledge through the interactions between explicit knowledge and tacit knowledge. Through the conversion process, tacit and explicit knowledge expands in both quality and quantity. There are four modes of knowledge conversion (Nonaka, Toyama & Konno, 2000):

1. Socialisation (from tacit knowledge to tacit knowledge)
2. Externalisation (from tacit knowledge to explicit knowledge)
3. Combination (from explicit knowledge to explicit knowledge)
4. Internalisation (from explicit knowledge to tacit knowledge)

Nonaka et. al (2000) describe socialisation as the process of converting new tacit knowledge through shared experiences. Tacit knowledge is hard to formalise and can be acquired only through shared experience, such as spending time together. An

example of socialisation is a traditional apprenticeship, where apprentices learn the tacit knowledge of their craft through hands-on experience, rather than from written guides.

According to Nonaka et al, (2000) in SECI model externalisation is the process of articulating tacit knowledge into explicit knowledge. Explicit, knowledge is crystallised and this allows it to be shared by others. And thus, it becomes the basis of new knowledge.

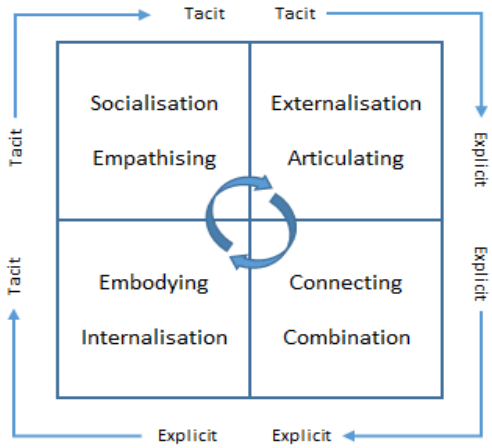

Figure 2: The SECI Process

When the knowledge has been made explicit, to the extent it is possible, the next phase is combination. According to Nonaka et al, (2000) combination refers to a process of converting explicit knowledge into more complicated and systematic set of explicit knowledge. They further explain that explicit knowledge can be collected from inside or outside the organisation. Knowledge is then combined, edited or processed to form new knowledge. For example, when a corporate finance manager collects information about an organization as a whole and combines it with context to produce a financial report, that report is new information because it synthesizes information from many different sources into a single context.

Internalisation, according to Nonaka et al, (2000,), is the process of embodying explicit knowledge into tacit knowledge. Through the process of internalisation, explicit knowledge is converted into tacit knowledge by persons involved. Nonaka et al, (2000) further explain that internalisation is closely related to "learning by doing". Explicit information, such as production methods, must be actualized through action and practice. For example, in training programs, trainees read and reflect on documents and manuals related to their work. Through this, they can internalize explicit information in these documents to enrich their knowledge base of tacit knowledge. Writers acknowledge that this description presented by Nonaka et al is well aligned with Polanyi´s notion that knowledge and knower are ontologically connected when discussing about tacit knowing (Oğuz & Şengün, 2011).

Execution the LbD Course

The need for a LbD course was identified in Autumn 2019 when Laurea UAS had collaboration discussions with Far East Universities. Their desire was to improve working life connections and integrate learning objectives and working life

development projects. In December 2019 a "kick-off" meeting was organized and Laurea set up the team to develop the LbD course. The team consisted of three persons with different types of skill sets and specialisation areas; a productisation specialist, LbD specialist lecturer and visualising specialist. Project steering group included RDI Vice President and Laurea Sales Director. The course target group was defined as universities and their teachers looking a way to integrate working life projects to their courses. The creation process is presented in figure 3 (see below).

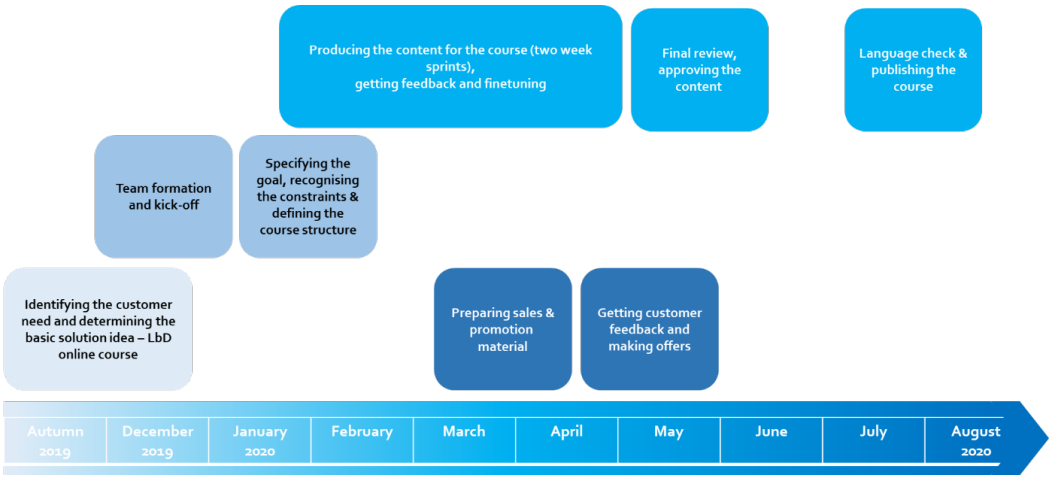

Figure 3: Overview of the Creation Process of Lbd Course.

In the very first phase of preparing the course we (the team) identified core customer needs and also constraints. This led into an agile project plan and rough sub-goals, time schedule and obstacles for the LbD course. For instance, through these initial discussions it became evident that the course should work fully online. The first concrete deliverable was the overall structure for the online course. The course structure, with eight module topics, was finished by mid-February. Those modules follow the same steps as a typical LbD project course implemented by the teacher at Laurea.

After agreeing on the overall structure, we initiated weekly sprints that included one face-to-face weekly workshop. Later we held these workshops virtually due to COVID-19. Our working method was the following:

1. The productisation specialist made sure that each module was carefully described (supplier, input, process, output, customer)
2. The LbD specialist presented the teachers view, e.g. what are the things to do in each module and how to do it
3. LbD specialist was interviewed by other team members and a detailed description was documented

The essential part of the workshops was that the LbD specialists were challenged by asking the questions like what, why and how. Between the workshops the documentation was created which included; descriptions, instructions, templates, questionnaires etc.

We documented the content into Canvas (Learning platform) by the team members. The Course is based on the principle of Learning by Developing idea – during the

Course the teacher implements real working life project with her/his students and working life partner. Every module follows the same structure:

1. Content - overview of the module works and task. In some modules academic LbD articles or part of them are available for reading to get deeper understanding on the subject
2. Guidance – getting in to the LbD mindset and enabling concrete actions with "hands-on" advice what and how to do in practice
3. Tools – project tools and templates help teacher and her/his students in implementing the LbD project
4. Quiz – the quiz questions help teacher to reflect and identify the essential discoveries in the module
5. Feedback – giving the feedback for course organizers

During the preparing of the course Laurea Sales Director was in touch with the foreign universities and got feedback and improvement ideas. This information was analyzed and utilized in the course creation process. Also, the promotion and sales material was prepared during the course creation process and Laurea Marketing team contributed to this process.

The final review and approval by the steering group of the course was made at the end of May. The language checking was done by August 2020.

Applying the SECI Process in Creating the Lbd Course

While the original SECI-model comprises of four phases we limited our own operations to cover the last three phases of the SECI model (figure 4 below). It may be that we didn´t do justice to the original model by choosing this approach, but we justify this limited approach with our narrower focus and acknowledging that we may continue this investigation further once we have the data from the intended end-users.

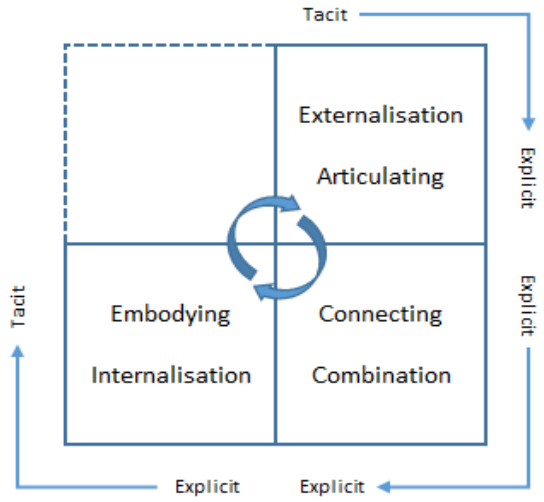

Figure 4: Applying the SECI-Model in the Creation Process

Our process began with externalisation. The basic steps of the LbD model at a general level are easy to communicate and make visible. However, when we looked deeper into practices we began to discover that there are things that are easy to express and things that, (even for an expert), required a longer time and substantial amount of

application before they were properly understood. This tacit knowledge based on experience was unearthed through dialogue. An experienced expert in the LbD model was matched with persons with no prior understanding of the subject. These "outsiders" asked questions and were not content with answers that to be understood would have required prior understanding and even practice. The goal of externalisation was to make information explicit using concepts and models. At this stage, tacit knowledge was also transformed into a form that can be understood by others not just the expert himself. During the preparation of the LbD online course, we identified several common unwritten practices that were applied within the appropriate community of practice, aka Laurea´s teachers.

Figure 5 depicts an example of our discussion and it illustrates our typical discussion on unearthing tacit knowledge. The LbD expert is indicating that at a certain phase the students are evaluated. When we continue with the inquiring details, he first dismisses the questions by stating that evaluating is basic work for the teachers. He takes this evaluation and assessment work and the knowledge required to do the job for granted. He knows how to do an assessment without detailed instructions because he has been doing it for years. However, for persons new to this concept the evaluation does not open up without a very practical description of the matter, which is why the expert is challenged with the question of how to describe the matter even more precisely. That way even "outsiders" can internalize the practical implementation of the evaluation.

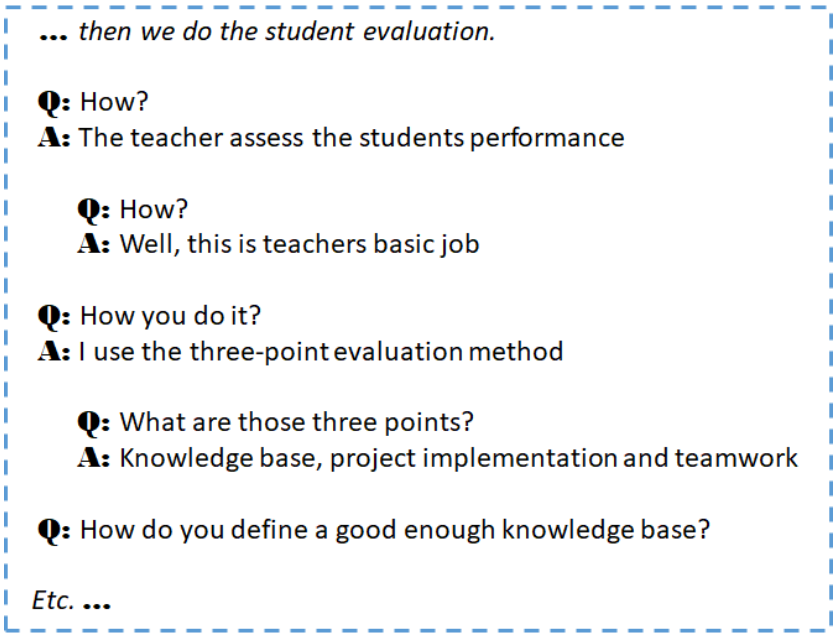

Figure 5: Example of Dialogue in the Creation Process

In the next step of the process, the information obtained explicitly was combined into larger knowledge bases. Once the information is in an explicit form, it can be analysed, organized, and combined with previous data. This was done by adding more subheadings, text, and tool templates under the previously outlined heading structure. Adding, structuring, and enriching knowledge began to form a structure beyond the plan. It was not only a one-way enrichment of the table of contents, but this amalgamation led us to questions our specific contents and, at times, even the very structure. At the beginning of the work, the structure, modules, titles and their content, seemed so clear, but then we had to re-justify them. This led, at times, to us changing

the titles of the modules, as well as refinement of the content and changes in the order of the contents.

The final stage of our process, that is, internalisation, means understanding the explicit knowledge and internalising this knowledge thus converting it into tacit. The information becomes part of the participant's personal knowledge base. Our role at this stage is indirect. We may never be in contact with a course participant, so our influence must be based on other methods and tools. Here lies our pedagogical idea behind the course content. While attending our course the participant is required to set up and implement a course for her/his own students and consequently she/he is learning by doing. That way we have built the course on the same principles as what we aim to teach in the course.

Results

LbD Course

We created a very practical online course for university teachers in which the LbD course consists of eight consecutive modules. Modules provide; background information, instructions on how to implement the module, tools to support the practical execution and reflection at the end of every module. Modules are: 1) Introduction, 2) Choosing a suitable course, 3) Working life partners, 4) Theoretical studies, 5) Working life project, 6) Reporting, 7) Presenting the results, 8) Evaluation (see figure 6).

We are fully aware that for the teacher completing this course this will be a different journey into exploring her/his role as a teacher. In the LbD model, the students and working life partners are the active players and the teacher is encouraged to position her/himself as a mentor and a coach rather than act as a "classic classroom" teacher. This model connects working life partners and students in a very practical way. Students develop real life experience and networks and the working life partner "gets the job done" while also learning. The teacher and her/his university connects with working life, which will increase the relevance and impact of the education work.

The online course itself is based on LbD principles and when a teacher initiates such a course she/he is expected to actually implement real life projects with her/his students and working life partners while completing it. Therefore, we emphasise implementation aspects strongly.There are some theoretical articles to provide a teacher with background information, but the focus is on applying, implementing and reflecting.

We have described the teacher’s journey on the course (see figure 6) who has her/his own path that is interlocked with the path of other significant parties such as her/his students and the working life partners. Teachers are providing learning and guidance to their students and overseeing the co-operation with working life partners.

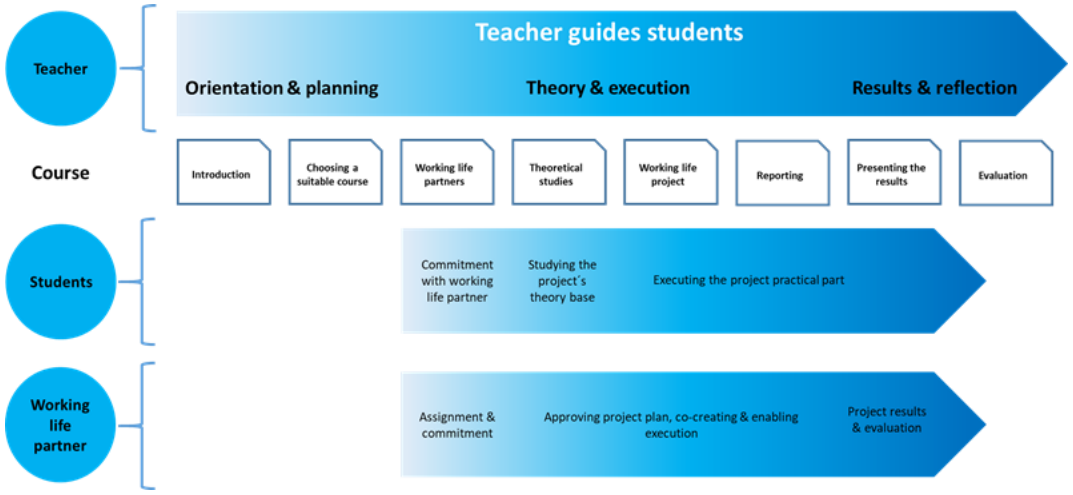

Figure 6: A General Overview of the Course.

Tools

We created several concrete tools to help the teacher with implementation practicalities. These tools included; course timeline tool, course assessment tool, email templates, project commitment document, memo template, student evaluation formula, project plan template, result presentation template and feedback from working life partners.

As an example, there is the Project Commitment Document (figure 7). We recognized that Laurea's existing project agreement was too context-specific and this new document included externalised existing knowledge and new explicit information created during the preparation of the course. The new document was thus not a re-creation of old document but something new. We also tested this and other tools to verify their usability and relevance. Our intention was not to replace existing tools used in Laurea but it turned out that a number of these documents were taken into active use by Laurea experts straight away.

YOUR LOGO

PROJECT COMMITMENT

Working life partner	**Project team (students)**	**Teacher**
Company / organisation *Contact person and contact info*	*Team members* *Project manager and contact info*	*Name and contact info*
Project goal	**Project schedule**	**Other relevant issues**
What is to be the end result of the project and key deliverables?	*Start and completion date*	• *Confidentiality* • *Who can utilise the findings?* • *Who is responsible for costs, e.g travel expenses?*
Date and signatures	*Everybody signs and, in so doing, shares the same understanding and commitment to this shared vision.*	

Figure 7: Project Commitment Document

Earlier in the article (see example figure 5) we described the typical discussion of unearthing tacit knowledge and showing it as explicit knowledge. In that example given the expert was answering an inquiry about the student evaluation and the discussion led to explicit categorisation of the way he conducted the evaluation. When this was documented and analysed, we were able to create a template to be used as a tool to help course participants to evaluate their own students (Figure 8. Student Evaluation Template). This documenting enabled the exposure of the tacit elements of the evaluation for wider discussion among the Laurea experts. As stated previously Lazaric et al, (2003,1830): "Articulation paves the way for codification and can only be achieved by making the relevant practices explicit within different communities of practice". We are now able to see that taking place through such documenting.

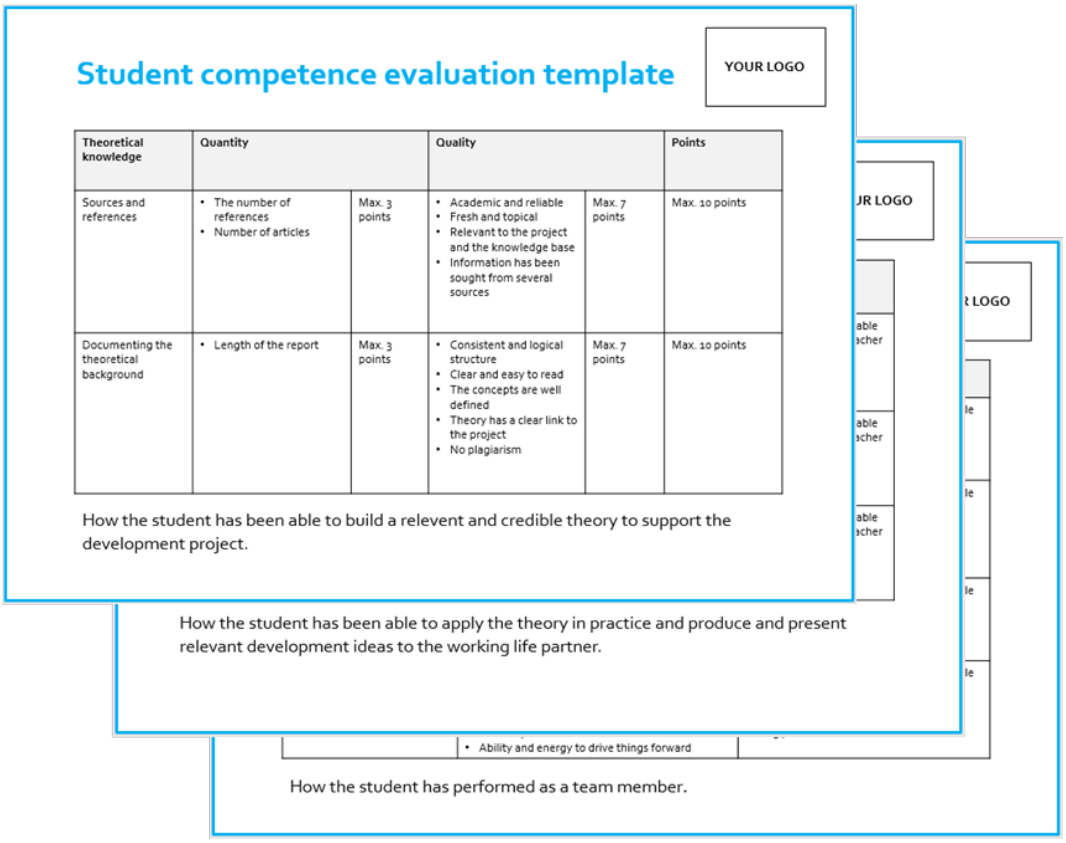

Figure 8: Student Evaluation Template

Conclusions and Discussion

Our primary objective was to make Laurea's LbD know-how, (which has become partially tacit knowledge over a decade), explicit, to be able to combine and communicate this, and to make it possible for other university teachers to internalize this explicit knowledge and turn it into tacit knowledge again. However, it seems that the results generated as a by-product were in the end more insightful than expected. In the shallowest sense, we reached our intended target, at a deeper level we have started to understand the meaning of tacit knowledge. Going even further, we have realised that there are some pre-requisites which are necessary to facilitate successful work which can enable the visibility of tacit knowledge within explicit documents.

We identified several common unwritten practices that Laurea teachers actively use and one such example related to the practices used when preparing the LbD projects for their courses. The way the Laurea teachers contact the working life partners and integrate them into their courses is similar to actual working business practice.For the Laurea LbD teachers it is obvious that they are networked with working life and they have relatively easy access to working life partner decision makers. While these practices are undocumented they are implemented in much the same way. It is perhaps fair to say that tacit knowledge is hiding in plain sight as It is something that is present and used every day whether we are aware of it or not. This was something that became evident to us and this supported Polanyi´s original comment "we can know more than we can tell".

Its worth noting that this making of practices explicit enabled further development of our own tools and processes. Specialist colleagues found something concrete to grab on to and these discussions led for example to revision of existing practices concerning project planning. Previously a project plan was presented by the students 2-3 weeks after the project briefing. New template and practice led to a shorter lead time and shifted the focus more towards co-creating.

We found some crucial ingredients in making tacit knowledge explicit such as making simple questions, digging ever deeper to reach the satisfactory level of shared understanding and challenging each other. We could simply call this a dialogue and what makes this kind of insightful dialogue possible? The key element seemed to be the ability to create a heart-to-heart atmosphere during the discussions. This atmosphere was present due to lack of hierarchies in the team and the absence of defensiveness on the part of the experts. In other words, it was possible to ask very simple and "unintelligent" questions and nobody felt offended. Additionally that satisfactory level of shared understanding is dependent on a pre-existing understanding by team members. Thus instead of having only high level experts in the team we found that it is optimal to have members with different levels of understanding to obtain good results.

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Multigrade Teaching Experiences in Ilocos Sur: Basis for Extension Program

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Abstract
The main goal of this research is to describe the teaching experiences, problems, and concerns of fifty-seven multigrade teachers of schools in Ilocos Sur. It analyzed the positive and negative impacts of multigrade teaching, which was the basis for an extension program. The study made use of the descriptive survey method of research. The results showed that majority of the respondents are handling Grades 1 & 2 classes; 21-25 years of age, married, females, bachelor's degree holder; with 6-10 years of experience, belong to Salary Grade Scale of 11, and have attended training in the district, division, regional, and national level. The respondents believed that the level of assessment of the multigrade classes is very satisfactory; there is no significant relationship between the profile of the respondents and the level of assessment on multigrade classes; there are no significant differences on the three sets of respondents. Also, participants responded that there is too much work for teachers in multi-grade classrooms. Nevertheless, they enjoyed and are used to teaching multigrade classes. Given such findings, the "Turo Mo, Gawa Ko, Kagalingan ng Mag-aaral Ko:" (Your Teaching, My Output, Improvement of my Learners): A CTE Extension Program is proposed to provide supplementary aid to multigrade teachers.

Keywords: Teaching, Experiences, Problems

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Introduction

Education plays a very significant role in this modern world. It enables people to acquire a set of knowledge, values, and skills that would result in personal and professional growth, which ultimately contributes to society's progress. Also, through education, people can secure employment and take an active part in the socio-economic activities in the community. Given these benefits, it is deemed significant that all people enjoy their right to education most, especially children who greatly need formal education in their formative years. Moreover, education should have to reach even the farthest school in the locality to benefit children in rural areas. To accommodate these schools, combination classes have been established to provide all learners of different ages and grade levels. One of the strategies is through multigrade teaching.

Multigrade teaching encompasses the teaching of children from two or more grade levels in a single class. Such settings require the use of specific teaching strategies, methodologies, and classroom administration. Since this class has a lesser number of learners and can be done cheaply compared to the usual classroom settings, these classes can be higher in frequency. Children are then more encouraged to attend school because they do not have to traverse for very long in their houses to reach their schools.

Multi-grade schools, being smaller and more discrete, would enjoy much closer links with the smaller communities that they would be set up to serve. This would have a very positive effect on local attitudes and access to education. The professional teacher is an important resource person in the multigrade context. The local content is a significant part of the curriculum; it is particularly important to resolve the issue of appointing well-trained and locally-oriented teachers.

In response to international commitments to education for all, the Millennium Development Goals and the Convention on the Rights of the Childmany of the multigrade schools in Southeast Asia were also established. UNESCO statistics show that 66% of Indonesian schools are remote schools; about7,952 schools in the Philippines are MG schools (36%); 1,353 schools in 22 provinces of Cambodia are multigrade; 135 schools in Timor Leste are multigrade; 8,404 schools in Vietnam are multigrade. Malaysia has only four remaining multigrade schools.

According to Sabian (2010), in the Philippines, the first mission schools were formed as multigrade schools. These were established because remote barangays needed to be educated, the limited enrolment, distance of houses to schools, teacher shortage, lack of school facilities, and funds; thus, this is a necessity.

According to Education Secretary Armin D. Luistro, most of the students attending multigrade/combination classes are learners who belong to isolated and financially challenged communities, are indigenous people, and reside in far-flung mountains and islands where schools are far from each other.

Multigrade Education is one of the Department's strategies access to quality education for all school-age children in far-flung communities where enrollment does not warrant the organization of monograde classes. DepED Order No. 96, s. 1997, "Policies and Guidelines in the Organization and Operation of Multigrade (MG) Classes" was implemented to address recurring issues, Teachers appointed shall undergo training on

multigrade teaching an ongoing standards-based professional development program managed by a core of division and regional MG trainers and shall not be transferred to other schools within two years.

Velasco (2018) found out that the problems encountered by the combination of teachers of Sto. Domingo-San Ildefonso districts are lack of time and unattained objectives, lack of facilities, parents and administrators misconceptions about the holding of combination classes. In a much boarder context, according to SEAMEO-INNOTECH (2014), based on the National Achievement Test results administered to Grades 3 and 6 pupils under multigrade classes, pupils acquired below 65% passing rate.

There are issues and challenges in holding combination classes. Some of these are the perception of parents that a combination class is a second type of education. Many teachers, administrators, and parents continue to wonder whether the holding of a combination class has negative effects on student performance. Others view that combination organized classes are potentially a cost of effective means of providing quality education in difficult to reach areas. Despite the issues that continue to surface in connection to combination classes, this mode of instruction is still observed. This led the researcher to conduct a study on the performance of pupils in combination classes to validate the issues that continue to surface.

The study is deemed significant for teachers handling combination classes because the results may lead to the improvement of instruction in combination classes. This study will provide school administrators deeper insights on the organization of combination classes in the country, which could lead to better alternatives for the improvement of learning conditions for the benefit of Filipino learners who will be the great people in the country. Furthermore, the result of this study may serve as an eye opener and motivation for teachers who are assigned to teach in combination classes. Results of previous studies have a resemblance to the present study in the sense that the different problems and concerns in multigrade teaching were also the focus of this study.

Objectives of the Study

The main objective of this study was to describe the experiences, problems, and concerns in multi-grade classes of schools in Ilocos Sur. It analyzed the ups and downs of multi-grade teaching, which was the basis for an extension program. It sought to determine 1) the profile of the respondents in terms of grade assignment, age, sex, civil status, highest educational attainment, years in service, salary grade; and number of training/seminars attended; 2)the level of assessment of the respondents on multi-grade classes in terms of administrators' competence, teachers' competence, pupils' experience, community support/participation, instructional adequacy of resources, and curriculum content Management, 3) significant relationship between the profile of the respondents and their level of assessment in multi-grade classes, 4) the problems and concerns experience by the respondents in multigrade classes, and 4) the proposed extension program related to the study.

Methodology

The study made use of the descriptive survey method of research. This was used to describe and assert the experiences, problems, and concerns in multi-grade classes of schools in Ilocos Sur. It analyzed the positive and negative impacts of multi-grade teaching, which will be the basis for an extension program. All (57) multi-grade teachers of the first district of Ilocos Sur particularly, the teachers in San Juan (17), Magsingal (24) and, Sto. Domingo (16) Districts are the respondents of the study. The main instrument that was used by the researcher in this study was a questionnaire made by the researcher and validated by the experts. Research ethics were appropriately observed in the conduct of the study. Permission to gather data was sought from proper authorities. Informed consent was provided to the respondents, and they were assured of anonymity of their names. Frequency count and percent distribution were used to determine the profile of the respondents. Mean was used to describe the level of assessment of teachers of multi-grade classes. Pearson Product Moment of Correlation was used to determine the relationship between the profile of the respondents and their level of assessment in multi-grade classes. The significance of the correlation coefficients was tested at the .05 probability level.

Results and Discussions

A great number of the respondents (19 or 33.33%) are handling Grades 1 & 2 classes; 21-25 (30 or 52.63%) years of age; married (33 or 57.89%). The great majority of the respondents (44 or 77.19%) are female; 42 or 73.68% are bachelor's degree holders. The majority of the respondents (31 or 54.39%) have 6-10 years of experience. 34 or 59.65% belong to Salary Grade Scale. All of the respondents in San Juan, Magsingal, and Sto. Domingo districts have attended district, division, regional, and national levels of training.

Table 1. Level of Assessment of the Respondents on Multi-Grade Classes Along Administrators' Competence

District / Indicators	San Juan		Magsingal		Sto. Domingo		As a Whole	
	x	DR	x	DR	x	DR	x	DR
A. Administrators' Competence								
1. Administrators implement policies and guidelines in the conduct of Multi-grade classes.	4.63	SA	4.58	SA	4.59	SA	**4.60**	**O**
2. Administrators are is reliable and willing to be responsible for his subordinates' performance.	4.38	A	4.38	A	4.41	A	**4.39**	**VS**
3. Administrators' responsibility in administrative affairs is observed.	4.50	SA	4.58	SA	4.59	SA	**4.56**	**O**
4. Administrators have the ability to solve	4.00	A	4.25	A	4.24	A	**4.18**	**VS**

problems pertaining to Multi-grade classes.								
5. There is an organized and reasonable administrative approach applied by the administrator	3.94	A	4.33	A	4.35	A	**4.23**	**VS**
6. Administrators are creative especially in implementing programs and projects related to Multi-grade classes.	4.38	A	4.38	A	4.29	A	**4.35**	**VS**
7. Administrators are very supportive to teachers and pupils in Multi-grade classes.	4.44	A	4.50	SA	4.59	SA	**4.51**	**O**
8. Provides timely and accurate feedback toteachers and learners to encouragethe administratorstoreflect on and monitorthelearninggrowth and development.	4.38	A	4.33	A	4.41	A	**4.37**	**VS**
9. Administrators develop and utilize creative and appropriate instructional plan.	4.38	A	4.42	A	4.65	SA	**4.47**	**VS**
10. Administrators monitor regularly and provides feedback to Multi-Grade classes.	4.38	A	4.25	A	4.47	A	**4.35**	**VS**
As A Whole	**4.34**	**VS**	**4.40**	**VS**	**4.46**	**VS**	**4.40**	**VS**

Legend:

Range of Scores	**Descriptive Rating**	**Overall Descriptive Rating**
4.50-5.00	Strongly Agree (SA)	Outstanding (O)
3.50-4.49	Agree (A)	Very Satisfactory (VS)
2.50-3.49	Undecided (U)	Satisfactory (S)
1.50-2.49	Disagree (D)	Poor (P)
1.00-1.49	Strongly Disagree (SD)	Needs Improvement (NI)

As a whole, it is revealed on the table that the level of assessment of the respondents on multi-grade classes along administrative competence is "Very Satisfactory "as backed up by the mean rating of 4.40. The item "Administrators implement policies and guidelines in the conduct of Multi-grade classes." tend to have the highest mean rating of4.60 and fell on an "Outstanding" level of assessment. On the other hand, item "Administrators have the ability to solve problems about Multi-grade classes." has the lowest mean rating of 4.18 and fell on a "Very Satisfactory" level. This could only mean that the respondents perceived their administrators to be a law-abiding citizen in the

sense that they strictly follow and administer policies and guidelines prescribed by the higher authorities. Meanwhile, the respondents observed that the administrators could really resolve problems about multi- grade classes, as revealed by the result of the study. As administrators, they are expected to do these things because this is their number one role in the school. The findings are in consonance with that of Kucita (2013). Principals and teachers experience instructional leadership within the context of MU in different ways; others feel positive about it, and others view it negatively. Those who experience it positively cite advantages of providing access to education to a large number of learners living in remote areas with sparse population and schools, promoting learner independence, affording opportunities for interdependence amongst learners when assisting one another.

Table 2. Level of Assessment of the Respondents on Multi-Grade Classes Along Teachers' Competence

District / Indicators	San Juan		Magsingal		Sto. Domingo		As a Whole	
	x	DR	x	DR	X	DR	x	DR
B. Teachers' Competence								
1. Teachers undergo continuing and advanced professional training on teaching Multi-Grade classes.	5.00	SA	4.96	SA	4.94	SA	**4.96**	**O**
2. Teachers provide accurate and updated content knowledge using appropriate methodologies, approaches and strategies.	4.13	A	4.21	A	4.12	A	**4.16**	**VS**
3. Teachers explain earning goals, instructional procedures and content clearly and accurately to multi-grade learners.	4.63	SA	4.54	SA	4.41	A	**4.53**	**O**
4. Teachers have sufficient manuals and guide for teaching Multi-Grade classes.	3.88	A	3.25	A	2.76	U	**3.28**	**S**
5. Teachers update themselves of trends in teaching multigrade classes through reading supplementary materials.	3.88	A	3.71	A	3.41	A	**3.67**	**VS**
6. Teachers employ constructive alignment of objectives, strategies and activities and assessment.	4.63	SA	4.46	A	4.29	A	**4.46**	**VS**
7. Teachers exhibit professional collaboration through group sharing of	4.88	SA	4.75	SA	4.71	SA	**4.77**	**O**

teaching techniques and experiences.								
8. Teachers have the ability to obtain information on the learning styles, multiple intelligences and needs of learners.	4.63	SA	4.50	SA	4.47	A	**4.53**	**O**
9. Teachers determine, understand, and accept the learners diverse background knowledge and experience.	4.63	SA	4.54	SA	4.47	A	**4.54**	**O**
10. Teachers are effective and efficient in handling Multi-Grade classes.	4.38	A	4.38	A	4.29	A	**4.35**	**VS**
As A Whole	**4.46**	**VS**	**4.33**	**VS**	**4.19**	**VS**	**4.32**	**VS**

Legend:

Range of Scores	**Descriptive Rating**	**Overall Descriptive Rating**
4.50-5.00	Strongly Agree (SA)	Outstanding (O)
3.50-4.49	Agree (A)	Very Satisfactory (VS)
2.50-3.49	Undecided (U)	Satisfactory (S)
1.50-2.49	Disagree (D)	Poor (P)
1.00-1.49	Strongly Disagree (SD)	Needs Improvement (NI)

It is shown on the table that the overall level of assessment of the respondents on multi-grade classes along the teacher's experience is "Very Satisfactory, "as evidenced by the mean rating of 4.32. The item "Teachers undergo continuing and advanced professional training on Multi-Grade classes." tend to have the highest mean rating of 4.96 and fell on an "Outstanding" level of assessment. This implies that the teachers undertake a series of seminars, training, and workshops to keep abreast of the new trends, techniques, and strategies in teaching especially in handling multi-glade classes. This is contrary to the findings of Du Plessis & Subramanien, 2014. They said that the lack of training either at a tertiary level or through in-service training, ill-equipped educators to handle the phenomenon of MU are indications of the unpreparedness of teachers to deal with MU schools. Because of these challenges, they do not even complete the syllabus for the year

Table 3. Level of Assessment of the Respondents on Multi-Grade Classes Along Pupils' Experience

District / Indicators	San Juan		Magsingal		Sto. Domingo		As a Whole	
	x	DR	x	DR	X	DR	x	DR
C. Pupils' Experience								
1. Pupils can comprehend the topics being discussed by the teacher.	4.00	A	3.92	A	3.88	A	**4.05**	**VS**
2. Pupils are engaged in the learning activities, regardless of their diverse and differing capacities.	4.13	A	4.08	A	4.06	A	**3.98**	**VS**
3. Pupils are provided with diverse opportunities to develop their higher order thinking skills.	4.63	SA	4.25	A	4.18	A	**3.86**	**VS**
4. Pupils are easy to manage.	4.00	A	3.63	A	3.53	A	**3.30**	**S**
5. Pupils see and appreciate the value of the curricular goals and objectives set for the different lessons in class.	3.88	A	4.00	A	3.88	A	**3.25**	**S**
6. Pupils can see and appreciate value of pursuing learning by being exposed to a conducive environment.	3.75	A	3.88	A	3.71	A	**3.79**	**VS**
7. Pupils can easily adjust themselves in Multi-Grade classes.	4.13	A	4.21	A	4.24	A	**4.19**	**VS**
8. Pupils show constant progress based on standard evaluation tools.	4.00	A	4.13	A	4.12	A	**4.09**	**A**
9. Pupils are knowledgeable of their situation/set-up as Multi-Grade class.	4.00	A	4.25	A	4.24	A	**4.18**	**VS**
10. Pupils in Multi-Grade classes cooperate and help each other in their lessons.	4.13	A	4.25	A	4.12	A	**4.18**	**VS**
As a Whole	**4.06**	**VS**	**4.06**	**VS**	**3.99**	**VS**	**4.04**	**VS**

As a whole, it is revealed on the table that the level of assessment of the respondents on multi-grade classes along pupils' experience is "Very Satisfactory," as supported by the mean rating of 4.04. The item "Pupils can easily adjust themselves in Multi-Grade

classes." tend to have the highest mean rating of 4.19 and fell on a "Very Satisfactory" level of assessment. This means that pupils are already used to the kind of classes where they belong. They are already comfortable with the present set-up wherein they have - to be with the other grade levels. On the other hand, item "Pupils see and appreciate the value of the curricular goals and objectives set for the different lessons in class." has the lowest mean rating of 3.25 and fell on a "Satisfactory" level. This means that the pupils are not fully aware of the curricular goals and objectives established in their various lessons in class, maybe because they are used to mixed lessons. They cannot distinguish their lessons from that of the other grade level.

Table 4. Level of Assessment of the Respondents on Multi-Grade Classes Along Community Support/Participation

District / Indicators	San Juan		Magsingal		Sto. Domingo		As a Whole	
	x	DR	X	DR	x	DR	x	DR
D. Community Support/Participation								
1. The community shows support to the school especially the grade levels with Multi-Grade classes.	4.25	A	4.08	A	3.82	A	**4.05**	**VS**
2. The community enlists the support of some organizations to help raise funds and resources for learning.	4.00	A	4.00	A	3.94	A	**3.98**	**VS**
3. The community engages in discussion with teachers regarding the learning experiences and progress of children.	3.88	A	3.96	A	3.71	A	**3.86**	**VS**
4. Non-Government organizations show readiness to support the Multi-Grade classes	3.63	A	3.25	U	3.06	U	**3.30**	**S**
5. The Municipal Committee Chairman on Education takes the lead in conducting literacy programs on Multi-Grade classes.	3.63	A	3.08	U	3.12	U	**3.25**	**S**
6. Parents and teachers are partners in the requisition and procurement of equipment, facilities, and instructional materials needed in the school in teaching Multi-Grade classes.	4.00	A	4.17	A	3.94	A	**4.05**	**VS**
7. The community promotes programs and projects that can help Multi-Grade classes.	4.25	A	3.92	A	3.82	A	**3.98**	**VS**

8. The community has a positive perception/regard on Multi-Grade classes.	4.38	A	4.17	A	4.06	A	**4.19**	**VS**
9. The community shares accountability in promoting the learners' achievement.	4.00	A	3.96	A	3.82	A	**3.93**	**VS**
10. The community participates in all programs and projects of the school.	3.88	A	4.08	A	3.94	A	**3.98**	**VS**
As a Whole	**3.99**	**VS**	**3.87**	**VS**	**3.72**	**VS**	**3.86**	**VS**

It is shown on the table that the overall level of assessment of the respondents on multi-grade classes along community support/participation is "Very Satisfactory," as evidenced by the mean rating of 3.86. The item "The community has a positive perception/regards on Multi-Grade classes." tends to have the highest mean rating of 4.19 and fell on a "Very Satisfactory" level of assessment. This means that the community accepts the situation in multigrade teaching. They wanted their children can gain learnings and go to school. What matters is that their children can gain knowledge regardless of the type of classes they take part of. The findings are in consonance with that of Magno, (2014) . They said that multigrade the Municipal Committee Chairman on Education takes the lead in conducting literacy programs on Multi-Grade classes." has the lowest mean rating of 3.25 and fell on a "Satisfactory" level. This means that literacy programs on multigrade classes are seemingly not the priority of the municipal committee chairman on education.

Table 5. Level of Assessment of the Respondents on Multi-Grade Classes Along Instructional Adequacy of Resources

District / Indicators	San Juan		Magsingal		Sto. Domingo		As a Whole	
	x	**DR**	**x**	**DR**	**x**	**DR**	**x**	**DR**
E. Instructional Adequacy of Resources								
1. There are adequate supplies for making teaching-learning aids.	4.25	A	3.21	U	3.12	U	**3.47**	**S**
2. There are adequate supplies of pictures, charts, posters, modes and other visual aids.	4.38	A	3.50	A	3.35	U	**3.70**	**VS**
3. Taped stories, songs, poems and rhymes are available.	4.13	A	3.21	U	3.12	U	**3.44**	**S**
4. There are adequate supplies of updated books for teaching and learning activities.	3.63	A	3.13	U	2.88	U	**3.19**	**S**
5. Adequate supplies of workbooks in every subject and are available for use.	3.38	U	3.21	U	2.88	U	**3.16**	**S**

6. Adequate teaching guides and manuals are available.	3.88	A	3.63	A	3.41	U	**3.63**	**VS**
7. There are adequate standard evaluation devices.	3.63	A	3.54	A	3.29	U	**3.49**	**S**
8. Adequate evaluation forms are available.	3.88	A	3.67	A	3.53	A	**3.68**	**VS**
9. Instructional facilities are available.	3.88	A	3.63	A	3.47	U	**3.65**	**VS**
10. Adequate modules, teaching aids/devices, and facilities.	3.75	A	3.50	A	3.35	U	**3.53**	**VS**
As a Whole	**3.88**	**VS**	**3.42**	**S**	**3.24**	**S**	**3.49**	**S**

Legend:

Range of Scores	**Descriptive Rating**	**Overall Descriptive Rating**
4.50-5.00	Strongly Agree (SA)	Outstanding (O)
3.50-4.49	Agree (A)	Very Satisfactory (VS)
2.50-3.49	Undecided (U)	Satisfactory (S)
1.50-2.49	Disagree (D)	Poor (P)
1.00-1.49	Strongly Disagree (SD)	Needs Improvement (NI)

It is shown on the table that the overall level of assessment of the respondents on multi-grade classes along the instructional adequacy of resources is "Satisfactory" as backed up by the mean rating of 3.49. The item "There are adequate supplies of pictures, charts, posters, modes, and other visual aids." tend to have the highest mean rating of 3.70 and fell on a "Very Satisfactory" level of assessment. On the other hand, item "Adequate supplies of workbooks in every subject and are available for use." has the lowest mean rating of 3.16 and fell on a "Satisfactory" level. This means that the instructional management is not as high as expected. This conforms the previous findings that instructional materials tend to have the lowest mean ratings. Lack of teaching materials is one of the problems of the teachers, especially those who teach multigrade classes.
Table 7 shows the level of assessment of the respondents on multi-grade classes along curriculum content.

Table 6. Level of Assessment of the Respondents on Multi-Grade Classes Along Curriculum Content

District / Indicators	San Juan		Magsingal		Sto. Domingo		As a Whole	
	x	DR	x	DR	x	DR	x	DR
F. Content Management								
1. The subjects taught in Multi-Grade classes are the same with that of single classes.	4.75	SA	4.88	SA	4.94	SA	**4.86**	**O**
2. The lessons set for the day are taught within timeframe.	3.63	A	3.88	A	3.82	A	**3.79**	**VS**
3. The objectives for the day are duly accomplished.	4.38	A	4.17	A	4.12	A	**4.21**	**VS**
4. The lesson for the day is well-prepared.	4.00	A	4.13	A	4.06	A	**4.07**	**VS**
5. The content knowledge is properly delivered using appropriate methodologies, approaches and strategies.	4.50	SA	4.46	A	4.29	A	**4.42**	**VS**
6. The current content is linked with past and future lessons.	4.50	SA	4.46	A	4.41	A	**4.46**	**VS**
7. The lesson objectives are properly aligned with the teaching methods, learning activities, and instructional materials or resources appropriate to Multi-Grade classes.	4.50	SA	4.46	A	4.41	A	**4.46**	**VS**
8. Content of subject area is integrated with other disciplines.	4.00	A	4.38	A	4.35	A	**4.26**	**VS**
9. Variety of appropriate assessment strategies to monitor and evaluate learning is developed and used.	4.50	SA	4.54	A	4.53	SA	**4.53**	**O**
10. Language, literacy and quantitative skill development and values in subject area are integrated.	4.50	SA	4.58	A	4.59	SA	**4.56**	**O**
As a Whole	**4.33**	**VS**	**4.39**	**VS**	**4.35**	**VS**	**4.36**	**VS**

Legend:

Range of Scores	Descriptive Rating	Overall Descriptive Rating
4.50-5.00	Strongly Agree (SA)	Outstanding (O)
3.50-4.49	Agree (A)	Very Satisfactory (VS)
2.50-3.49	Undecided (U)	Satisfactory (S)
1.50-2.49	Disagree (D)	Poor (P)
1.00-1.49	Strongly Disagree (SD)	Needs Improvement (NI)

As a whole, it is revealed on the table that the level of assessment of the respondents on multi-grade classes along curriculum content is "Very Satisfactory," as supported by the mean rating of 4.36. The item "The subjects taught to Multi-Grade classes are the same with that of single classes." tend to have the highest mean rating of 4.86 and fell on an "Outstanding" level of assessment. On the other hand, the item "The lessons assigned for the day is religiously attained." has the lowest mean rating of 3.79 and fell on a "Very Satisfactory" level. This means that content being taught to these multigrade classes is the same as with that of the monograde classes. The curriculum is properly organized. Little (2004) suggested that a single graded structure must be adapted to address the needs of multigrade classes.

Table 7 presents the level summary of the level of assessment of the respondents on multi-grade classes.

Table 7. Significant Relationship Between the Profile of the Respondents and the Level of Assessment on Multi-Grade Classes

Indicators / Profile	Administrators' Competence	Teachers' Competence	Pupils' Experience	Community Support/Participation	Instructional Adequacy of Resources	Curriculum Content	Grand Mean
Grade Assignment	-.138	.094	.094	-.403	-.357	-.356	-.290
Age	.184	.075	.084	.165	.287	.308	.276
Civil Status	.574*	.299	-.291	.310	.351	.622*	.547*
Sex	.422	.323	.078	-.195	.108	.282	.283
Highest Educ	-.174	-.098	-.009	.324	.147	.026	.027
Years in Service	.062	.008	.012	-.081	-.009	.035	.015
Salary Grade	-.042	.100	.592*	.171	.469	.219	.277
No. of District	-.408	-.236	.342	-.061	-.012	-.267	-.240
No. of Division	-.135	.043	.264	-.125	-.008	-.120	-.072
No. of Regional	-.186	.008	.512*	-.257	.009	-.199	-.113

No. of National	-.427	-.233	.485	-.135	.013	-.286	-.244

**.Correlation is significant at the 0.01 level (2-tailed).

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

Looking at the overall result, it shows that there is no significant relationship between the profile of the respondents and the level of assessment on multigrade classes. Nevertheless, there is a significant relationship between the civil status of the respondents and the level of assessment on multigrade classes (r=.547). This could mean that the civil status affects the indicators of multigrade classes. Single teachers have more time to teach this type of class. They can devote their time to their pupils because they do not have a family yet to attend to. According to Mulaudzi 2016, multigrade teaching Multi-grade teaching has the potential to improve the quality of teaching, and it is essential in ensuring basic education for all.

A significant relationship also fell between the salary grade and pupils' experience (r = .592). This implies that the salary grade of teachers has a bearing with the pupils' experience in multigrade classes. The higher the salary grade, the higher the motivation of the teacher in teaching. In consonance to the previous findings, the number of regional training bear a significant relationship with the pupils' experience. It is a fact that the more trainings the teacher has attended, the more knowledge he has to offer to his learners. Gasa2016 found out in his study that participants regarded the act and or the process of shaping the vision of the school to be an imperative aspect of achieving academic excellence among all learners. They regarded the school vision as a guide that directs them on what they want to accomplish at the end of a certain period. The outcome was educative teaching and academic excellence among all learners; hence they expressed a view that they needed not to deviate from the vision.

Conclusions

From the findings, the following are concluded:

1. The teacher-respondents are handling Grades 1 & 2 classes, are 21-25 years of age, married, female, bachelor's degree holder, with 6-10 years of experience, belong to Salary Grade Scale of 11, and have attended only one training in the district, division, regional, and national level.
2. The respondents believed that the overall level of assessment of the respondents in multi-grade classes is quite satisfying.
3. There is no effect on the profile of the respondents and the level of assessment on multigrade classes.
4. Participants alluded to the fact that there is too much work for teachers in multi-grade classrooms nevertheless, they enjoyed and used to teach multigrade classes.
5. The "Turo Mo, Gawa Ko, Kagalingan ng Mag-aaral Ko :" A CTE Extension Program is proposed.

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Teacher Candidates' Experiences with Distance Learning in the Initial Year of COVID-19

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Abstract
The advent of distance learning as a result of the *COVID-19 pandemic* introduced challenges to teaching and learning. Teacher preparation programs worldwide grappled with the predicament of moving practicum-based field experiences online. The following research examines a practicum, field-based, teacher preparation course that was transitioned to distance learning as a result of the COVID-19 pandemic. Two university field supervisors noticed teacher candidates struggled with promoting student engagement when teaching to elementary students in distance learning environments. This inquiry was developed to investigate how elementary education teacher candidates promote student engagement in distance learning environments. An interpretive phenomenological analysis of 20 lesson reflections reveals candidates need more support with questioning, formative assessment, and technology tools to keep students engaged online. Findings from the research suggest teacher preparation programs need to consider the addition of distance learning methods to teacher preparation coursework.

Keywords: Teacher Preparation, Distance Education, Student Engagement, Teacher Candidate, COVID-19, Pandemic

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Introduction

The abrupt transition of traditional face-to-face instruction to screen-to-screen instruction due to the *COVID-19 pandemic* presents many challenges for teacher preparation programs (TPPs) in the United States (US). TPPs must decide how to move practice-based, face-to-face field experiences online so teacher candidates (TCs) may learn how to lesson plan and teach content to K-12 students remotely. While widespread use of distance learning appears to be a consequence of the COVID-19 pandemic, distance learning increased as a pre-pandemic instruction mode. For example, the states of Michigan, Alabama, New Mexico, and Idaho passed legislation nearly a decade ago to require that all K-12 students complete online learning experiences before graduating from high school (Kennedy & Archambault, 2012). Most US states offer free online virtual schooling alternatives for students (Littlefield, 2020). However, there are no requirements to mandate that teacher candidates complete distance learning methods courses in teacher preparation years. To date, only 1.3 % of TPPs in the US address distance education (Barbour, Siko, Gross & Waddell, 2014; Kennedy & Archambault, 2012) in teacher preparation. Now more than ever, TPPs need to consider ways to create distance education coursework to prepare teachers effectively for working in 21st-century classrooms.

In the spring 2020 semester, two university field supervisors (authors) transitioned a face-to-face field-based practicum course to synchronous distance learning due to the COVID-19 pandemic. Ten undergraduate, third-year, elementary education TCs worked with mentor teachers to provide online synchronous instruction to elementary (K-5) students. Throughout the spring 2020 semester, TCs met with the authors to reflect on their distance learning experiences. The authors noticed TCs experienced difficulties with student engagement. An inquiry ensued to examine how teacher candidates support online engagement when working with elementary students synchronously in distance learning environments.

Situated Learning

Situated learning (Lave & Wenger, 1991) is used in this research to understand how teacher candidates construct knowledge of distance learning student engagement. Situated learning proposes that understanding develops through interpersonal relationships. When communicating with others, individuals connect prior experience with the authentic contextual learning environment to understand a specific situation, topic, or task. Situated learning is a learning concept that involves learners in cooperative reflective activities while being immersed in an experience. The teacher candidates examined in this study cooperated with a university supervisor to plan, enact, and reflect on their ability to provide synchronous distance learning to elementary-aged students.

Distance Learning

In distance learning environments, media channels enable synchronous or asynchronous interactions between physically separate learners, teachers, and educational resources (Saykılı, 2018). Students who learn online undertake more responsibility to perform learning activities using multimedia resources such as discussion boards or social media to learn content and interact with others. Thus,

distance education is an interactive telecommunication system that connects learners, resources, and teachers (Türkan, Leblebibi, & Önal, 2020). Distance learning provides several advantages to students, such as working from home, being responsible for personal education, and reviewing lesson content slowly or repeatedly. Through synchronous or asynchronous modes of instruction, students may learn together or on their own time. Technology is part of the 21-st century classroom; however, stakeholders must make several considerations before implementing a distance learning curriculum. Teachers need time to adapt to new technologies before being expected to use them effectively. Teachers' Technological Pedagogical Content Knowledge (TPACK) emphasizes that it is essential for teachers to use technologies effectively to teach content to students (Koehler & Mishra 2009). The abrupt change from face-to-face to screen-to-screen instruction has challenged even the most well-prepared experienced teachers. The COVID-19 pandemic ushered in a new pedagogical need. Teachers now need to address the social-emotional needs of students' by implementing trauma- and healing-informed pedagogical practices all while making up for learning loss and preparing for the coming unpredictable combinations of distance learning (Darling-Hammond & Hyler, 2020). The greater expectations placed on the teaching workforce means TPPs need to update program standards to reflect the needs of today's students, failing to do so will result in increased teacher attrition. Teachers who feel ill-prepared for a school's distance learning curriculum may experience an abrupt change to their teaching identity, resulting in feelings of loneliness and isolation (Zhang, 2020), thus attributing to teacher attrition.

Student Engagement

Research on student engagement focuses on behavioral indicators of students' participation in academic settings to associate student engagement with instructional excellence (Axelson & Flick, 2011). The bahavioral perspective of student engagement is utilitarian in nature because it examines behaviors such as academic achievement and attendance to suggest that schools use extrinsic motivations, such as grades and attendance expectations, to promote student engagement. Other literature (Wolters & Taylor, 2012) draws the concept of self-regulated learning to describe student engagement as it relates to motivation, classroom climate, and student attitude. From a self-regulated learning perspective, student engagement is a psychological and physical phenomenon. The self-regulated learning perspective on student engagement suggests that teachers use intrinsic motivations that capitalize on students' interests and address community-relevant issues to keep students engaged.

Others describe types of student engagement (Wang & Eccles 2013). Behavioral engagement relates to attendance and active participation in classroom learning. Emotional engagement examines students' positive and negative reactions to school, teachers, and activities. Cognitive engagement focuses on the degree to which the student is willing to put in the effort to comprehend challenging material and acquire difficult skills. While one may think types of student engagement should be studied in isolation. However, critics (Axelson & Flick, 2011) warn that "we do damage to the messy reality of student learning if we disaggregate the various forms of student engagement from each other" (p.41). For this reason, it is recommended that researchers conceptualize student engagement as a multidimensional construct.

Methods

Phenomenology is a qualitative research approach that investigates the commonality of a lived experience within a particular group. The purpose of phenomenological research is to reach a description of the universal essence of individuals' experiences with a phenomenon (Creswell & Poth, 2018). Classical phenomenology focuses on first-person experiences and the trait of intentionality, direction of experience towards things in the world, to understand how an established way of seeing is brought into being. In phenomenological research, intentionality refers to the way the researcher uses established 'objects' and ways of seeing to analyze experiences (any subject and all phenomena are 'objects'). Meaning is created by the mind, through actions directed towards objects via the process of intentionality.

Research Context and Participants

The TPP uses a cohort model and is a four-semester long program that results in an undergraduate degree in elementary education with initial teacher licensure. TCs begin the TPP their junior year of college and complete four semesters of field experiences and methods courses instruction. A cohort coordinator assigns TCs to an elementary school and mentor teacher. Semesters one through three include two days of field experience and methods course instruction. Semester four includes full-time student teaching. A university field supervisor observes TCs in the field and teaches bi-monthly seminars. Seminars provide opportunities for TCs to discuss field experience events, review relevant theory, receive lesson plan support, engage in reflective practice, and practice instructional strategies. The research reported on in this study took place when TCs were in the third semester of the TPP. At the start of the fall 2020 semester, instruction remained online, however, TCs were allowed to choose one of three pathways to complete the third semester field experience requirement: (1) work face-to-face with a mentor teacher, (2) work online with a mentor teacher, or (3) complete field simulation tasks provided by the field supervisor with no mentor teacher assignment. 10 of 18 TCs chose to work with a mentor teacher, either face-to-face or remotely and are reported on in this research because they planned and enacted instruction to students in a distance learning environment. The ten TCs reported on in this study completed two formal observations that included a lesson pre-conference, formal observation, and post-conference. To accommodate online instruction, field supervisors (the authors) joined TCs' live online lesson or watched a recording of TCs lesson. To plan online instruction, TCs used the university's lesson plan template and chose a Charlotte Danielson Framework (CDF) (2013) domain as a professional development goal for their lesson. The public school system used the CDF for in-service teacher evaluation. Therefore, the CDF allowed TCs to become fluent in and comfortable using the CDF for personal goal-setting. TCs shared their lesson plan with their supervisor and used CDF language to establish a goal (i.e. in this lesson, I want to create a culture for learning). The field supervisor used the TCs' CDF goal to provide lesson plan suggestions in pre-conference meetings. TCs were required to record their lesson (even if the field supervisor attended their live instruction online) and analyze their video using a video reflection framework (Smith, 2019). Then TCs used the video reflection protocol to guide post-conference reflective dialogue with the university field supervisor.

COVID-19: The Virtual Field Experience

Nationwide lockdown changed the way TPPs provide learning to TCs. On March 13, 2020 TCs (of the affiliated university being studied in this research) moved the face-to-face teaching they provided to elementary-aged students to screen-to-screen instruction. To accommodate the quick escalation of virtual learning, the university referred to empirical research to explore how to create "virtual" field experiences for TCs. According to the literature, there are three types of virtually enhanced field experiences (Hixon & So, 2009). *Type I* is characterized by concrete, direct experiences where the TC works in a live classroom setting with a mentor teacher and students. In a Type I field experience, technological tools facilitate, supervision, reflection, and communication. In *Type II* virtually-enhanced field experiences, TCs observe students and teachers in classrooms remotely. Examples of Type II technological tools include synchronous lesson observations or non-real-time pre-recorded videos. Simulated environments are used to create Type III virtually-enhanced field experiences. In *Type III* "virtual practicum", TCs learn about and practice pedagogy using an artificial model of reality. The different types of virtual field experiences may be used in conjunction with one another. For example, TCs may be asked to remotely observe a classroom (Type II experience) for an assignment while working in direct (Type I) field experience.

Data Collection

Data were collected over the course of a 16-week semester of online instruction in fall 2020. Primary data included 20 teacher candidate lesson reflections (two per TC). TCs completed written reflection prompts on their enacted distance education lessons. TCs recorded their screen-to-screen instruction using the *Screen-Cast-o-Matic* (a web-based screen recording tool), then reflected on their audio-video recording using a free video annotation download tool (v-note.org). Written reflection prompts asked TCs to comment on how their screen-to-screen instruction was met or not met a personal pedagogical goal. TCs referred to the CDF Evaluation Instrument (2013) to select a pedagogical goal. Before watching and analyzing their video, TCs decided what instructional elements would evidence them having met or not having met this goal. Secondary data sources included university supervisor notes. The authors (university supervisors) took notes when meeting with TCs to conduct post-lesson conferences. In post-lesson conferences, TCs shared their written reflections with the university supervisor. They described how they analyzed their video recording and what they noticed about their instruction related to their CDF goal. University supervisor notes were triangulated with TCs' lesson reflections to provide clarification and insight into participants' reflective responses and their reflective processes.

Data Analysis

Interpretative Phenomenological Analysis (IPA) was used to explore the experiences and challenges TCs had with promoting student engagement in distance learning environments. IPA involves a light form of thematic analysis where the data are kept intact through a process of phenomenological reduction or bracketing so a phenomenon may become evident (Smith & Osborn, 2015). Data were analyzed in three stages: initial note-taking, transferring notes into themes, and connecting themes

to generate findings. During initial note-taking, we employed a free analysis approach (Smith & Osbron, 2015) to focus on how TCs support student engagement in distance learning environments. To do so, we opened TCs' lesson reflections on *Google Docs* and created a three-column-table (listing initial note, data excerpt, and theme). We then used an idiographic analytical approach (Grbich, 2013) to transfer our initial notes into themes and met to discuss our notes. Our joint discussion resulted in four themes: *engagement strategy, beliefs about engagement, engagement challenges, and plan of action.* A research key was created to independently analyze one TC lesson reflection (case) to help us orient subsequent analysis. We independently coded the single case using the right column of the three-column table to list each theme as it occurred. This process allowed new sub-ordinate themes to emerge. Next, we shared our coding with each other until 100% inter-rater reliability was established. Then, we looked for connections between themes, placing each theme in chronological order to look for patterns. At this time, we noticed the following pattern: "engagement strategy", "engagement challenge", "plan of action", albeit the pattern did not answer the research question at hand. Therefore, we isolated the engagement strategy theme for deeper analysis. This resulted in the addition of three subordinate themes: ("questioning", "technology", "feedback", "formative assessment" to the research key (Table 1).

Theme/ Subthemes	Definition	Example
Engagement Strategy	Distance learning strategy enacted by TC to promote student engagement	Behavioral, cognitive, or emotional engagement
questioning	TC uses a question-response format to engage students in verbal or written discussion	chatbox discussion
formative assessment	Verification of student understanding progress before moving on.	*Kahoot!* Feedback
technology	use of applications, software, or other computer resources to model, problem-solve, or practice content with students	*PowerPoint* Whiteboard tool
challenge	TC perceives feeling(s) of discomfort about an instructional event	Not all students were engaged
plan of action	TC reflects on ways to improve student engagement in subsequent instruction	I want to do…next I want to try…

Table 1: *Research Key*

We used the research key to independently re-code the data. Since we had omitted "challenge", and "plan of action" from our research key we coded any perceived challenge or plan of action within each subordinate theme, for example within the questioning subtheme we looked for any perceived challenges and plan of action). We split the data in half amongst us to ensure that we analyzed lesson reflections from participants who we did not supervise during the spring 2020 semester. This was done

in an attempt to preserve phenomenological reduction as much as possible. In our analysis, we created another Google Doc where we manually coded the data using the same two-row, three-column table (subordinate theme, data excerpt, theme). Then, we uploaded the table as a pdf single case *HyperResearch*. We independently analyzed the pdf source as one case using the research key we developed as a codebook. Themes were used to create groups, and subordinate themes became codes within a group. We each ran a group and code report, then converted our independent reports into one joint excel spreadsheet. Then we conducted an iterative analysis checking the HyperResearch report against the raw data to make sure thematic connections worked to compile a directory of participants' phrases as a way to identify strongly captured thematic clusters.

Reflexivity

The first author is an Assistant Professor in multilingual learning, elementary education. Her beliefs about student engagement and distance learning align with Sociocultural concepts of learning and come from her personal experiences growing up as a bilingual and her professional experiences working as a former public elementary school teacher and now a university professor. She believes tools mediate learning and that humans make sense of the world through their interactions with others. The first author believes teachers should plan instruction using content and language standards. Teachers should use differentiated language supports to help students (who are in different levels of language proficiency) make sense of content. The first author is knowledgeable in preparing TCs to design and enact instruction to students who are multilingual or who speak a language other than English as a first language. The first author worked as an elementary school teacher for over eight years and currently works as a university methods course instructor and field supervisor. She values teacher reflection for professional development and requires that TCs' use video and video annotation tools for evidence-based teaching reflections. The first author whole-heartedly believes that students are engaged when they understand and are excited about what they are learning.

The second author is supervising teacher candidates in the field and works as a lecturer in education. A former elementary and secondary teacher, she developed an immersive language program and engaged her students in numerous art projects. Her teaching philosophy is grounded in social constructivism while providing students a sense of self-efficacy and agency. Her research interest takes a sociocultural perspective as learning and development is taking place in the interaction with others. COVID-19 required a transfer to distant learning and the second author explored synchronous and asynchronous teaching formats. The second author believes that teaching in a distance learning environment requires educators to adapt to new ways for student participation and engagement and challenges P-12 and higher education to develop different modes of teaching.

Findings

This study explored TCs experiences with promoting student engagement in a distance learning environment. To understand TCs' experiences with distance learning as a phenomenon, we examined the engagement strategies TCs utilized, the challenges TCs perceived, and any mention of next steps for a plan of action.

Questioning

TCs used questioning to promote student engagement and add rigor to online lessons as a way to invite students to think critically. For example, one TC explained, *"[Students] had the most attention when I asked them questions. They could even regain their focus if I asked them to answer a question or give me an answer to a problem*" (TC, November 2020).

Other TCs combined strategies they learned about in their methods courses with questioning. TCs used think-aloud and open-ended questions such as: "What should I do now? Can you help me?" along with Total Participation Techniques (TPTs) such as "think-pair-share" and "thumbs-up" in an attempt to keep students engaged online. TCs noticed TPTs did not work in the online setting with the same tenacity as the face-to-face setting. A TC explained, *"I model how to solve the problems then give them [students] time to practice on their own, but it's hard to create the 'pair' time online. I know I should do breakout rooms, but I don't think I can do this on WebEx [distance learning software used by the school]"* (TC, September 2020).

TCs revealed they needed to reconceptualize the participation strategies they learned about in their methods classes to "fit" the online platform they were using. This made some TCs feel ill-prepared and unsure of their teaching competency. As one TC shared, *"I know I have to get better at teaching online. I don't feel confident"* (TC, October 2020).

TCs expressed strong desires to improve on the types of questions they used to promote online student engagement. One TC summed it up, "*I should have added more variation to my questions. In this way, I could introduce new vocabulary and expose students to the different styles of questioning"* (TC, December 2020).

Distance learning showed TCs they needed to improve their questioning skills. As TCs taught students online, the screen provided evidence of student disengagement, this evidence promoted TCs to see a need for improvement. As one TC expressed, "*I can see them doing other things as I'm speaking, so I know I need to improve on how I ask them questions*" (TC, November 2020).

An overall feeling of needing to improve questioning techniques via online tools was expressed by all TCs. Six of ten TCs shared a desire to use breakout rooms to engage students' online discussions, while four TCs shared they wanted to use the chatbox feature to keep track of student responses.

Formative Assessment

TC used formative assessment in the form of feedback to promote online student engagement. Praise such as "thank you" or "good job" kept students interested in a lesson. However, TCs noted that praise was not enough to develop online student discussions for critical thinking. For instance, one TC stated: *"I'd like to take the comments my students make and have them elaborate or turn their comments into a discussion. Instead of saying a mere thank you, I'd like my feedback to become more detailed*" (TC, November 2020).

In other instances, TCs analyzed students' independent work samples to keep track of student progress and understanding. A TC shared, *"I use practice problems to see what students know how to do before I moved on"* (TC, October 2020). However, when completing practice problems online, TCs noted that they did most of the talking and provided little time for students to work with each other in small groups to problem-solve. As one TC shared, "*It's hard for me to create a way for students to work together in small groups online. It's always a whole-group with me doing most of the talking. I know I need to change this*" (TC, November 2020).

Formative assessment became challenging for TCs to implement online: "*I created a rubric to use to check off when students complete a specific task, but I cannot see each student individually, so I observe a few students at a time; usually the ones I know are struggling"* (TC, October 2020). The distance learning environment challenged TCs abilities to keep track of student progress during instruction. While some TCs used online games like *Kahoot*! to formatively assess students TCs noticed they needed to rethink formative assessment in their lessons to consider the use of technology as an instructional tool. As one TC shared, "*I can't walk around to check on the progress anymore and offer support*" (TC, October 2020). TCs began to consider the use of technology as an instructional tool putting technology in the hands of students to keep students engaged.

Technology

Respective schools provided video conferencing apps such as *WebEx* or *Google Meets* as distance learning platforms. TCS frequently used the chatbox and camera features to keep track of student engagement in the form of verbal responses and facial gestures. Other candidates relied on the Google suite and used Google slides to present lesson content with animations (pictures and emojis on the slides). TCs felt confident using the Google suite for instruction but expressed issues with internet connectivity (the video freezing), visibility, (not being able to see all students in a grid view), and multitasking (showing the google slide and teaching while also observing students online). As a result, TCs expressed frustration, "*It's so hard to see all of the students when I'm teaching […] I can't see everything on my one screen*" (TC, September 2020). Another TC voiced, "*I could not successfully explain to the students how to take a screenshot*" (TC, September 2020). Teaching in a screen-to-screen setting demanded that TCs have pedagogical, content, and technological competence. Feelings of frustration led TCs to notice the importance of practicing distance learning lessons in advance to detect and solve technical problems. TCs explicitly stated that they practiced their lesson procedures at home or asked a peer what they did to solve a similar problem. TC's expressed that they would like to improve their multitasking skills such as monitoring students via camera and chat, working with an additional screen to monitor students during presentations, or asking their mentor teacher what he or she does to multitask.

Conclusions

Findings from this research reiterate the need for TPPs to reconceptualize teacher competency. Teaching in a screen-to-screen setting requires that TCs have pedagogical, content, and technological competence. Changes to how teachers learn and how they are prepared for distance education should be made in concert with

TPPs, teacher educators, partnership school faculty, administrators, and policymakers to establish as much agreement as possible. As Zhang (2020) notes, "the key to successful learning is to bridge the gap between physical and virtual spaces by extending the learning beyond the physical classroom" (p.36). With the advancement of interactive web 2.0, mobile technology, and artificial intelligence, paradigmatic changes in conceptual designations are needed in teacher preparation. Wide-spread access to information and greater availability to communicate online has become more prevalent to students, which positively enhances students' ability to learn independently. It would be negligent to think that things will return to how they once were in the classroom pre-pandemic. Teaching no longer includes technology, it is technology. TPPs must prepare TCs for 21st-century classrooms by including coursework and field experiences to make TCs competent in and comfortable with distance learning.

The COVID-19 pandemic is often referred to as "the new normal" and this "new normal" has several implications for TPPs: First, teachers need to be competent in technology and able to use technology for student instruction. Using technology for instruction involves risk-taking, innovation, and creativity. TPPs need to experiment with ways of preparing TCs for distance education environments. We recommend that TPPs consider adding distance learning field placements to their curriculum to ensure graduating TCs are competent and able to work effectively in both face-to-face and screen-to-screen environments.

Lastly, teachers need to adapt to novel technologies to keep up with technological changes and advancements. Teachers need opportunities to connect with other educators to receive professional development on the latest technologies (Darling-Hammond & Hyler, 2020). Professional collaboration is associated with higher job satisfaction, self-efficacy, and the use of innovative practices. TPPs need to provide TCs with peer collaboration experiences to discuss and explore teaching and learning technologies in teacher preparation so this form of teacher professional development becomes commonplace. In the same vein, teacher professional development needs to be reconceptualized to include technology as a mode of learning and topic of learning.

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Strengthening the Quality of Teacher Education through School - University Partnerships

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Abstract
Professional Development Schools promote connections between schools and teacher education programs. These partnerships are thought to benefit teacher candidates, teachers, and teacher educators through promoting positive and collaborative relationships and bridging the efforts of schools and universities. In the school year 2016-2017, seven public schools and a university teacher education institute started the first complex-wide Professional Development School in Hawai‘i. I explored the development of this partnership though interviews with three groups of stakeholders, observations of meetings and events, and analysis of program documents such as meeting minutes. I used the theoretical framework of Cultural-Historical-Activity-Theory and activity systems analysis to investigate these data and identify expectations, challenges, and successes of the complex-wide Professional Development School. This qualitative single-case study examined how participants interpreted and made meaning of their experiences in this partnership among the teacher education programs and the schools. Findings suggest necessary procedures as well as supporting organizational structures in the development of the partnership. Implications from the Complex-wide PDS include recommendations for PDS work in building a professional community, creating a learning culture, and forming collaborative leadership structures. This research adds to the literature addressing school improvement and student learning in Hawai‘i.

Keywords: School-University Partnerships, PDS, Teacher Education, CHAT, Activity Systems Analysis

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Introduction

Professional Development Schools (PDS) promote connections between schools and teacher education programs. These partnerships are thought to benefit teacher candidates, teachers, and teacher educators through promoting positive and collaborative relationships and bridging the efforts of schools and universities (Zeichner, 2010). Members of the PDS form and shape the working relationships, and reshape the cultures of public schools, teacher education programs, and their extended communities (Levine, 2002). Though change is a continuous process, implementing change in an organization is challenging and often fails (Higgs & Rowland, 2000; Kotter, 2014). Therefore, a change in the culture of an organization and building capacity for change is seen as fundamental perspectives in this process (Higgs & Rowland, 2000). As Senge and his colleagues (2000) advised, "If you want to improve a school system, before you change the rules, look first to the ways that people think and interact together" (p.19).

In the school year 2016-2017, seven public schools and a university teacher education institute (TE) started the first Complex-wide PDS in Hawai'i. This was the first step to organize placements across one school complex and TE. All seven schools offered placements, and two teacher education programs provided teacher candidates to work with mentor teachers; on both sides, liaisons were appointed to collaborate and organize the partnership.

The purpose of this study was to explore organizational structures and individual perceptions and interactions that advanced and supported the development of this Complex-wide PDS. I explored the experiences and perceptions of the members participating in the PDS initiative, including mentor teachers, administrators from the schools and TE, and liaisons from the schools and TE. This increased dialogue among participants acknowledged challenges in the partnership and problems were seen as indicators of growth. This fostered an awareness for the partnership and a search for solutions that supported the developmental nature of the PDS (Breault, 2013; Hess-Rice, 2002).

Theoretical Framework

The Cultural-Historical-Activity-Theory (CHAT) and the activity system analysis provided the framework to identify sources of disruption, innovation, and change in the activity systems of the PDS (Engeström, 1993). CHAT theorizes how individual knowledge is acquired while the individual is in reciprocal interaction with his or her social context (Yamagata-Lynch & Smaldino, 2007). Using the theoretical lens of CHAT, I explored human interactions in the multifaceted learning environment of the Complex-wide PDS to capture the essence of transformation and change (Yamagata-Lynch, 2010).

I explore the research question: What facilitates and impedes the development of a PDS? My investigation reflected four aspects as demonstrated in Figure 1: a) the *objective* for participating and the understanding of the PDS, b) the *tools* and activities in the PDS, c) the understanding of the participants' *roles*, and d) the *division of labor* expressed in organizational structures that support and impede the development and

sustainability of the PDS. The *subjects* in this PDS specific activity system are the administrators, mentor teachers, and liaisons, each making up its own activity system.

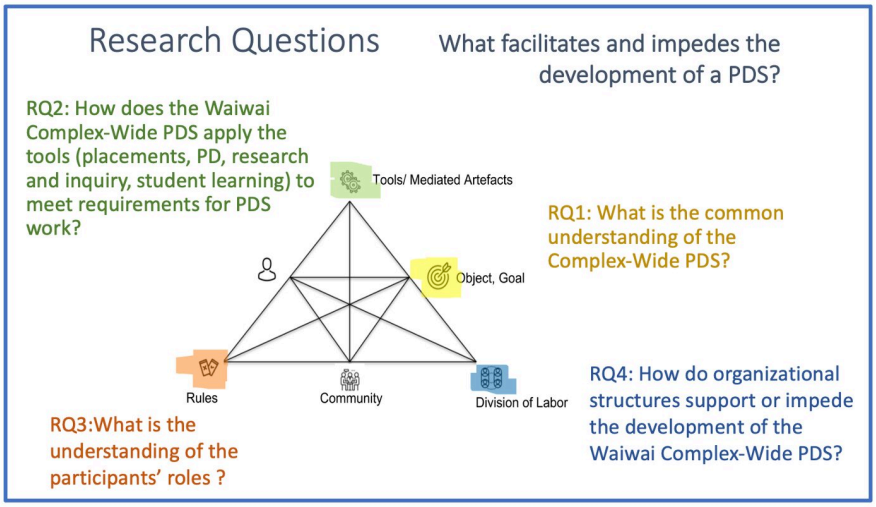

Figure 1. Activity triangle (Engeström, 1987), adapted for the Complex-wide PDS

Method

This qualitative research is a single case study bounded by time and the participating school Complex and TE programs. In the beginning stage of the PDS, participants build the foundation of a shared vision and mission that sets "the stage for planning and exploring the potential for the PDS" (Neapolitan & Tunks, 2009, p. 7). The Complex-wide PDS provided the social context and this research investigated the individual practices of the three participant groups of mentor teachers, liaisons, and administrators within it. I used a purposeful sample of convenience to recruit participants. I made efforts to have the representation distributed among schools, TE programs, and from each participant group.

Data Sources

Data were collected over the course of the first three years of the implementation of the PDS. The primary source of data were 25 interviews collected in Spring 2018 and survey data administered to the group of 42 mentors. This research explored important components such as participants' motivation, activities, and organizational structures that may have strengthened development in this partnership. The researcher attended meetings and took field notes at various events throughout the time of 2016 to 2019. Official program documents and reports were also consulted for data.

The researcher used activity system analysis as a descriptive tool to capture the processes in organizational change and to identify systemic contradictions and tensions in the educational setting (Yamagata-Lynch, 2010). Data analysis unfolded in three steps. First, the researcher applied grounded theory with open and axial coding to three interview transcripts, representing each activity system to generate categories across the activity systems. These categories were used to code all interviews (Strauss & Corbin, 1990). In a second step, the researcher applied selective coding within each activity system to generate and integrate categories. In a third step, the researcher proceeded with selective coding across the three activity systems. Triangulation of

multiple sources of data, member checks and the researcher's reflection on her role as a participant observer (Angrosin, 2007) confirmed and built confidence in the quality of the evidence.

Findings

The findings are presented according to the themes aligning with the theoretical framework and provide a summary for the goals, tools, roles and organizational structures in the partnership between the school complex and the TE.

Goals

Across the three activity systems of mentor teachers, liaisons, and administrators, the participants aligned in their overall goal to improve teacher education, but they differed in their understanding of what the PDS entailed. Whereas principals and university faculty mentioned the "win-win situation for both of us, for UH students as well as our complex schools" (Principal, 2018), mentor teachers primarily defined the PDS as a school that "puts a high value on professional development as many classes are offered at the school level" (Mentor survey, 2018). Principals and mentor teachers voiced the advantage of recruiting teachers for their school and appreciated screening candidates in their daily interaction with students and staff over the period of a semester. Principals were highly satisfied with the performance of the PDS graduates and TE directors and appreciated the growing partnership and valued the in-depth experiences the university students were able to make at the school.

Five of the seven schools increased their number of placements, and three of those five schools had twelve and more student candidates placed with mentor teachers. Principals at these schools voiced a strong appreciation for the collaborative work and its impact on the school's faculty. Mentor teachers and principals valued the freshness that student teachers were bringing to their school, "the younger teachers, they might not bring the experience and some of the knowledge the experienced teachers may have but they bring a lot of enthusiasm" (Principal, 2018). The principals noticed an effect on veteran teachers, "I think it forces our teachers to up their game" (Principal, 2018). On the other hand, mentor teachers appreciated having student teachers in the classroom; despite the time teachers have to invest in planning with the student teacher, these candidates supported small group instruction, introduced new strategies, and integrated the arts. Further, mentors valued the reflection the collaborative work with the candidate required and recognized their personal improvement as teachers.

Tools

The schools in the complex have a history of collaborating with teacher training institutions. Still, the PDS is the first attempt to formalize and structure the partnership. All Principals and program directors signed a memorandum of agreement, which included guidelines for PDS work (NAPDS, 2001).

The complex superintendent and principals follow a systemic approach in school development and the unique geographical location of the complex requires collaboration among the schools; most of the elementary students attend the complex' high school. Principals initiate collaborative professional development, align

educational programs, and refer potential hires. Student teachers, who get exposed to the different schools, are seen as an asset to tighten the collaborative work in the complex (Principal, 2018).

The PDS initiative addressed the different cultures concerning research by strengthening collaborative inquiry. In the first years, university partners invited school staff to co-present at three national conferences. More than 30 PDS participants presented and attended conferences, which was financially supported by the university. Interview participants mentioned the conferences and expressed a certain pride that their complex was represented at a national conference (Principal, 2018). A mentor teacher stated: "[School and university] collaborating on what they learned, and then going to a conference for schools who have teacher programs, not only gives those participants a view of what we are doing, but also strengthens, validates what we are doing".

Roles

The PDS started without clear role descriptions, a written program, or a handbook. The development was left to the individual schools and CE liaisons. The liaisons attributed activities such as co-creating, coordinating, and communicating to their role and functioned as boundary-spanners between the PDS schools and the TE (Whitenack & Swanson, 2013). Liaison teams explored their work relationships to serve the teacher candidates and mentor teachers in innovative ways (Douglas, 2017). But the role as a liaison was always added to the work of the coordinator, vice-principal, or resource teacher. Time became a challenge for liaisons as well as mentor teachers.

The partnership implemented a steering committee for collaborative leadership. Initiated to be a forum for governance, reflection, and collaboration, its members were unable to find a functional role. The committee failed to communicate information regarding professional development and lacked leadership in generating and organizing Complex-wide activities. Members questioned the committee's contributions toward the development of the PDS.

Organizational Structures

The PDS started as a partnership between one school with one TE program, expanding to seven schools and three TE programs required formal structures. Members convened liaison meetings, implemented a steering committee, and initiated complex-wide activities. The activities included professional development, conference attendance, and school visits.

Though the PDS was viewed as a complex initiative, participants recognized the individual development at the different schools. Participants were given the freedom to develop their partnership according to their needs. "I think each school has its own unique relationship and it depends a lot on the liaison, how well the liaison works with the TE liaison because that is where the relationship is rooted" (Steering, 2018). A liaison appreciated this "new system that is formed by its participants".

After the first two years, the committees were under evaluation in their structure and function. Whereas the liaison meetings were appreciated as places to learn from each

other, the structure of the meetings lacked decision making and collaborative initiative to plan complex-wide activities. Principals' awareness of the discrepancy in numbers of mentor teachers at the various schools called for more even distribution to sustain the partnership (Principal, 2018).

Conclusion

This Complex-wide PDS was shown to be a valuable structure to promote and improve teacher education. It was based on collaboration among programs and emphasized relationship building and discourse about best practices in teacher education. Envisioned, initiated, and enacted by TE and school members, this PDS partnership adjusted common practices in teacher education to create a learning culture through collaborative practices. Collaborative leadership allowed the shift to an institutional responsibility in the organization of teacher candidate placements, this holds the possibility of increased quality in placements and a change in policy (Frazier et al., 2015). This research is a contribution to the development of teacher education in the State of Hawai‘i and revealed helpful structures for meaningful teacher education.

Acknowledgment

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Perceptions and Processes of Virtual Teamwork Involving Japanese Undergraduate Students

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Abstract
In this paper we examine the virtual teamwork processes by focusing on the perceptions of undergraduate students when they transition, take action and build interpersonal relationships during an intensive multi-university learning project carried out at the time of COVID-19 pandemic. The participants (n=20) were Japanese undergraduate students from three universities enrolled in a synchronous online course in international organizations. The study employed inductive content analysis of students' e-Portfolios completed during the course. It builds on the three-tier model of team processes (Marks, Mathieu & Zaccaro, 2001) as its theoretical framework. The findings are in line with previous research suggesting that virtual teams are multitasking entities that transition through multiple processes simultaneously and consequentially to achieve team goals. We conclude with implications for online teaching and collaborative learning.

Keywords: Japanese Undergraduate Students, Virtual Teamwork, Team Processes, Multi-University Course

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Introduction

Virtual teamwork is becoming an important element of undergraduate education, providing students with the opportunity to acquire essential team working skills. Previous research has extensively addressed teamwork in a conventional face-to-face environment involving college students (Hansen, 2006). These studies focus on various dynamics related to student teams, such as team cohesiveness (Bravo, Catalán & Pina, 2019), teamwork outcomes, goal attainment and learning satisfaction, teamwork experiences (Wilson, Ho & Brookes, 2018), as well as performance measurement and assessment (Britton et al., 2017). It was argued in previous studies that compared with face-to-face collaborative learning, virtual collaborative learning is more demanding for students as the online context involves different tools and methods of communication and collaboration (Kopp, Matteucci & Tomasetto, 2012).

Collaborative learning among students can take place in various online settings using learning communities, wikis, blogs, discussion prompts and other *virtual taskwork*, where students are assigned to a group to share their experiences or engage in the course material with each other (Page, Charteris & Berman, 2020). However, studies suggest that *virtual teamwork* is different from conventional collaborative online learning in that the former involves teams with clear tasks to perform, interdependent members, and shared outcomes. Also, communicating with other members electronically does not transform a group of students into a virtual team (Gibson & Cohen, 2003).

By thematically synthesizing and examining the perceptions of students of their virtual teamwork participation, this study aims to map out the occurring team processes along transition, action and interpersonal dimensions. Following the team processes model developed by Marks, Mathieu and Zaccaro (2001), this study builds on the assumption that virtual teamwork is based on a multiphase and time-based interaction among team members working together to accomplish concrete and shared outcomes.

Literature review

Despite ongoing debates about the degree of virtualness needed in the making of virtual teams, many researchers agree that these teams are functional units whose members meet and work using technology as their primary medium of communication to achieve shared goals (Bell & Kozlowski, 2002). Compared to conventional face-to-face teams, members of virtual teams are not constrained to the same geographic location and can be located anywhere in the world (Montoya-Weiss, Massey & Song, 2001). Members of a virtual team may belong to the same organization but physically dispersed across different geographic locations or may be affiliated with different organisations and work at the same geographic location (Martins, Gilson, & Maynard, 2004).

Virtual teams often have no choice but to communicate electronically in order to perform their tasks and effectively coordinate their activities (Gibson & Cohen, 2003). Therefore, teams whose members are dispersed across different locations must choose optimal technology to replace in-person interaction (Martins, Gilson, & Maynard, 2004). They may use various communication technologies that range in media richness and sophistication (Workman, Kahnweiler & Bommer, 2003), as well as in the degree to which they enable real-time versus asynchronous teamwork (Riopelle et al., 2003).

It is likely for a virtual team to include members from multiple disciplines, functions, organizations, countries, and cultures or to consist of members from the same profession, organization, and culture (Gibson & Cohen, 2003). The greater the geographic distance between the virtual team members as well as their organizational diversity, the higher the likelihood that the team will include members from different professional, cultural and socio-linguistic backgrounds (Chudoba, Wynn, Lu, & Watson-Manheim, 2005).

Being geographically distant, using communication technology and working at different organisations do not make a group of individuals a team. Any team, including a virtual team, needs to have a solid task to perform as well as interdependent members with shared responsibilities and outcomes (Hertel, Geister & Konradt, 2005). Task interdependence occurs when the members of a virtual team need to coordinate their activities regularly so that the input from one member significantly affects the output by other team members (Thompson, 1967). Studies suggest that the higher the level of goal, task and outcome interdependence, the greater the degree of team's motivation, communication, cohesion, and overall effectiveness of teamwork (Hertel, Konradt, & Orlikowski, 2004).

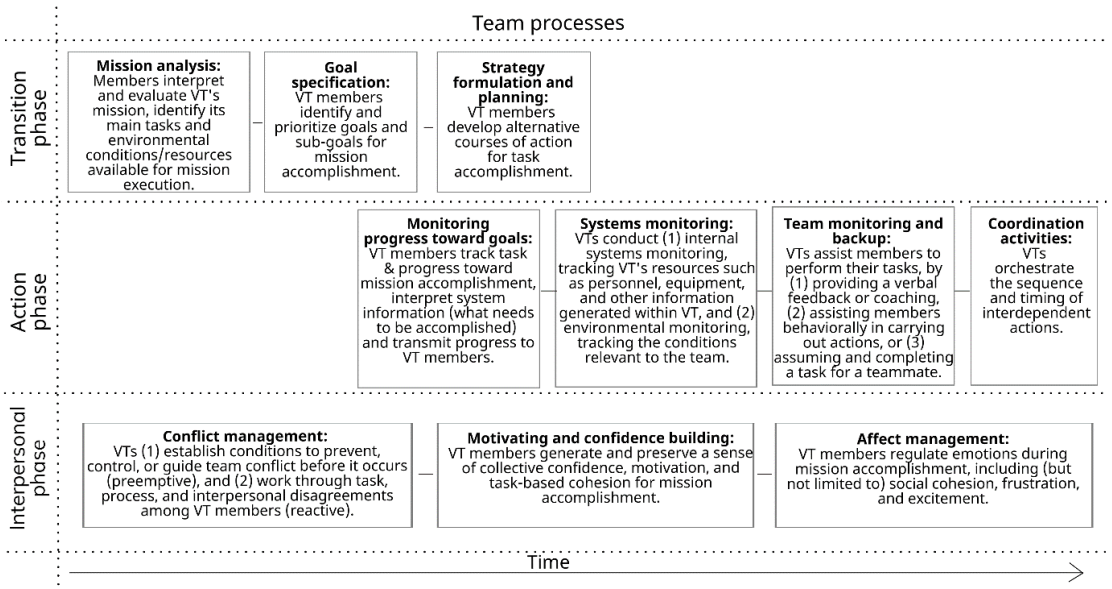

Figure 1: The taxonomy of team processes (adapted from Marks et al 2001)

Previous research on virtual teamwork suggests that virtual teams are complex social entities and many factors determine their functionality and effectiveness (Gibson & Cohen, 2003). The prevailing framework often mentioned in the studies of virtual teams is referred to as input-process-outcome (I-P-O) model (Martins, Gilson, & Maynard, 2004). According to the I-P-O framework, inputs represent the physical and organisational characteristics of a team, including member 'knowledge, skills, abilities and other characteristics' referred to as KSAOs (Krumm et al., 2016) as well as team size, the nature of task performed, the type of communication technology used, and whether or not the members have prior collaborative work experience (Kirkman et al., 2004). Team processes are defined as members' interdependent acts that convert inputs to outcomes through cognitive, verbal, and behavioral activities directed toward organizing taskwork to achieve collective goals, and are inclusive of three distinct

processes: (1) transition, (2) action, and (3) interpersonal (Marks, Mathieu & Zaccaro, 2001)

Virtual teamwork and relationships among its dimensions were extensively studied from the business and organizational perspectives. Also, there is a plethora of studies focusing on virtual collaborative learning and teamwork in the higher educational context, notably in pre-COVID period. However, one can also observe that there has been little research to date on the process-oriented dynamics of virtual teamwork in a multi-university setting. In this study, we aim to address some of these gaps in the literature.

Methodology

The participants in this study included 20 undergraduate students who were enrolled in a milti-university online course in international organizations taught during the summer of 2020. The students were from a humanities-specialized and two technical universities in the Tokyo area which were part of an inter-university agreement allowing their students to attend courses and earn credits outside their respective institutions. The cohort consisted of 14 females (70%) and 6 males (30%). The participants' ages ranged from 19 to 23 years (M = 20.4, SD = 1.3). 17 students (85%) were Japanese and 3 participants were international students from Northern Europe, South-East Asia and East Asia, respectively. The study used virtual ethnography to examine fifteen unique combinations of virtual teams working on three tasks. This qualitative approach allows an in-depth and real-time observation of processes emanating from the recordings of student perceptions. Because "virtual worlds are multi-user in nature and they exist as shared social environments with synchronous communication and interaction" (Boellstorff et al., 2012: 7), virtual ethnographic approach helps to explore broader cultural, social and other dynamics within online media practice.

The primary data were collected through observation and analysis of e-Portfolios created by students during the course using shared Google Docs files. E-portfolio is a personal digital record that contains evidence about one's accomplishments in the form of artifacts and reflection on learning" (Balaban et al., 2013). Qualitative data was coded and analyzed using MAXQDA version 2020 (Figure 2).

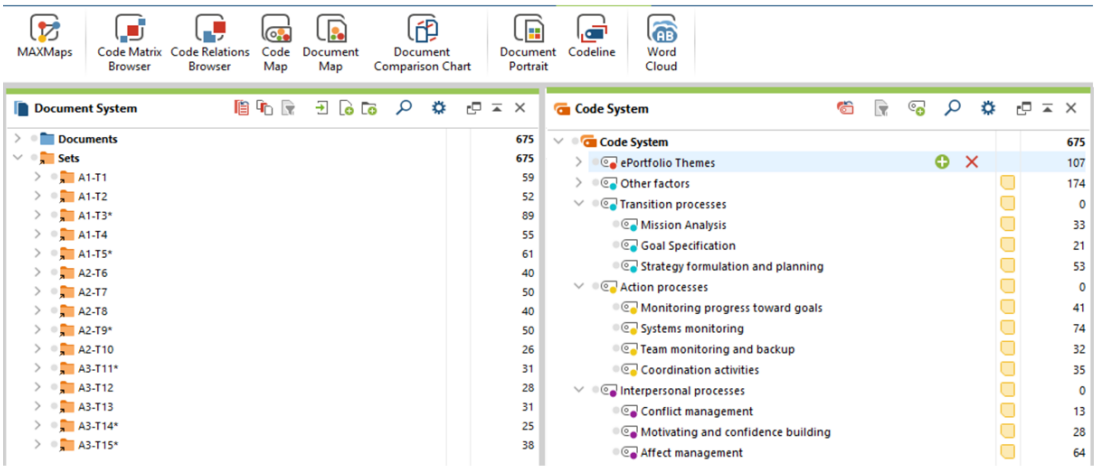

Figure 2: E-Portfolio analysis and coding in MAXQDA Ver.2020

Results

A total of 63 pages of students' e-Portfolio entries related to the three main virtual taskwork have been analysed (Figure 3). Teams 1-5 worked on assignment 1 and their members' entries produced 316 units of meaning related to their teamwork dynamics, whereas teams 6-10 and teams 11-15 worked on assignments 2 and 3, producing 206 and 153 units of meaning, respectively. Twenty e-Portfolios yielded 675 units of meaning in total, from which 394 units (58.4%) have been found to be directly related to team processes.

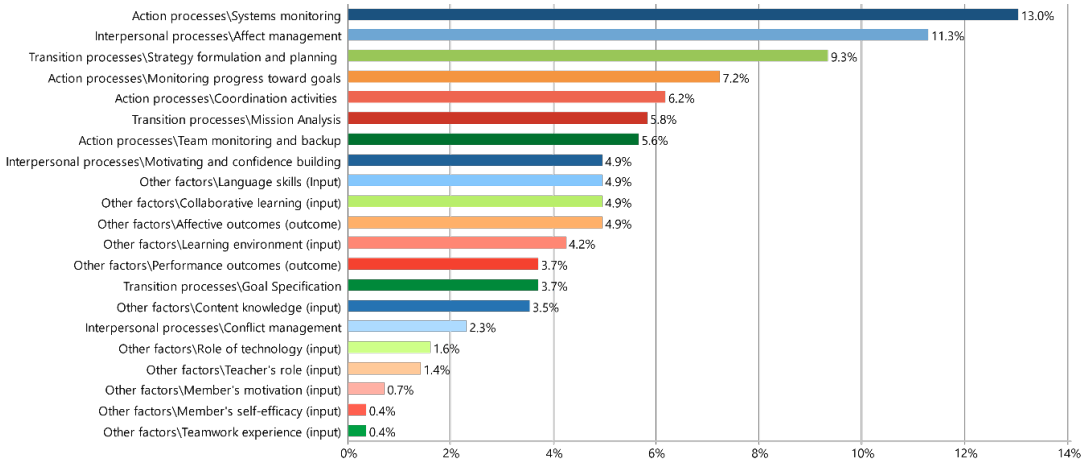

Figure 3: Frequency distribution of themes across e-Portfolios

Analysed e-Portfolio content (Figure 3) indicated that across all Input-Processes-Outcomes (I-P-O) themes, Systems monitoring/Action processes (13.0%), Affect management/ Interpersonal processes (11.3%) and Strategy formulation and planning/ Transition processes (9.3%) have been crucial in invigorating virtual teams toward task accomplishment. In addition, themes related to Action processes, such as Monitoring progress toward goals (7.2%) and Coordination activities (6.2%) have often been highlighted by virtual teams. On the other hand, themes related to Goal specification/Transition processes (3.7%) and Conflict management/Interpersonal processes (2.3%) have been least frequently reflected in data. To various degrees, e-Portfolio data also seem to highlight the role of team inputs (e.g., language skills, collaborative learning, general learning environment, technology, etc.) and outcomes (i.e., affective and performance) during virtual team's task accomplishment.

How do Japanese undergraduate perceive virtual team processes?

Below we provide detailed description and discussion of team processes across fifteen teams (see Figures 4-6).

Mission analysis. Results suggest that several virtual teams, especially those with diverse memberships, have been actively involved in the interpretation and evaluation of their teams' mission. (*Each of our members introduced their articles, and then we decided which one article we would use for our project* [sic]. A1-T3). These teams also attempted, though sometimes unsuccessfully, to identify their main tasks as well as the environmental conditions, available team resources and time constraints (*For a long time we discussed how to present and who should do each part. The problem was that*

we couldn't easily decide on how to perform a puppet or music show on the Zoom [sic]. A2-T6).

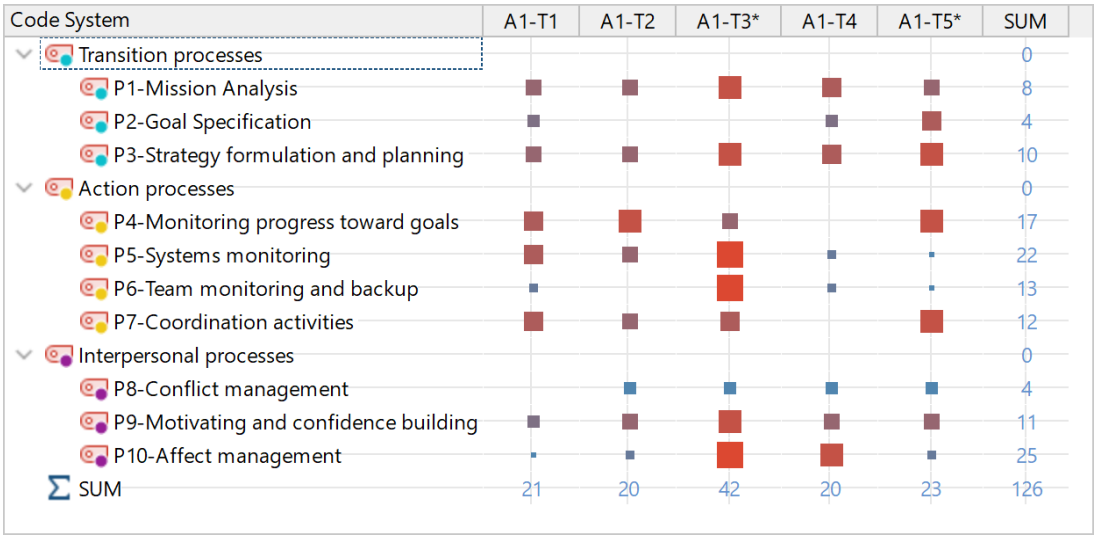

Figure 4: Matrix overview of team processes in virtual teams #1-#5 in MAXQDA

Goal specification. During goal specification process virtual teams sought to identify and prioritize their goals and subgoals for mission accomplishment. E-Portfolio analyses indicate that half of the teams went through this process to develop and assign overall mission goals and subgoals (*We set up several goals, such as a) making the presentation as short as possible, b) using less specialized term, c) using less politics/treaty/agreements, more real-life examples/solutions, d) making it visual, such as using background videos on Zoom, e) doing something different to attract the viewers' attention* [sic]. A2-T9).

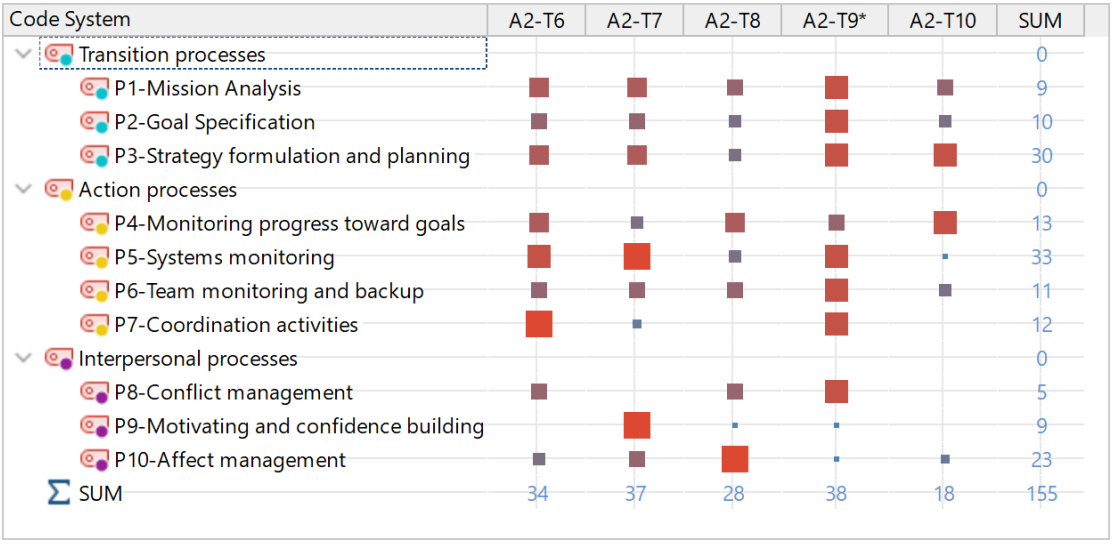

Figure 5: Matrix overview of team processes in virtual teams #6-#10 in MAXQDA

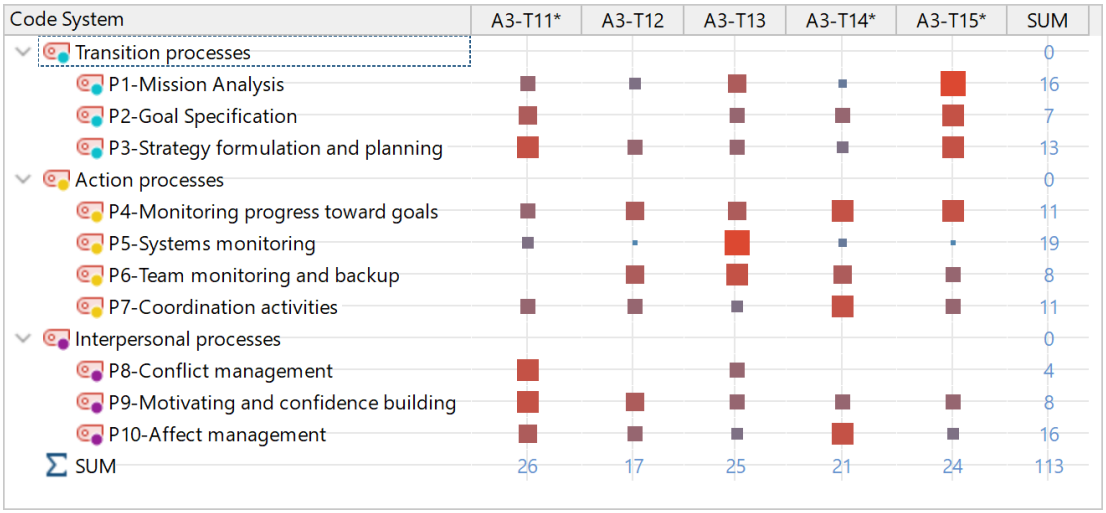

Figure 6: Matrix overview of team processes in virtual teams #11-#15 in MAXQDA

Strategy formulation and planning. E-Portfolio entries suggest that many teams have been active in the formulation of alternative courses of action for mission accomplishment. This process involved decision making about how team members should achieve their missions (*Rather than deciding on the topic through headlines search, we thought it would be efficient first to choose the topic which we were familiar with, and later research it separately and more extensively* [sic]. A1-T5) as well as discussing expectations and relaying of task-related information (*We knew that using the theories to make a presentation would bore the listeners. With this in mind, we decided to make it more like storytelling* [sic]. A2-T10).

Monitoring progress toward goals. We observed that several teams were actively tracking their progress toward mission accomplishment by interpreting the current situation in terms of what needed to be accomplished for goal attainment (*During the group meeting as we all got deeply involved in the lecture's contents and specific examples of organizations, however overall, we were struggling to organize our ideas* [sic]. A2-T12). Some team members tried to provide feedback to their team on its goal accomplishment status so that members could determine their progress and take action if necessary (*We have experienced running out of time during planning and not being able to present the issue properly earlier, so I tried to monitor time and keep the team informed* [sic]. A1-T5).

Systems monitoring. Systems monitoring appears to be the most frequently mentioned process-related characteristic of virtual teamwork in this study. From the data, one could observe that many teams tracked their internal resources and other environmental conditions during taskwork. Some teams focused on internal systems monitoring, by tracking team resources, such as skills, equipment, and other information that was generated within the team (*Fortunately we had good English speakers, so we didn't have any big problems with this assignment. Everything went smoothly* [sic]. A2-T6).

Team monitoring and back up. Team monitoring and backup processes have been observed across many teams. These and other teams witnessed how their members tried to assist each other to perform taskwork by providing verbal feedback or coaching (*Since I have already known about theories of international relations, I explained them*

to other teammates by using simple real-life examples [sic]. Subaru, A1-T1; *Some other members explained clearly by using easy English words* [sic]. A1-T3).

Coordination activities. Coordination activities have been mentioned often in students' e-Portfolios. These statements referred to the handling of synchronous activities and involved information exchange and mutual adjustment of action (*So, first, I asked the team members about any current events they knew or might be interested in, and we all agreed to research about the ban of Tik Tok app in the United States* [sic]. A1-T5). This feature of teamwork seems to be closely connected with the taskwork required of the team (*While we had difficulty with deciding our team's topic, I found news about ASEAN and that was when we finalized our search and started our discussion about ASEAN organisation* [sic]. A1-T1).

Conflict management. Although team members seem to have built constructive and friendly relationships with each other, from e-Portfolios one can nonetheless observe two forms of conflict management processes that were used by some members to mitigate conflict. For instance, some members engaged in pre-emptive conflict management which included establishing conditions to prevent or guide team conflict before it occurred (*When we discussed the presentation format. Everyone suggested ideas about how to do it. I think, at that time, everyone showed interest and listened patiently to each other's suggestions so we could avoid conflict* [sic]. A2-T6).

Motivating and confidence building. Motivating and confidence building occasionally occurred during virtual team interactions. These processes were evident in members' intent to generate and preserve a sense of collective confidence, motivation, and cohesion (*We were always in the good mood, which enabled us to say our own opinions more freely.* [sic] A3-T11*; *But other students participated in the lesson actively, so I was impressed and motivated* [sic]. A1-T4).

Affect management. Affect management was evident during various taskwork when members regulated emotions related to social cohesion (*Despite the ease of online conversation through the screen, talking with others was tense* [sic]. A1-T5*), frustration (*I soon regretted it because there was a lot of research that needed to be done* [sic]. A2-T6), and excitement (*I really enjoyed the groupwork* [sic]. A1-T4).

Implications and Conclusions

The study observed that in the transition processes, virtual teams formulated their mission, specify goals, and strategies to achieve these goals. Previous empirical studies have found that embedded goal-setting structure helped virtual teams achieve stronger collaboration, better team cohesion and commitment as well as better perceived decision quality and more decision alternatives compared to virtual teams without goal-setting structures (Huang, Wei, Watson & Tan, 2003). Researchers also argued that effective virtual teams tend to establish a set of rules that help team members communicate and collaborate productively (Blackburn et al., 2003).

Action processes, on the other hand, could be observed in the degree of coordination, communication, and support among team members, as well as monitoring team's resources and performance (Marks, Mathieu & Zaccaro, 2001). Studies looking into virtual team processes tend to emphasize coordination and communication (Martins,

Gilson & Maynard, 2004), as well as dynamics of engagement, mutual support, and progress monitoring (Costa, Passos & Bakker, 2014).

Interpersonal processes encompassed conflict management, affect, motivation, confidence building and other processes that govern human relationships inside a team (Varela & Mead, 2018). These relationships play an important role in strengthening the team's morale, motivation, trust, and sense of belonging (Blackburn et al., 2003). Some researchers argued that interpersonal processes underlie both the transition and action phase processes (Fisher, 2014). Studies focusing on students' teamwork specifically found that perceptions of improvement in skills and learning, as well as the development of a more positive attitude toward teamwork take place within interpersonal processes (Bravo, Lucia-Palacios & Martin, 2016). In sum, the findings of this study are in line with previous research suggesting that virtual teams are multitasking entities that transition through multiple processes simultaneously and consequentially to achieve team goals.

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The Effectiveness of Online Portfolios for Assessment in Higher Education

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Abstract
The use of online portfolios for both summative and formative assessment is an important part of blended learning. At Queen Mary University of London Engineering School, English Language and Professional Development Planning modules utilised portfolios as one of the ways for formative and summative assessment. Students kept individual and group portfolios throughout the academic year to upload a variety of tasks, including reflections, videos, posters and tasks based on course material from other modules, such as report methodology and results and discussion sections. The teachers provided ongoing feedback on student work to encourage skills development and learner autonomy throughout the semester. A survey was conducted to assess the students' perceptions of online portfolios as part of their learning and development. Despite the initial issues of setting the portfolio, such as lack of familiarity with the software and regular engagement, students identified key academic and transferable skills that had developed and a favourable attitude to portfolios for assessment and learning. Over time, portfolios have additionally proven to be an incredibly valuable way to introduce blended learning to the course. Online portfolio assessment could be widely implemented to a variety of courses or activities and is particularly relevant given the recent move to online learning platforms due to Covid-19.

Keywords: Online Portfolio, Blended Learning, Learner Autonomy, Formative Assessment, Summative Assessment

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Introduction

Queen Mary Engineering School (QMES) is the Joint Educational Institute between Queen Mary University of London (QMUL) and Northwestern Polytechnical University (NPU) in Xi'an, China. The school welcomed its first cohort of students in September 2017. In the 2020/2021 academic year the school had 923 students in total. The programme is delivered in English by QMUL and NPU staff. English Language 1 and English Language 2 are academic language support modules taught to 1st-year students. Professional Development Planning (PDP) 1, PDP 2, PDP 3 are taught to 1st, 2nd, and 3rd-year students. They focus on professional and academic skills. These 5 modules utilised online portfolios for formative and summative assessment both before and during the Covid-19 pandemic. The aim of this paper is to demonstrate how the portfolios were utilised in different modules, present results from student surveys to show what benefits the students thought portfolios brought to their learning and finally to suggest ways portfolios can be adapted to encourage blended learning and diversify formative and summative assessment, particularly given the way Covid-19 has impacted global classrooms.

Summative assessment is administered at the end of a course to determine if students have achieved the objectives set out in the syllabus, whereas formative assessment feeds back into learning and informs the student of their progress throughout a course thus helping them to be a more efficient learner (Harris & McCann, 1994, p28). Formative assessment is aided by feedback given by the teacher or peers. Ongoing, formative feedback helps to develop learning strategies and can have a positive effect on the affective domain and learning outcomes (Yang, 2010). Giving learners "ongoing low-threat objective feedback rather than non-specific numeric evaluations" helps them develop a positive attitude towards errors and an approach to learning which is not focussed solely on grades and results but improving their own competence as well (Allman, 2019, p. 3). This could be particularly valuable in contexts where grades have traditionally been viewed as the most important feedback. Furthermore, Chen and Zhang (2017) suggest that formative assessment may be more beneficial for improving learners' academic English writing ability than summative assessment. Online portfolios (or e-portfolios), which are editable and provide teachers and students with the ability to communicate via comment sections, provide the ideal platform for formative assessment.

Hyland (2006) defines portfolios as:
An assessment method based on a collection of multiple writing samples selected either to showcase a student's most successful texts or to reveal a process of writing development. They can be used to structure writing courses, encourage reflection, and provide more comprehensive and equitable assessment. (p. 315)

Online portfolios are rich tools that allow students to easily share a wide array of tasks with their teacher, enabling formative and summative feedback (Goldsmith, 2007). As well as text-based tasks, they can also be used for graphic and multimedia elements (Lorenzo and Ittelson, 2005). At QMES, a Moodle-based Virtual Learning Environment (VLE) provides the online platform for this (known as QMPlus). Students can collate their work and reflect on their strengths and weaknesses, achieving objectives over the course of the academic year. They provide institutions not only work

to assess but also critical data to plan for curriculum improvements (Miller and Morgaine, 2009) and implement blended learning approaches.

Blended learning is an approach that combines online as well as face-to-face classroom interactions to achieve learning objectives. Blended learning can be implemented to improve students' engagement with learning materials (Mestan, 2019), present more flexible and personalised curricula to cater to different students' needs (Jonker et al., 2018), or to maximise the effectiveness of face-to-face activities (Glazer, 2011, p. 7). Literature reviews (Glazer, 2011, p. 2) have shown that blended learning can result in significantly better student learning compared to a conventional classroom. In QMES's case the teachers were not on campus full time, therefore using online portfolios was one of the ways to allow for meaningful engagement with students when the teachers were away.

Using online portfolios for this purpose requires students to be more autonomous. Autonomous learners are described as having several common attributes that lead to more successful acquisition of the target language. Autonomous language learners can select appropriate and suitable learning methods to be used, determine realistic and reachable goals, monitor their own learning process, and evaluate the progress of their own learning, seeking help when necessary; autonomous learners are active participants in their own learning both inside and outside of the classroom (Ceylan, 2015). Developing reflection and analytical skills are key in increasing learner autonomy (Little, 1996, p. 210) and the use of portfolios provided an excellent platform for the development of these skills. Developing learner autonomy was one of the goals of using online portfolios at QMES.

Recently greater emphasis has been placed within higher education to promote transferable or employability skills to graduating students (Fallows and Steven, 2013, p. 6). The focus on a varied approach to skills means that programmes need to develop to embed transferable skills into the curriculum (Smith and Paton, 2014). Therefore, using online group and individual portfolios in the PDP and English Language modules at QMES can enable students to develop the skills they will need in their future careers. As portfolio use is online, this teaches students valuable computer and technological skills which are not only necessary for the workplace, but also for the blended learning approach that many institutions are taking now since the start of the Covid-19 pandemic. These skills will also afford students the opportunity to engage further in future remote learning through postgraduate study or workplace professional development, as well as enable them to successfully network online, which will enhance their future careers.

Creating a group portfolio where students collate project documents, meeting minutes and agenda forms prepares students for real-life projects and work experience after graduation. This develops students' teamwork, communication, organisation and project management skills, vital for any workplace situation. Individual portfolios engage students with the process of learning through continual addition and development of tasks as well as reflective practice.

Reflection is an important tool for learners at university to help them develop their skills, identify their goals and progress towards their future career. It is usual for students to produce a development plan whilst at university (Head and Johnston, 2012)

and such plans have long been part of higher education (Clegg and Bradley, 2006). However, in PDP modules at QMES, students are encouraged to reflect on tasks they have completed using Gibbs' reflective cycle (Gibbs, 1998) rather than simply producing a plan. This enables students to deeply connect with their learning by identifying aspects they performed well in, which should be replicated in future tasks, or areas where improvement is needed. This reflection is further developed in the English Language modules where students use SMART planning to set goals and reflect on their progress. This two-pronged approach gives ownership of development to the student as a continual process of reflection and goal setting can enable students to progress more rapidly. Head and Johnston (2012) argue that reflection can be something that learners have difficulty with as they do not see its value in relation to their studies. They further mention that reflection takes time, and often learners have difficulty with time management. Therefore, learners want to spend time on the subjects they feel are most relevant to them; mostly discipline-specific content. This, combined with the perceived lack of value, can lead learners to dismiss the usefulness of reflection and therefore engage only when it is necessary, for example, for assessment (Hearn, 2007). Struyven, Dochy and Janssens (2005) discuss the need for innovative, summative assessment that students now require. Portfolios fit this requirement, and if they provide authentic tasks and prepare students for the workplace, students will prefer this as a form of assessment (Struyven et al., ibid).

Materials and Methods

Portfolio Tasks

QMPlus provides a platform for students to upload a variety of written and spoken tasks, including setting and reflecting on SMART goals, critical thinking tasks, writing reports, recording short monologues, uploading PDFs of posters, and project management and agenda forms. The combination of formative and summative assessment means students receive formative feedback throughout the semester on specific tasks as well as feedback on their whole portfolio, and a summative, final grade on the portfolio at the end of the semester or the year. Another benefit is the flexibility of using a portfolio assignment over the duration of an academic year or one semester or for specific projects only (as with PDP).

English Language and PDP portfolios constitute approximately 50% of the student's final grade, with the remainder being used for more extensive, summative assignments such as presentations or written case studies. Variety in assessment type offers students more opportunity to display their knowledge and ability in the subject (Ramsden, 2003).

Survey

The survey consisted of 10 questions assessing using the portfolio, skills developed, feedback on tasks, range of tasks and effectiveness of the portfolio. Most of the questions were multiple-choice, but there was also an opportunity for students to rate questions and to give their own opinions.

The questionnaire was disseminated to year 2, 3 and 4 students who had experience of using the portfolio in different subjects and for the full range of tasks. 110 students completed the survey, most of which were third-year students.

Results

When assessing the challenges of the portfolio, two-thirds of students reported the major challenge being the speed of the Internet. Familiarity with this new type of learning tool was rated as a challenge by 15% of students. However, 12% of respondents registered no challenges with using online portfolios. After using the portfolio for 6 months, figure 1 shows that 38% of students believed the challenges of using the portfolio remained the same, 40% reported the challenges improved slightly and 16% believed there was a significant improvement.

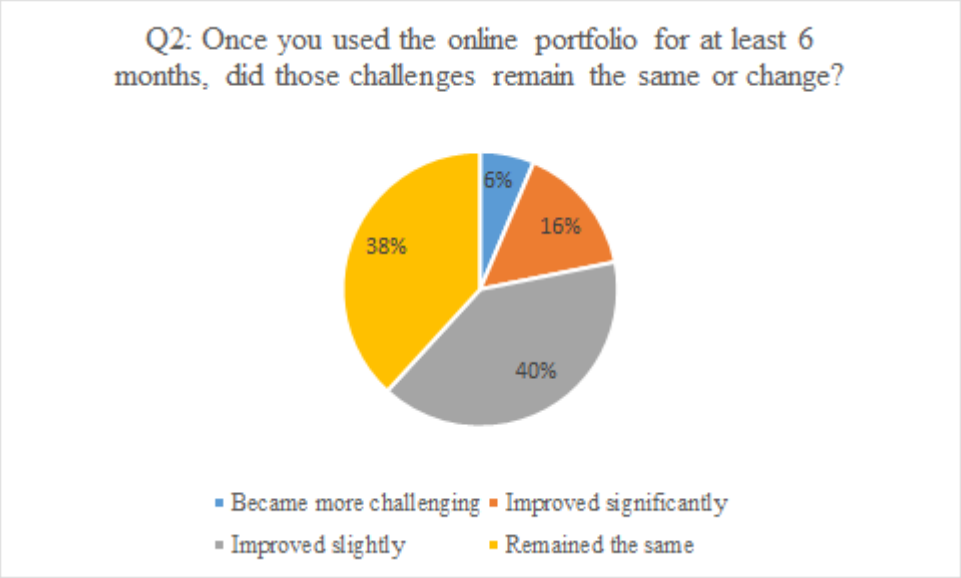

Figure 1: Question 2, Improvement of Challenges When Using the Portfolio

Figure 2 shows that 67.9% of students surveyed agreed or strongly agreed that using the portfolio had been valuable for their learning.

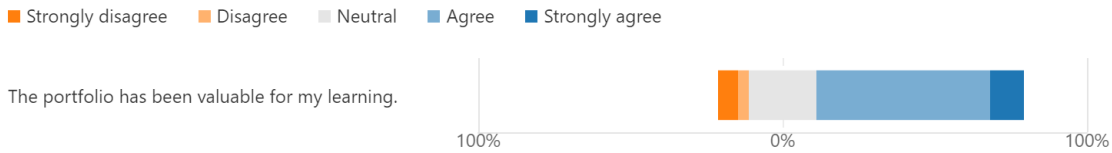

Figure 2: Question 3, the Value of the Portfolio Towards Learning

In terms of skills development, figure 3 shows that students believed their academic writing, reflection and organisation skills were the most developed, with learner autonomy, IT skills and language fluency being the least developed from using the portfolio.

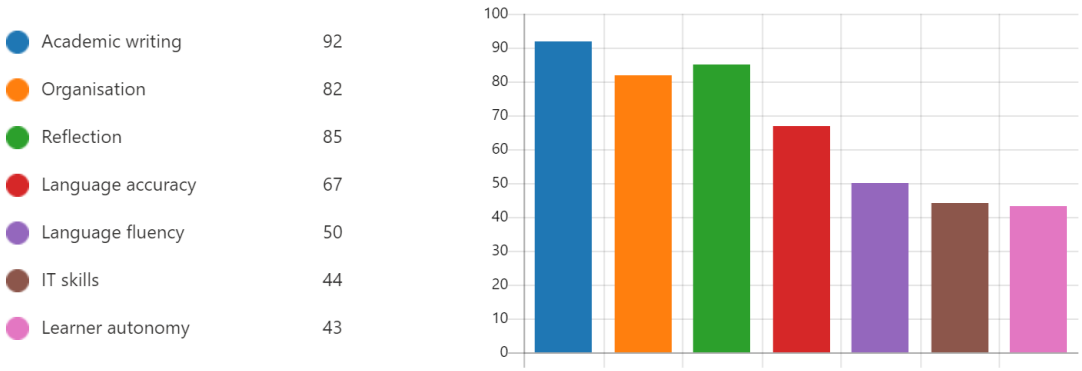

Figure 3: Question 4, Skills Development

Feedback on the work on the portfolio was left as comments by teachers for the students to see. Figure 4 shows that 94% of students found the feedback very useful or somewhat useful.

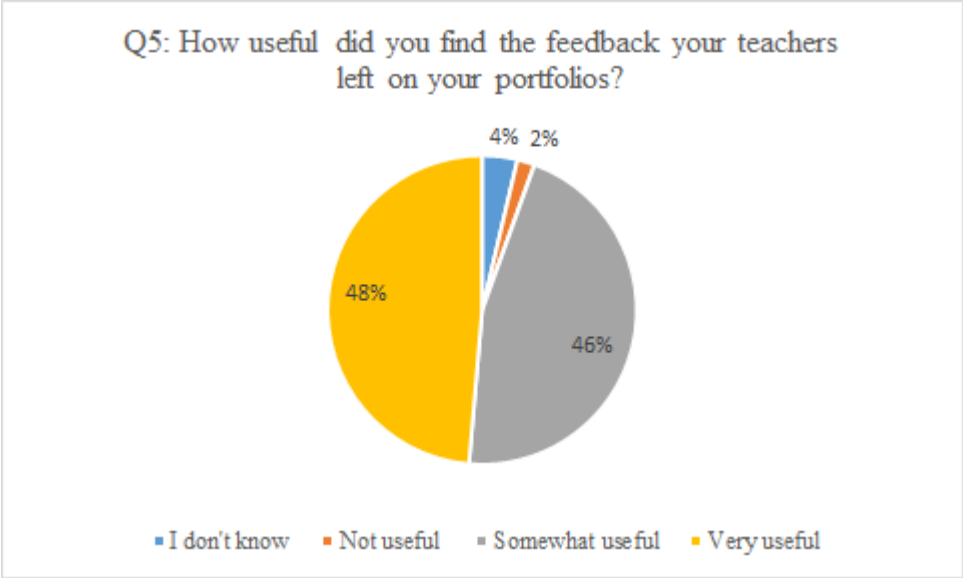

Figure 4: Question 5, Usefulness Of Feedback

Figure 5 shows that feedback was used by students with 91% of students using the feedback to some degree. 21% of students always used the feedback, 39% often used the feedback and 31% sometimes used the feedback.

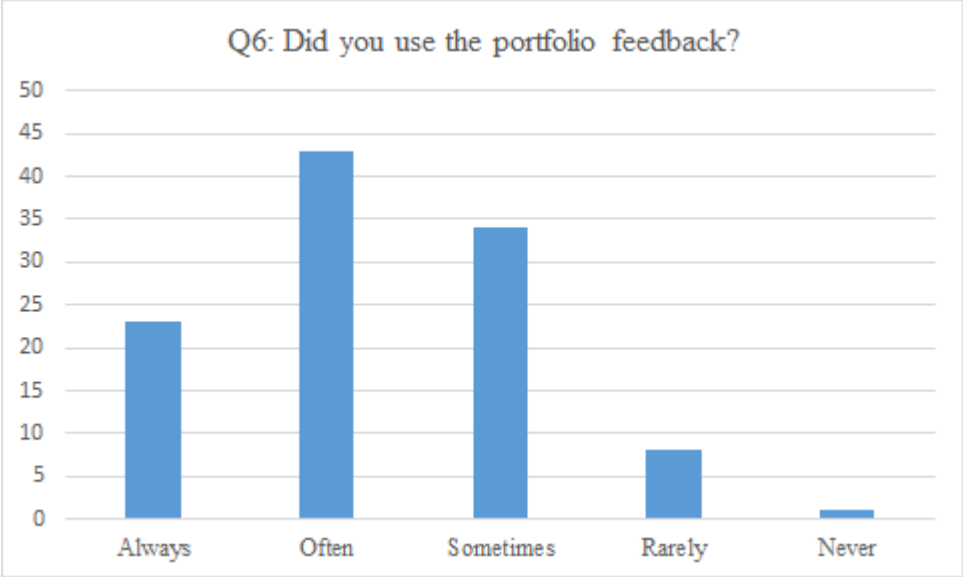

Figure 5: Question 6, Use of Feedback

The feedback was used by students to improve on and edit their current portfolio work (48%), to identify errors and improve future work (10%), or to identify where their skills and abilities needed to improve (20%). Some students also shared their feedback to gain insights from their peers (4%) or simply reflected themselves (9%).

The portfolios were used for a range of tasks and students identified report writing practice and reflection being the most useful as can be seen in figure 6. 47.3% of students found both report writing practice and reflection very useful and 48.2% and 44.5% identified each task as somewhat useful respectively. Videos had the highest percentage of students identifying them as not useful or not at all useful (13% in total).

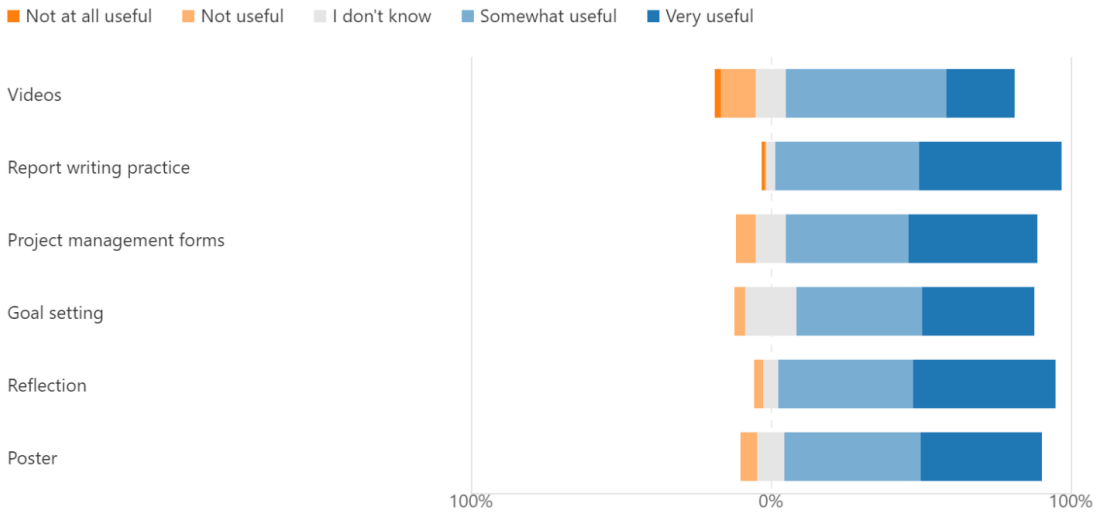

Figure 6: Question 9, Range of Tasks

Overall, students surveyed rated the effectiveness of portfolios as an assessment tool as 4.14 out 5, and when asked if using the portfolio had prepared them for further study as distance learning in light of the Covid-19 pandemic, 78% agreed or strongly agreed as can be seen in figure 7.

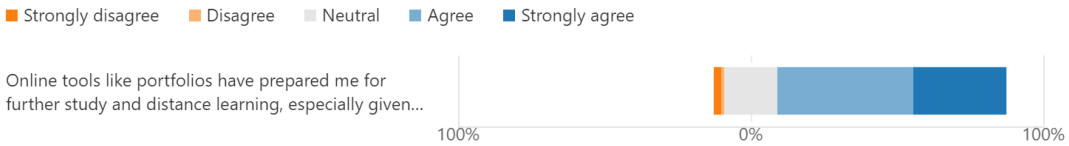

Figure 7: Question 10, Preparation for Online Learning

Discussion and Broader Applications

The results indicate an overall positive view of using portfolios in terms of skills development, range of tasks, feedback, and effectiveness of the portfolio, with the only significant negative being the internet connection, which was out of the teacher's control.

The use of an online tool was a new experience for students, and for some it was challenging. Training was given to the students in how to use and interact with QMPlus and the wide range of tools this learning platform offers. Training is important for students, so they are fully able to interact with, participate in and gain from activities, tools and even feedback (Harmer, 2007, p. 149). At QMES it was found that once students had been trained in using this new tool, students were able to use the online portfolio with ease. Some students have even flourished in their use of the portfolio, making their online record truly their own by adding pictures, links and developing a page that aids readability for the audience.

As the portfolio is primarily a written form of assessment, it is not surprising to see students assessing their academic writing and organisation skills developing well. A study by Romova and Andrew (2011) discussed the improvement in the writing skills of students when given the opportunity to draft and rework their writing by using a portfolio, in addition to teacher feedback. Whilst similar in nature, the present study uses portfolios that are online which allows for continual improvement and feedback, rather than at prescriptive times as in Romova and Andrew's study.

Reflection is also a key skill that students identified as improving and this is supported in the literature. Farahian, Avarzamani and Rajabi (2020) found in their study that portfolios improve students' reflective ability; however, they do note that time is needed to improve critical reflection. Students may have an advantage at QMES as they are actively taught what critical reflection is and given multiple opportunities to practise this throughout their modules.

The results also show that students identify IT skills, language fluency and learner autonomy as least developed skills. IT skills should have been developed due to the online portfolio being a new tool that students were unfamiliar with. The ease of the tool use and the fact that students are given training on how to use the portfolio is likely to lead to this lower perceived development. Language fluency may also be seen by students as something that is more developed in oral communication, which usually takes place within the classroom. As there is limited opportunity to practise oral skills on the portfolio, this could be the reason for this belief. From observations by teachers of portfolio use and the work produced within the portfolio, clearly learner autonomy has increased. However, the students did not feel this way. This raises the question as to whether students fully understood what learner autonomy meant, and this is something that would require further investigation.

Students provided positive responses about using their feedback and identified most tasks as useful. Using online platforms for learning provides many benefits, one of them being the ease of providing and using formative feedback (Carrier, 2017; Fernando, 2018). As Wingate (2006) summarised, teaching writing is most effective when it is an incremental process that receives regular feedback and portfolios provide an excellent platform to execute that. It also allows the teacher to easily track their students' work over an extended period, provide detailed feedback when convenient, and clearly see how the student has progressed. The researchers believe that this is the reason that students found most tasks beneficial – they were able to improve each task and see the effects of long-term development clearly. The only exception, the video, was reported as less useful than other tasks. This might be because of technical difficulties in filming the video or because the students felt that a monologue was less valuable than a meaningful conversation or a presentation in class or because the improvement was not as clear as with other writing-based tasks.

From this research, several broader applications could be considered and implemented in other modules. Firstly, due to the easily accessible format and availability of feedback, portfolios could be used to develop writing as a process for full pieces of coursework, for example, case studies or reports, instead of individual tasks. Portfolios could be used to stage the coursework, for example, by adding the plan then different sections such as introduction, literature review and so on, with feedback being added, enabling students to redraft their work before final submission. This would also be effective for distance learning, especially for those in different time zones. The ease of access for the teacher and student would enable continuous drafting and feedback to take place.

Portfolios could also be used in project-based learning. In QMES, the Materials Library project uses the online portfolio to create websites by creating collections of portfolio pages. Pedagogically this enabled students to upgrade their abilities with a tool they were familiar with, whilst focussing on the project outcomes (Nightingale and Spowage, 2021). This type of innovation allows students to develop the important technical/software skills that employers require, especially within ever-changing industries (Andreea and Bucur, 2020) as well as maintain the essence of a portfolio which is a collection of summative work created and developed by students.

Conclusions

This paper presented an overview of how online portfolios were used in QMES. The paper presented results from the student survey about the usefulness of the portfolios.

Overall, the results show that students had positive attitudes towards portfolio use, indicating that they have developed several useful, transferable skills, in addition to improving their academic writing skills. This is especially encouraging given the effect Covid-19 has had on higher education worldwide. The findings of this research encourage the use of online portfolios as part of blended learning and online courses to enhance activities out of class and provide students with a variety of tasks to encourage learner autonomy.

From the teacher's perspective, students engage well with online portfolios and provided adequate training is given when using a new tool, there are limited issues

overall. The internet connection was an issue in this study due to the use of a foreign learning platform in China. However, other online platforms with similar functionality to the Moodle platform used here could be used to implement an approach like this to provide accessibility to all.

The research clearly advocates that online portfolios are valuable tools and therefore could be used to facilitate other tasks in other modules. Given the flexibility the online portfolio offers, any number of tasks, from shorter tasks likes reflections to larger projects like case studies, could be transferred into this format. This not only gives the student a wider-ranging academic experience, but also enhances the provision of resources for online learning.

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Factors Predicting Doctoral Students' Future Career Perspectives: An Initial Look into the Role of Academic Identities

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Abstract
Increased competition of universities in Taiwan has promoted the adaptation of neo-liberal management practices within institutions. These changes have altered the career outlook of faculty from a more *single focus* into a *multi-role* perspective. This continuing role conflicts have created the misalignment of academic identity and blurring of work ideologies. Within the aspects of doctoral education, currently a decreasing trend in number of enrollments and graduation rates are seen. This is in part caused by the outgoing mobility of graduate students and the perceived difficulties in securing a job for post-graduate degree holders. As doctoral students are crucial to the future of Taiwan academia, understanding how their career perspectives are shaped is of the utmost importance. To analyzed the doctoral students' career inclination, a survey containing their perceived importance with regards to interactions with their mentor, classmates, course design, and together with their perceived self-efficacies are collected. A total of 94 doctoral students from the two comprehensive universities in Taiwan are surveyed. Regression results show that academic identity inclined towards *research only* career is highly dependent on doctoral students' coping facilitations, while *teaching only* career is best determined by their mentors' provision of career opportunities, and the teaching and management oriented courses. More important, results show that a *dual perspective* academic identity is highly significant with the doctoral students' mentor provision of career opportunities. These findings suggest that doctoral students' future career are highly shaped by their experiences with their course undertaking and quality of interactions with their mentors.

Keywords: Higher Education, Academic Identity, Changing Academic Profession, Neoliberal Management Practices, Research Teaching Nexus

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Introduction

Competition among universities around the world is not new (Marginson, 2004; Portnoi et al., 2010). Many have attributed the rise in higher education competitions due to the importance placed on global university rankings (Grewal et al., 2008; Hazelkorn, 2011; Lynch, 2014). These competitions within higher education institutions have all contributed to the changes within university governance (Giroux, 2002, 2010; Olssen & Peters, 2005), which has also impacted the Taiwan academia (Chang et al., 2009; Chou, 2014; Chou & Ching, 2012; Mok, 2014).

Currently, higher education institutions in Taiwan are faced with challenges brought about by the many facets of globalization and internationalization (Mok, 2000, 2003) and together with the drive for institutional quality (Hou et al., 2018). These challenges have ultimately pushed for the adaptation of the neo-liberal management policies (Chou, 2008). Besides the changes within the financial management of higher education institutions (Jacob et al., 2018), numerous policy measures are in-placed to reflect the need for cross-strait exchanges (Chou & Ching, 2020), internationalization (Chang, 2015), and the pursuit for academic excellence (Hou, 2012; Hou et al., 2020). Ultimately, these changes within university governance all over the world have altogether altered the career outlook of faculty from a more ***single*** focus into a ***multi-role*** perspective (Vera et al., 2010), which is quite similar to what is happening in Taiwan (Hu et al., 2018).

Within the aspects of graduate education, a report from the Taiwan Ministry of Education shows that the current and projected number of graduate students (including both from the masteral and doctoral programs) is decreasing (Ministry of Education, 2017). Records have shown that there is a gradual drop of around 33% enrolments for the past decade (Chou et al., 2016). While a projected decreased of more than 3,000 doctoral and 38,000 masteral students will be seen over the next ten years. This is in part caused by the outgoing mobility of graduate students; an urged to get a degree outside Taiwan (Hsu & Lin, 2019) and also the perceived difficulties in securing a job for post-graduate degree holders (Chang & Shaw, 2016; Yang & White, 2016).

In reality, doctoral education world-wide has been undergoing various difficulties and challenges (Andres et al., 2015; Nerad, 2004). The previous notion of the purpose of a doctoral education, which is to have a *career in academics* is already changing (Nerad, 2009). A report published with regards to doctoral graduates in Europe mentioned that there are many possible careers in the industries, government, consultancy, and many other related organizations (Hasgall et al., 2019). Altogether, these circumstances have affected the essence and purpose of doctoral education not only in Taiwan, but also elsewhere around the world.

As doctoral students are crucial to the future of Taiwan academia, understanding how their career perspectives are shaped is of the utmost importance. Hence, the current study shall present the findings of an analysis of the doctoral students' career inclination in Taiwan. In addition, the study also seeks to determine the role played by the perceived importance of doctoral students' interactions with their mentor, classmates, and overall course (graduate program) design and their contribution to the development of academic identities. In essence, as *academic identities* are assumed to

be instrumental to the doctoral students' future career. Clear understanding on how identities are formed is paramount for further graduate program enhancement.

The Inner Workings of Academic Identity

Academic identity is a complex and constantly shifting issue, to an extent that it might be different for each individual scholar (Quigley, 2011). Identity is said to encompass a set of characteristics that define individuals (Bailey, 2003). Within psychology, identity is comparable to self-image, self-esteem, and individuality (Vasile, 2011, p. 1826). Besides being *unique*, identity also pertains to *self*, more specifically within the aspects of self-development (Beaumont, 2009). This process of self-development is closely related to what Maslow (1954) noted as the actualization of one's potential. This self-actualization is said to be correlated with an individual's sense of *fulfillment* (Ivtzan et al., 2013) and *security* (Otway & Carnelley, 2013). Furthermore, various psychological processes such as the individual's sense of appreciation, connectedness, competence, commitment, and future career path are proven to contribute to one's identity formation (van Lankveld et al., 2017). In addition, the construction of such identity is also highly anchored in the perceived *moral value* of the profession (Fitzmaurice, 2013). Hence, identity can generally be noted as to an individual's unique characteristic that strives towards fulfillment and self-actualization.

To obtain a sense of fulfillment and self-actualization, faculty should not be force but rather motivated (Han et al., 2016). Since the early 19th century, the traditional higher education follows the Humboldtian model, wherein faculty are mostly free to involved in more or less with either discipline-focused research, teaching-related activities, and/or university or community service (Pritchard, 2004). This freedom has enabled faculty to do what they want and are quite satisfied with what they do (Johnsrud & Rosser, 2002). During those days, academic identity is quite simple; faculty will just have to choose from the three academic missions. However, as global higher education evolves, academic identities based on these three academic missions have now become in constant tension (Altbach et al., 2010; Billot & King, 2015). Currently, faculty has to conform to the needs of the university, more specifically; academic identity is now being shift to a particular direction that the university emphasizes (Flecknoe et al., 2017), which inevitably causes stress.

This shift in academic identity is due to the change in university priorities brought upon by the need to perform whether for quality audits and/or university rankings (Altbach et al., 2010). For instance, university performance indicators have now placed greater emphasis on research outputs, hence, the research teaching nexus is more inclined towards a research focus academic identity (Bexley et al., 2013). Although having a research inclined faculty is not bad, since, students can also benefit from the exposure and participation with the research process, while also benefiting from the research findings (Prince et al., 2007; Seymour et al., 2004). However, this phenomenon has created a bias for the recruitment of research-intensive academics (Hajdarpasic et al., 2015), which is again stressful and abnormal for the norm of the academe.

In the other end of the spectrum, the global massification of higher education has also change the learning environment, which poses further demands on the academic workforce (Flecknoe et al., 2017). This phenomenon has opened up the opportunity

for the *identity struggles* between the competing demands for academic teaching and research (Skelton, 2012). For instance, in order for institutions in the United Kingdom to cope with the demand of the expanding academic workforce, introduction of new academic positions are being structured (Fanghanel, 2012). Parallel with universities in Australia, in order to address similar issues, an education focused academic category was introduced (Probert, 2013). However, this type of career position is often characterized by heavy and repetitive teaching loads, which is actually seen by some as a sort of *punishment* (Leisyte et al., 2009). Similarly in Taiwan, a teaching only contractual position is used to supplement the needed academic hours (Ministry of Labor, 2014). In reality, such transition from a scholarly discipline and academic freedom to a stressful constraint is potentially harmful for an individual's *self-esteem* and *sense of identity* (Simmons et al., 2013), hence, the struggling of one's academic identity occurs.

Methodology

To understand how doctoral students' career perspectives are shaped, the current study utilized a quantitative survey to collect the perceived importance on the various interactions with mentor (adviser), classmates, and overall course design. The proposed Doctoral Students' Experience Survey (**DSES**) is composed of the three dimensions of doctoral students' experiences with their mentor (12 items), experiences within their intellectual community (classmates) (10 items), and the doctoral students' curricular engagement (26 items) (Anderson et al., 2013; Shin et al., 2018), and together with a doctoral student self-efficacy inventory (18 items) (Chen et al., 2001; Laurencelle & Scanlan, 2018; Scherbaum et al., 2006; Vera et al., 2011). In addition, key questions regarding their perceived career inclinations were also collected together with some background information (Weisberg et al., 1996). Data collection used a five-point Likert (1932) type scale weighted from 5 to 1 respectively (very high importance, important, neither important or not, low importance, very low importance).

Data was collected from 94 doctoral students within the social science field, studying at two comprehensive universities in Taiwan. Among the 94 participants, 52 (55%) are male students, while 42 (45%) are female. Average age of participants is 41 years old. Data collected where analyzed using exploratory factor analysis for the latent concepts within the dimensions, computation for the mean and standard deviation (SD) of the factors, and multiple regression for the perceived predictors of the different academic identities. Overall Cronbach (1951) Alpha (α) reliability of the survey is computed at .96 exhibiting high reliable results (Cohen et al., 2007).

Results and Discussions

For the doctoral students' experiences with their mentor (**DEM**), two items were deleted due to low factor loadings (Costello & Osborne, 2005). DEM consists of three factors, namely: *quality advising* (5 items with α=.82; *M*=4.55, *SD*=0.53), *career opportunities* (3 items with α=.81; *M*=3.59, *SD*=0.99), and *genuine concern* (2 items with α=.82; *M*=4.18, *SD*=0.67). Overall α of the DEM is computed at .85 with a mean of 4.11 and *SD* equal to 0.56.

While for the doctoral students' experiences with their intellectual community (**DEC**) or classmates, two factors were extracted, namely: *mutual professional growth* (5 items with α=.82; *M*=4.14, *SD*=0.68) and *support building* (5 items with α=.85; *M*=4.23, *SD*=0.62). Overall α of the DEC is computed at .88 with a mean of 4.19 and *SD* equal to 0.58.

Lastly, for the doctoral students' experiences with their studies (**DES**) or curricular engagement, 3 items were removed due to low factor loadings (Costello & Osborne, 2005), then after four factors were extracted, namely: *management oriented* (9 items with α=.91; *M*=3.90, *SD*=0.70), *teaching oriented* (5 items with α=.85; *M*=3.70, *SD*=0.84), *research oriented* (4 items with α=.84; *M*=4.49, *SD*=0.53), and *business oriented* (5 items with α=.82; *M*=4.01, *SD*=0.73). Overall α of the DES is computed at .95 with a mean of 4.02. In general, all of the α values (.81 to .91) are within the acceptable limits (Cohen et al., 2007).

As for the doctoral students' self-efficacy (**EFF**), 1 item was removed and three factors were extracted, namely: *research inclined* (7 items with α=.93; *M*=4.35, *SD*=0.68), *coping facilitation* (6 items with α=.86; *M*=3.99, *SD*=0.76), and *teaching inclined* (4 items with α=.85; *M*=4.14, *SD*=0.75). Overall α of the EFF is computed at .95 with a mean of 4.16 and *SD* of equal to 0.65. Similarly, all of the α values (.85 to .93) of the EFF factors are within the acceptable limits (Cohen et al., 2007). Tables 1 to 4 show the various items, means, and *SD*s of the DSES.

Table 1. *Descriptive of the DEM factors and items (N=94)*

Factors/Items	Mean	SD
Quality advising (α = .82)	4.55	0.53
Provides guidance toward degree completion	4.57	0.71
Provides constructive feedback on my dissertation	4.63	0.66
Gives feedback on my dissertation in a timely manner	4.29	0.83
Provides advice on my research	4.65	0.54
Helped me clarify my research topic	4.62	0.71
Career opportunity (α = .81)	3.59	0.99
Promotes my development as a researcher	3.88	0.93
Promotes my development as a teacher	3.45	1.14
Promotes my development as a scholar	3.84	1.11
Genuine concern (α = .81)	4.18	0.67
Shows enthusiasm for my research topic	4.27	0.82
Considers my personal circumstances	4.10	0.83
DEM mean	4.11	0.56

Table 2. *Descriptive of the DEC factors and items (N=94)*

Factors/Items	Mean	SD
Mutual professional growth (α = .82)	4.14	0.68
Shares intellectual resources	4.33	0.80
Shares opportunities for professional advancement	4.28	0.80
Helps develop professional relationships with others	4.21	0.83
Shares opportunities for scholarship development	4.18	0.87
Shares information regarding financial scholarship	3.72	1.13
Support building (α = .85)	4.23	0.62
Engages in the lively exchange of ideas	4.32	0.74

Values intellectual contribution from new members		4.38	0.71
Nurtures its members' intellectual curiosity		4.19	0.79
Is large enough for members to learn from each other		4.17	0.86
Provide guidance and support for new classmates		4.11	0.82
	DEC mean	4.19	0.58

Table 3. *Descriptive of the DES factors and items (N=94)*

Factors/Items	Mean	SD
Management oriented (α = .91)	3.90	0.70
Collaborate and work with others	4.01	0.94
Expand my professional network	4.09	0.89
Enhance my career planning skills	3.90	0.95
Enhance my communication skills	4.11	0.85
Develop my research grant writing skills	4.28	0.79
Enhance my leadership potential	3.69	0.96
Better understand the purpose of higher education	3.78	0.99
Participate in policy making process	3.66	0.96
Develop my negotiation skills	3.58	0.98
Teaching oriented (α = .85)	3.70	0.84
Practice my teaching skills	3.70	1.04
Understand the ethical norms	4.06	0.87
Better understand my school's mission	3.31	1.22
Develop my institutional citizenship	3.47	1.14
Develop ethics and integrity	3.97	0.96
Research oriented (α = .84)	4.49	0.53
Learn adequate research methodology techniques	4.51	0.65
Understand theoretical knowledge	4.48	0.67
Build my publication skills	4.51	0.62
Build my presentation skills	4.44	0.65
Business oriented (α = .82)	4.01	0.73
Develop my problem solving skills	4.29	0.90
Balance my priorities	4.10	0.98
Motivate for lifelong learning	4.16	0.86
Become creative	4.28	0.80
Understand how to become an entrepreneur	3.22	1.21
DES mean	4.02	0.59

Within the doctoral education, experiences whether academic with their studies or mentorship with their advisers are all considered important factors of the process (Areesophonpichet, 2013; Chung et al., 2018; Syed, 2020). Hence, for the relationship between the doctoral students' experiences and self-efficacies with their preferred future career academic identity, several multiple regressions were accomplished.

Teaching only career academic identity - Regression results revealed significant prediction for the doctoral students' academic identity inclined towards ***teaching only*** career with $F(4, 88)=10.01$, $p=.000$. R^2 for the model was .31, and adjusted R^2 was .28. Table 5 shows the unstandardized regression coefficients (B), intercept, standardized regression coefficients (Beta), *t* values, and confidence intervals. With regards to the individual relationships between the independent variables, **career opportunity**

(*t*=3.68, *p*=.000), **teaching oriented** (*t*=3.41, *p*=.001), **management oriented** (*t*=-2.85, *p*=.005), and **coping facilitation** (*t*=2.25, *p*=.027) each significantly predicted *teaching only* career. Denoting that doctoral students' tendency to pursue faculty only career are much related to their mentors provision of career opportunities, teaching oriented curricular engagements, and coping facilitation efficacies. While management oriented courses tend to diminish the students' perceived teaching only career intentions.

Table 4. *Descriptive of the EFF factors and items (N=94)*

Factors/Items	Mean	SD
Research inclined (α = .93)	4.35	0.68
Carry out a research study	4.48	0.70
Write manuscript for peer-reviewed publication	4.35	0.76
Apply expertise in addressing practical problems	4.39	0.82
Work collaboratively with other scholars	4.15	0.88
Realize that there are things that I don't know	4.29	0.89
Have the intelligence to complete the degree	4.38	0.81
Finish what I started	4.38	0.87
Coping facilitation (α = .86)	3.99	0.76
Cope with the competing demands from work, study, and home	3.97	1.01
Surpass difficult moments in life	3.76	1.17
Cope with the hours needed in studying	4.01	0.93
Develop a passion and desire for learning	4.24	0.92
Get good grades	3.79	0.98
Have the support of my family and friends	4.20	0.91
Teaching inclined (α = .85)	4.14	0.75
Teach disciplinary knowledge to undergraduate students	4.28	0.87
Transmit knowledge to a group of students	4.23	0.84
Communicate with students of different competencies and characteristics	4.28	0.85
Carry out administrative management tasks	3.79	1.05
EFF mean	4.16	0.65

Research only career academic identity - Regression results also showed that there is a significant prediction for the doctoral students' academic identity inclined towards ***research only*** career with $F(1, 91)=5.81$, $p=.018$. R^2 for the model was .60, and adjusted R^2 was .50. Table 6 shows the unstandardized regression coefficients (B), intercept, standardized regression coefficients (Beta), *t* values, and confidence intervals. With regards to the individual relationships between the independent variables, only **coping facilitation** (*t*=2.41, *p*=.018) significantly predicted *research only* career. Signifying that *research only* career is highly dependent on doctoral students' coping facilitations. This finding is quite interesting, wherein it signifies that a research intensive career is quite challenging. Similar to a recent study within Hong Kong doctoral students, Taiwan graduate students also experiences various contextual challenges that exists within a highly competitive environment (Tan, 2017; Teng, 2020).

Dual track academic identity - Lastly, regression results showed that there is also a significant prediction for the doctoral students' academic identity inclined towards a ***dual*** (combination of teaching and research) track career with $F(1, 91)=13.68$, $p=.000$.

R^2 for the model was .13, and adjusted R^2 was .12. Table 7 shows the unstandardized regression coefficients (B), intercept, standardized regression coefficients (Beta), *t* values, and confidence intervals. With regards to the individual relationships between the independent variables, only **career opportunity** (t=3.70, p=.000) significantly predicted *dual perspective* academic identity career. Hence, results show that a *dual perspective* academic identity is highly significant with the doctoral students' mentor provisions of career opportunities. This finding is similar in some ways with the teaching career only academic identity, wherein mentor's provision of career opportunities tends to shape whether the doctoral student would develop a future career in research, teaching, or both.

Table 5. *Multiple regressions analysis for teaching only career identity (N=94)*

Factors	B	SE	Beta	*t*	*p*	95% CI	
						LB	UB
Constant	0.65	0.78				-0.90	2.19
Career opportunity	0.46	0.12	.352	3.68	.000	0.21	0.70
Teaching oriented	0.75	0.22	.495	3.41	.001	0.32	1.19
Management oriented	-0.76	0.27	-.416	-2.85	.005	-1.28	-0.23
Coping facilitation	0.36	0.16	.215	2.25	.027	0.04	0.68

Table 6. *Multiple regressions analysis for research only career identity (N=94)*

Factors	B	SE	Beta	*t*	*p*	95% CI	
						LB	UB
Constant	1.96	0.65		3.01	.003	0.67	3.25
Coping facilitation	0.39	0.16	.245	2.41	.018	0.07	0.70

Table 7. *Multiple regressions analysis for dual career identity (N=94)*

Factors	B	SE	Beta	*t*	*p*	95% CI	
						LB	UB
Constant	2.09	0.41		5.16	.000	1.29	2.90
Career opportunity	0.40	0.11	.361	3.70	.000	0.19	0.62

Conclusion

In sum, the current findings suggest that doctoral students' future career are highly shaped by their experiences with their course undertaking and quality of interactions with their mentors. As such, proper career counseling should also be accomplished in order to clarify future occupational goals. It is hoped that by understanding how career identities are formed, appropriate training can be provided to help the Taiwan future academics.

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Expanding Role of University Department Secretaries: Potential Middle Managers in the Making

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Abstract
In Taiwan, the plummeting birthrate has further driven the need for drastic changes within universities. Currently, university enrollments are at an all-time low, while also suffering from an increasing number of dropouts. In effect, many graduate programs are rethinking and realigning their program priorities. These strategic changes have actually opened up opportunities in harnessing the untapped potentials of university department secretaries. Within organizational behavior theories, employees' organizational citizenship behavior is highly affected by their role definition. To better understand these issues, the current presentation shall summarize the findings with regards to the expanding role of university department secretaries in Taiwan. A total of 20 university department secretaries were strategically selected and interviewed. Semi-structured interviews included the depth and scope of their responsibilities, together with the insights into their contribution and potential role within the organization. Interview data were transcribed and repeating themes organized and categorized. Findings show that majority of the secretaries have been connected with their programs for more than 10 years and has already surpassed several management terms. More important, almost half of the interviewed secretaries are alumni of the university and are graduate degree holders. Specific themes generated are career developmental plan, training focus on specific career tracks, and increased opportunities for career growth. Lastly, the role of secretaries can also serve as a buffering effect between the faculty and students. It is hoped that by expanding the role of department secretaries, increased in organizational citizenship behaviors can spill over to the student population and promotes retention.

Keywords: Higher Education, Career Development, Buffering Effect, Human Resource Development, Employee Training

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Introduction

For the past ten years, Taiwan higher education institutions are suffering from the problematic decreased in numbers of incoming students (Kuo, 2016; Tran, 2017). Currently, the ministry of education predicted that the number of new freshmen students will have a 40 percent dropped by the year 2028 (Fulco, 2018). Furthermore, a more severe projection is that by 2023 (in just two years from now), around 40 of Taiwan's 101 private universities and 12 of the 51 national institutions would either close down or merge together (Green, 2020). This continued shrinkage of Taiwan higher education has promoted the ***competition*** between universities (Grentzer, 2017), at the same time hastened the need for institutional change (Chang, 2019).

Besides the decline in numbers of incoming new students and strategic shrinkage of universities, Taiwan institutions are also suffering from increased numbers of dropouts. Tsai (2020) reported that according to the Taiwan Ministry of Education (MOE) the percentage of college dropouts increased from 4.63 percent in 2000 to 11.06 percent (or around 90,000 students) in 2017. Upon further investigation, among the 90,000 dropouts almost one-third (28.4 percent) of the students claimed that they are not interested with their studies (Tsai, 2020). While some reports mentioned that student dropouts are due to the rigid teaching methods in universities and the presumption that getting good grades would translate to future career success (Yang, 2017). Furthermore, during the last academic year alone, the MOE reported that the dropout rate was a record high of 13.38 percent (this is around 166,562 students of the total 1.24 million university students) with 19,000 students claiming the ***lack of interest*** as the main reason for leaving the school (Lin et al., 2020). For these reasons, many course programs are rethinking and realigning their program priorities, and adjust to the need of the students.

In anticipation for the decreasing number of incoming freshmen students and the changing student needs, many universities have started to restructure their degree programs (Ching, 2020). However, within any institutional restructuring or change, stress always occurs (Smollan, 2017). These work related stress within higher education institutions are said to be remedied by effective communication, better training, and careful selection of management (Mark & Smith, 2018). Within the university structure, the department secretaries (and staff) are actually a crucial part of the institutional governance (Strike, 2019), which is largely neglected. Within organizational change, department staff and secretaries are actually among the most affected individuals within the school. In reality, university secretaries is an important part of the organizational structure (Liu & Yu, 2017; Strike, 2019). Hence, it would be high time to actually open up opportunities in harnessing the ***untapped potentials*** of university department secretaries within the current age of change.

Within organizational behavior theories, employees' organizational citizenship behavior (OCB) is highly affected by their role definition (Morrison, 1994). With this having said, the current presentation shall summarize the findings with regards to the expanding role of university department secretaries in Taiwan. Focus shall be made within the scope of their responsibilities, together with the insights into their contribution and potential role within the organization. It is hoped that by expanding the role of department secretaries, increased in OCBs can spill over to the student population and promotes retention. Furthermore, implications of the current findings

can also provide university human resource managers and administrators valuable insights into the potential career developments within the department staff and secretaries.

Occupational Stress within the University

Occupational stress within university staff and secretaries is a research topic that is fast gaining popularity. As mentioned previously, occupational stress or work related stresses are much more evident during times of organizational change (Smollan, 2017). Early studies have shown that stress are much reflected on employees' level of job satisfaction and performance, in other words, when employees are under *high* levels stress their job satisfaction levels are at the *lowest* (Winefield & Jarrett 2001). Furthermore, Winefield and Jarett (2001) extrapolated that the cause of work stress in universities are much related to the financial issues and changes within institutions, such as *funding cuts* that led to problems within the day to day operations and educational activities. In addition, the lack of appropriate number of staff to handle the needs of the students (low staff-student ratio), would also result in over work and fatigue (Winefield et al., 2003).

Studies have also shown that the actual relationship between the department secretaries and department administrators (superiors) are highly correlated with their levels of psychological distress (Biron et al., 2008), denoting the need for appropriate *positive interactions* between administrators and staff. In addition, besides the negative correlational relationship between work related stress and university employee's sense of job satisfaction, additional work brought about by downsizing and financial difficulties of institutions are also one of the persistent causes of job pressure (Love et al., 2010). While, high university workloads can increase the chance of job strain and *withdrawal behaviors* of school employees (Taris et al., 2001). Furthermore, research studies have also noted that besides the pressure caused by job demands, *work-family conflict* is also proven to be a significant predictor of stress (Winefield et al., 2014). To summarized, studies have all noted that strategic changes caused by financial difficulties as the main reason for university employees' work related stress and should not be left unattended.

To remedy the inevitable work related stress, many researchers have suggested various concepts and ideas with respect to coping strategies (Williams et al., 2017). Early studies noted the importance of the nature and type of the interaction university staff are involved with (Rose et al., 1998). These interactions in terms of *positive communication strategies* (Mark & Smith, 2018), *increased participation in decision making* (Biron et al., 2008), and *job and career enhancements* (Abouserie, 1996; Tan, 2017; Thongdee & Wattananonsakul, 2016) are seen as important coping strategies that are quite useful in uplifting the overall work experience of department secretaries and staff. Furthermore, focus group interviews with Australian university staff have suggested that the *support* from peers, *recognition and achievement*, *high morale*, and *flexible working conditions* as positive coping strategies that help in reducing work related stress (Gillespie et al., 2001). In sum, work related stress for university secretaries and staff is an important research area wherein conditions can be made better to enhance the overall work experience.

Organizational Citizenship Behavior and Role Definition

Studies within occupational stress of university staff and secretaries have noted that *role conflict* or *role ambiguity* as an important source of stress (Ahsan et al., 2009). However, these role conflicts if incorporated by a high level of positive organizational support can actually help reduce work related distress (Jawahar et al., 2007) and promote employees engagement (Alday, 2020; Hu et al., 2017). Furthermore, studies have also noted that these perceived organizational supports are also helping the promotion of organizational citizenship behavior (OCB) (Shaheen et al., 2016; Singh & Singh, 2010).

The concept of OCB is nothing new. Organ et al. (2005) defined OCB as the *individual behavior that is discretionary, not directly or explicitly recognized by the formal reward system, and in the aggregate promotes the efficient and effective functioning of the organization* (p. 8). This suggests that an OCB is not driven by getting a reward (Ryan, 2002), but rather more related to the individual's personality (Organ, 1994). A sense of *proactive* behavior that promotes a positive sense of satisfaction (Li et al., 2010). At the same time, OCB also tends to enhance the overall *organizational commitment* of the employees (Besharat & Pourbohlool, 2014). More important, for some instances OCB is able to minimize the tendency to commit counterproductive work behaviors (Ching et al., 2017; Hu et al., 2015, 2017).

OCB is said to be measured by observing personality qualities of individuals (Elanain, 2007; Neuman & Kickul, 1998). Lo and Ramayah (2009) used four personality behaviors to determine the OCB of individuals, such as: *civic virtue*, *conscientiousness*, *altruism*, and *courtesy*. On the other hand, Farooqui (2012) proposed five factors describing OCB behaviors, namely: *leadership*, *role characteristics*, *workplace relationships*, *organizational system*, and *job characteristics*. Besides these characteristics, the notion of *sportsmanship* behavior is also seen as a crucial indicator for OCB (Podsakoff & MacKenzie, 1997). While some incorporated *prosocial actions* and thoughts (Penner et al., 1997), *humility* (Bourdage et al., 2012), and *desire to help* co-workers (Finkelstein & Penner, 2004) as other indicators of OCB. In general, OCB is a complex and evolving concepts (Ocampo et al., 2018), and there are many behavioral traits that can be related, nonetheless, antecedents in promotion of OCB behaviors are also important. One such important antecedent is the clarification of ***role identities*** (Finkelstein & Penner, 2004; Love et al., 2010; Morrison, 1994).

Methodology

Literature suggests that within organizational behavior theories, employees' OCB is highly affected by their role definition. Moreover, role definitions are highly dependent on career development (Hoekstra, 2011; Schein, 1996). To better understand these issues, the current presentation shall summarize the findings with regards to the expanding role of university department secretaries in Taiwan. The study is designed as a qualitative format, wherein information is collected with the use of semi-structured individual interviews (Maxwell, 2009). A total of 20 university department graduate program secretaries were strategically selected and interviewed. Semi-structured interviews included the *depth and scope of their responsibilities*, together with the *insights into their contribution* and *potential role within the*

organization. Interviews were held in the participants' choice of location and informed consent was signed. Each interview session lasted from one to two hours. Sessions were conducted with the use of the Mandarin Chinese language and consent to audio-record. After the interview sessions, data were transcribed while carefully noting recurrent themes related to topic of discussion (Miles & Huberman, 1994).

Participants of the study were 20 university department graduate program secretaries. With average years of service of almost 12 years, denoting that the participants are quite knowledgeable with regards to the inner workings of the university. More important, many of the participants (7 participants) are actually alumni of the school, denoting a perceived higher sense of organizational commitment (Borden et al., 2014). As for the educational attainment of the participants, 50 percent or half of them have a masters' degree or higher, while twelve (12) of them are working in a national university and the remaining eight (8) are employed by the private sector. Moreover, most university secretaries are female as denoted by only 1 male respondent. Lastly, half of the participants are working in a science related course department and the other half in a social science (non-science) field of study. Table 1 shows the detailed figures of the background demographics.

Table 1. *Background demographics of the participants (N=20)*

	n	*%*	Min.	Max.	*Mean*	*SD*
Years of service			1	37	13.05	11.61
Gender						
Female	19	95				
Male	1	5				
Educational level						
Undergraduate	10	50				
Master	10	50				
Alumni						
Yes	7	35				
No	13	65				
Institution type						
Public (national)	12	60				
Private	8	40				
Field						
Science	10	50				
Non-science	10	50				

Results and Discussions

As mentioned earlier after the interview data were transcribed, repeating themes were also organized and categorized. Within the specific *depth and scope of university secretaries' role*, participants all noted several responsibilities that are quite common and standard. These are the ability to *support the administration* in terms of policy implementations, *management of the meeting agendas* and minutes, assistance with the *quality assurance* processes, handling of the *student enrolment* (selection) procedures, and the taking care of the day to day teaching and learning activities. Furthermore, more specific themes generated are *career developmental plan*, *training focus on specific career tracks*, and *increased opportunities for career growth*. Besides these three themes, two added findings are the current predicament facing

graduate course programs and the potential expanded role of department secretaries within the university.

For the **career development plan**, most of the participants mentioned the university should have an overall professional career plan for the department secretaries. During the interview, many noted the need to have a sort of option for university secretaries to have the opportunity to *take up further studies*. Many participants who are already graduate degree holders all noted the opportunity to take up graduate studies as an important *career achievement*. Furthermore, participants also mentioned that there are many courses that they are quite interested with; such *interdisciplinary learning opportunities* can help secretaries widen and broaden their skills and competencies. In essence, participants are hopeful that university human resource department (HRD) would be able to provide a certain policy (such as *career promotion tracks*) that enables secretaries to further their career, may it be graduate degrees or other competencies or skills.

For the **training focus on specific career tracks**, further investigation of what other skills or competencies the secretaries are interested with, which resulted with mostly information technology related topics. These are information technology productivity knowhow, such as how to further their skills with the use of Microsoft office software, basic computer troubleshooting, and how to maintain (or enhance) the department's webpage. In addition, participants also noted the need for understanding how big data can help with their work and how such data can be visualized effectively. Furthermore, insights on how to manage the department's social media (Facebook, Instagram, and many others) or how can social media help or create more student enrolments. Besides these information technologies related issues, participants also mentioned the need to understand project management, simple statistics, and some information regarding on how to positively interact with the students.

Results indicated that department secretaries are actually quite concern with their work performance with all of the previous mentioned competencies and skills are all *work related*. Participants are truly interested with increasing their competitive advantages in order to further assist their work within the university. The researchers believed that majority of the participants are quite committed to their work. More important, there seems to be no specific difference between national (public) and private institutions or between the science or non-science departments (course programs).

As for the **increased opportunities for career growth**, besides the previous mentioned career advancement and competency building, participants also noted that work *burnout* can be prevented or minimized by *time out from work* and more important the need for *job rotation*. The concept of job rotation has long been used to address employees' job burnout (Hsieh & Chao, 2004). Participants noted that job rotations can be within the department itself (rotating job responsibilities) or even rotation within the college or university.

Table 2. *Specific themes and sub-themes*

Career developmental plan	Specific career tracks	Career growth opportunities
Further studies	Information technology	Job rotation
Interdisciplinary learning	Educational technology	Inter-department rotation
Career promotion track	Project management	
	Statistical data analysis	
	Data visualization	
	Webpage	
	Big data	
	Social media management	
	Counselling	
	Interpersonal skills	

As mentioned, besides these three themes, two added findings are the *current predicament facing graduate course programs* and the *potential expanded role of department secretaries* within the university. During the course of the interviews, participants also mentioned several issues with regards to their graduate programs. More specifically, the *problems with enrolments and dropouts* are still the majority of their concern. Several antecedents are noted such as the current low birth-rate situation within Taiwan, the lack of learning motivation by the students themselves (low in engagement), insufficient educational resources, the need for additional industry cooperation, and the current societal perception on doctoral students, as some of the issues related to student dropouts and difficulties in student recruitment.

As for the potential growth or expansion of role for department secretaries, many participants mentioned that they also aspired to *transition to an academic* (teaching) *related position* or lecturer. This is actually one of the major reasons why participants are pursuing further education, few even mentioned if given the opportunity they are willing to take up a doctoral degree. Lastly, many department secretaries mentioned the need for them to interact with their students in a way quite similar to *counselling*. Participants noted that there are many instances that students have some problems may it be personal, financial, course related, or some minor issues with their mentors or teachers; the role of the secretaries now is to try to understand and clarify the predicaments, since students tends to divulge more information with them. Hence, department secretaries have the opportunity to act as a bridge or provide a sort of buffering effect between the students and faculty.

Conclusion

In sum, the current study summarizes the various findings of the qualitative insights into the career and future opportunities of university secretaries. Findings show that majority of the secretaries have been connected with their programs for more than 10 years and has already surpassed several management terms. More important, almost half of the interviewed secretaries are alumni of the university and are graduate degree holders. Findings also suggests that participants are willing to expand their competency and skills to further help with their responsibilities, hence are quite high with organizational commitment. Furthermore, role definition should be clear and consistent with the possibility of future advancement. Lastly, the role of secretaries

can also serve as a *buffering effect* between the faculty and students. Buffering effect to help students relay information to their faculty (or vice versa), hence minimized misunderstanding and help promote positive interactions. It is hoped that by expanding the role of department secretaries, increased in OCBs can spill over to the student population and promotes retention.

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