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Table of Contents

<i>Adaptation of the Teacher Professional Agency Scale in the Unique Cultural Context of Estonia</i> Liudmila Zaichenko	pp. 1 - 16
<i>Examining the Impact of Classroom Group Identity Development in an Urban Chemistry Classroom</i> Stefania Macaluso Felicia Mensah	pp. 17 - 30
<i>'Off-Site Insights' – A Qualitative Study of Teacher Professional Development Through the Pandemic and Beyond</i> Sateja Joshi Suravi Banerjee Preetha S Kumar	pp. 31 - 47
<i>Modulation of the Imaginary Perceptive Maps and Its Effect on the Cognitive Attitude of Medical Students</i> Nikhil Kumar Lolita Shengelia	pp. 49 - 59
<i>Perceptions of TVET Students Regarding the Integration and Accepting of Learning Management Systems (LMS) for Teaching and Learning: Situation Analysis of TVET College in South Africa</i> Glory Moroesi Pitikoe-Chiloane Thelma de Jager Toy White	pp. 61 - 73
<i>Finding Solutions for Addressing Poor Performance in the Botswana Education Systems and Lessons Learnt From COVID-19</i> Veronica Margaret Makwinja Olivia Ndzimuunopa Nthoi	pp. 75 - 85
<i>Let's Play: Using Gamification in University Classes as a Means to Increase Motivation and Engagement While Lowering Stress</i> Katherine Green Kelly M. Torres Alisha DeWalt	pp. 87 - 98
<i>Effectiveness of Learning Objectives Articulated in Some of the Undergraduate Textbooks in Developing Entrepreneurial Skills in the Students</i> Beatrice Ngulube	pp. 99 - 113
<i>University ESL Students' Challenges and Insights Towards Online Learning Amidst COVID Pandemic</i> Johara D. Alangca-Azis	pp. 115 - 126

<i>Teachers' Perspectives on Digital Technologies and Educational Practices: Challenges and Resilience in a Brazilian Public Educational Context</i> Eliane Fernandes Azzari	pp. 127 - 132
<i>Understanding User Feedback Through Negative Emotions: A Learning Experience</i> Franci Suni-Lopez Angela Mayhua-Quispe Nadia Rodriguez-Rodriguez	pp. 133 - 140
<i>Involvement of Experts From Practice in Practical Laboratory Teaching - A Way to Increase the Competencies and Skills of Science Study Programs Graduates</i> Zuzana Vargová Mária Ganajová Gabriela Kuzderová	pp. 141 - 149
<i>Metacognitive Strategies in the Preparation of Future Chemistry Teachers</i> Mária Ganajová Ivana Sotáková Mária Kožurková	pp. 151 - 160
<i>The Effects of Lockdown on Undergraduate Training and the Well-Being of Pre-Service Teachers</i> Eva Ballová Mikušková	pp. 161 - 169
<i>Tunisian EFL Students' Awareness and Use of Metacognitive Strategies in Academic Reading</i> Hanan Dammak Asma Maaoui	pp. 171 - 183
<i>Evaluation of Secondary School EFL Textbook Used in Public Schools: A Case of Oman</i> Samia Naqvi	pp. 185 - 206
<i>Can Blended Learning Replace Face-to-Face Teaching in Machine-Knitting Courses?</i> Kawai Lo Chu-po Ho Jinyun Zhou Hiu-ting Tang	pp. 207 - 214
<i>Enhancing Student Learning Experiences Through Recorded Presentation Using the "Gongyeh" System</i> Man-chong Wong	pp. 215 - 221

- Escape Room in Pre-School Education Learning*
 Rocío Patiño Fernández
 Samary Guillen
 Erika Pazmino pp. 223 - 233
- Teaching Without Borders: A Gamification Paradigm for Practical Subjects*
 Marco Canesi
 Paolo Pisano
 Giacomo Placenti pp. 235 - 246
- Developing English-Speaking Skills of Engineering Students Through Project-Based Learning in Uzbekistan*
 Gulbakhor Mamadiyeva pp. 247 - 252
- Assessment for Learning in Tunisian Higher Education: English Language Teachers' Self-Efficacy and Knowledge Base*
 Asma Maaoui
 Amel Jarraya pp. 253 - 267
- Promoting Teacher Confidence With Technology Through Risk Taking and Organisational Changes: A Welsh Perspective*
 Sophie Meace
 Fiona Carroll
 Rita Kop pp. 269 - 281
- Fostering the Academic Transition of International Students Who Are Ethnoculturally and Linguistically Diverse in Postsecondary Education*
 Kacia Whilby pp. 283 - 292
- Autoethnography: Preserving the History of the Resilient U.S.-Mexico Border Peoples*
 Toni Muñoz-Hunt pp. 293 - 298
- Negotiating the Place for Human Rights in Education- Implications for Curricular Integration*
 Astha Saxena pp. 299 - 313
- Representation of the Student's Controllable Performance Features Based on PS2CLH Model*
 Arlindo Almada
 Qicheng Yu
 Preeti Patel pp. 315 - 323

<i>Digital Learning Assistants in Higher Education Environments: A Qualitative Focus Group Study</i> Mascha-Lea Fersch Sigurd Schacht Betiel Woldai Charlotte Kätzel Sophie Henne	pp. 325 - 341
<i>Innovative Lecturer: Using Digital Tools in the Study Process</i> Agnė Juškevičienė Ieva Bilbokaitė-Skiauterienė Stanislav Sabaliauskas Ingrida Donielienė	pp. 343 - 357
<i>Fostering the Entrepreneurial Mindset of Students Through Pioneering Teaching Pedagogies: An Empirical Study on a B-School</i> Vaibhav Goutham Suresh Sakshi Chhabra Dinesh Nilkant	pp. 359 - 365
<i>Reflection of Sustainable Entrepreneurial Intent Among the Learners on Completion of Courses on Sustainability</i> Sakshi Chhabra Lubna Ambreen	pp. 367 - 373
<i>Use of Information and Communication Technology for Quality Education</i> Ningchuiliu Gangmei Kennedy Andrew Thomas	pp. 375 - 385
<i>Study of the Attitudes and Manifestations of Non-Standardness of Primary Teachers in the Educational Environment</i> Nadezhda Angelova Kaloyanova	pp. 387 - 398
<i>Prevalence of Anxiety in University Students During the COVID Pandemic -19</i> Jonida Mustafaraj	pp. 399 - 407
<i>Financially Educating Generation Z Using Digital Media – A Competitive Field Test of eduStories® Versus Texts</i> Stefanie Schöberl Barbara Brandstetter Mona Winterwerb	pp. 409 - 427
<i>Picture Books to Support the Teaching of Disciplinary Literacy in the Primary School Classroom</i> Lorraine Lawrance	pp. 429 - 439

- Reformed STEM Education and Its Effects on Student Learning Outcomes and Plagiarism Rates: A Look at a Higher Education Institution in the Northeastern Democratic Republic of Congo*
Heather Douglas
Dianne Anderson pp. 441 - 455
- Evaluating Student Perspectives on Understanding of Complex Systems*
Stephen G. Barker pp. 457 - 468
- Interaction as Storytelling: A Framework for Structuring Stories From the Perspective of Quantum Theory*
Wenchang Lin pp. 469 - 477
- Learning Experiences of Online English Learning With Pedagogical Redesign for Complementing Formal Face-to-Face Learning*
Jeanne Lam
Ruhong Chen pp. 479 - 487
- On Space, On Place: Emerging Tamaraw Identity – The Lived Experience Journey of Communication Students*
Maria Gwenetha Y. Pusta pp. 489 - 504
- Democratic Citizenship in the Formal Civic Education in Albania: Assessment of Curriculum and Teaching of Democratic Citizenship in Pre-University Education*
Suela Kusi Drita
Zyhrada Kongoli pp. 505 - 509

Adaptation of the Teacher Professional Agency Scale in the Unique Cultural Context of Estonia

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Abstract

Teachers' work-related agency has scientific and practical significance. It is associated with redefining pessimistic projects and finding pleasure in the vocation. Measuring this phenomenon among teachers ($N=686$) in the culturally diverse education context of Estonia, where Estonian language of instruction and Russian instructional language schools historically co-exist, representing two various logics associated with transformation vs reproduction, may lead to valuable results for the advancement of the theoretical concept. The author suggests adapting an already existing tool used in another regional context and across other professional domains. The first measures and implications for further conceptualisation are presented.

Keywords: Professional Agency, Minority Teachers, Agency Scale, Cross-Cultural

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Introduction

The concept of professional agency has been amply explored both theoretically and qualitatively (Smith, 2017; Goller, 2017) more than quantitatively in various domains and with diverse epistemologies. Meanwhile quantitative tools for measuring this construct have been implemented recently for the purpose of exploring multifarious vocational contexts (Goller, 2017; Vähäsantanen et al., 2019, 2020), where new inventions in support of teachers' work-related agency in particular situations have been highlighted mostly due to the endeavours of scholars from Finland (Pyhältö et al., 2015; Soini et al., 2016; Toom et al., 2017).

Sharpening the tool for measuring work-related agency across professional domains is still in progress (Goller, 2017) and one particular instrument may not suffice; meanwhile, inventing separate tools for each profession may lead to the proliferation of the concept, which will reshape the root theory in such a way that it loses its consistency and depth. Consolidating the methodology of measuring teachers' work-related agency has both scientific and applied significance. The scientific significance of cross-cultural validation and the adaptation of particular measures for teachers' professional agency, considering the specifics of diverse regional contexts, may assist in the development of the proper methodological toolkit for further advancement of the concept. The aim of the study was to adapt to the Estonian education domain an instrument for measuring the professional agency of teachers following the design proposed by Vähäsantanen et al. (2019). The mentioned professional agency scale utilised subject-centred sociocultural epistemology, emphasising transformative occupational agency, associated with proactivity and 'job crafting' (Goller, 2017), as well as with 'change, novelty and variety' or social morphogenesis (Archer, 2013). Tested so far only regionally (Vähäsantanen et al., 2019, 2020), the scale hadn't yet been adapted to other contexts or validated in different cultural and structural affordances. The author proposes its adaptation in the unique cross-cultural educational context of Estonia, where two parallel education systems – schools with Estonian language of instruction (henceforth, Estonian schools), associated with a long period of transformation (Loogma et al., 2013), and schools with Russian instructional language (henceforth, Russian schools), reflecting a logic of reproduction – historically co-exist.

The Russian-speaking community in Estonia is quite large (26% of the total population at the moment, Statistics Estonia, 2021). It is mostly served by the Russian schools, which contribute to 'parallelism' of the education system. Teachers of these schools are associated in political, media and scientific discourses with using 'Soviet methods' (Lindemann & Saar 2012; Zaichenko, 2021), having low levels of national language, therefore being cut off from the professional development; and the graduates of such schools continue to take disadvantaged positions in the labour market. Additionally in the PISA international assessment the Russian-speaking students show weaker results than the students from Estonian schools at the national level (one academic year lower in all domains, according to MoER (2019). Today, the number of Russian schools is falling due to various structural factors (see also Vihalemm et al, 2020): there are 24 monolingual (using only Russian) and 78 bilingual schools teaching in both national and the Russian languages (4.8% and 15% respectively of the overall number of schools nationally).

A professional agency multidimensional construct was validated between the two samples – teachers of both types of schools – via EFA (Vähäsantanen et al., 2019), the factor structures were compared between two samples and the reliability of the scale and its subscales was

tested on each sample. Convergent validity was tested by computing Pearson correlations of agency scale with other theoretically substantiated constructs (Goller, 2017; Pyhältö et al., 2015). Finally, teachers' agency on two dimensions, 'Influencing at Work' (IW) and 'Developing Work Practices' (DWP), was compared between the groups using an independent-samples *t*-test. The study focuses on exploring and validating the mentioned methodological tool across two contrasting cultures, and provides the first measures of teachers' work-related agency in Estonia (which had never been measured before).

Teacher agency quantitative measurements and instrument choice

In various research projects, teachers' work-related agency was measured either through constructs highly associated with the concept (Song et al., 2020), such as self-efficacy and autonomy, or in specific situations, such as 'learning', 'in the classroom', 'in the community' and 'decision-making' (Liu, et al., 2016), as well as among particular samples, e.g. student teachers. Following the 'logic of social transformation' (Archer, 2013), in which teachers are seen as 'corporate agents' (ibid.), these measures promote 'extended professionalism' (Evans, 2008, 11), where teachers exhibit 'wider vision' (ibid.), sense of community (Schuster et al., 2021) and the ability to be 'reciprocal collaborative learners' (Soini et al., 2016), constantly re-negotiating their own work identity in pursuit of 'morphogenetic scenarios' (Brock et al., 2016, 89). However, teacher professional agency has never been measured as a general behavioural phenomenon that is situationally present in teachers' work life, manifesting itself as a *modus vivendi*, acknowledging their socio-occupational satisfaction, open-mindedness to collaboration and ability to be heard in the decision-making arena.

For this study, a quantitative tool proposed by Vähäsantanen et al. (2019) was utilised. This tool measures teachers' agency as a behavioural action-based phenomenon theoretically connected with the subject-centred sociocultural approach (Eteläpelto et al., 2013). Such an approach results in a combination of the social realist concept of agency (Archer, 2013) and socio-cultural theories (Stetsenko, 2019) which emphasise the importance of the socio-cultural context's inseparability from individual agentic action, and the subject-oriented suggestion which takes into account individuals' subjectivity and intentionality (Billet, 2011). Measures proposed by Vähäsantanen et al. (2019) suggest that professional agency is manifested in actions which are the results of internal choices and situational stances, although they are defined by workplace affordances which enhance opportunities (1) to make organisational decisions on both individual and collective levels, (2) to present one's own ideas, which are heard and considered by the community's inside organisations, and (3) to participate in shared cultural practices, which in an ideal scenario lead to (4) transforming the work milieu, termed 'transformative agency' (Stetsenko, 2019), always resulting in the implementation of innovations. All of these dimensions of action-based and contextually embedded agency (Vähäsantanen et al., 2019) lead to a variety of professional situations in which an agent constantly re-negotiates and renews her own vocational *modus vivendi*.

Purpose of the study

On the basis of the aspects outlined above, the study aimed at:

- (1) refinement and validation of the TPA-scale (Vähäsantanen, et al., 2019) in the context of Estonian education system;
- (2) examinations of differences in cross-cultural adaptation of the TPA between teachers in Estonian (EST sample) schools and Russian (RUS sample) schools.

Methodology

The participants

Data was gathered in the framework of the comparative survey ‘Teacher 2021’, conducted by the Centre for Innovations in Education of Tallinn University in January-March 2021. The survey questionnaire included 55 sections focusing on eliciting teachers' perceptions of various aspects of their profession. Participation was voluntary and anonymous. All schools in Estonia were offered the chance to participate. The survey was delivered through the LineSurvey platform. Each participating school received an individual link to the web questionnaire, in Russian or Estonian, as chosen by the teacher, and took around 20 minutes to complete. The sample of the survey included 2 050 teachers from 79 schools around Estonia with Russian ($n = 10$) and Estonian ($n = 69$) languages of instruction. The breakdown of the teachers was as follows: 1 707 teachers from the EST sample (83.0%), 343 teachers from the RUS sample in Estonia (17.0%). Both samples corresponded to the total population of teachers for both types of schools in Estonia and therefore were representative (Cook et al., 2000) (Tables 1-3).

Tables 1-3. Participants characteristics by samples

Age Group Count (%)	Estonian	Russian
< 30	44 (12.8)	16 (4.7)
30 - 39	67 (19.5)	51 (14.9)
40 - 49	89 (25.9)	87 (25.4)
50 - 59	84 (24.5)	115 (33.5)
60 - 69	51 (14.9)	67 (19.5)
> 70	8 (2.3)	7 (2.0)

Table 1.

Subject Taught Count (%)	Estonian	Russian
Math, Physics, Chem	55 (16.0)	46 (13.4)
STEM (Bio, Geo)	27 (7.9)	24 (7)
Humanities	161 (46.9)	140 (40.8)
Sports, Art	28 (8.2)	65 (19)
Other	72 (21)	68 (19.8)

Table 2.

	Median Age Group (%)	Median Income	Gender % Female	Mode School Size
Estonian	40 – 49 (25.9)	€1100-1200	82.8	500
Russian	50 – 59 (33.5)	€1100-1200	90.1	900

Table 3.

Development of the instrument

As a TPA-scale, an instrument proposed by Vähäsantanen et al. (2019) utilising a ‘subject-centred’ transformative perspective was chosen, with the aim of exploring teacher agency ‘on the level of action’, in work-related settings. The 17-item instrument (Vähäsantanen et al., 2019) was used as a starting point, discussed for clarification of meanings in a focus group of researchers ($N = 4$), reformulated according to the complexity of the teaching profession, drawing on already elaborated formulations (Toom et al., 2017; Goller, 2017), and translated into Estonian and Russian. After the first pilot study among the teachers of the EST sample ($N=58$), the scale was reduced to 12 items because some items reflecting subjects' commitments to their work values (see for details Vähäsantanen et al., 2019) didn't load as separate factors and showed low reliability coefficients. As the scale was meant to be a part of a combined multi-sectional questionnaire, there was a need to keep it concise and the decision was made to include only the 12 items which showed high reliability and communality. These items were repeatedly revised and again translated into both languages, with the application of back-translation. This version was piloted among a group of teachers ($N = 25$), then discussed among the researchers regarding content validity, and the 12 final items (Table 4) were approved along the dimensions initially proposed by Vähäsantanen et al. (2019): ‘Decision Making at Work’, ‘Being Heard at Work’, ‘Participation in Shared Work Practices’ and ‘Transforming Work Practices’, which were combined later into the ‘IW’ (composite reliability 0.75) and ‘DWP’ (composite reliability 0.74) dimensions (ibid.). The final instrument was used with a seven-point Likert scale (from 1 = ‘strongly disagree’ to 7 = ‘strongly agree’).

Measures

Three scales included in the study were utilised to measure convergent validity. All scales were used in this composition for the first time and their reliability was tested in the survey ‘Teacher 2021’ on the whole sample ($N = 2\ 050$).

Decision-Making (DM) Scale

The Decision-Making Scale was used following theoretical assumptions from previous studies (Goller, 2017) that the manifestations of agency are highly associated with ‘building capacity in contextualised decision making’ (Simpson et al., 2018) in the workplace. Three items measure teachers' active participation in school development planning, rated on a three-point Likert scale (from 1: not acquainted with the programme to 3: participated in elaborating): Cronbach $\alpha = 0.71$ (reliability $\alpha = .68$ on the RUS sample, inter-item correlation $r = .43$; reliability $\alpha = .68$ on the EST sample, inter-item correlation $r = .43$).

Job Satisfaction (JS) Scale

Following Vähäsantanen et al.'s (2019) procedure, who used the ‘Emotionally Meaningful Work’ scale, in this study the ‘Job Satisfaction’ construct was used to test convergent

validity. Although these concepts are different, they both represent phenomena which emerge 'from individuals' emotional experiences' (ibid.), and in previous studies (Skaalvik & Skaalvik, 2021) job satisfaction was found to be positively correlated with teachers' motivation and occupational commitment; therefore, a positive relationship between job satisfaction and agency was expected. The scale measures teachers' satisfaction with their work content and the environment using three items, rated on a seven-point Likert scale (from 1 – Not satisfied at all to 7 – Very satisfied): Cronbach $\alpha = 0.73$ (reliability $\alpha = .74$ on the RUS sample, inter-item correlation $r = .49$; reliability $\alpha = .72$ on the EST sample, inter-item correlation $r = .46$).

Collaborative Learning (SL) Scale

Similarly, following Vähäsantanen et al. (2019), it was expected that the agency scale would be positively associated with collaborative teaching and learning. The authors of the Finnish study used the similar 'Learning at Work' construct, emphasising that work-related learning occurs through collaboration and active interactions (Pyhältö et al., 2015), as well as sharing competencies and professional co-construction activities among teachers (Schuster et al., 2021). The scale consisted of four items measuring teachers' pro-active collaborative strategies in their teaching practices; it was rated on a seven-point Likert scale (from 1: doesn't look like me at all to 7: looks exactly like me): Cronbach $\alpha = 0.72$ ($\alpha = .75$ on the RUS sample, inter-item correlation $r = .43$; $\alpha = .72$ on the EST sample, inter-item correlation $r = .39$).

Data analysis

Validation of the 12-item agency scale was performed separately on the RUS and EST samples. First, an exploratory factor analysis was conducted using IBM SPSS Statistics 26 to determine the factor structure. The obtained factor structures on the two samples were compared with each other, and with the results of Vähäsantanen et al. (2019). Afterwards, the reliability of the scale and subscales was tested on each sample. Convergent validity was tested by computing a Pearson correlations of agency scale and its subscales with scores on DM, JS, and CL. Differences in the levels of the professional agency of teachers in Russian and Estonian schools were tested using an independent-samples *t*-test, with *School Type* as the independent variable, and *Agency* as the dependent variable. After that, a multivariate analysis of variance (MANOVA) was performed, with *School Type* as an independent variable, and *IW and DWP* as dependent variables. A random subsample of the EST sample matching the size of the RUS sample ($n=343$) was used for all analyses.

Findings

TPA Factor Structure (RUS sample)

The twelve items of the agency scale (Table 4) were included in the EFA to determine the factor structure. As there were non-normally distributed items (according to histograms and Kolmogorov-Smirnov tests, $p < .001$; Fabrigar et al., 1999), as well as following the procedure of Vähäsantanen et al. (2019), the principal axis factoring method was used.

The data was appropriate for factor analysis. The sample size ($N = 343$) was adequate for the factor analysis of twelve items (Tabachnick, & Fidell, 2007, pg. 613). There were many inter-item correlations higher than $r = .30$. The Kaiser-Meyer-Olkin measure of sampling adequacy

was .85, higher than the recommended value of .60 (Kaiser, 1974). Bartlett's test of sphericity (Bartlett, 1954) was statistically significant, as recommended ($p < .001$).

With the principal axis factoring, three factors with eigenvalues higher than $\lambda = 1.00$ were revealed, explaining 60.97% of the total variance. According to the Scree plot (*Figure 1*), it seemed, however, more appropriate to keep the two factors (Cattell, 1966). Additionally, the three-factor solution was not interpretable, as it included four cross-loadings.

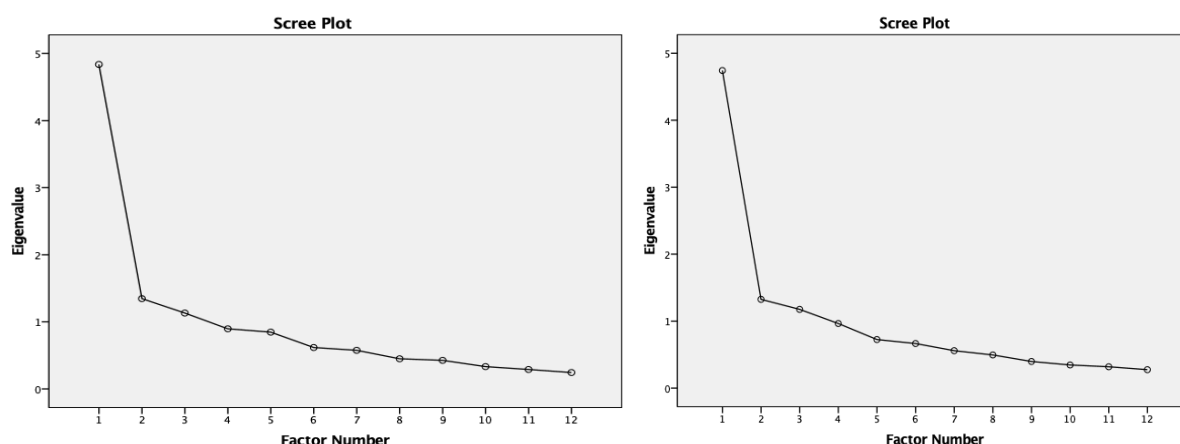


Figure 1. Scree plots, RUS (left)/ EST (right) samples

Two retained factors explained 51.5% of the total variance: the first one 40.3%, and the second one 11.2%. The most meaningful solution was found using a Varimax rotation, which supported the fact that the two factors were correlated ($r = .60$). Most of the items had communalities after extraction higher than .40, showing that they correlated to the other items. The exceptions were (see *Table 4*) item 3 and item 12, with communalities lower than .06. Additionally, their factor loadings on both factors were lower than .32, so they were excluded from further consideration (Tabachnick, & Fidell, 2007).

According to *Table 4*, there were seven items with higher loadings on the first factor, and three items with higher loadings on the second factor. Except for the two rather obvious cross-loadings (items 8 and 9), the factor structure was clear and interpretable, showing that there were two latent dimensions underlying the concept of agency among Russian teachers in Estonia. The factors resembled two of the three factors found in the study of Vähäsantanen et al. (2019), and they were named after them. The first factor was, therefore, named 'Influencing at Work' (IW), which includes 'Decision Making' and 'Being Heard at Work'. The second factor was named 'Developing Work Practices' (DWP), which involves 'Participation in Shared Work Practices' and 'Transforming Work Practices'.

Factor structure of the Agency scale (EST sample)

The results of the factor analysis on the agency scale for Russian teachers were compared with the results for the Estonian teachers to evaluate the stability of the factor structure. The same steps were performed. Specifically, the principal axis factoring method was used, along with a Varimax rotation. This sample was adequate for the factor analysis procedure ($N = 343$; Tabachnick, & Fidell, 2007, p. 613). Many inter-item correlations were higher than $r = .30$. The KMO measure of sampling adequacy was .85, while Bartlett's test of sphericity was significant ($p < .001$).

Three factors with eigenvalues over $\lambda = 1.00$ were revealed, and they explained 60.4 % of the total variance. However, according to the Scree plot (*Figure 1*), due to the low interpretability of the three-factor solution, and inconsistency in the analysis on the sample of Russian teachers in Estonia, only the first two factors were kept. These two factors explained 50.6 % of the total variance, with the first one explaining 39.5 %, and the second one explaining 11.1 % of the variance. The majority of the items had communalities over .40 after extraction. As in the analysis on the first sample, items 3 and 12 had extremely low communalities, and were excluded from further analysis.

As shown in Table 4, five items loaded predominantly on one factor, and five items on the other. Except for the three cross-loadings (items 8, 10 and 11), the factor structure was interpretable. The obtained factor structure was also similar to the factor structure in the first sample, except for items 8 and 9, which loaded predominantly on a different factor. Accordingly, factor 1 in this sample could also be called 'IW', and factor 2 'DWP'.

As items 8 and 9 had obvious cross-loadings on the first sample, it was worth rethinking the final factor structure, i.e. the construction of the subscales of agency. First, item 9 was similar to the item 'I actively bring up my opinions in the work community' from the study of Vähäsantanen et al. (2019), which was grouped with the factor 'DWP'. Therefore, although on the first sample it was with the items from the factor 'IW', the final decision was to put it in 'DWP', as in the Estonian teachers' sample.

Item 8 was, however, more ambiguous, as a similar item was not found among the items in the study of Vähäsantanen et al. (2019). It was created following Goller's (2017) 'proactive personality' construct. As it refers to offering new, unique solutions in specific, complex situations, it was decided to put it in 'DWP'. The final version of the scale included 10 items (Table 4), five in each dimension as follows: 'Influencing at Work': items 4, 5, 6, 7, 11; 'Developing Work Practices': items 1, 2, 8, 9, 10.

Item	Factor (RUS sample)		Factor (EST sample)	
	1	2	1	2
1. I actively speak or comment at my school on work-related issues	.305	.707	.799	.242
2. If innovations are planned at school, I definitely want to be involved in deciding on them	.202	.861	.723	.205
3. I cannot decide for myself which textbooks and study materials to use in my work (reversed)	.100	-.019	.080	.233
4. School management takes into account my wishes and suggestions regarding the organisation of work	.727	.200	.136	.690
5. Other teachers are always attentive to my views	.726	.268	.267	.616
6. I decide which teaching methods and techniques to use in my teaching	.568	.258	.209	.524
7. When I express my views, they are taken seriously	.833	.125	.297	.726
8. I always offer my own solutions in difficult professional situations	.502	.422	.595	.428
9. I always express my opinions in work teams	.498	.487	.771	.213
10. I like to experiment with new teaching methods and techniques	.280	.413	.371	.350
11. I have every opportunity to steer my school life for the better	.565	.266	.331	.605
12. For me, the teaching methods that have proved their worth over time are suitable, rather than the constant pursuit of new ideas	.120	-.207	-.114	-.058

Table 4. Rotated factor matrix obtained with principal axis factoring with varimax rotation, RUS/EST samples (12-items initial scale)

Reliability

The internal consistency of the initial 12-item agency scale was $\alpha = .80$ on both samples. After excluding items 3 and 12, the Cronbach coefficient increased to $\alpha = .88$ among RUS sample, and to $\alpha = .87$ among EST sample, which justified excluding these two items during EFA. The average inter-item correlation was $r = .42$, i.e. $r = .40$.

The internal consistency of the 'IW' subscale, involving items 4, 5, 6, 7 and 11 was $\alpha = .83$ among Russian teachers, and $\alpha = .80$ among Estonian teachers (inter-item correlations $r = .51$, i.e. $r = .46$). The reliability of 'DWP', including items 1, 2, 8, 9 and 10, was $\alpha = .80$

among Russian teachers, and $\alpha = .83$ among Estonian teachers (inter-item correlations $r = .45$, i.e. $r = .50$).

Convergent validity

As shown in Table 5, there were weak and moderate positive correlations of DM-scale with TPA-scale and its subscales among the RUS teachers in Estonia. DM-scale was correlated moderately with 'DWP' and showed weak correlation with 'IW'. There were moderate to high correlations of JS-scale with agency and the 'IW' dimension, and a somewhat lower correlation with 'DWP'. Finally, CL-scale was moderately associated with TPA, with a somewhat stronger relationship with 'DWP' than with 'IW'.

Scale / Subscale	1.	2.	3.	4.	5.	6.
1. Agency	1					
2. IW	.90/.88**	1				
3. DWP	.90/91**	.64/59**	1			
4. DM	.27/32**	.20/29**	.30/34**	1		
5. JS	.50/50**	.55/61**	.36/30**	.09/16	1	
6. CL	.35/35**	.26/23**	.37/37**	.17/19**	.19/17**	1

Table 5. Convergent validity of the TPA-scale and its subscales, RUS/ EST samples

** Correlation is significant at the 0.01 level (2-tailed), $N = 343$ (both samples)

With the EST sample there were still weak but somewhat stronger correlations of DM with the agency dimensions. JS-scale correlated more strongly with the 'IW' dimension, and moderately with 'DWP'. The relationships of CL-scale with the TPA variables were the same as on the previous sample.

Differences in levels of agency between the samples

According to the results of an independent samples t -test, there were statistically significant difference between teachers in Russian and in Estonian schools in levels of agency dimensions 'IW': $t(686) = 3.63, p < .001$ and 'DWP': $t(686) = 4.22, p < .001$. Teachers from both types of school had relatively high levels of agency (Table 6).

	School type					
	Russian		Estonian		Total	
	Mean	SD	Mean	SD	Mean	SD
Agency	5.27	.749	5.23	.780	5.25	.764
Influencing at work	5.29	.827	5.51	.792	5.40	.817
Developing work practices	5.25	.829	4.96	.958	5.11	.907

Table 6. Descriptive statistics of TPA-scale and its dimensions for RUS/EST teachers
SD, standard deviation

Before performing a multivariate analysis of variance, the assumptions were tested. The sample size was adequate, as there were more cases per cell ($n = 343$) than the number of dependent variables (two). The assumptions of univariate and multivariate normality were not violated, as both IW and DWP had histogram distributions close to a normal distribution for both levels of *School Type*. Only eight multivariate outliers were found. The relationships between IW and DWP were relatively linear for each group of teachers. The assumption of the absence of multicollinearity was not violated, as the Pearson correlation of the two dependent variables was not very high: $r = .57$, $p < .001$. The assumption of the equality of covariance matrices was not violated, as the significance of Box's M was $p = .002$, which was higher than the threshold of $p = .00$ recommended by Tabachnick and Fidell (2007). Finally, the variances of IW were not unequal but the DWP was unequal across the two groups, according to the Levene test ($p = .541$, i.e. $p = .015$), and thus the t-test significance was evaluated for unequal variances. According to the results of the multivariate tests, *School Type* had a significant effect on the linear combination of IW and DWP: Wilks' $\lambda = .897$, $F(2, 686) = 39.16$, $p < .001$, partial $\eta^2 = .103$. According to the results of tests of between-subject effects, *School Type* had significant effects on IW: $F(1, 686) = 13.18$, $p < .001$, partial $\eta^2 = .019$ and DWP: $F(1, 686) = 17.79$, $p < .001$, partial $\eta^2 = .025$.

As shown in Table 6, IW was higher for the teachers at Estonian schools, while DWP was higher for the RUS sample. Following Vähäsantanen et al.'s (2019) logic, the items in the DWP dimension reflect the constructs connected with 'participation in' and 'transforming of' work practices, either collaboratively or individually through proactive, 'transformative' agency. Conversely the IW dimension reflects occupational autonomy and affordances for being heard by the closest community at work. The dimension not only measures personal capacity in creating novelties but also workplace opportunities and environmental enablements for such commitments. Possible explanations of such measure results are discussed in the following section.

Discussion and Conclusions

The study aimed at the modification, adaptation and validation of the professional agency measurement tool proposed earlier by Vähäsantanen et al (2019), validated so far only regionally in Finland (Vähäsantanen et al, 2019, 2020), with application to the modern Estonian education context, which combines two contradictory cultures (Vihalemm et al., 2020) and is distinct in its parallelism due to the quite weak socio-cultural integration of the majority and minority schools in a single national schoolscape. The validation of a tool and applying it to measure teachers' work-related agency in Estonia's unique cross-cultural context suggests valuable outcomes for operationalisation of the concept internationally. As the education context of Estonia offers a clear example of the morphogenetic and morphostatic contradistinction where, due to various cultural and structural complexities, majority and minority teachers may externalise their occupational identities (Eteläpelto et al., 2013) in a multidirectional logic of creative transformation versus cultural reproduction (Archer, 2013), the author validated and applied the same domain-specific instrument crafted from the cross-domain tool of Vähäsantanen et al. (2019) to the two 'cultures of teachers' separately. The scale was cross-culturally adapted through translation and back-translation, expert feedback, pilot testing, and scale refinement to provide evidence for the content validity of the scale. Validation across the two groups of teachers showed a stable two-factor structure of the agency construct among the teachers in Estonia, consistent with the factor structure of this scale across various professional domains in Finland (Vähäsantanen et al., 2019). The limitation was that items 8 and 9 (Table 4) loaded on both factors with the

Russian sample, and only on DWP with the Estonian sample. Following the factor structure in the study of Vähäsantanen et al. (2019), there was also a strong enough reason to join these two items on the DWP dimension for the Russian sample. As EFA is a theory-driven analysis and the author was guided by the preliminary studies, the factor solution seemed clear for measuring the *DWP* dimension. However, there is a need for further support of this factor structure among minority teachers, which would require a larger sample of Russian teachers in Estonia in future research, qualitative studies (such as focus groups and in-depth interviews), and a possible need for a more systematic scale translation in Russian (Wang et al., 2006).

The validity of the scale was supported by finding positive correlations with decision making, job satisfaction and collaborative teaching and learning. However, the author used the particular scales included in the survey 'Teacher 2021', which restricted the methodological repertoire. The internal consistency coefficient of the DM-scale was somewhat below the recommended threshold value, and therefore there is a need to revisit the convergent validity of the TPA-scale using some already established decision-making scales previously validated on the sample of teachers (Sheppard & Levy, 2019). Additionally, the JS-scale consisted of only three items. It is unclear whether the correlation coefficients with the TPA-scale and its subscales would differ if some longer internationally used scales which capture perceptions on more aspects of workplace affordances were utilised for validation. Collaborative learning measures may be further utilised from scales proposed earlier by Pyhältö et al. (2015).

Overall, the study contributed to the validation of the agency measurement instrument proposed by Vähäsantanen et al. (2019). However, there is a strong need to reconsider its validity in various cultural contexts, and with a more systematic scale-translation approach.

The analysis indicated there was a statistically significant difference in TPA levels between the teachers in the Russian and Estonian schools. Specifically, Estonian teachers scored higher on IW, and Russian teachers scored higher on DWP. These differences may be due to the fact that these two groups of teachers are culturally distinct and their workplace opportunities may not only be distributed unevenly, but also be perceived differently. While IW represents teachers' perceptions of such contextual affordances as the ability to be heard by colleagues and school management and a degree of latitude in making work-related decisions both in the class and in the school generally, the DWP is highly associated with teachers' sense of community and the ability to reach transformative solutions, including making them in teams, as well as the perceived freedom to speak up with colleagues. However, both communities' organisational agency has so far scarcely been explored, and this result in some ways contradicts previous literature, where it has been found that teachers from Russian schools prefer more traditional methods in classrooms, teacher-centred practices and direct instruction (Suviste et al., 2017), as well as being used to a hierarchical organisational leadership style (Kestere et al., 2020). The exercise of agency by minority teachers (Kiilo and Kutsar, 2013) may be constrained by their uncertain knowledge of the national language, which may limit their optimism compared with their Estonian counterparts. The RUS sample's higher mean scores on the DWP dimension in this light requires further exploration, with the application of qualitative methods, and can at this point be explained by the favourable school cultures of the particular schools participating in the survey. As Vähäsantanen et al. (2019) also mentioned, these theoretically based dimensions overlap and multi-layered triangulated data is needed to interpret such complex context-dependent phenomena more precisely. The general level of professional agency in both samples was quite high, with minor differences between them but, as this was the first

measuring of this work-related construct among the teachers in Estonia, other cultural and structural ‘organisational suggestions’ (Billet, 2011) of the schools participating in the study should be taken into account both regionally and internationally, as was mentioned by Vähäsantanen et al. (2019, 2020).

Main limitation of the study is that the schools were chosen on the basis of convenience sampling, meaning they themselves defined their participation, which is not a rigorous sampling technique for the quantitative method. Also, the participating schools were motivated to take part in the survey by the opportunity to be anonymously compared at the national level, and therefore we may assume these schools might have been distinct in terms of occupational affordances and agency-promoting environments.

Implications for further research

Further conceptualisation of occupational agency among teachers in cross-cultural contexts should take into account not only the transformative ‘situational logic of opportunity’ but also the ‘logic of reproduction’ (Archer, 2013). Further refinement of the TPA scale in ethnically diverse contexts may include more items related to the cultural values of teachers and their adherence to them in their teaching strategies, as well as their perceptions of community cohesion and institutional beliefs about their roles. The qualitative difference between majority and minority cohorts of teachers may be quite significant here, which can be explored further with the application of qualitative methods, as Vähäsantanen et al. (2020) have mentioned. The author believes that the study contributes to the theoretical knowledge and methodological advancement of the agency concept in diverse education contexts.

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Examining the Impact of Classroom Group Identity Development in an Urban Chemistry Classroom

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Abstract

In this grounded theory study, we follow the cases of two marginalized female students in their Regents High School Chemistry class. Both traditionally and historically, chemistry has been viewed as a challenging field of study, one promoting elite status stereotypes that often alienate and hamper students' capacity for achievement in science. Especially now that we live in an era where collaborative group learning is emphasized, particularly in urban classroom settings, it is critical to determine the effect group identity development has on students' perceptions of themselves, their social groups, and the implications when learning science content. This research expands the current work in group memberships and social identity by utilizing an emergent model we are calling Classroom Group Identity or CGI, which stems from theories of social identity, interaction ritual chains, and communities of practice. Using the conceptual lens of classroom group identity, class surveys, interview transcripts, classroom observations, and classroom transcripts, a positive change in emotions was observed in the values, perceptions, and behaviors of these two students. In turn, CGI development, described as a micro scale collective or social identity, influenced the construction of classroom leadership and trust in both marginalized female students and provided a means to encourage and support the learning of chemistry topics.

Keywords: Classroom Group Identity, Collective Identity, Urban Science Education, Chemistry, Gender, STEM Education

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Introduction

Although little research has documented group identity development, this study looks at classroom group identities or CGI in one high school science classroom. We define CGI as the classroom group membership of the teacher and students in which solidarity building interaction rituals, (interactions between two or more individuals that generate symbols of group membership), positive emotional energy (feelings of motivation and enthusiasm when engaging in successful interaction rituals), and classroom discourse (classroom discussions that exchange and share information) are cultivated in a collaborative learning environment to develop a sense of belonging to science. Like other social identities, CGI is a temporary identity because it is dependent on continuous interactions that occur within the classroom. In this case, the interactions are focused on those between the chemistry teacher and two of his female students, and these interactions occur within a small and collaborative chemistry classroom environment. Over the course of the academic school year, CGI occurs in four stages (a) establishing collaborative classroom group dynamics and shared emotions; (b) establishing teacher roles and student roles; (c) developing sacred objects, content knowledge and/or science discourse; and (d) developing a sense of belonging to science. This sense of belonging references both a strong affiliation to the learning of science and serves as the potential point of entry for students to later develop long-term science identities.

To understand the development of CGI, we followed a grounded theory case study approach, where theory emerges and is grounded in the context of the case under study. We used ethnography as the predominate methodology for observation, grounded theory in our analysis, and case study to look specifically at the development of CGI in the chemistry classroom. Robert Yin (1994) suggests that case studies provide holistic and enlightening perspectives of true to life situations. As both process and product are of interest and grounded theory is a subjective process that relies on the careful gathering and analysis of data, the case study approach expands the limitations of grounded theory. Here, the teacher-student interaction within the chemistry class composed a bounded system to better identify the shared behaviors, attitudes and language of a social group.

We specifically looked at the development of classroom group identities of the chemistry teacher, Michael, and of the 18 classroom participants, two female students, Ariel and Simone (all names are pseudonyms) were identified as in-depth case study participants due to their attendance and availability.

Michael, in his late twenties, was a native New Yorker. He had attended undergraduate and graduate school in the state. As a second year teacher at Urban Chemistry High School, Michael taught the class we observed as researchers, as well as four other chemistry classes. All his students called him Mr. Michael. He taught two classes of grade 10 chemistry (Regents and non-Regents) and two classes of grade 11 chemistry (Regents and non-Regents). Michael often built his own chemistry models for classroom use, incorporated classroom sing-a-longs, small group work, short lectures, chemistry demonstrations in class and in the lab, and utilized education technology and media like remote clickers, films, or video clips to supplement his Power Point presentations. Michael was interviewed three separate times in the course of the academic year: October, December, and June.

From the data collection and analysis, a classroom group identity model is constructed as introduced in Figure 1.1 and further elaborated in the following four stages: (a) Stage One: Establishing Collaborative Classroom Group Dynamics and Shared Emotions; (b) Stage

Two: Power Dynamics Establishing Teacher Roles and Student Roles; (c) Stage Three: Developing Sacred Objects, Content Knowledge and Science Discourse; and (d) Stage Four: Sense of Belonging to Science and Completing the Model.

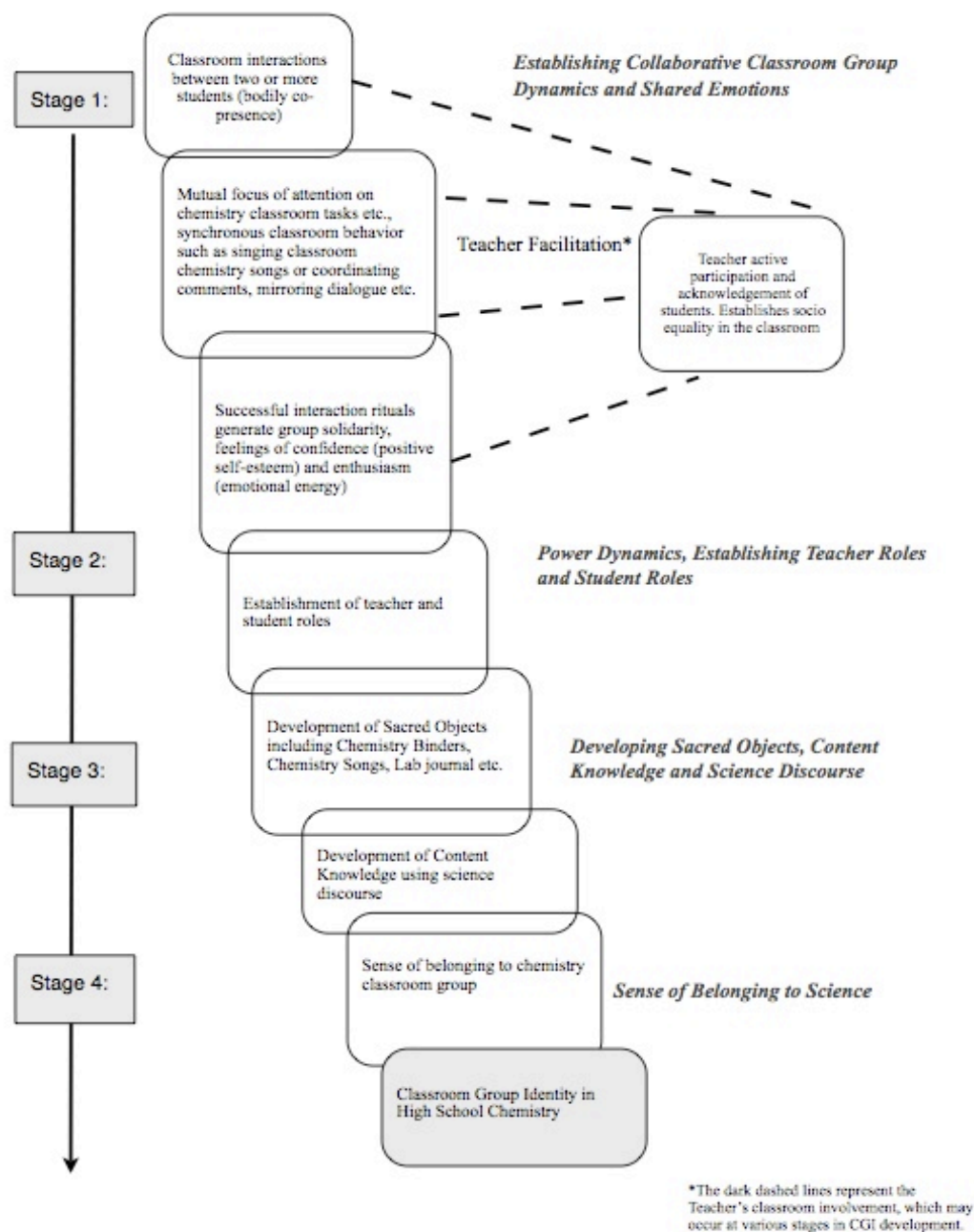


Figure 1.1 The mechanisms that construct classroom group identity in high school chemistry

Stage One: Establishing Collaborative Classroom Group Dynamics and Shared Emotions

The first step was to construct a collective classroom group. Here teacher and students interact, share, and exchange knowledge, information, and ideas amongst its members. This was determined by the students' participation and willingness to work in groups and share answers during class.

Stage Two: Power Dynamics Establishing Teacher Roles and Student Roles

Even though these students are cooperative and participatory as shown by raised hands bidding for the floor to ask/answer questions, Michael's role as the chemistry teacher was neither static nor permanent. Throughout the academic year, Michael reminded students of procedures, how to develop their ideas, deliver instructions by providing directives, which are typical commands of classroom teachers, such as asking for a response from students, calling on specific students to encourage those that did not participate in class, encouraging discussion, and repeatedly circling the classroom when students worked on chemistry activities or problems in their groups. Michael also rarely fumbles or stutters, so this displays his articulate powerful position, yet also remaining aware of his position as a teacher and also aware of his limitations.

Stage Three: Developing Sacred Objects, Content Knowledge and Science Discourse

Third, by engaging in collective and synchronous behavior, the students are organically building membership not only to each other as a class, but also with their teacher. The relationship building is significant in building a classroom group identity. Within the classroom, acts of membership and solidarity also deliver new meanings to the objects used in these rituals. For instance, initially the student binders, orange review books, scrub top uniforms, and reference tables may appear to be nothing but class materials, yet over the academic year, the students came to rely on these classroom objects as important artifacts in the science classroom.

Stage Four: Sense of Belonging to Science and Completing the Model

The fourth component of the classroom group identity model is having a sense of belonging. This component completes the CGI model. In this classroom's case, the bonds of social interaction strengthen over time if there is constant participation and collaboration taking place. Still, it all depends on the frequency that these interactions occur to generate rituals, roles, norms, symbols, etc.

Ariel

At only 15 years old, Ariel was a very mature teenager who presented characteristics of poise and care. Having emigrated from Puerto Rico to the United States, she lived in the Bronx with her family. She automatically stood out in class not because of her very light complexion or long brown hair but due to her relatively quiet and timid demeanor. This appeared rare for the lively chemistry classroom. In fact, she was only one of six students who began attending her chemistry class at 7:30am, a half an hour earlier than the start of school. This pre-class time was spent asking Michael questions about the previous night's homework or reviewing topics from earlier lessons. While most of the other early attendees asked each other questions and reviewed in small groups together, Ariel sat alone and did not participate in the conversation unless Michael asked her to contribute. At these times, Ariel was attentive to the teacher's detailed descriptions of the homework problems and watched her peers interact in the center of the classroom while she copied down notes Michael wrote on the board.

During the initial two months of observations, we noticed a sort of ritual in how Ariel came to class. Ariel appeared to be quite shy with her classmates, rarely talking to any of the

students seated next to her either before or after the start of class. She often entered the classroom only greeting Michael, then taking a seat at her desk and getting up only to grab the chemistry review books located at the front of the classroom, then returning to her desk with her face held down.

Separately, an interesting aspect of her classroom behavior was her level of participation during the actual class period. From the very first observation of the class, Ariel was the only student who raised her hand to every question Michael posed. Although it seemed she preferred to work alone, the fact that she attended class early and was involved in classroom discussions, though most of them directed toward the teacher, suggested that there was a desire to join and participate with her classmates. Since she was arriving early and often volunteered to help Michael co-teach. This required Ariel going to the board, writing down, and describing her reasoning in detail for answers to questions. Early in the school year, we were unsure if this was merely an aspect of her personality, being timid and reserved, yet wanting to “show-off” her knowledge, or was she deeply interested in learning chemistry and desired to help her peers learn chemistry.

When asked about helping her classmates both in and out of class, Ariel stated, “Yea, if someone asks for help and I understand the topic greatly I will help.” Even though Ariel would readily help her peers, she first had to feel confident in actually knowing the content before providing the help. Having science content knowledge was crucial for Ariel to be able to help her peers, in the chemistry classroom and in the laboratory setting. She did not see helping her students as competition, unless it was with an assignment. For instance, she stated: “Unless there is a competition assignment Mr. Michael may have assigned, I try to help my classmates.” The competition assignment that Ariel was referring to was simply homework questions assigned as chemistry homework free passes. These may also be used as points for the weekly Friday exams. Every student had a chance to win these passes, which were considered honorable class prizes. The value placed on them was viewed as a sacred classroom object. Ariel restricted the degree to which she was willing to help her classmates in an effort to remain a top student and be recognized as such.

During the first several weeks of observations in the chemistry classroom, Ariel was a floater group member, collaborating and participating in group work only when Michael requested it. This type of interaction further developed Ariel’s own personal identity of isolation rather than a member of the collective as a group. She did not resist helping her peers unless she felt unable, unqualified, or not knowledgeable to help; still, this depended upon the circumstances. By only participating when she was confident, this ritual limited her involvement to further herself academically or as a collective member of the classroom community. As a borderline, marginal collaborator, who helped her peers but only on select occasions, Ariel was not well integrated in the classroom community.

By mid-October, Michael gave Ariel a great deal of classroom responsibility as co-teacher, which promoted her within the classroom. Ariel was made a co-teacher in the chemistry classroom. Although Michael was guiding the lesson, Ariel was there to assist him and to ask questions to her peers. Co-teaching became a common occurrence in the chemistry classroom with Ariel. This role served as a great form of motivation for her, and it offered her a space in the classroom community to share her knowledge and to feel more integrated into the class. Michael shared the reason for selecting Ariel as co-teacher was to promote student leaders in the science classroom and for students to help other students gain confidence and interest in chemistry. In Ariel’s case, Michael, as well as the entire class, accepted Ariel in the role as

co-teacher. The “golf clap” or quiet applause represented a collective ritual in which all students were encouraged to engage in praise and acknowledge Ariel’s class participation. It was vital that Ariel felt included and Michael as the teacher made it a point to further support Ariel’s inclusion and leadership in the chemistry classroom. Michael too developed higher expectations of Ariel as the co-teacher.

Consequently, Ariel began to feel socially accountable to the classroom community. Ariel increasingly provided extra support to her peers more regularly or consistently over the academic year. In return, she was publically praised by Michael and her classmates within the classroom community, either by golf clap applause when answering a question correctly or verbal thank you’s from Michael and the class. Following these moments, and increasingly over the academic year, Ariel would smile more in class and became far more sociable, especially with the other members of the focus group. Rather than sit alone during the pre-class time period, when she arrived to class, Ariel joined others at their desks. She would sit with two other female focus group members as they sat, ate breakfast together, and sang pop culture songs. Ariel also at times “allowed” the girls to comb her long dark hair.

As a student in her chemistry class, Ariel often viewed herself as smart but also lazy. She stated that school came easily to her; thus, she needed to find inspiration and excitement to entice her to attend school. Although Ariel said it was “weird” that she actually liked chemistry, she described her enjoyment with chemistry as a “great bond towards chemistry.” Over the course of the year, her thoughts on chemistry intensified directly relating her success as the co-teacher and being accepted by her peers in the chemistry classroom. Moreover, Ariel attributed her interest in chemistry to Michael. She could relate to him, and she found him to be teacher who stood out among her other teachers. Michael used solidarity building rituals in the chemistry classroom which Ariel found to be culturally relevant. Although she thought one of the rituals-- class sing-a-longs --was “corny”, she still appreciated Michael for not being like her other teachers. His difference made him “stand out” and this also made him an effective and relatable teacher.

By December, Ariel no longer mentioned classroom competition as a means to block her fellow class members from excelling. Instead she stated that although she might feel competitive about grades, “the competition is good sometimes but like when it comes to the bottom of it, we are all here for each other.” Ariel, as part of the classroom group identity, no longer felt isolated or excluded from the classroom group. She was no longer confined to a role as student learner, student floater, sitting quietly alone. She instead referred to her classmates as being “there for each other.” By becoming an integral part of the classroom community, Ariel changed her level of classroom participation and also made it a point to state she was there to help her friends and class members learn and understand the content of chemistry.

At the mid-year interview (December), Ariel shared more of her interest in chemistry and her future aspirations. She started watching Grey’s Anatomy television show and became interested in being a specific kind of doctor: “Ever since I was like 5 or 6, I’ve always said I wanted to be a doctor and then I was probably about 9, 10 [years old] when I started saying I want to be this specific doctor [childhood trauma general surgeon].” Ariel also shared her identity as a chemist:

Stefania: Do you think of yourself as a chemist when you are in chemistry class or chem lab?

Ariel: Not really but given the name I would consider myself more of a student chemist.

Although Ariel had interests in becoming a doctor since the age of five, she felt a sense of belonging to science due to her chemistry class interactions. She did not admit to feeling a sense of belonging in her past science classes, like anatomy and biology, though she liked those sciences too. Regardless, in her current role as chemistry co-teacher, she did not primarily feel like a chemist-- but a “student chemist.” This identity was enough to maintain her interest in chemistry for the year.

Simone

Simone moved from Jamaica to the Bronx at the start of 9th grade. She described the move from the Caribbean to the United States and her new school, The Urban Chemistry High School, as a “migration.” Simone found herself in a period of a transition during her freshman year, having missed over three months of school and not only being thrust into a new school culture but a new culture altogether. Unlike her freshman year, Simone anticipated starting her sophomore year with a strong ambition toward reaching her future goals. Her cultural background played an important role in how she viewed herself. In an early interview where she discussed her family background, gender, and ethnicity, she noted the love and attention she receives from her family:

I grew up around my large family consisting of old and young and they’ve had a major impact on the student and person I am today. My parents are loving and encouraging in everything I do and always want to be involved in my life. ... I think your race and gender does have an impact on who you are but not how far you can go or achieve in life. Being Jamaican, I am proud of my ethnicity and ancestors and unconsciously my ethnicity does round out who I am and how I behave.

Simone specifically stated the following about her future interests and education: “I love learning different languages and how people with these languages interpret different things and would like to major in many languages in the future.” Because of her passion for learning and studying, the need to fulfill a hunger was built from a foundation rooted in her family’s culture and from family support, which enhanced her ability to embrace her own individual sense of self. Simone did not place any limits on her potential to achieve her dreams. She stated that even though she was female, a minority, and an immigrant, these identities did not determine her future capabilities, nor should it for anyone else. Simone was determined to achieve her goals and her strong sense of self was her personal identity.

Others also recognized Simone as a student who “loved” science. Simone was often referred to by Michael as an individual that was “really good at helping out” and even “tutoring” one of the students in Michael’s third period class. Because of Simone’s tutoring, Michael stated that “the student’s grade had “sky-rocketed.” Michael had established an incentive program in which students of varying abilities were paired with other students needing assistance. The student tutors would help others who needed more assistance in learning and understanding chemistry. Simone showed leadership skills as a chemistry tutor, and her efforts were acknowledged, appreciated, and applauded by Michael. The acknowledgements that Simone

received from Michael were reciprocated. Like Ariel, Simone attributed a great deal of her interest in chemistry to Michael:

I think he stands out compared to all our teachers. He's really effective. He's a really good teacher. ...Not saying that the others are bad but I don't know like how he approaches it. It's like you actually understand what you are doing.

Simone described Michael's teaching methods as creative and effective in his approach to teaching chemistry. Simone appreciated his methods, particularly his introduction of chemistry songs. She shared:

Yeah and he's the only teacher I know that can associate chemistry with songs.... I was very shocked. I was very shocked. He was like, 'Oh I have a song for you,' and I was like, 'What song. Is it about chemistry?' Of course it is about chemistry. (laughter)... I was like oh, 'Ok.' ...Then he tried to sing. (laughter)

Simone said Michael's inclusion of song was as an "effective" tool that she had never been previously exposed to in school. Michael's use of chemistry songs was especially appreciated, since Simone was an avid singer.

At mid-academic year in a December interview with Simone, she stated that she had not always loved science. She explained that in grade 5 she started to understand science when she "got really deeply introduced to biology." She understood biology and how to relate the many concepts in biology. She found biology "easy" and "started liking it. It just got easy... and it was like ohhh cool. Pretty awesome." Thus, her first remembered experience of liking science was in elementary school and learning biology. In addition, as Simone was able to see "how this relates to that," learning and understanding science became exciting and "awesome" to learn. With continual observations of Simone over the second half of the academic school year, she interacted with more students in both the classroom and laboratory spaces. Her classmates often asked her to join their groups and help them conduct their experiments. The call for assistance was not one-sided, because Simone often asked her classmates for help as well. This also supported her earlier comment that having a group structure in class helped in learning from multiple perspectives and learning new course material. She had the respect of her peers, and she also learned from them.

By the end of the school year, Simone was asked about responses she gave on the Science Is Me Survey. Although her final perceptions largely remained the same, she no longer thought scientists worked by themselves. In fact, she strongly disagreed with her previous choice and also changed her opinion about friendships she made in the class. Rather than stating none of her closest friends were in chemistry, which she responded on the early survey, she responded now having met and made many of her closest friends in her chemistry class. Simone also summarized her chemistry class experience:

This year was my first time doing chemistry and honestly I'd do it all over again. My chemistry class was fun, informative, crazy, and definitely interactive. My teacher's teaching method was very effective and made chemistry seem easier than I thought... Chemistry class sort of forced me to interact with classmates I didn't normally speak with and made me more comfortable with my peers. The atmosphere was fun and sometimes too noisy but mostly interesting... Chemistry gave me a chance to understand how to help my classmates and figure out more about them and they about

me. I think many of them learned who I really am and we got a chance to rely on each other.”

Therefore, the collaborative and supportive learning environment that made up Simone’s chemistry class was a place where overtime she continually developed an identity in chemistry as a tutor and made close friendships. Simone participated in pre-class and during class as a means to help her classmates also connect to chemistry concepts. In the process, relationships of classroom community were made. Thus, her chemistry class gave Simone an academic platform to explore her multiple identities—that of student, group member, and scientist.

Conclusions

From observations and interviews, it was determined that Michael’s practices as the chemistry teacher deeply influenced both Ariel and Simone’s engagement, participation, and their pursuit of classroom leadership. Both of these females were also able to develop classroom group identities as student chemists. Based on their responses and involvement in the chemistry classroom and laboratory setting, Ariel and Simone, as well as their peers, helped to unearth the processes that influenced the development of a classroom group identity in their urban chemistry classroom. This meant that the two focal students and their chemistry cohort, the entire class, underwent a multi-stage process in which they formed memberships, roles, rituals, symbols, and solidarity, comprising all four segments of CGI. Specifically, Ariel and Simone started out merely as classmates, but by the end of the year, both had changed their perceptions of science and each other. Based on interactions within the micro scale collective identity of the chemistry classroom, Ariel and Simone demonstrated increased levels of student engagement, participation, power, and development of identities in chemistry.

Upon analyzing the cases of Ariel and Simone, two distinct themes arise: first, students and teachers benefit from classroom group identity development because there is reciprocated trust and values tied to leadership that is demonstrated between students and their teacher. In this manner, competition is limited even amongst peers. In its place students encourage and support each other in understanding topics in their chemistry class, and concurrently strong friendships are formed. Second, students’ perceptions of chemistry as a field of study improve, and they begin to feel stronger attachments to learning chemistry. Classroom group identity allows for interaction rituals as the fundamental ingredient to generate group solidarity and a sense of *belonging* to high school chemistry as the end of the identity process.

Ariel and Simone also took on new roles, such as co-teacher and tutor, which support their development of classroom group identity. Both participants are designated as leaders because they are active learners and attain teacher roles in the classroom. This is particularly salient because in the beginning of the school year, Ariel is shy, reserved, and keeps to herself; and though Simone is funny and happy, she gains respect from both Michael and her peers as a chemistry tutor. Since CGI feeds off of synchrony, and positive emotional energy to develop a sense of belonging, even more roles that are assigned to Ariel and Simone, and others within the classrooms, is likely. In a CGI community, roles are generated, supported, and appreciated to support learning.

The value of interaction ritual development and collaborative community environments that everyday activities, like homework review or classroom sing-a-longs in the classroom are shown to potentially encourage positive emotional energy and produce classroom group identities that align to science. Thus, CGI has the potential of being an avenue of research that moves towards promoting positive science experiences and science identities, especially in more male dominated fields like the physical sciences. Much like Lave and Wenger's (1991) views of legitimate peripheral learning, Ariel seems to designate herself as an active participant but at an apprentice level. When she is in this learning environment, it not only gives rise to her feeling of community but also allows her to be recognized as a class leader.

By the end of the year, Ariel and Simone both feel they either know more chemistry than their peers or possess an equal level of content knowledge. Ariel and Simone also relied on each other for help in order to better understand the topics from their chemistry class. These students develop a collective sense of self that includes interdependence on their classmates and teacher, which in turn provided them with a sense of security in their learning, sharing, and understanding of chemistry. In October, Simone indicates that although she strongly enjoys science and views her chemistry classroom as a social field, her portrayal of professional scientists is not as defined or so positive. She considers scientists as men and women who do not work in teams, did not collaborate, and often worked alone. Yet by June, all these negative perceptions changed.

Simone also begins to communicate more and share personal aspects of herself to both her teacher and classmates. At the start of the academic year Simone is more reserved and did not dispel her emotions or ideas, much like Ariel's early behavior. Again, by the end of the academic year both girls are able to open up to more modes of communication, that is speaking to their teacher and to fellow student members, including those they at first did not know.

Michael entrusted Ariel and Simone with leadership positions and by working together with him as a guide, the entire class benefited from the sharing of their knowledge. Ariel in particular felt a sense of accomplishment and confidence once she taught the material to others. Both girls also recognize their own strengths and limitations when in their leadership roles in class. In the CGI process both students also gained the inner confidence and acquired sufficient content knowledge to be classroom leaders. Here, the full class of participants is sharing and developing relationships amongst members of the community that positively influence the community as a whole. Again, the more that people want to engage in such positive interactions, the greater the production of emotional energy. Specifically, the more emotional energy an individual can foster, the greater the chances that the individual will engage in the same action in the future, especially if emotions or feelings arose that inspired positive feelings like happiness or confidence.

The cases of Ariel and Simone also suggest moving toward developing positive attitudes toward chemistry, not just science. Ariel and Simone "liked" science starting from childhood, but found many benefits of learning chemistry in high school to support their early interests and future careers in science. This element of building from positive experiences in science is critical to help encourage and attract young women to the sciences. Michael serves as a facilitator in Ariel and Simone's development as classroom leaders. But in order to be a facilitator for leadership, Michael relinquishes authority and power as the teacher in the classroom. Lisa Hobson and Lynn Moss (2010, p. 30) state "leadership should be shared and performed in strategic ways and synergizing efforts should be employed for making learning

connections”; thus, Michael’s role does not need to be limited as the sole authority of leadership the chemistry classroom. Individuals may be powerful in one respect and powerless in another. Therefore, in the science classroom the teacher and their students alike can be both powerful and powerless.

Although Michael’s race, upbringing and culture are different from that of his students, the dynamics that we observe in the class do not infer a cultural divide or resistance to learn by his students. Based on classroom group dynamics, a symmetrical relationship is seen: Michael’s role as a teacher exists because students exist. Thereby teacher and students must negotiate the interplay of power and solidarity occurring in groups. In the classroom, the teacher has the opportunity to influence, to make the ultimate decisions and to relinquish or share that power with other group members. Leadership for example, as shown in Michael’s incentive program demonstrates his flexibility as an instructor, his cultural awareness, and his dedication to academic and professional excellence. Students like Ariel and Simone are matched to his struggling students and are able to demonstrate their strengths and more importantly share their knowledge with other chemistry students to collectively form a classroom group identity.

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‘Off-Site Insights’ – A Qualitative Study of Teacher Professional Development Through the Pandemic and Beyond

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Abstract

The *Professional Development Centre (PDC)* at *Mallya Aditi International School, Bangalore, India*, began teacher training when Covid-19 hit and all interaction moved online. The aim was to create a democratic and organic training process with equal understanding of one's colleagues as well as the goal ahead. PDC also reflected on generic training practices that never inquired about, or acknowledged, teachers' classroom strategies. This paper will present how we accentuated teachers' voices. The projects involved all 120 teachers, including the principal, irrespective of the department or section a teacher belonged to. Three projects continued over two years while we, as trainers, catered to awareness, sensitivity, and successful utilization of technology. The three major endeavours are incorporated in this paper.

–*The Aditi Learner Traits* came from the floor and brought forth the attributes that teachers wanted to cultivate in students.

–*The Aditi Teacher Talks* included a series of sessions sharing ideas throughout school and honing workshop presentation skills.

–*The Reading PoDs*, in groups of three, focused on discussing eclectic articles, individual teacher philosophies and creating teacher portfolios. We stitched these conversations together to weave the Aditi Teacher Philosophy.

Professional development is most effective when the whole diet of innovative implementation has the teacher as the main stakeholder, who has joyfully engaged with the shifting contexts in a dynamic educational model. Such off-site insights led to the *Education Reimagined Project* which lays out a clear vision for the future of teaching and learning.

Keywords: Bottom-Up, Learner Traits, Insights, Hands-On, Reimagined

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Introduction

Mallya Aditi International School (MAIS) is a private, non-profit school located in Bangalore, India. It was founded in 1984 and is governed by the Ujjwal Trust. The school has four sections – Elementary (Std 1-5), Middle (Std 6-8), High (Std 9-10) and Pre-University (Std 11-12). The number of students in each section is given below:

Elementary: 264

Middle: 146

High: 119

Pre-University: 188

During an off-site retreat in 1999, a consensus emerged to make the organizational structure more lateral, shifting some of the decision-making from the Principal to Section Coordinators. In June 2020, the terminology was amended, and Section Coordinators were renamed Heads of Sections, indicating that the decision-making powers of the Section leaders had broadened further. The move was a deliberate one and the pandemic helped in the practice of shifting more responsibility from the Principal to the Heads of Sections, faster and easier. This model has segued very effectively into the organisation as we go forward into the new, offline academic year.

In June 2020, the Professional Development Centre (PDC) was initiated with the main aim of developing and fostering innovative teaching practices. The Head of PDC was also inducted into the SMT (Senior Management Team). The SMT now consists of Heads of Sections, Head of Counselling Services, Head of PDC, Head of Advocacy & Outreach, Administrator and Principal.

The PDC is currently a three-member team consisting of the Head of PDC, who has been a senior teacher at international schools for over 30 years. The other two members of PDC include an English teacher with more than 44 years of teaching experience with twenty of those years spent as part of Aditi, while the third member is a research associate with ten years of varied experience as a teacher and as a journalist.

Given school closures due to the pandemic through June 2020 to December 2021, the PDC team had to do professional development entirely online, with a new dimension of embedding technology to make teaching and learning effective. Earlier probes and informal exchanges had indicated that, while many teachers did not believe professional development had helped them prepare for the changing nature of their jobs, others felt that professional development was more of an annoyance and a compulsion – one did not attend by choice. Many schoolteachers acknowledged that teacher training was barely on their minds when traversing through the labyrinth of a harried school day.

To quote from *Professional Development Risks and Opportunities Embodied within Self Study* by Margaret Macintyre Latta and Gayle A Buck - “Individually and collectively, self-involvement instils and re-instils purposeful participation within teaching and learning, articulating why educators orient pedagogical practices in particular ways. This is what is so desperately missing from the language and practices of professional development ‘fixes’ that tend to undermine teacher and student participation in the learning process.”

In the same text, it is mentioned that repetition is a notion that Risser (1997) traces back to Aristotle, referring to the turn and re-turn to self-understandings, acting on possibilities.¹

Therefore, it was important to remember that educators need and want by far the same things that students do. Impetus, inspiration, validation and a general sense of exhilaration that infuses an animated and fruitful ambiance into the classroom. Keeping this, as well as the devolved Aditi structure in mind, the PDC decided to opt for *a bottom-up* approach to professional development for the following specific reasons:

1. The decentralised school organizational structure.
2. Consensus method of operation of the Senior Management Team.
3. Shift in thinking about teaching and learning due to the pandemic where teachers had to make quick decisions in online classrooms.
4. The PDC also had an innate conviction that teachers were the best repositories of what worked in the classroom.
5. In an argument for teacher-led learning, Dyer (2013) describes a few elements that make this process worthwhile for participants: choice, flexibility, incremental steps, and supportive accountability.²
6. It is increasingly recognized that opportunities for Continuing Professional Development (CPD) are needed to support teaching as lifelong learning, and that if these incorporate a nurturing bottom-up approach, it is more likely to lead to teacher empowerment.³

After much brainstorming and soul-searching, the PDC put a three-pronged system in place. All three steps ran concurrently, and it was posited that the main stakeholders – the teachers – would feel motivated enough to implement and then execute the building blocks of each exercise.

Step 1 - June 2020-September 2020

Traits that Aditi Teachers wanted to develop in the Aditi Learner.

The school is affiliated to the Cambridge International Board which has learner traits clearly articulated.⁴ The school offers the Delhi Board examination as well. There is also a specially curated internal curriculum till Std 8. The first step of the PDC was to conduct a study of what traits teachers wanted their students to develop in the course of the teaching/learning process.

¹ See *Margaret Macintyre Latta and Gayle A Buck: Professional Development Risks and Opportunities Embodied within Self Study.*

² See *Angela Macias: Teacher Led Professional Development: A proposal for a Bottom-Up Structure Approach.*

³ See *Mark Wyatt and Elena Oncevska Anger: Teachers Cognitions Regarding Continuous Professional Development.*

⁴ Refer, <https://www.cambridgeinternational.org/>

-Confident in working with information and ideas – their own and those of others

-Innovative and equipped for new and future challenges

-Engaged intellectually and socially, ready to make a difference

-Responsible for themselves, responsive to and respectful of others

-Reflective as learners, developing their ability to learn

The Process

Respondents: All members of the Teaching Faculty (125)

Aim: A common Aditi Learner outline / summation / traits which would help teachers move in a shared direction towards a common goal. It would be what teachers wanted and not what was imposed on them. Aditi teachers needed to own the learner traits.

Methodology: Teachers were asked to name three traits that they wanted developed in their students. No traits were given to them either as examples or options. While this had its advantages of giving choice to teachers, it also made the task of collating the data challenging. To make the process as transparent as possible the choices were collated under broader headings and terminology was explained to show what was included under each such heading.

Traits with similar attributes were put into groups. Eg. The broad heading ‘Resilient’ included all the following responses that had come from brainstorming group sessions in Elementary School.

- Taking ownership
- Acknowledging failures
- Perseverance
- Reflection
- Honesty
- Self-worth
- Adaptability

In the same way four other categories were selected after codification of the multiple inputs that were received. The teachers felt that there could not be a hierarchy in the list of traits.

Results: The data was further analysed⁵ and five comprehensive *Aditi Learner Traits* were identified. These were to be applicable across all sections of the school.

Aditi Teachers would want their students to be:

- Independent Learners
- Collaborative Workers
- Critical Thinkers
- Empathetic
- Resilient

A number of conversations ensued between the PDC and teachers from across the school, on a one-on-one basis or in small groups. The final goal denoted by the Aditi Learner Traits went beyond the academic requirement of examinations. This evolved into much greater clarity for lesson-planning. Teachers were encouraged to interpret the existing syllabi with elements that would foster, as seamlessly as possible, the dissemination of the above-mentioned Aditi Learner Traits. It was quite straightforward to promote this ideal because the teachers themselves were committed to the significance and advancement of these traits.

⁵Inputs by Dr. Shailaja Sharma, Dr. Vandana Goswami and Dr. Neena David.

Several such ‘Best Practices’ were shared in small groups by members of all departments. This, then, evolved into a much wider compass that brought the entire faculty into focus and resulted in the next step.

Step 2 - January 2021-October 2021

The Innovative Teaching Practices that already existed in Aditi and could be used to develop these traits.

The Process

Respondents: Across sections and subject departments, 59 teachers shared their teaching practices individually, or as group presentations. Other teachers signed up for the sessions in accordance with their own choices and interests – each session had a maximum of twenty participants. It did matter which discipline was being showcased – the participating group was always an eclectic one.

Aim: Collecting the best practices around teaching and learning and showcasing the combined wisdom of a committed teaching circle.

Methodology: Every teacher, including the principal, was requested to share any two of the most exciting and inventive teaching experiences from their whole career. It did not matter if the experience took place in a school other than Aditi. A time frame of three months was given, at the end of which, the PDC had an invaluable repository of teaching practices and proficiencies. After this, material was duly sorted and systematized, and a series of talks called *Aditi Teacher Talks* was organized by the PDC. Each session was of 90 minutes duration which included around 15 – 30 minutes of Q & A.

Results: The following are the workshops that were conducted under the aegis of Aditi Teacher Talks.

January 13		Please sign up for only ONE session			Timings: 3.15 – 4.45 pm	
Book Club	From Scripting to Production	Creating Engaged Learners	Innovation Workshop	Second Languages	Student-led Collaborative Learning	Turing Test for Teachers
Getting Students To Read	Insect Play & Matilda	Personal/ Social/ Emotional Development	Going from STEM to STEAM	Blended Learning	Students figuring out Collaboration	Competing with Computers
January 27		Please sign up for only ONE session			Timings: 3.15 – 4.45 pm	
Creating Digital Books	Second Languages	The Art of Story-Telling	Master Chefs in the Classroom	Learning Through Games	Activities for Student Engagement	The Lakes Project
Interactive Session	Digital Techniques & Activities	Interactive Session	Skill Building with Food	Experiential Learning	Inside & Outside the Classroom	A Multi-disciplinary Approach
February 3		Please sign up for only ONE session			Timings: 3.15 – 4.45 pm	
My Subject in the News	Detecting Authorial Bias & Fake News Online	Creativity in Physics & Mathematics	The Human Element: The Most Interesting Thing, Ever	Creative Writing	Truly Evil Writing Tasks & Research Projects	Can Students Actively Participate in an Online Class?
Using Newspapers to Teach Law & Sociology	How to Verify Sources & Information Online	Includes a Showcase on the Trip to Kuppam	Stories Behind the Information	Interactive Session	Assignments on Real World Problems for Critical Thinking	Role-playing for Engagement
February 17		Please sign up for only ONE session			Timings: 3.15 – 4.45 pm	
Interrogating Notions: Equality, Liberty & Justice	Using Technology Creatively in Math.	Interactive Psychology	Inter-disciplinary Approach to Learning	Sneak-Peek: A Journey with Sherlock Holmes	Inventions for Flood Management	Would you rather WALK backwards, or RUN for the rest of your life?
Making Sense of Federalism	Use of the White Board	Activities to build Resilience & Empathy	Interactive Session	Interactive Session	Student Creativity through Collaboration	Supporting Joyful Learning & Emotional Engagement
October 21		Please sign up for only ONE session			Timings: 3.15 – 4.45 pm	
What If? Fallacy – What's that?	Chemistry is Everywhere	Parts of a Cell	Teaching Formations of Mountains Creatively	Gender Fluidity: Student Perspectives	Math Stations	PE – The Challenges Faced During E-learning
Building Resilience in English Language Classes	Building Appreciation of the World Around Us	Flowcharts & Applications in Biology	A Diverse Presentation	Students' Discussion & Questions	Differentiated Instruction	Three Presentations

Table 1: The 'Teacher Talks' Project

These talks helped not only to document and articulate, but also recognize and appreciate the sagacity that already existed within the school community. Following the same format, the PDC hopes to showcase more teachers' innovative practices during the next academic year.

Step 3 - June 2021-June 2022

Capturing Personal Experiences

The Process

Respondents: 39 High School & Pre-University teachers

Aim: The premise that the PDC team began with was as follows -

A teacher can inspire learning by being a learner. In fact, a teacher often helps to create new knowledge by continuously examining one's own teaching methods and finding novel ones. PDC wished to create a safe forum that would allow teachers to do all of this, in very small groups, away from any sense of pressure.

The first issue was to discover if individual teachers had the discernment and appreciation of their own teaching philosophies, and whether their values and beliefs, as they related to teaching, were clear and succinctly articulated. What in their view were the factors that made for an excellent class and a class that did not go as planned? This also included their insights of online classes during school closures. Besides, the pandemic had also distanced teachers from their relaxed, small group discussions in informal settings. In-depth ponderings, dialogues, parleys had to be restored, rethought and reconsidered. This led to the development of the Reading PoD.

Methodology: Each Reading PoD was structured in the following way:

Number of Teachers in Reading PoDs: 3 (generally from different disciplines)

Number of Reading PoDs: 13 (High School and Pre-University Section teachers)

Timeframe: Each session was of 40 minutes duration and each group of 3 teachers had a session once a week, for a period of 4 weeks.

Week 1: Session 1: Individual Teaching Philosophy

Aim: To proffer teachers options that gave them ownership over their own Teaching Philosophies while working in small, relaxed, professional learning groups fortified by informal discussions over diverse subjects.

Methodology: Each group was eased into thinking about individual teaching philosophy and the role it played in planning the lesson and dealing with class dynamics. Did one's teaching philosophy change across subjects (in case a teacher taught multiple subjects) or across sections?

After discussion, the three participants were given time to express in writing what their own teaching philosophy might be. These responses were then documented and held in deferral till the fourth and last session.

Results: As the PDC team probed the teaching philosophies at hand, it was clear that these were mostly looking at the larger picture that went beyond the specific class or the subject.

The goal seemed to be to take the students 'beyond the benchmarks' of syllabi and examinations. Several significant issues were gleaned from this session.

Main Teaching Philosophies	How They Were Expressed
A relationship between teacher and students is the most important. This was even more so during online classes.	<ul style="list-style-type: none"> a) I believe in making learning more productive so that students can relate their learning with day-to-day life. b) Subject-specific knowledge becomes redundant unless students learn how to use what they have gleaned in a constructive, positive way, for the betterment of society.
Recognition that the classroom could be an uncomfortable space, where discussions may not go as planned. A teacher needs to be prepared for the unexpected.	<ul style="list-style-type: none"> a) The fertile class will have to be a liberal space. This involves enabling students to make sense of society in a classroom that values critical engagement and depth. b) The class must be a safe space where students can express themselves without fear. c) Students' efforts are more important than their results or grades and they must be able to enjoy the learning process.
Learning is a two-way street, and a teacher should be willing to learn from the students.	<ul style="list-style-type: none"> a) I always want to be a teacher who inspires curiosity. b) The teacher is an important member of the classroom, but not THE most, and true learning for the students takes place when they begin 'doing'.
Making sure that as many students as possible were engaged in the classroom.	<ul style="list-style-type: none"> a) My teaching philosophy includes understanding the needs and interests of the students and drafting the syllabi/class activities accordingly. b) I want to ensure that students fall in love with the subject. Love for learning must be top priority. Therefore, learning must involve kinesthetic, auditory, visual inputs and above all, fun.
Making teaching accessible to a wide range of student abilities.	<ul style="list-style-type: none"> a) I wish to use the class environment to tie the student's motivation to the class content.

Table 2: Individual Teaching Philosophies

Week 2: Session 2: Socratic Seminar

Aim: The normal energy of offline discussions was missing at this time. In order to make up for this loss and provide a welcome break from online teaching the Socratic seminar was devised. This gave teachers space and a structured time slot to engage in an intellectual discussion, where many questions could be raised, and also explore ideas that were not immediately related to academics.

Methodology: A short article or an excerpt from a longer piece was mailed to the group and they were asked to come to the session with a question on the reading. All readings were unrelated to education, unless one sought questions or answers in the piece that made for universal links.

Results: The questions were aplenty and given below is a small sample which can exhibit the variety of thoughts, arguments, real-life experiences, connections to teaching, universal

truths, and several other tantalising issues that jostled with each other. The discussions had to be curtailed often because of the time constraint. There were much fewer clear resolutions, but the questions arrived with great earnestness and those explorations were what the PDC team had set out to provoke!

Week 2, Session 2: The Socratic Seminar		
	The Readings	Questions Raised on the Readings
1.	Margaret Atwood's Commencement Speech	Finding fault with the education system – why is this par for the course across generations? Why do educators never get it right?
2.	Why Facts don't Change Our Minds – James Clear	How factual is a fact?
3.	Indo-Anglians – Sajith Pai	Let's ask ourselves. Are we Indo-Anglians? Is it aspirational for us or are we a little defensive about this?
4.	Justice and Morality – Excerpted from Michael Sandel's book <i>Justice</i>	Is it wrong for sellers of goods and services to take advantage of a natural disaster by charging whatever the market will bear? If so, what, if anything, should the law do about it?
5.	Desiree's Baby – Kate Chopin	Kate Chopin's use of the colours black and white (as well as darkness and light) impact the reader's understanding of the story. Are these two colours the most ubiquitous threads of human society today?
6.	No Time to Think – Facing History and Ourselves: Holocaust and Human Behavior.	Professionally and personally, what are you likely to regret more – your action or inaction?
7.	Humour – Excerpted From theschooloflife.com	Have you ever used humour effectively to come out of a sticky situation?
8.	Why Hard Work Alone isn't Enough – Kate Morgan	The writer considers politicking a valuable asset. Do students use this path as well? Is there a teacher responsibility here?
9.	Does Knitting have a Gender? – Sue Green, Nicole Snow, James Madison	Are these stereotypical attitudes always learnt at home or are they cultivated as a result of living in a society like ours which over-dramatizes 'domestic chores' but only when men turn to it?
10.	The Power of Red Lipstick – Asia Milia Ware, Jacqui Palumbo	Red lips and Protest – are these two to do with the lips, or the colour, or both?
11.	Satire – Cameron Laux	Satire complains a lot – is that a dead end in itself?
12.	Views on Sport – Martin Kettle, Keith Parry, Eric Anderson	Why do class and race prejudices show up in sport?
13.	The Downside of Work-Life Balance – James Clear	Is there an inevitable gender bias involved when it comes to maintaining the work-life balance?

Table 3: Socratic Seminar on Eclectic Readings

Week 3 - Session 3: Reflecting on Remarkable as well as Mediocre Lessons

Week 4 - Session 4: Both these sessions were dedicated to teachers reflecting upon their own teaching practice

Q. What makes for an excellent lesson and what are the features of a lesson that did not go as planned?

Aim: Many studies have emphasised the role of critical reflection in teacher education. The PDC believed that reflection enhances teachers' knowledge and skills. This can help instructors deeply understand their own teaching styles and further define how they will grow as teachers.

Methodology: A short time was spent in discussing that all teachers face the eventuality of a good class and one that becomes a nightmare. Sundry reasons were discussed, but most of the allotted time was spent by the participants in writing out their responses to the above question. These responses were then mailed to the PDC team.

In session 4, the participants had a choice regarding which class one wished to share with the group. Interestingly, most wished to share both, and if it was only one, then the negative class was generally shared! This was when the PDC team made the connect between a personal teaching philosophy (from Session 1) and one's perception of which class went right and which disappointed. While one does not reiterate a teaching philosophy to oneself regularly, in a subliminal state, it is always there and manifests itself in significant ways. It was clear that a teacher's teaching philosophy invariably shaped the perception of a class – whether it went remarkably well or not.

Results: All participants were amazingly candid about their successes and also what they considered as disappointments. The PDC team gleaned much from each teacher's individual journey and was able to put together some ideas, sharing both the kudos and the self-criticism in equal measure.

a. An Excellent Lesson happens when:

- students engage above and beyond the expectations of the teacher
- in the online class changing the onscreen background brings in a sense of novelty and excitement
- the class trusts the teacher and the process, and indulges in discussion and reflection
- the teacher makes the class relevant to students
- a student, who is a negative influencer, is rehabilitated into the class dynamics
- trust is built, and the teacher recognises it through student responses
- a hands-on activity is successful
- space is given to students allowing them to make certain decisions in class
- the teacher uses a setback and turns it around
- spontaneity can emerge even in a planned lesson or structured environment

b. A Mediocre Lesson happens when:

- a teacher overestimates the rapport built with students that might actually not be there
- a teacher is unable to gauge the class dynamics
- there is a mismatch between a teacher's love of the subject and the students' indifference to it
- a teacher overlooks the problem that a particular student might be facing
- the teacher is not conversant with the new terminologies used by current-day students, and it leads to a disconnect in understanding
- in an online class, there are too many elements to deal with, which remain only visual and not kinaesthetic
- irrespective of how many times a teacher has taught the topic earlier, meticulous planning has not happened
- a teacher jumps to conclusions without knowing the background clearly
- the teacher does all the talking and the student has no time to think
- the spontaneity of a moment is curbed because the planned lesson must go through

Step 4 – June 2021 – July 2021

Technology Platforms

The Process:

Respondents: Section Heads

Aim: Collecting information on technology platforms operating across school.

Methodology: Meetings were held with relevant section heads discussing the efficacy of the technology used and what should be taken forward to offline classes.

Results: The following technology platforms satisfactorily facilitated the delivery of online classes in the respective sections:

Elementary – Showbie, Zoom

Middle – i-tunesU, Showbie, Zoom

High – Google Classroom, Google Meet

Pre-University – Google Classroom, Google Meet

Step 5 - February 2022 - March 2022

Education Re-imagined

The Process:

The final step included using all the information gained over a two-year period to re-imagine Teaching and Learning.

Aim: The Covid-19 pandemic resulted in a much greater appreciation for the importance of schools. The role of teachers, their skills and their invaluable responsibility in student well-being, came to the forefront. Teaching had come under the kind of scrutiny that made it imperative to look beyond and discern what might be possible for education on the other side of Covid-19. Technology and Innovation had suddenly moved from the margins to the centre of our education systems. The PDC took this as an opportunity to identify new strategies, that if sustained, could help young people get an education that prepared them for our fluctuating times. The student body that would be accountable for completely independent learning would also participate in the decision making process.

Methodology: The PDC posted on its Google Classroom a need for a teacher team to take this project forward. 11 teachers applied, and a group of 5 teachers* were selected across Sections.

**The Team:* Nandita Mohan, Shukti Dutt, Ritika Paul, Priya Rao, Rajeshwari G.

Timeframe: The team met once a week, every week for a period of two months – February and March 2022. Discussions kept the Aditi Learner Traits firmly in focus.

The Respondents	Questions Asked	Responses
Student Council Representatives: a) Middle School b) High School c) Pre-university d) Elementary School - Std 2 students	a) What did you think were the benefits of Online teaching? b) Would you wish for some aspects of online teaching to continue when Offline School starts? c) What are the benefits of Offline School?	a) The LMS (Learning Management Systems) had advantages for organization of study material. b) All Student Council members of Middle School wanted Offline School on all days of the week. c) Student Council members of High and Pre-University Sections felt a hybrid system would be beneficial. Pre-University Section Student Council members felt that one day a week online classes could continue. It would lead to less time spent commuting. d) The benefits of Offline School were the physical interactions between all school stakeholders including developing deep and meaningful relationships.

Table 4: Inputs from Student Council Representatives

Results: Tying all the threads together the Education Reimagined team recommended a three pronged process – a ‘must do’, a ‘should do’, and a ‘could do’.

“MUST DO”	
1.	The LMS would continue to be used, even after school reopened. Google Forms to be used to elicit responses and collect data for a variety of purposes.
2.	All students except those belonging to Elementary School must be encouraged to use technology during the school day, in greater or lesser measure, in as many subjects as possible.
3.	One parent-teacher conference a year would continue to be online. This would facilitate a parent/s who could be travelling.

Table 5: The Must Do

As social distancing restrictions relaxed in 2022, the faculty had to consider what activities might be used to engage our students in more active and collaborative forms of learning.

“SHOULD DO”	
1.	Create, share and comment on images, PowerPoint presentations, videos, audio files, and so on. This is typically based on solving a specific problem or providing reflections on the topic at hand.
2.	Co-facilitate meaningful discussions, thereby de-constructing and co-constructing knowledge.
3.	Find applications and programmes that allow students to implement animation or movies to illustrate their own writing or conceptual understanding for topics.
4.	Teach digital etiquette – this should continue through the year. Current students are digital natives who must be allowed opportunities to practise these skills in a safe environment , while engaging their minds.

Table 6: The Should Do

Finally, the Education Re-Imagined team reiterated that the Aditi vision is committed to graduating students who are digitally literate, critical thinkers, problem-solvers and excellent written and verbal communicators. But these outcomes cannot be achieved through programmes that are solely based on ‘must’ or ‘should’, because it’s not just about “knowing stuff”, it’s about “doing stuff”. ‘**Could**’ is about “doing stuff”!

“COULD DO”	
1.	At what point does a translation/ interpretation/ elucidation/ analysis/ version become an ‘imitation’ or, has it become a poem/ theory/ concept/ philosophy/ hypothesis in its own right? Beginning with the root, ‘could’ one see the different tangents in which the root has travelled? Has it been a movement forward or backward?
2.	Putting together two supposedly disparate subjects during the course of a single unit – physics and music / fiction and science / history and economics / history and geography / languages and mathematics – the more unusual the combination the better! ‘Could’ the two be melded in a manner that defies severance, an innovation quite distinct from where we started and one that eventually exists as a novel thought in its own right?

Table 7: The Could Do**Step 6 – Academic Year 2022-2023****Myline Project**

The Education Re-Imagined team finally put together the MyLine Project to be implemented across school in the course of the next academic year.

Aims: The MyLine Project hopes to develop two important traits from amongst the five identified by Aditi teachers in the course of Step 1 of this study. While all the Learner Traits will generally be in focus, the two traits chosen to be highlighted and improved during the course of the MyLine Project are Independent Learning and Collaboration.

Methodology: Every teacher in the school will select one topic/unit where all material will be uploaded on Google Classroom and students can independently negotiate the learning materials with the entire emphasis being on self-learning. The teacher needs to:

- a. Inform students about the topic taught in the MyLine Project.
- b. Clarify that the teacher will continue to teach other topics and proceed with covering the curriculum throughout the MyLine Project. The MyLine Project takes place in parallel.
- c. Upload all learning materials, links and other study material on Google Classroom.
- d. Make the timeline clear.
- e. Embed quizzes/questions in the online material to test understanding.
- f. Encourage students to collaboratively problem solve in their own time.
- g. Have a mid-point check in class for students to ask questions.
- h. Assess the students at the end of the topic/unit.
- i. A member of faculty will be the single-point-of-contact (SPOC), who will liaise with the heads of departments to oversee the journey of the MyLine Project and also keep the PDC apprised of the same.

Subject areas, chosen specifically from the syllabus, will be given to students for self-study, but with the requisite scaffolding in place. This implies that all course material must be prepared and disseminated according to a timetable so that students may successfully comprehend an area of study without direct teacher intervention. Students could turn to their peers for help and thus the goals of both independent learning and collaboration could be met. Secondly, the project will encourage teachers to use technology creatively. From amongst the faculty a group of technology-mentors will assist teachers, should they encounter any difficulties.

Conclusion

In October 2021, the PDC asked the Heads of Departments of High School and Pre-university Sections to ask teachers in their departments the following question:
Can independent learners be created in an online platform?

95% of the respondents replied ‘Yes’ while 5% of the respondents replied ‘Sometimes’.

Given this response and the fact that classes have become offline, the PDC is very hopeful of the success of the MyLine Project in the coming year.

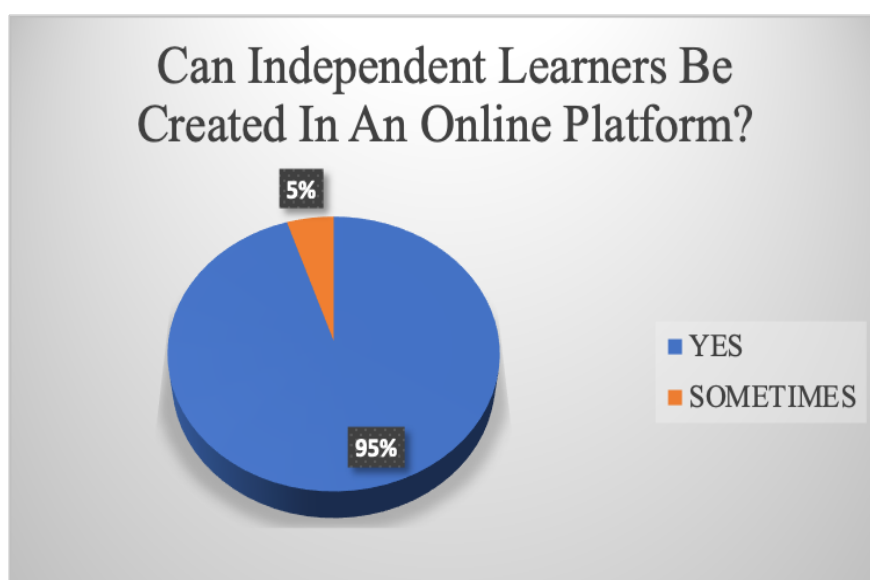


Figure 1: MyLine Project

Despite the difficulties of enlarged teacher accountability due to a *bottom-up* teacher professional development approach, there were opportunities which teachers at Aditi took as they negotiated self-learning, especially of various technology applications, to make teaching more effective.

The downsides of *bottom-up* professional development are the risks associated with snowballing teacher obligations. Face-to-face interaction being scarce, teachers felt the need to consult the Heads of Sections or Heads of Departments more often. However, given the unique nature of the pandemic teaching years, educators also appreciated the fact that they were provided adequate support from the school administration to conduct their classes successfully.

Baptized by 'Covid fire' most of the teachers at Aditi successfully negotiated the 3 Steps coordinated by the PDC and some even managed a few more steps on their own!

The PDC team has been able to conclude that professional development could be more effective if it is differentiated by gauging teachers' readiness, involving them in the process, utilizing their own interests and providing continual reflection opportunities.

During one of the first planning sessions of the PDC a formula was coined which lit the way at every step that was taken during the last two years – 2020-2022. The PDC team witnessed innovation and risk-taking, the breaking of moulds and improvisation, serious application and passion, in almost equal measure.

The formula was “Organized Magic & Madness”.

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Modulation of the Imaginary Perceptive Maps and Its Effect on the Cognitive Attitude of Medical Students

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Abstract

The perception maps affect the analysis process of information which is base on an individual's previous exposure and purpose of events that influence the cognitive attitude, i.e. the response to the facts. The processing of external sensory inputs is formulated and encapsulated at different mind levels in the form of various experience modules (Pylyshyn, 1999; Raftopoulos, 2015). This study aims to investigate when these perception domains are resilient to changes in adverse conditions, regulates cognitive dimensions positively. We tested this hypothesis of self-modification by devising SPIMA technique by combining different elements of cognitive therapy. Forty medical students with South Asian ethnic status from age 19 to 26 ($M=22.5$, $SD=2.44$) were selected voluntarily without gender discrimination and assigned to their respective group of problems that participants identified to occur in the therapeutic environment. Then they completed a 15 item questionnaire and group discussion and counseling session on problems. Results (based on quantitative analysis including t-test and f-ratio, and descriptive analysis) showed when participants could recognize problems and open to self-improvement, and respond accordingly, have a positive impact on cognitive attitude. The research data reflects when perception involves the analysis of situations through various domains of self learning, produces resilience in cognitive behavior which provides an opportunity to acquire reflective and flexible knowledge that is needed to adopt according to the demand of situation. The categorization of problems in well structured format increases the intrinsic motivation, and fosters the flexibility of thinking that permits the participants to appraise the knowledge.

Keywords: Perceptive Maps, Cognition, SPIMA

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Introduction

The perceptive maps of the mind can elucidate as sequential concepts that are built on the assimilation of information and acquired experiences. They can also be referred to the imaginary maps, cognitive maps, and frames of references. These are strategic tools of the brain to process information received through various senses and to gain memory at different levels based on prioritization of information. The complex incoming information processes into manageable portions of spatial arrangement to simplify the information and to infer the sense. This is the basis of cognitive development which not only improves memory but also procures knowledge.

The perceptive map influences the mental process of information analysis. It works as a coping mechanism in various uncertain situations which helps in building memory, and also explains, how does the nervous system work in co-ordination to make a strategic decision? This acquired cognitive level affects further inputs from the environment which describe the cue and priority of information which is based on the purpose, perception, and reasoning, and stored as memory i.e. functional neuroplasticity. Although, perception and cognition are two different entities at a neurological level, namely, perception is the processing of information at various mind levels, and cognition is the conclusion of this processed information. This distinction reinforces the point of selectivity of information i.e. the filter process of mind, which further elucidates the selective acquisition of knowledge or judgment based on previous observant experiences of an individual.

Besides the clear distinction, perception and cognition are closely interrelated. The processing of external sensory inputs is formulated and encapsulated at different mind levels in the form of various experience modules (Pylyshyn, 1999; Raftopoulos, 2015). These subjective experiences in different situations at various life stages are integrated to create cognition maps i.e. cognitive penetrability (Raftopoulos, 2014). On the contrary, the cognitive process affects the perceptual processes i.e. late perception which regulates the flow of information and influences cognitive integration through selective awareness and attention to the sensory inputs i.e. perception-cognition architecture.

This perceptive architecture is very crucial and complex for learning at different academic levels, which is influenced by the factors i.e. aspiration, attitude, opinion, and speculation. These factors are influenced by determination and emotional guidelines. These create a space between perception and cognitive penetration which navigate sensory inputs. This strengthen the point of information integration at various neurological levels for the execution of task i.e. sensory-motor co-ordination. When mind is overwhelmed by the information based on these factors, this demarcation between these two interfaces reduces which is expressed as the cognitive load. This reduces the reaction time of cognitive architecture, and so the response to various learning stimuli is also affected i.e. attention. This explains the subject in which top down attention influences the bottom up attention (Vetter and Newen, 2014). When this process is influenced negatively by factors which affect perceptive architecture, co-ordination between the perceptual processes and higher cognitive brain functions is distorted that can be termed as negative stress. The autonomic nervous system override and overlap of these two interfaces endorse the point that it reduces analytical capacity of brain, so the learning process 1.

Academic stress has been the subject of many researches on various aspects of stressors i.e. the influencing factors, and their effects on cognitive skills. According to Murphy and Archer

(1996), if the perception of stress is negative, it leads to the psychological and physical ailments. Higher education especially medical education, presents a disturbing scenario of negative stress. Intense academic demand and performance pressure act as stimuli to evoke stress in terms of depression and anxiety. According to Suor (2015) the long term stress levels influence the stress hormone i.e. cortisol levels and the evidences explicitly establish its role in neuro-cognitive impairments. This stress is the consequence of conflict between individual stressors and external stressors. The individual stressors are the factors that are acquired over a period of time i.e. opinion, attitude, habits, desires which, from philosophical point of view are the personality traits, and individual health issues. The external stimulus can be the environment, time, or finance. The academic stress stimulus also includes the interaction between assimilation of extensive knowledge and time required to generate perception from this (Carveth, Gesse,& Moss, 1996). For example, when an individual has a transition of situations i.e. new opportunity, moving from one class to another, changing direction to the higher education etc., that individual evaluates the whole situation and scenario according to a perceptive map in the mind, and tries to deal with the situation by making modifications and adjustments to get best out of it. When this transition fails, it creates a web of inarticulate thinking patterns which influences the perception negatively, and reduces the cognitive possibilities which further perpetuates the stress on somatic and mental health (Brosschot JF, Pieper S, Thayer JF 2010; Smyth J, Zawadzki M, Gerin W. 2020).

The cognitive capabilities are affected by individual perception according to which a person respond in a variety of ways to stressful situations. This indicates the existence of difference in vulnerability of individuals according to their cognitive responses. These cognitive changes based on their perceptive mind presentations, are influenced by predisposing factors i.e. life experiences, and individual factors like genetic characteristics (Palumbo ML, et al 2010), personality traits, and age. This complex interaction affects the thinking patterns, although in mild cases and problem solving reflections, it can be adaptive. But, continuous maladaptive patterns impose cognitive load and cause anxiety and depression among individuals. The cognitive behavioral therapy strives to control these patterns which are generally divided into listening, motivational discourses, medications i.e. supportive care.

The perceptive presentations regulate the attitude and responses in changing circumstances, which in turn affected by the personal traits and predisposing factors. This hypothesis assumes that perception maps and their modulation affect the cognitive capabilities. The sustainability of behavioral therapy depends upon the flexibility of these cognitive maps which in turn, depends largely on the personal factors. The personal attitude influences the dynamic equilibrium between perception and cognition. The more will be flexible personal attitude towards changing situations in personal, academic, or social environments, the better will be the outcome of therapy. This flexibility can be termed as acceptance of the conflict in cognitive architecture or disturbed equilibrium between perceptive presentations and cognitive response. This jumbled pattern amplifies the emotional-stress response and reduces the resiliency of acceptance. This affects results of cognitive therapy negatively which results in reoccurrence of anxiety and depression.

The SPIMA (Self Problem Identification and Modulation Approach) a devised technique by combining the different components of cognitive therapy, the authors tries to fill this loop of conflict and investigate how does perception map affect the cognitive attitude? The medical academic environment presents such possibilities for investigation. This technique tests the hypothesis in a three way process in a cyclic manner in which the first step provides not only the primary step for identification of conflict i.e. acceptance, but also serves as a counseling

tool. Second, it identifies the external factors and their categorization based on individual's perception. The second step helps in creating problem oriented questionnaires and feedback forms, and also sets the direction of discussion. Third, it combines the personal factors and external factors through heuristic, and records and rectifies the responses. In order to understand heuristic and rectification, third step includes in depth interview of participants which also checks the attitude and degree of acceptance of the process.

Methodology

Participants

40 medical students from European University, Tbilisi were involved, who shared relatively same background in terms of social status, academic status and environment. The age group with South Asian ethnic status, was selected from age 19 to 26 ($M=22.5$, $SD=2.44$) without gender discrimination. The participants were second and third year regular medical students without any previous involvement in such behavioral and modulation studies or workshops. They were selected on the basis of voluntary participation as a research group. They were explained about the perception, and its influence on the cognitive behavior. For example, perception of a situation and self affirmation can change the way of dealing with the harsh conditions, and help to modulate thinking to get best out of the situations, and improve the quality of life.

Material

The questionnaire was developed by modifying the standard cognitive behavior therapy questionnaire according to the requirement of the study process. The format of the questionnaire includes fifteen questions which are divided into seven (1, 2, 5, 9, 10, 11, 15) leading questions, and eight follow up or supportive items. This division was done to reduce the chances of biased answers by analyzing the equilibrium among leading items and their follow up items. It helped in handling and increasing the sensitivity of data.

The construction of questionnaire was based on the equilibrium between identified problems of the academic environment and the categorized perception of the participants. This creates a possibility of semantic difference (Snider & Osgood, 1969) which not only helps to produce problem oriented material but also focuses on the cognitive behavioral process. This differentiation helps in understanding the disparity of answers between leading and supportive items, and directs the rectification and response re-arrangement process in the response scale. This also helps in explaining the qualitative fluctuations of responses, thought modulation, and self assessment.

This construction provided the practical approach, and avoidance of idea control, perception-action interaction, and negative self appraisal. The responses of these items were assessed on a six point Likert scale with grades from 1 to 6, e.g. 1 never true; 2 usually not true; 3 sometimes true; 4 usually true; 5 always true; and 6 not important. The sixth grade is very important in this approach as it explains the effectiveness and sustainability of perception modulation while dealing with problems, and positive direction of in depth interview and counseling on self addressed problems.

Modified Version of Cognitive and behavioral Process Questionnaire (CBP-Q):

1. The academic environment motivates you to increase contextual insight on learned issues.
2. Are you clear about the learning objectives and outcomes of the course?
3. The content seems to match with learning objectives what we are supposed to practice.
4. The provided content presents a fine sense of academic and research development.
5. Are you able to relate information what you have learnt?
6. Do peer review and group discussion help you to increase your understanding?
7. Are you able to work comfortable with academic groups?
8. Are you able to get opportunities to express important ideas and academic issues?
9. Are you able to balance between feedback and what is expected regarding your work?
10. Are you able to comprehend assigned work?
11. Are you able to draw and explain conclusions from your academic observations?
12. Are you able to organize time according to your academic requirements?
13. Do you use organized plan to learn complex medical content?
14. Do you find difficulty to keep pace with assigned work during medical health issues?
15. Do you get support to get over from these medical health issues (i.e. administrative and academic staff)?

Procedure

After receiving ethical approval from the university, students were recruited on the basis of voluntary participation in the study and signed the consent form with a privacy clause of not to share personal information. The three steps procedure was explained to them, which included discussion, response recording on Likert scale, and in depth interview and counseling session.

During the first phase of the procedure, the researcher had a discussion with participants on those academic problems students were facing in the education environment. The participants identified five problems; one was academic environment which further subdivided into administrative and academic environment, the second was complex medical syllabus, third included difficulty in managing time during strenuous study process, fourth had personal psycho-social problems that limit the personal-social interaction, and fifth involved other medical situations that not only affect the student's physical conditioning but also affect the mental performance. The second step of first phase was the categorization of these problems in groups because philosophically and practically, a single person cannot have a single problem when they are involved in self problem identification process. The four groups were made on the basis of each individual response and perception of the problems. The participants were assigned to their corresponding group based on the self affirmation discussion with the researcher.

Table 1 : The groups according to Individual response and perception of problem.

Sr. No.	Group	No. of Students
1.	Administrative environment, time management, and psycho-social problems	12
2.	Academic environment, complex medical syllabus, and time management	17
3.	Administrative environment, complex syllabus, and other medical conditions	7
4.	Environment (both sub-category), other medical conditions	4

The second step involved the formulation of questionnaire and scale to record the responses according to the identified problems. The individuals selected to record the responses, were blind to the participation format and procedure. They were assigned to fill the responses in likert scale that were gathered as a feedback of questionnaire based on personal interaction feedback collection method that was used to avoid the bias of feedback adulteration by the participants.

The third step included the in depth interview and discussion between the researcher and the participants. This was the qualitative part which had the self expression counseling session with each group separately. This discussion implied the presentation and attitude of participants towards problem, and their self-established solutions to those problems within a time frame, and the groups worked as a control to each other. In the end of the session, the feedback responses were tallied and rectified by the experimenter through a brief discussion with each participant of that group. Every week, this procedure was followed in a cyclic manner.

Data Analysis

The data was analyzed by performing **t-test** for each group separately, and **F- ratio** was used for comparison among groups. Both tests were performed manually for leading questions as well as for supportive questions to check the coherency of data between each other. This comparison provided deductive and inductive explanation of the data fluctuations within the period of study. The quantitative analysis was used to interpret, and to modulate the direction of qualitative analysis. Cronbach's alpha was examined of each group to ensure the internal consistency because each category has different sample size, and the sample size affect the reading.

Results

Reliability

The Cronbach's alpha reading for each group varied. The internal consistency for group one and two was high ($\alpha = 0.93, 0.90$) but, for group three and four it was under acceptable range ($\alpha = 0.70, 0.74$) which may be due to the low sample size.

Quantitative Analysis

In accordance with the requirement of the study, **t-test** for each group and **F-ratio** were adopted as explained earlier. The statistic results were positive and rejected the null hypothesis i.e. there is no change in perceptive maps, and it has no effect on cognitive attitude. As per data of **t-test** data in table 2 for all questions, the values (gp1, M=20.33, SD=2.53; gp2, M=13.65, SD=3.95; gp3, M=9.43, SD=3.31; gp4, M=22.00, SD= 1.15) showed the significant improvement. The **t-test** data in table 3 for leading questions followed the pattern in same way. But, the average change in all groups for leading questions was significant as per table 4, which signifies the difference in the improvement level among groups over the period of study. The fluctuations in weekly average response score were registered up to the six week but, after sixth week the results sustained with no significant difference.

Table 2: All groups t-test for all questions.

	n	Mean	sd	Observed t	Sig level	Decision
Gp1-All Qs	12	20.33	2.53	27.79	0.05	H1 = there is improvement
Gp2-All Qs	17	13.65	3.95	14.24	0.05	H1 = there is improvement
Gp3-All Qs	7	9.43	3.31	7.54	0.05	H1 = there is improvement
Gp4-All Qs	4	22.00	1.15	38.11	0.05	H1 = there is improvement

Table 3: All groups t-test for Leading questions.

	n	Mean	sd	Observed t	Sig level	Decision
Gp1-lead Qs	12	11.92	1.68	24.62	0.05	H1 = there is improvement
Gp2-lead Qs	17	7.76	2.91	11.02	0.05	H1 = there is improvement
Gp3-lead Qs	7	5.71	2.14	7.07	0.05	H1 = there is improvement
Gp4-lead Qs	4	13.00	1.41	18.38	0.05	H1 = there is improvement

Table 4: Weekly comparison of performance within and among the four groups.

Group	Average score-Wk1	Average score-Wk2	Average score-Wk3	Average score-Wk4	Average score-Wk5	Average score-Wk6	Average score-Wk7	Average score-Wk8	Average score-Wk9	Average score-Wk10
Group1	8.75	12.08	12.92	15.17	14.42	15.42	16.83	18.75	19.50	20.67
Group2	14.12	14.41	16.47	18.00	17.29	18.12	19.06	21.00	20.71	21.88
Group3	21.00	21.00	21.29	22.71	23.43	23.71	23.57	23.71	25.86	26.71
Group4	21.00	21.00	22.50	23.75	24.75	26.00	25.75	29.25	31.75	34.00

As per table 5, the **f-ratio** (all Questions=60; lead questions=39) with significance level of 0.05 noted the huge difference among the groups which suggested that each group has different approach to the same procedure. The results showed the significant positive attitude towards outlined methodological approach and procedure.

Table 5: f-ratio (all questions; lead questions).

	Between column variance	Within column variance	F-ratio	Sig level	Conclusion
All Qs	677	11	60	0.05	Different methods have different effects

	Between column variance	Within column variance	F-ratio	Sig level	Conclusion
Lead Qs	285	7	39	0.05	Different methods have different effects

Descriptive analysis

The descriptive references of the results showed the presentation of problem, and helped in categorization and explanation of problems within a time frame, and participant's attitude towards the procedure. The voluntary participation and in depth counseling discussion provided a possibility for understanding and intervention of problem. The modulation of perception starts with acceptance of the problem, and belief to change the scenario of problem according to the demand of need and time. This influences their sensitivity towards change of situations.

The fluctuations of the response data endorse the fact of participant's involvement in the process of self identification. The reduction of average score in initial weeks established that the participants appraised the modulation counseling method which involved the articulation of self identified solutions for the problems under problem presentation, quality of work, problem explanatory skills within a time frame procedure, and their attitude to deal with the problem. This fluctuation also explained the conflict between their perception based on previous experiences and the need to change it to adapt according to present situations to get best out of it. Although, it seemed to create stress but, this created a positive equilibrium to work efficiently among groups, and capability to discriminate between correctable and non-correctable situation. This process set a buffer of activity in stressed conditions. The sustained results during last week's indicated this. This is the main foundation of modulation of perception with self affirmation. The data also indicated the active participation of participants in the study procedure.

Discussion

The study focused on changing the preformed perception that is the result of previous experiences gained at different periods of time. When, a person with these deep rooted thoughts encounters with similar situation but at large level, these perceptive maps affects the response, which in turn affects the cognitive capabilities. These predefined directions post the challenge to adopt according to new high scale situations, which creates the negative stress

which has been the part of many research studies. Most of the techniques are focused on how to control the behavior and thought process which in the form of psychotherapy help but for a certain period of time because this doesn't break the taboo of preformed perception. The quantitative analysis shows this conflict in the form of data fluctuations. This research helped in formulating new technique SPIMA which presents a possibility for the modification of perceptive domains. This suggests when the person is able to identify the problem at internal as well as external stressors level that uncover the potential of acceptance which is the resistant part. At this transition point the problem oriented cognitive approach plays the crucial role in maintaining the dynamic balance between identification and multi-directed solutions of the problem. Hence, this study suggests that this opens the probability of modification in perceptive zone which increase the resilience to deal with stressful conditions.

Secondly, this research suggests the categorization of problems in well structured format increases the intrinsic motivation and foster the flexibility of thinking that permits the participants to appraise the knowledge, reasoning, and learning tools. This process ensures the students active participation in learning process. The direct in depth interaction helped not only in building a confidence between experimenter and the participants but also it helped in creating a positive attitude towards the problem. This opens the new dimensions of solution from various angles of ideas, and when the individual is ready to accept new prospects, the modulation of perception starts which creates a buffer of response according to demand of situation. Although, there are certain barriers like vast information collection, previous exposure experience, acquired belief system and minds' processing ability to balance between thoughts and information at intrinsic level which affect the flexibility of perception. The external factors i.e. the problems to which participants were responding are non modifiable. The difference in average among groups indicates that disparity of perception in spite of being exposed to the same procedure. The individual data between groups also shows the difference and established the fact that exposure to the same situation and procedure doesn't mean the possibility of equality of response.

The reflection of this study is to create flexible perception that organize the learning process across the multiple dimensions, and generate a working memory that can be applied under varying and appropriate situations (CTGV, 1997; Kolodner, 1993). This process encourages individuals to use this coherent flexible learning, and self evaluation in negative situations. The challenges of this study are voluntary participation i.e. the reason of small sample size, self approval to the problem and its categorization, and execution of the self recognized solution guidelines. The disparity in individual data response confirms this finding. Based on the findings, the participants need to be prepared thoroughly on the importance of flexibility of perception in producing flexible knowledge to compensate the non-modifiable factors, and being able to set learning goals and strategies to get the best from the task they are engaged in.

The present study tries to explore how flexible perceptive mind maps affects the individual capacity to deal with external factors identified subjectively to have negative effect on cognitive skills by using SPIMA, a devised method by authors. This provides a subjective as well as objective ground to inspect intrinsic as well as extrinsic discrepancies, their categorization, and helps in mapping a problem oriented plan. This also provides an insight to understand cognitive patterns by facilitating the open exchange of ideas among the members of a group (Cohen, 1994; Wenger, 1998) which opens a possibility of methodology modification.

This strategy helps in controlling quantitative as well as qualitative data through continuous assessment of progress of each group at subjective level (small scale) and objective level (large scale). This serves a purpose of intrinsic motivation for both experimenter and participants by working on the task of their own interests which require their active participation, group interaction, deep understanding, and independent thoughts. According to Bandura(1997) and Dweck (1991), the participants are more motivated when they believe the outcome of learning is in their control. This produces an opportunity to apply this strategy clinically, academically, and as a research tool at the same frame of time by incorporating other meta-cognitive strategies, a possibility to be tested by further research. The SPIMA system provides an integrated environment of self problem analysis and solution, and individualistic explanation which creates a sense of psychological rationalization and satisfaction of ideas that ease the process of perception modulation and affects cognitive domain positively.

Conclusion

This study discusses the effects of perception flexibility on cognitive skills to deal with subjective problems efficiently which count on combined research methodology. The research data reflects when perception involves the analysis of situations through various domains of self learning, produces resilience in cognitive behavior which provides an opportunity to acquire reflective and flexible knowledge that is needed to adopt according to the demand of situation. Although, research findings exhibit positive effects still, further investigations are required by incorporating gender discrimination, age factor, educational and academic levels, and social interaction to realize its potential and to check the sensitivity, and precision of study data.

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Perceptions of TVET Students Regarding the Integration and Accepting of Learning Management Systems (LMS) for Teaching and Learning: Situation Analysis of TVET College in South Africa

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Abstract

Emerging digital technologies in education are changing the traditional institutions by providing new possibilities for learning online and integrating technology for pedagogical innovation. Higher institutions such as universities and Technical and Vocational Education and Training (TVET) colleges have implemented and adopted the learning management system (LMS) as an innovative alternative digital technology for online teaching and learning. A quantitative research approach was applied in this study. A questionnaire was used to collect data from the 215 TVET students. The students were randomly selected to share their experiences with regard to the integration and adoption of Learning Management Systems (LMS) for teaching and learning. The collected data were analysed using the SPSS software package. The findings indicated that most of the participants believed that LMS improved their learning performance, it is easy to be used and they will continue using it because it is fun. The recommendations indicated that the TVET college need to develop the lecturers with relevant technological skills and knowledge. The college management must be abreast with the latest technology tools that are applied at other TVET colleges.

Keywords: Perceptions, TVET, LMS, Teaching, Learning

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Introduction

Then rapid transformation of technology and the vast demand of the 21st century has put pressure on higher education institutions to drive for the best pedagogical and theoretical approach to train and prepare the students for work (Moate and Cox, 2015). Emerging digital technologies in education are changing the traditional institutions by providing new possibilities for learning online and integrating technology for pedagogical innovation (Pangeni 2020, Chiloane, de Jager & Mokgosi, 2022). Higher institutions such as universities and Technical and Vocational Education and Training (TVET) colleges have implemented and adopted the learning management system (LMS) as an innovative alternative digital technology for online teaching and learning (Chiloane 2021, Pangeni & Karki, 2021).

Learning Management system is defined as a technology software application that backup the documentation, training programmes, e-learning programmes, classroom and online events and the administration (Turnbull, Chugh & Luck, 2019). LMS is pivotal to enlarge the instructional delivery methods, assessments and collaboration among lecturers and students. LMS is an education practice of teaching and learning that is flexible, student-centred and convenient because it can be employed beyond the traditional classroom setting (Davis & Surajballi, 2014). Digital technologies such as LMS provides students with opportunities to learn beyond the classroom environment but provide social constructionist learning situation (Pangeni & Karki, 2021). LMS gives the TVET students the opportunity of using the platform when accessing and submitting assignments, using quiz, group projects online and watching lecture supplemental videos. The technology platform develops the student's learning skills and promotes their academic performance (Correa-Baena, Hippalgaonkar, Van Duren, Jaffer, Chandrasekhar, Stevanovic, Wadia, Guha & Buonassisi, 2018).

Although LMS has been employed for corporate organisational information management, instruction delivery in education, data-base management and for training. Still, its usability and impact has not been recognised in Technical and Vocational Education and Training (TVET) colleges (Drent & Meelissen, 2008). Therefore, this study aims to determine the perceptions of TVET students when integrating and accepting the LMS in their learning. The theoretical framework is deliberated in the following section.

The Technology Acceptance Model (TAM)

The study used the theory of Technology Acceptance Model (TAM) as its base to understanding the perceptions of students when employing and accepting the LMS in their learning. The TAM theory is the adaptation of Theory of Reasoned Action by Fishbein and Ajzen (1975). The theory of technology acceptance model indicates that a user's behavior intention to integrate and use technology is influenced by three elements which are perceived usefulness, perceived ease of use and attitude (Baki, Birgoren & Aktepe, 2018). The TAM theory suggests that the user's behavioral intention to accept an information technology system is influenced by user's attitude towards employing the system and perceived usefulness. Again, perceived ease of use, perceived usefulness are primary factors influencing information technology acceptance behaviours (Wu & Chen, 2016).

According to Guriting and Ndubisi (2006) perceived usefulness is the subjective probability that employing technology would enhance the way the operator finishes the provided task. Davis, Bagozzi and Warshaw (1989); Gahtani, (2001) claimed that perceived ease of use is

the degree to which an individual agrees that employing a certain technique would be priceless. Again, it is argued that attitude has a powerful, direct and positive impact on user's intentions to use the new technology system (Hernandez and Mazzon 2007). In addition, Davis, Bagozzi and Warshaw findings (1992) indicated the importance of the influence of the perceived enjoyment on the behavioural intention. According to the TAM, students' attitudes can motivate the use of LMS. Venkatesh and Bala (2008) proposed the latest work on the Technology Acceptance Model (TAM III).

The greater the perceived usefulness of Learning Management system, the more possible the students' will use it in their learning. Perceived usefulness is also a pivotal variable of attitude in the model (Gurtubay, Chaparro, Bienzobas & Gilete, 2013), the implication of the findings is that perceive usefulness of LMS leads to a positive attitude to use the system. Zeithaml, Parasuraman and Malhotra (2002) stated that the extend at which a method used is simple to grasp then could be considered as perceive ease of use. Perceived ease of use has a positive impact on the students' perceived usefulness of the LMS system. Some previous studies suggest that perceived enjoyment is an intrinsic part that stimulates individuals to be involved in a system that incite them (Hussain & Mkpojiogu, 2016). Therefore, in the context of this research paper it suggests that besides the results anticipated when integrating the LMS the students would uncover their pleasure and excitement.

Other studies argued that the users' attitude has a direct positive impact on the users' actual intention to use the system (Hernandez & Mazzon 2007). Teo (2010) supported that attitude determines the degree at which the users weigh the possibility of encountering pleasure and satisfaction when using the system. In this paper, the students' attitude would be positively impacted when they have fun using the LMS. Jogyianto (2007) discovered that individuals who are curios in a particular system will behave in certain way. Therefore, their intention will influence the use technology tools. The implication in the context of this study is that when the students are eager to learn how to use the LMS, they will have the intention to integrate technology (LMS) to enhance their learning.

Research Objective

The aim of the study is to determine the perceptions of TVET students when integrating and adopting the LMS in their learning in one TVET college in South Africa. The study proposed the following hypothesis questions:

H1: Perceived usefulness positively influence users' attitude

H2. Perceived ease of use positively influence users' attitude

H3: Perceived enjoyment positively influence attitude

H4: Attitude positively influence intention to use

H5: Intention to use positively influence users' actual system usage

Methodology

The study used the quantitative approach that provided the researcher with the chance to collect numeric data from a huge number of individuals employing the questionnaire instruments with pre-set questions and responses (Creswell & Guetterman, 2019).

Population and Sampling

The population is a group of individual or proceedings with the same features that can provide assistance to the researcher in the study (Cohen, Manion & Morris, 2018). The population of the study comprised of all TVET students studying at 52 TVET colleges in South Africa. A sample is a smaller group of the entire population that assists the researcher to obtain knowledge and data that epitomise the total population in the study (Bailey, 1994). The study sample comprised of 214 TVET students who were randomly sampled. The probability simple random sampling was employed because it draws randomly from the broader population and each individual has the opportunity of being chosen from the population. The probability of each individual being selected is not negatively impacted by the selection of other individuals (Fisher, 1966).

The study utilised the questionnaire to collect data and the instrument comprised of two parts. The first section concentrates on the demographics such as the year of study, faculty and technology experience. The second section focussed on the constructs to test the theoretical model. A five-point Likert scale was adopted as a measurement with 22 items adapted and improved from previous studies (Davis et al., 1989). Each item was measured using: (1=Strongly disagree, 2= Disagree, 3= Neutral, 4=Strongly agree, 5=Agree).

Ethical clearance and permission to perform the research in a particular TVET college were attained from the Research Ethics Committee (REC) from the University, Department of Higher Education and the specific. TVET Colleges before the study was initiated. The participants completed the forms and their anonymity was kept confidential and private. The participants were informed that they have a choice of not participating in the research. (Creswell & Guetterman 2019).

Results and Discussion

Descriptive statistics

Table 1 presents the participants year of study, faculty and technology experience. Most of the students that participated were the 1st years (50.5%), then 2nd year (25.2), 3rd year (19.2), 4th year (3.3%) and 5th year (1.9%). Students from the faculty of Engineering (49.5%), Hospitality (28.0%), Commerce & Management Faculty (8.4%), Building and Construction Faculty (6.5%), Services (4.2%) and Faculty of ICT (3.3%). Students that were technologically experienced (68.7%), lack of technology experience (29.0%) and (2.3%) were neutral.

Year of study				
	Frequency	Percent	Valid Percent	Cumulative Percent
1 st year	108	50.5	50.5	50.5
2 nd year	54	25.2	25.2	75.7
3 rd year	41	19.2	19.2	94.9
4 th year	7	3.3	3.3	98.1
5 th year	4	1.9	1.9	100.0
Total	214	100.0	100.0	
Faculty				
Building & Construction	14	6.5	6.5	6.5
Commerce & Mng	18	8.4	8.4	15.0
Engineering	106	49.5	49.5	64.5
Hospitality	60	28.0	28.0	92.5
ICT	7	3.3	3.3	95.8
Services	9	4.2	4.2	100.0
Total	214	100.0	100.0	
Technology experience				
	Frequency	Percent	Valid Percent	Cumulative Percent
Unknown	5	2.3	2.3	2.3
No	62	29.0	29.0	31.3
Yes	147	68.7	68.7	100.0
Total	214	100.0	100.0	

Table 1 Descriptive statistics**Regression statistics**

The results showed that there is strong evidence that a significant difference of most of the participants agreed that they believe LMS improves their learning performance because the p value of the mean =3,24 and p value less than 0.05 ($p < 0.05$). There was no strong evidence that a significant difference between participants were uncertain that using LMS enhances their learning effectiveness because the p value of the mean=3.23 and p value higher than >0.5 ($p > 0.05$). The results indicated a strong evidence that most of the participants agreed that using LMS easily translated the learning material into specific knowledge since the p value of the mean = 3.23 and the p value is less than 0.05 ($p < 0.05$). There was no strong

evidence that a significant difference of most of the participants were neutral that learning to use LMS was easy because the p value of the mean= 3.02, p value is greater than 0.05 (>0.05), it is easy to become proficient in using LMS because the p value of the mean=3.07, p value is greater than 0.05, LMS interaction is clear and understandable as the p value of the mean=3.06, p value is greater than 0.05 (>0.05). Lastly, students were uncertain that it can be easy for an individual to become skilful at using the LMS as the p value of the mean=3.14, p value greater than 0.05 (>0.05).

The findings demonstrated that there is a strong evidence that there is a significant difference that most of the participants agreed that using LMS is a good idea because the p value of the mean=3.54, p value is less than 0.05 ($p<0.05$), participants feel comfortable when using the system' functions and services as the p value of the mean=3.24, p value is less than 0.05. A strong evidence that a significant difference of students' participants believed that using online assessment is advisable because the p value of the mean=3.29, p value is less than 0.05. However, there is no strong evidence that participants agreed that they are satisfied in using the Learning Management System.

It was established in the study's outcomes that there is no strong evidence that there is significant difference that other participants agreed that participants perceive enjoyable when using the LMS because the p value mean=3.14, p value is higher than 0.05 ($p>0.05$) and no strong evidence that there is significant difference that students find it pleasurable when using LMS since the p value mean=3.32, p value is higher than 0.05 ($p>0.05$). Despite the uncertainty of students, it was mentioned that there is a strong evidence that there is significant difference that some of students found LSM to be interesting when used because the p value of the mean=3.32, p value is higher than 0.05. Also, fun to use LMS for their learning content because the p value of the mean=3.17, p value is higher than 0.05.

There is strong evidence that there is a significant difference that most of the students wished to continue using LMS in the near future. Since the p value of the mean= 3.37, p value is less than 0.05. Students intend to use the LMS in the future and be active users of the system because the p value of the mean=3.41, p value is less than 0.05. Other students mentioned that they will frequently use the LMS in the future as the p value of the mean=3.39, p value is less than 0.05. The findings also stated that participants will use LMS on a regular basis in the future as the p value of the mean=3.39, p value is less than 0.05. Participants stated strongly to recommend the use of LMS to others, as the online platform was found helpful in their learning at all times because the p value of the mean=3.46, p value is less than 0.05 ($p>0.05$).

Correlation Coefficient- Bivariate analysis: Relationship between variables

Perceived usefulness and Perceived ease of use

The study findings pointed out a significant positive relationship between Perceived usefulness (PU) and Perceived ease of use (PEU): "Learning to use LMS is easy" and perceived usefulness/I believe LMS improve my learning performance (chi-square=136.821, df=24, $p=0.000$). A significant positive relationship between "It is easy to become proficient when using LMS" and "I believe LMS improve my learning" (chi-square=141.801, df=24, $p=0.000$). Another significant positive relationship between "The interaction with LMS is clear and understandable" and "I believe LMS improve my learning" (chi-square=140.894, df=24, $p=0.000$) was presented by the findings. There was a significant positive relationship

between “It is easy for me to become skillful when using the LMS” and “I believe LMS improve my learning” (chi-square=154.100, df=36, p=0.000).

Perceived usefulness and Attitude

There was a significant positive relationship between perceived usefulness(PU) and attitude(AT) because of the following items measurements: “I believe using LMS is a good idea” and “I believe LMS improve my learning” (chi-square=108.095, df=24, p=0.000). The two variables “I feel comfortable in using the functions and services provided by the LMS” and “I believe LMS improve my learning” showed a significant positive relationship (chi-square=171.849, df=24, p=0.000). The results indicated a significant positive relationship between “I believe using online assessment is advisable” and “I believe LMS improve my learning” (chi-square=87.107, df=24, p=0.000). An illustration of a positive relationship between “I am satisfied in using LMS” and “I believe LMS improve my learning” (chi-square=134.962, df=24, p=0.000) was indicated by the results.

Perceived usefulness and Perceived enjoyment

The results indicated a significant positive relationship between Perceived usefulness (PU) and perceived enjoyment (PE): “I like using LMS” and “I believe LMS improve my learning” (chi-square=162.077, df=24, p=0.000). Also, it was uncovered that a positive association between “It is pleasurable to use LMS” and “I believe LMS improve my learning” (chi-square=149.362, df=24, p=0.000). There was a significant positive association between “I have fun with using LMS” and “I believe LMS improve my learning” (chi-square=118.158, df=24, p=0.000). A significant positive relationship between “I find using LMS to be interesting” and “I believe LMS improve my learning” (chi-square=137.665, df=24, p=0.000).

Perceived usefulness and Continuance Intention

A significant positive relationship Perceived usefulness(PU) and Continuance Intention(CI): “I will continue using LMS increasingly in the future” and “I believe LMS improve my learning” (chi-square=141.389, df=24, p=0.000). Another results showed a significant positive association between “My intentions are to use LMS in the future, at least as active as today” and “I believe LMS improve my learning” (chi-square=116.303, df=24, p=0.000). There is a significant positive association between “I will frequently use LMS in the future” and “I believe LMS improve my learning” (chi-square=126.303, df=24, p=0.000). The findings mentioned that there is a significant association between “I will use the LMS on a regular basis in the future” and “I believe LMS improve my learning” (chi-square=127.000, df=30, p=0.000). Lastly, it was indicated that a significant positive relationship between “I will strongly recommend others to use it” and “I believe LMS improve my learning” (chi-square=120, df=24, p=0.000).

Discussions

According to the findings most of the students perceived that the more they use LMS for their studies, the more it will be useful because it improves their learning performance, technology skills, learning effectiveness and interpret their learning material into specific knowledge. Literature findings revealed that LMS is an effective teaching and learning tools that improves the learning environment and the students’ academic performance (Taat &

Francis,2020; Eden et al.,2021). However, some of the students were not certain that using LMS can be useful to their learning by improving their performance and enhancing their learning effectiveness. This finding is supported by the literature of Eden et.al., (2021) by indicating that using the LMS it is not useful and no LMS skills obtained when using the system.

Most of the students are uncertain that when using LMS for learning it is easy, clear and understandable, maybe they are lacking the technology skills and experience to use the technology tools/systems during their studies. Eden et.al., (2021) and Abbad, Morris and Nahlik (2009) stated that when continually using the LMS it becomes easy to use and gain the relevant technology skills that are required when integrating it with the learning.

The perceived attitude hypothesis is confirmed by the results that positive attitude influences the use of LMS. When students use the system is continuously, it becomes ease to integrate it for learning. The system turns out to be useful because it can also be used for online assessments. The literature findings of Eden et.al., (2021) mentioned that using LMS encouraged the students in their learning, academic performance, improved their research skills. Students have a positive attitude towards the use of LMS because they find the system to ease to use and useful in their learning. Although, there are students that are not satisfied in using the LMS because of being neutral in their responses.

Lectures need to provide support and encouragement during the lesson so that students can see the importance of using the online system. The finding is supported by Taat and Francis (2020) who mentioned that it is imperative lecturers are developed to use the LMS because the system improves their professional practices. At the end, lecturers will be able to deliver their lesson through the platform, provide the necessary support their students which will positively impact their attitude towards the use of LMS when learning.

There are students who are technologically challenged because they were not exposed to technology use due to lack or shortage of resources at the TVET colleges and their previous schools. Since, they find it difficult to use the LMS they ended up being demotivated. They cannot experience the ease of use, the usefulness of this technology system and they are not looking forward to continue using the Learning Management system in the future. Students who are not exposed to technology in their learning they tend to resist change and prefer their traditional mode of learning (Hondonga, Chinengundu & Maphosa, 2021).

As, mentioned before in the study that most of the TVET lecturers are challenged with regard to usage of technology tools in their teaching. TVET lecturers are lacking the technology skills, and it is difficult for them to provide the support needed so that their students are able to use the LMS for their learning. Ghavifekr and Rosdy (2015); Chiloane (2021) in their study findings observed that TVET lecturers lack Information Communication and Technology (ICT) skills for the instructional delivery. As such, it is a barrier to integrate LMS in their teaching and to provide support to their students especially those that were not exposed to technology in secondary school. Hondonga et al., (2021) supported the study finding and indicated that TVET lecturers lack the technology training that can assist them to acquire relevant technology skills to use technology tools such as LMS for teaching and learning.

Nevertheless, there are other students who are technological savvy finding it easier, pleasurable, satisfying, fun when utilising the Learning Management System. Such students

learn quickly and know how to use the system functions and service with ease. These students are the ones who provide support to their peers. The study finding was confirmed by Oguguo, Nannim, Agah, Ugwuanyi, Ene and Nzeadibe (2021) and Abbad, Morris and Nahlik (2009) who echoed that constant utilisation of LMS assist both the lecturers and students to recall, simplify the content taught, obtain relevant technology skills and knowledge on how to use the system and improving the students' academic performance.

Fearnley and Amora (2020) findings indicated that PE had a positive and significant impact on PU. Their findings agreed with this study finding that revealed a significant and positive relationship between Perceived usefulness (PU) and Perceived ease of use (PEU).

There was a significant positive relationship between perceived usefulness(PU) and attitude(AT). Most students indicated that they are positively motivated to use LMS for their learning as it is useful in their learning. They can write the online assessments and get their feedback instantly from their lecturers. The results indicated a significant positive relationship between Perceived usefulness (PU) and perceived enjoyment (PE). However, the findings of Hondonga et al., (2021) stated that most of the students are demotivated and cannot enjoy the use of LMS due to lack of support to use the college LMS and lack of technology tools at home so that they can be able to access the system for learning.

A significant positive relationship Perceived usefulness(PU) and Continuance Intention(CI) was revealed by the findings. Most of the students echoed that they will continue using LMS in the near future, they will frequently use the system in the future, on a regular basis and recommend it to others. Since, they have discovered the advantage of using the online platform, such as accessing the uploaded assignments, being assessed online, accessing the announcement very quickly from the system and alternating the face2face classes with the online teaching and learning. Students who are confident to use technology are able to experience the usefulness of the system and intend to continue using learning system (Abbad, Morris & Nahlik, 2009).

It is an indication that LMS improves teaching and learning by making the learning content simpler for both students and lectures. For an example, lectures are able to upload the module content, notes and quizzes so that students can read before the lesson. The implication is that the more the students use LMS it will be easier to use the system and useful to their studies. At the end, students will have a positive attitude to continually use the system in their learning environment. The recommendations are that management of the college needs to develop their lecturers with relevant technological skills and knowledge. College management needs to be abreast with the changing technology that is being used at higher institutions globally. Enough support needs to be provided to their students so that they can be able to acquire technology skills so as to integrate LMS in their learning.

Conclusion

It was concluded that most of the students perceive the integration of LMS as pivotal because it enhances their learning in various ways. LMS support the teaching and learning of TVET courses and improves the student's technology skills. Most of the students find the system to be easier, pleasurable, satisfying, fun when integrating it in their learning content. However, some of the students are neutral and disagreeing towards the use of the learning system. Due to lecturers that are unable to support and teach them how to integrate LMS in the learning. Lecturers lack the relevant technology training to acquire skills on how to use LMS.

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Consent to participate

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Finding Solutions for Addressing Poor Performance in the Botswana Education Systems and Lessons Learnt From COVID-19

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Abstract

As the world evolves towards complex technological advances in Botswana poor academic performance in schools has over the years remained of paramount concern. To date not only do students in public schools perform poorly in their end of year examinations, but throughout the entire teaching and learning process in general. The situation was exacerbated by the outbreak of COVID-19. The Ministry of Basic Education and the Ministry of Finance and Economic Development carried out a study entitled, “Public Expenditure Review (PER) of the Basic Education Sector in Botswana,” that identified several challenges the country faces in its education system, such as, overcrowded classrooms, poor performance in the national examinations, education decisions made from different ministries, especially for primary education, poor in international educational assessments (World Bank Groups, 2019). The report further asserts that within secondary schools around the country, it is not uncommon to find a class of over 40 while in primary schools the ratio of student to the teacher is a bit lower. This paper is an attempt to assist the Botswana government implement solutions to the challenges faced by the education system, including those experienced during the COVID-19 outbreak, that continuously perpetuates poor performance in schools, leading to poor standard and quality of education. The researcher will analyse secondary data that has been collected over years to recommend solutions to the problems experienced by the country.

Keywords: Poor Performance, Overcrowding, Quality Education

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Introduction

It has become apparent over the years that Technology provides students with easy-to-access information, accelerated learning, and fun opportunities to practice what they learn. It enables students to explore new subjects while deepening their understanding of difficult concepts, particularly in STEM. Through the use of technology inside and outside the classroom, students can gain 21st-century technical skills necessary for their desired future occupations (Brown & Nthoi, 2022). Today as the world levitates towards complex technological advances in the case of Botswana over the last few years poor academic performance within the primary and secondary school education system of this country remains dwindling despite these above mentioned global technological advances. To date not only do students in public schools perform poorly in their end of year examinations, but throughout the entire teaching and learning process and duration in general. This current situation has also been exacerbated by the outbreak of the COVID-19. Following a study involving various countries in Africa such including Burkina Faso, Cameroon, South Africa, and Zambia emanated in a report by Human Rights Watch. This Report established the effects of the pandemic on children's education including those children who prior to this pandemic were at risk of being excluded from a quality education (Nanima, 2021). Several studies have been carried out as an attempt to unravel the causes of failure, but there is no evidence whether the recommendations suggested for improvement have been successfully implemented successfully (Chukwuere, 2017; Makwinja, 2017; Marumo, Pansiri, 2016). The relevance of associated interventions remain questionable as the status quo prevails. Year after year scathing reports of high rates of failure are shared in various forums in Botswana. The Ministry of Basic Education and the Ministry of Finance and Economic Development also carried out a study titled, "Public Expenditure Review (PER) of the Basic Education Sector in Botswana." This report identified several challenges the country faces in its education system, such as, overcrowded classrooms, uneven teacher- student ratios, poor performance in the national examinations, education decisions made in silos from different ministries, especially for primary education, poor performance in international educational assessments (World Bank Groups, 2019).

The report further asserts that within secondary schools around the country, it is not uncommon to find a class of over 40 while in primary schools the ratio of student to the teacher should be lower at around 1:15 (World bank, 2019). Hattie (2005) advocates for the reduction in class size for better pedagogy strategies relevant for an individual rather than a group. This in this way allows for individualized instruction, higher-quality instruction, and greater ease in engaging students with academic activities. In relation to access to technology, the mentioned shortage of classrooms and educators are overwhelmed. There is a clear need to reduce the number of students per class, but lack of infrastructure remains an obstacle and unavailability of funds is usually a barrier to this. The large number of students stems from the fact that as the country continues to develop the youth have become the highest population of the country at present in this regard. Using secondary data, this paper is an attempt to bring about effective solutions that the Botswana government and others within the education sector can impactfully implement to address the current challenges faced by the education system in the country. Public schools continuously perpetuate poor performance, which has been associated with poor standard and quality of education; this in turn affecting the quality of students produced and in turn the quality of industry ready graduates at tertiary level.

In addition, while this paper is an attempt to assist the Botswana government implement solutions to the challenges faced by the education system, it also delves into challenges experienced during the COVID-19 outbreak, that continuously perpetuate poor performance in schools, leading to poor standard and quality of education.

The researchers analysed secondary data that has been collected over the last 10 years in order to recommend solutions. Studies have been carried out by various academics and concerned civil organisations to address this poor academic performance from basic to tertiary education. One can observe that these studies have emphasised more on problems than solutions and there is need for a paradigm change to find solutions to the challenges. Reports written noted several stumbling blocks that inhibit children from attaining the international set standards of performance. At the peak of the millennium and with a high population of the youths, it is urgent that Botswana finds lasting solutions to the failure rate in schools. Africa has gained much traction in recognising the rights of the child with an emphasis on his or her holistic environments over the years and this on its own warrants the purpose of this paper (Nanima, 2021).

Implementing recommendations

Educational policies

All the educational policies alluded to the need to improve the state of the learning and teaching environment in Botswana. The 1977 Education for Kagsano advocated for the transition of the Botswana society on its national principle of social harmony. This was followed by the Commission on Education of 1993 that was reviewed into a working paper of 1994 known as the Revised National Policy on Education (RNPE) which aimed to transit the society from an agro-based economy to an industrial society (Republic of Botswana 1977; 1994). Although this was a welcome development for growth, development and diversification of the economy, to some extent it derailed Botswana from growing their agricultural sector which the government is struggling to resuscitate to date. Most farming land was neglected and laid fallow, and Botswana continued to depend on her neighbours especially South Africa for food supplies.

The Botswana government is well known for its high profile, well-articulated educational policies that are usually overtaken by events due to poor implementation procedures. “Education policy implementation is a complex, evolving process that involves many stakeholders and can result in failure if not well targeted (Viennet, & Pont, 2017: p.6)”. The education system relied more on consultations from foreign consultants who would bring other innovative ideas that overshadow and derail the intentions of the national policies that were based on the context of the society. However, Botswana could be heralded for maintaining the principles of the Education for Kagsano (unity) that led the country’s diverse society peaceful co-existence. Botswana is well endowed with a rich variety of cultures and languages (Republic of Botswana, (1996). Botswana live together in harmony despite their differences in ethnicity and varied languages. Every Botswana has a right to settle in any place of their choice regardless of their origin, hence the reason why there are no civil wars.

For a country to develop, all its citizens must participate in the socio-political and economic spectrum of the country. Women must be given equal opportunities as men in politics, high profile positions and to compete fairly in projects of large amounts of money. This would lead to self-reliance and freedom of all to exploit their potential. The graduates who have

been unemployed for years would enjoy the resources that government claims to share through various financial organisations.

Visions

The Vision 2036 of Botswana prides itself with its vision of “towards prosperity for all” promised a future for an educated and informed nation, advocating long life learning for all Botswana, a vision that has been an enigma to date. There are still children and other groups of people who fail to access education. This vision was mirrored through the Botswana Education and Training Sector Strategic Plan (ETSSP 2015-2020) which marked a significant milestone to diversify and become a knowledge-based economy, through a planned and careful development of human capital (ETSSP 2015-2020). The ETSSP sought to refocus the education and training towards fulfilment of social and economic aspirations identified in our Revised National Policy on Education (RNPE), the National Development Plan 12, Vision 2036 and as well as the United Nations Sustainable Development Goals.

For all to prosper and be educated schools should be well equipped to cater for those living with disabilities, those with varied learning challenges, the marginalised, out of school street children etc. According to cited issues relating to various barriers such as programmes designed for sighted individuals and accessibility issues, Mukhopadhyay & Moswela, (2020) and Rubin (2002) The government should devise a system of following up those missing children from the system to ensure inclusivity. Some children as those living with disabilities and those from independent religious sects. Some of these children from marginalised groups move around assisting their families to make a living and this hinders their access to education. Mokibelo (2016) asserts that the language barrier within minority groups present inequalities in learning. Although the government advocates teaching at lower levels through the mother tongue, a lot still needs to be done. It is important to start strategising about developing other ethnic languages and to formalise their teaching in schools, the provision of mobile schools for the roaming children, or a plan for attendance of varying school times during certain hours to cater for these individual is seen as an opportunity for the purpose of this paper.

In this way, a knowledge-based economy cannot be attained if some members of the society do not have access to education. Education is also a basic human right and a foundation for a more sustainable and inclusive society (Damon, Glewwe, Wisniewski & Sun, 2016; Nanima, 2021). The government must provide technology in all schools and ensure that the knowledge attained is utilised to change the lives of the children and does not warrant knowledge to maneuver computers. Instead, children must use the skills for survival. Teachers in Botswana continue to use the chalk boards for teaching. There has been limited usage of technology in primary and secondary schools. Tertiary institutions have adapted to the use of technology particularly private institutions (Brown & Nthoi, 2022). Even though the government set up computer labs in schools, most of them were not utilised until the advent of the COVID-19 scourge. Lately the government has attempted to provide all secondary schools with computers, a welcome move to improve performance. However, there is need to equip primary school children with relevant activities that will assist in the use of technology to enhance their skills.

Developmental goals

At the time of this paper the country had translated and contextualised the 17 Sustainable Development Goals and matched them to the Vision 16 pillars, which reflected the Millennium goals. Goals 1 to 5 fall under the category of human development; a sign that people are more important and must be given priority to ensure their continuous existence and sustainability. The country mapped out 7 goals of which 5 were derived from the Vision 2036 Pillar 2 on human and social development. The 6th goal was to ensure availability and sustainable management of water and sanitation for all mapped to vision 2036 Pillar 3 of sustainable environment; Goal 7 is to for access to affordable, reliable, sustainable and modern energy for all derived from pillar 1 on sustainable economic development. A review of the goals set advocates eradication of poverty which is a stumbling block to Botswana's economic development.

Like all other aspirations to improve education, Goal 4 purports inclusive and equitable quality education and promote lifelong learning opportunities for all, a derivative of the Vision 2036 Pillar 2 is a repetition of the attempts the country had embarked on to provide quality education. In 2022, there are children still learning under trees, walk long distances from home to schools, do not have adequate resources such as classrooms, books, technology or teachers refusing to work in far rural places. The question is how the country intends to solve the problems faced in the education system to ensure quality education. To acquire the outcomes of all schools must be provided with adequate learning space, well equipped libraries and any other resources needed in schools.

Improve learning environment

There remains a number of children in schools the country has always had shortage of infrastructure despite the highest budget being allocated to education. Botswana commissioned education policies in 1977, 1993/94, Vision 2016, ETSSP 2015-20; Vision 2036 and many other working papers as an attempt to improve the learning and teaching environment. However, many schools still do not have adequate classrooms and sit outside to learn despite the large budget dedicated to education yearly. School infrastructure is provided solely by the government and the education budget must be shared equally between schools, spent accordingly to improve schools.

Through their Corporate social investment initiatives, there are private and foreign organisations that gain economically from communities of operation and they give back to these communities through various means that include to share costs and to contribute towards infrastructure development. For example schools in areas where there are mining industries must have state of the art schools.

In most cases classrooms are over capacitated with more than 40 students per class. The teacher is unable to attend to each child's need. The teaching is one-size-fit-all and several students do not meet the outcomes or international standards of performance due to lack of diversified teaching methods. There are no teacher aide to remediate those who find concepts difficult to understand.

There is need to provide more classrooms, reduce the number of students per class and introduce remedial teachers to assist those with learning difficulties. There are individuals within society who could be engaged by schools to mentor the school going children, tutor

and ensure that the children complete their homework. Botswana are known for collaboration that it is some of the issues identified in their culture through proverbs such as, “*se tshwarwa ke ntsha pedi ga se thata*”, literally meaning that when people collaborate a lot can be achieved. Other proverbs deal with the upbringing of child such the upbringing of a child is the responsibility of whole community. Parents could alternate in hosting a certain number of students in their homes to ensuring that children complete their homework.

Ensure equity in education

Botswana subscribes to the world declaration on Education for All (EFA) of 1990 that education as a vehicle for national development and is a basic human right, essential for both social and individual development. One big problem is those children missing from the education system but are not accounted for. It is not clear or there is limited information on who is learning and who is not. There are children from the marginalised groups such as the poor, street children, the indigenous people; Basarwa, Bangologa, Bambukushu, Bazezuru who either miss school due to ignorance or other social challenges, religion, or culture.

The government need to make a conscious decision to account, monitor and establish the number of children out of school. Alternative programmes should be put in place to accommodate these children; either to incorporate them into the school system or provide opportunities for learning certain skills and competencies. The school going children must be prepared with more than basic reading and writing skills.

Financial reliance on the government by all institutions of learning is a ticking time bomb especially at tertiary levels. The University of Botswana was founded on the concept of self-reliance. Every member of society had to contribute towards the construction of the institutions. The spirit of self-reliance must continue for the sustenance of tertiary education. These institutions should identify alternatives to make money through research and innovations, partnerships and investment in property or other means.

Reduce poverty, unemployment, illiteracy

Poverty

Most of the Botswana are poor and this was exacerbated by the COVID-19 pandemic where some families lived on food baskets provided by the government. People living in poverty cannot afford to send their children to school or children are forced to work as maids, farm hands, baby-sitters to support their family. Children may go to school in civil clothes without school uniform. This trend is common in both rural and urban areas. Some children walk bare-footed and for long distance to get to schools since there are no school buses provided in Botswana. Others start work from an early age. Despite the desire to go to school, children drop out of school early because they cannot afford to go to school hungry and travel long distance to school. Poverty disables families to access materials and children cannot even get a chance to read books or navigate computer, leading to low literacy rates.

The Botswana government must continue to feed the children during school hours and provide school uniforms for poor children through the social welfare department, but more still needs to be done. There should be programmes that alleviate people from poverty that are easily accessible to every Motswana. There are various programmes that have been introduced in farming etc, but people complain about not being able to access them. Poverty

is not a Botswana issue but most developing countries. According to the World Food Programme in 2009, 66 million school children are live under the poverty line and have no access to proper nutrition. Botswana needs to improve the nutrition of food fed to the children to encourage attendance, reduce dropout and improve performance.

Creation of employment opportunities

As indicated above, unemployment is rife in Botswana with thousands of graduates unemployed due to dependence of government as a sole employer. Instead of the investors setting up shopping centres, they should set up industries and factories to create job opportunities. Tertiary institutions must team risk taking techniques to allow graduates take risks to work in other countries through skills export. The country produces the best teachers, nurses etc. The country relies solely on diamond export which cannot provide adequate jobs for the small population of around 2.4 million. There are older generation still working and a system could be devised to enable them to retire with comfortable retirement packages to open opportunities for the younger generation in the government departments.

Tertiary institutions must collaborate with industry, benchmark from other countries and implement lessons learnt to avoid mismatch of skills and competencies taught to the graduates. It is essential for the country to develop its people through provision of dual learning and employment opportunities, especially for undergraduate graduate students.

Innovative teaching and learning methods

Currently in Botswana across the education system, teaching is still traditional. Children listen to the teacher/lecturer and take down notes. A little bit of critical thinking is infused in tertiary institutions but more needs to be done. Due to this teaching techniques, there is limited engagement of the students and less ownership of learning. Teachers/lecturers must off innovative teaching methods that are more engaging, encourage group work and use the available tools and resources from the internet. There is a need for teachers to be trained to master knowledge, skills and competencies that could assist student to meet the international set standards of performance. Contemporary learning does not require test scores but critical and analytical thinking through competence-based methods. Teachers must work together as a community, a concept common in Botswana, to access immediate help where they have challenges. In most cases, teachers are promoted to lead in school without any training and face challenges of collaboration, delegation, planning and control. Measures should be in place to train leaders before they resume positions of responsibility.

Students/Children living with disabilities

People living with disabilities (PLWDs) in Botswana have struggled overtime for recognition and support in socio-political and economic spectra. This brawl emanates from the traditional beliefs when people living with disabilities were kept out of sight, mind and the public. Several families with children living with disabilities would not want anyone to know about the existence of such a family member. In some cases, those with mental disabilities were tied up to reduce their mobility. Coupled with indigenous beliefs such as believing that such children were either a curse, bewitched or existed for bad luck, there were no appropriate institutions to absorb the children or support families with children living with disabilities.

Students in all levels of education attend institutions from primary to tertiary in institutions that fail to provide adequate infrastructure to cater for their various disabilities. Although the country has implemented several educational policies including other innovations have always encouraged inclusion in the education system through equal access and quality education supports the 1989 Convention on the Rights of the Child (Article 29).

The Botswana government inclusive regulations do not cater for PLWD in schools and it is essential to provide all the required equipment and resources to enable these children access education.

Lesson learnt from COVID-19

The outbreak of COVID-19 caught the Botswana education system unaware. The government had to find alternative ways of teaching children and introduced. It was one of the first emergencies that Botswana had ever experienced in a long time. According to Marinoni, an't Land, Jensen, 2020: Murphy 2020) this emergency forced institutions around the world to switch to distance education and transiting rapidly from face-to-face classes to online learning systems. Botswana universities and other higher institutions of learning were forced to fully engage and use a variety emerging online communication platform technologies. The outbreak of COVID-19 called for swift decisions to augment the learning and educational by accelerating the distribution of educational system's technological infrastructure to expand the teachers' pedagogical expertise and the students' learning repertoire (Chiu, Lin and Lonka, 2021).

Although change is inevitable, it was difficult for the students to transit form the norm to a foreign way of learning. The tradition in Botswana HEIs is such that students attend classes based on their time-tabling and have sufficient time to interact with their peers and lecturers at a time convenient. The introduction of online learning created fear and anxiety of the unknown. The aggregated stress and anxiety during the pandemic may easily demotivate and disengage student learning (Pekrun, Lichtenfeld, Marsh, Murayama, and Goetz, 2017), and improper internet connection and gadgets to access the distance learning were also caused frustration (Gustiani,2020).

As previously mentioned, primary and secondary school children were not accustomed to study online or use computers to learn and did not pay much attention to technology. Like other countries, Botswana had to rapidly pivot to remote learning strategies (Winthrop Ershadi, Angrist, Bortsie & Matsheng, 2020). This was foreign to everyone, and parents were expected to participate in the learning process of their children.

For a long time, parents had abdicated the responsibility for their children's learning to the teachers and few had access to the internet and computers. Children had to use cell phone to learn. There was no longer the privilege of sitting in little rows listening to the teacher face to face. The children had to learn through the long-distance mode. This was a serious challenge indeed. This exposed the large gap between the rich and the poor and the inequality among the Batswana.

COVID-19 has taught the Botswana education system to appreciate new trends in teaching; that there is no need for large spaces to learn and that children can learn without the physical supervision of the teachers/lecturers. Educators began to acknowledge the welfare of

teachers/students/children. Online counselling facilities were provided to ensure that all cope with the effects of the pandemic.

Conclusion

The Botswana education system is guided by the 3Rs in all the spectrum of teaching and learning. This process of traditional pedagogical strategies have inhibited change in the education system. There is doubt whether all the educational policies commissioned and identified problems were ever implemented. There is also a need undertake an empirical study to tackle the effect of COVID-19 on children emphasised in this study. This will improve approaches by various stakeholders in improving the current system.

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Let's Play: Using Gamification in University Classes as a Means to Increase Motivation and Engagement While Lowering Stress

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Abstract

Worldwide, traditional face-to-face (f2f) students struggled with a rapid shift to virtual learning as did faculty who often had limited experience and knowledge of developing online courses or knowing how to engage their students. Many institutions of higher education have returned to classrooms, first with hybrid approaches, and now f2f. However, just as the world has changed, our students and faculty have changed too and many are struggling with the traditional approaches. Faculty are reporting students' lack of engagement, such as failing to turn in assignments or read material and engage in discussions. A recent study has faculty describing student disconnection with terms such as “defeated,” “exhausted,” and “overwhelmed.” Using information gained via international workshops and personal experiences, we present methods to increase motivation and engagement through the use of gamification approaches that can be used f2f or in online classes. There is a proliferation of free online tools that can be used to increase higher education student engagement and we outline and demonstrate multiple ways to bring this “playful” learning into our classes to promote collaboration and engagement plus expand our assessment strategies. Using gamification helps to promote playfulness which has been shown to lower perceived stress in adults and to facilitate lowering their use of negative, avoidant, or unhealthy behaviors (Magnuson & Barnett, 2013). This paper will address some of the current issues and provide suggestions as to how to introduce gamification ideas into higher education courses.

Keywords: Gamification, Motivation, Engagement

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Introduction

Motivation and engagement seem to be educational buzzwords at the moment and often discussed across all program levels, more so during and post-COVID-19. Worldwide, traditional face-to-face (f2f) students struggled with a rapid shift to virtual learning as did faculty who often had limited experience and knowledge of developing online courses or knowing how to engage their students. Universities adapted to virtual learning seemingly overnight and spent one and a half years or more using this approach. Many are now coming back, first with hybrid approaches, and now f2f. However, just as the world has changed, our students have changed too and many are struggling with the traditional approaches. Faculty are reporting students' lack of engagement, such as failing to turn in assignments or read material and engage in discussions.

This leads us to the topic then of how to motivate students so that they will engage with the learning process more deeply because we know from research that high motivation to learn is linked to better academic performance and to greater conceptual understanding of ideas, satisfaction with school, and higher self-esteem and adjustment (Gottfried, 2009; Gottfried, 1985; Ryan & Deci, 2009; Ryan & Deci, 2000). Our first step toward increasing learner motivation is to conceptualize it and what that actually is in terms of our specific goals of the course and program. Does it mean all students demonstrate an intrinsic push to learn, thus they do this with no promise of external reward? In other words, they are attending and studying simply for the joy of learning. Or, as with so many tasks in life, is their motivation more extrinsic in the form of knowing high grades will maintain their scholarship and the degree will lead to a promotion. The bulk of students in higher education are a mix of both extrinsic and intrinsic just as most people are; however, having an understanding of the general motivational states of the students in our classes will help us develop learning and assessment strategies that can help promote success.

We know there are different frameworks for thinking about motivation; however, we most generally agree on some specific factors' students need to have for motivation. Particularly, students need:

1. Competence, which is the belief that they're capable of doing something,
2. Autonomy or control, which is the ability to set appropriate goals and to understand the relationship between their effort and the visible outcome,
3. To have interest or see value in completing the task,
4. Relatedness, which is the need to feel a connection to either a group or social element aligned with the task/learning (Murray, 2011; Pintrich, 2003; Ryan & Deci, 2000).

We have to keep these concepts in mind as we move to developing our courses and find ways to increase the active learning in each class. This then leads us to engagement, another buzzword often heard as faculty bemoan their struggles to keep student interest and learning high. This too though requires us to step back and ponder what do we mean in each individual class when we examine engagement. Does it mean in a virtual setting that all students have their camera on and are staring at the screen? Does it mean students speak in each f2f class and take part in all discussions? Or does it mean students turn in quality work on time?

We all want to look out on a full class of excited, bright-eyed students eagerly trying to jump into discussion and demonstrate they have a solid understanding of the readings. We need to

realize that individual differences mean that many of our students may be introverted and uncomfortable speaking out or culturally they may feel inhibited about sharing information or demonstrating their knowledge (or lack thereof). Realistically students may have had a very rough week and been unable physically or emotionally to have read the material or perhaps they struggled to understand it. One theory that examines this struggle with understanding is cognitive load theory (Leahy & Sweller, 2011) which looks at the amount of working memory we possess. The theory posits that learning happens within a given range of information; if the cognitive load is too low then learning is inhibited; too high and it creates anxiety which shuts the learning down. The sweet spot lies between these two, and can, in addition to providing new learning, also allow us to enter a state of flow. This state of flow (or being “in the zone”) is the mental state in which a person who is performing an activity is fully immersed in a feeling of energized focus, physically and emotionally involved, and is enjoying the process (Csíkszentmihályi, 2008).

We can see cognitive load being applied at the just the right level and approach to trigger flow during those times we are fully engaged with our students, and they are discussing and commenting back and or working on a project together, only to suddenly realize class ended five minutes ago! Rarely though does this occur with the Sage on the Stage approach whereby the faculty is lecturing and reading material aloud to students. The state of flow is about engaging with the learning in a far more active manner, while understanding individual differences in temperament. There are a multitude of reasons that students will demonstrate a range of behaviors within our classrooms, and it is the faculty’s responsibility to identify what constitutes engagement in their course which leads to the ethical challenge of trying to find out what works best for them.

Collaborative Learning

One approach that has been shown to increase engagement is collaborative learning, which is the educational strategy using pairs or groups to enhance learning. There are many ways to foster collaborative learning amongst students in a f2f classroom setting. Group work, pair and share, discussions, and group problem solving are all examples of ways to facilitate collaborative learning in a classroom (Rutherford, 2014). With the onset of the COVID-19 pandemic, f2f classrooms needed to swiftly move to virtual learning and build virtual social learning communities. While we may not need to mandate virtual learning now, regardless of the learning modality, there will always be a need to ensure students are able to collaborate with each other and their faculty in ways that continue to support engagement, reduce transactional distance, and foster social learning communities.

In a virtual classroom, although students and the faculty are physically distanced from each other, there are tools and best practices to foster collaborative learning through social learning communities. Wankel and Blessinger (2013) postulate that, “Building social learning communities within the classroom has the potential to foster a greater sense of belonging, interactivity, and group cohesiveness which are important factors in student motivation and their willingness to participate in such communities.” Leveraging technology is only one component to foster social learning communities and further collaborative learning. Instructors also need to ensure the pedagogy and content is paired correctly to the technology in order to further learning (Wankel & Blessinger, 2013).

There are many reasons to use collaborative learning. First, collaborative learning bolsters high engagement from students, between students, and with the faculty. Students have to

communicate with each other in order to successfully complete the task. Additionally, it provides students a forum to practice additional social and leadership skills through working on group projects. This also allows for students to learn from diverse perspectives, working on a team with individuals from different backgrounds and experiences. Furthermore, research on collaborative learning has also demonstrated an increase in student self-esteem, social skills, and responsibility (Sultan & Hussain, 2012).

In order for collaborative learning to be most effective, there are some strategies for faculty to consider. Foremost, set expectations early. If group work is going to be an expectation in the class, let the students know early so they can best prepare. Next, ensure the directions and rules for participation and grading are clear. It can be challenging for groups to come together and when they do, time needs to be focused on the collaborative learning tasks, rather than trying to decipher the directions. Students will also want to know if they will be evaluated by their peers and/or the faculty. Finally, consider if the students need any training prior to the collaborative learning project. It may be helpful for the students to complete a self-reflection or team building exercise prior to their group work.

Assessment

Another way to promote engagement is to effectively use assessment. Course assessment provides valuable insight for faculty and students to monitor learning and progress toward achievement of the course objectives. Although assessment is considered a key element in the teaching and learning process, faculty do not always create effective assessments or adequately capture students' progression toward meeting course objectives. However, assessment highlights the pedagogical purposes that impact student learning (Wu & Jessop, 2018). Assessment within our class settings can be described as formative and summative and both of these assessment types are considered as equally important in understanding student learning gains. However, these two types of assessments provide different types of data that is valuable for both faculty and students.

One type of assessment is formative which helps to capture students' levels of understanding and allows faculty to identify any misconceptions, struggles, or learning gaps that are experienced by their learners. These frequent and often informal interactive assessments allow us to readjust our instruction and provide opportunities for the monitoring of our students' learning. When incorporating formative assessments into our classes, we should ponder questions such as "what learning is taking place in our classes," "what are our students not learning," and "how can we better support our learners?" These types of assessments are not typically graded or are weighted very low in students' overall final scores.

Another type of assessment is summative which focuses on students' performance of understanding course concepts. We use summative assessments to evaluate our students' learning, skill acquisition, and academic achievement. When we administer summative assessments, they are typically in the form of tests, assignments, or projects. Generally, we assign summative assessments at the conclusion of a specific period of time (e.g., mid-term exams, final exams) which makes them evaluative of a range of course concepts that students have learned in our classes. These assessments are weighted more heavily and impact students' final course grades.

When integrating assessments into our classes, we should consider what technological tools can help us best capture student learning and allow for the automation of grading and student

learning performance. Technology-enhanced assessments allow for innovative and engaging forms of informal data collection of student performance. The inclusion of technology provides students with real-world learning experiences that incorporate higher-order thinking skills (Devedzic & Devedzic, 2019). Further, utilizing technology in assessments allows us to provide greater variety and authenticity, allows for alignment with learning objectives, increases learner engagement, integrates autonomy, promotes efficiency in assignment submissions, results in immediate feedback, enhances opportunities for learner response to feedback, and ensures evidence of the effectiveness of curriculum design and delivery. However, when integrating technology into assessments, we need to consider factors such as accessibility issues, students' sense of isolation, hardware and software complications that prevent assessment from taking place or result in inaccurate saving of student submissions, challenges of students engaging with the technological tool outside of the classroom, difficulties of confirming the identity of students, and need for professional development training.

Researchers have continuously demonstrated that the implementation of technology-enhanced assessments positively impacts students' performance (Alavi et al., 2021; Jopp, 2019; Khalaf et al., 2020). Therefore, we need to consider how the inclusion of effective assessment techniques and approaches provides us a lens for understanding student learning, identifying invisible barriers, and helping educators improve their instructional strategies. This insight is vital because when we measure student learning through assessment, both faculty and students both receive vital insight to the extent that learners are achieving our established learning objectives. Effective assessment techniques enable students to demonstrate their learning as well as enhance their capacity for future learning (Winstone & Carless, 2020).

Instructional Technology

This section provides examples of technological tools and f2f activities that can be used to increase learning and engagement in both f2f and virtual learning environments. The tools can also help us with assessment so that we can measure engagement (using multiple definitions of this) and hopefully increase motivation to learn. Additionally, these tools provide ample collaborative learning opportunities to further assess, motivate, and engage our learners.

Online Tools

Trivia games and quizzes are engaging approaches that can be used to assess students on the material being taught. They are a fun and interactive way to bring gamification to the class and test student's knowledge either by having them play individually or in teams. Many online informal assessment tools allow students to log in using their phone/iPad/or laptop with a QR code or going to the link and putting in a short code. They can choose to put their name or a pseudonym in (faculty can decide if students need their real name or if they want to be anonymous then they can choose a pseudonym and inform the faculty member what this is; if assessment is part of this quiz). Faculty then start the quiz and can choose to show students on a live screen how everyone is doing along the way, or they can keep this until the end or even have it remain private. Faculty can choose the length of time between questions, type of question, and also pull in various media to the question. Many platforms allow for quiz data to be downloaded at the end to a cvs document.

Polling can also be a fast way to garner student input and let you know if they are understanding the material. For instance, faculty could ask them a specific knowledge question and if many do not seem to be at the level expected, an instructor could stop presenting new information and work on that concept, perhaps by having students turn to a partner and discuss and explain it to each other or similar active learning ideas. Ideas for polls include issuing anonymous surveys for feedback, tracking student attendance (put all their names in the poll so they have to check it; but set so that students can only answer once!), hosting speed competitions, and checking understanding. Question and answer formats can also be used prior to exams.

Using group activities through a social wall is a way to have students provide ideas or graphics in a group format so that all can be working on the project at the same time. The social wall keeps growing with the posts and can increase the excitement of an event. Faculty could use this for an onsite conference or capstone presentation event, etc. However, it is also a very solid tool to use in class for learning.

Some examples of how we can use this include assigning a research topic and having students individually post links to research or sites that address it. Building a social wall for initial connections with students (first day activity) can provide a visual connection as students post pictures of the chosen “task.” It can also be used to kick start the learning topic of the class. For instance, in a recent Psychology of Teaching and Learning class, one author asked small groups of students to work together and find a picture of a quote that they felt best captured their definition of learning. They then shared this on the social board and the full class was able to jump into discussion of each of the quotes. The same activity was then done at the end of the class and then compared to the first wall of quotes to examine if students felt any different.

Online virtual bulletin boards can be accessed as an app or website-based platform. Students can create information onto the virtual bulletin boards using a template or blank canvas. The platforms have the ability to allow students to upload, insert, or drag and drop documents, images, text, weblinks, and videos. Virtual bulletin boards typically contain voting and comment features as well. They are a great tool to use for collaborative group projects, as it allows for students to work together asynchronously while still being able to observe changes and contributions from group members.

Information Sharing Platforms

Blogs are a great way for instructors and students to share information and collaborate with the broader community through disseminating information in their blog and allowing readers to comment on their posts. Many online blogging systems are built for educational uses. Instructors can create class blogs, assign group projects, or even assign written work through these tools. For blogging assignments, teachers and students can create websites and blogs that are secured within an educational community and still have the option to share publicly. Blogging platforms contain many features that allow professors to customize their experience, such as widgets that provide links, tags, author lists, text boxes, and searches.

Content development can be collaborative through engaging with ePortfolio platforms, with groups working together to share files, videos, and projects. The layout of these digital portfolios is dynamic with large images and limited text on slides. Instructors can create their own ePortfolio and share content with the students or assign students collections to add to or

comment on. Collaborative tools can also be utilized to in order for groups to upload weblinks, videos, social media posts, etc. into a shared space and organize content into collections. Instructors and students can add directions, ask questions, and comment on the shared content. Users can also record videos of themselves, providing an additional opportunity for engagement and collaboration.

Face-to-Face Tools

Gamification approaches in the class can be a solid technique to promote active and engaged learning. They can be adjusted to incorporate team or individual competitions, practice skills, or build new knowledge. Behavioral approaches of rewarding via leaderboards or simply assigning points (or deducting points) on a white board makes a fast-paced reward system that engages the bulk of students. From experience, chocolate can also be a very engaging reward!

Having students work in small groups to create these activities as part of their course work is a good strategy for their learning of the topic and of course it helps release the load of the faculty member. Games that the students know from childhood can be adapted to include the material.

Crosswords and Word Search

Some examples of these include team-based crosswords or word search puzzles. These can be created online and then printed out and placed on cardboard to use in the class. There are multiple websites to help develop crosswords and clues and words can be taken from the lecture notes or even prior to exams. Then students can be divided into multiple teams, given the bag of letters and clues with a race to see who finishes first. There are also sites to do the crosswords or word searches online and so small groups can work together either through virtual formats such as Zoom or if f2f, with phones or laptops.

Snakes and Ladders

A similar idea is to use either an online or printed version of the game snakes and ladders. The organizers create questions that need to be answered about the course material and correct answers move the number rolled on the dice. There are many dice rolling sites or game timers as well! These can be put up on the digital screen or individual students use them on their phones. Pulling in an introverted student to be the “roller” or scorekeeper can also be a way to engage even the students who normally sit in the back and disengage. More games such as this can be introduced with a little imagination.

Assessment Technologies

These types of technology allow for gamified polling, discussion, and quiz options. Particularly, when using these tools, we can create pre-class activities to assess students’ background knowledge of topics that we will be teaching. This information informs us of what students already know about the topic and what foundational skills that they need to acquire. We can also use this tool to create lecture summaries to evaluate students’ comprehension of the lesson. To make this activity collaborative and engaging, we can create mini competitions in which groups of students compete in a friendly competition to determine who can answer the most questions. Essentially, this platform provides a plethora

of options to capture formative assessments through engaging and collaborative activities which include:

- **Brainstorming for assignments:** faculty can pose a question related to an assignment and have students share their thoughts of how to complete. For example, faculty can provide students autonomy in how to complete their assignments and students can share their assignment preferences (e.g., written assignment, oral presentation, timeline, etc.). This approach allows for student engagement and motivation in their assignments and provides faculty the opportunity to account for learning preferences within assignments and capturing assessment data. Another option is for faculty to create presentation topic options in which students select their topic preference. Similarly, this activity allows for students to have autonomy in their assignments further enhancing their levels of motivation and engagement and can promote opportunities for collaborative learning opportunities in which students can be grouped together randomly.
- **Word Clouds:** faculty can create engaging word clouds focused on the key discussion themes to highlight the most salient aspects of the lesson. This activity can be expanded to include collaborative discussions regarding which topics may be of most interest or importance to students. This activity can motivate students in the learning process and help provide faculty opportunities to informally capture an understanding of students' comprehension of the course content.
- **Backchanneling:** in lieu of creating discussion questions, students can pose questions anonymously to start a discussion. Through this activity, faculty can determine areas of uncertainty and motivate students in the content. This discussion approach can enhance students' engagement in the class discussion since they can provide input.
- **Real-time reactions:** students can submit their reactions to a video, peer project, class activity, or discussion topic. By submitting their reactions, students are engaged in the activity. Faculty can also incorporate this type of feedback into their evaluations of students' work and receive valuable insight into the areas and activities that students find most appealing.
- **Note sharing:** this activity can be helpful in creating a collaborative learning environment since students share their class notes with their peers. They can upload photos of their typed or handwritten notes to provide support to their peers. Faculty can also review the students' notes to ensure that they are accurately understanding the lessons.
- **Peer review:** this interactive and engaging activity incorporates the use of student feedback in the form of "likes" and comments on each other's posts. Student feedback can be used to informally assess students' levels of comprehension and to engage them in the lesson.
- **Poll and quiz questions -** faculty can create and share comprehension questions focused on the course concepts. Student performance on these activities can be used as course grades. Debate and group discussions can also transpire from poll questions.

This interactive assessment tool allows for us to receive instant feedback of student learning through engaging and motivating formats. For example, we can capture on-the-spot formative assessment data of students' comprehension of course concepts. Also, data that is collected can be displayed via student mode and graph mode. Ideas for this platform include:

- Team competitions: this technology tool can be used to create groups of student teams to review course content. By completing this activity, faculty and students can determine their understanding of concepts for an upcoming test or project. Team competitions can also engage and motivate students in which they are in the flow of learning resulting in enhanced levels of knowledge acquisition.
- Poll questions and voting: students can respond anonymously to questions focused on newly learned concepts or select a topic for class activities or assignments (e.g., do you want to conduct a presentation or write an essay on this topic?). By providing students autonomy in the lesson, they are more engaged and able to demonstrate their knowledge by completing assessments in a format that is most closely aligned to their learning preferences and styles.
- Selecting groups or topics: students can select their assignment topics or groups for projects. For example, faculty can include a list of five available presentation topics for students to select. All students who select the topic are then assigned to work together on the presentation.
- Student generated questions: faculty can require students to generate discussion questions or multiple-choice questions for a test review. Through this activity, faculty can identify which topics students perceived as most important and assess their understanding of the concepts (e.g., did they phrase the question correctly, is the correct answer provided).

Assessment apps additionally provide options to create quizzes, surveys, and mini competitions to assess student learning. Features include the ability for us to upload our class rosters, customized folders for assessments and reports, and provides the ability for students to use the silent user hand option for anonymity. Ideas for this platform include:

- Exit tickets - students can demonstrate their levels of understanding of course content prior to leaving the class. Faculty can ask students questions related to the most important lesson points and determine students' comprehension of these concepts. If many students select the incorrect answer, faculty can reteach or provide alternative lessons or activities in order to help students to grasp an understanding of the lesson components that they did not understand.
- Pre-assessment - faculty can check students' background knowledge of a topic prior to teaching it. This type of informal assessment can be valuable for complex concepts that build upon prior lessons.
- Visual data - graphs can be displayed to demonstrate students' comprehension of course topics. By asking students questions related to the lesson, faculty can quickly create a graph to display to students that illustrates the percentage of the class that answered correctly. This valuable insight allows for faculty to clarify misconceptions that a large majority of students possess.
- Quizzes - in-class quizzes can be administered before, during, or at the end of the class. These types of interactive activities can be used to commence discussions or to capture students' attention during lectures.
- Reflection - students can share their reflections of class activities and assignments. This data can be used to inform faculty of program curriculum that is most valuable to learners. Students can also be encouraged to provide constructive feedback on how to improve assignments or additional focuses that may need to be integrated into the course.
- Voting - students can vote on the best response provided in a class discussion. This friendly competition approach can be used to engage learners. For example, students

can vote on the best presentation, most creative response, or the most engaging group project.

Conclusions

In conclusion, worldwide students in higher education are still struggling post COVID-19 with returning to high levels of engagement and enthusiasm for learning. Finding ways to motivate students is imperative in order to ensure better academic performance, higher conceptual understanding of ideas, and increase self-esteem (Gottfried, 2009; Gottfried, 1985; Ryan & Deci, 2009; Ryan & Deci, 2000). Using some of the technology ideas stemming around gamification approaches can help increase motivation and engagement in students of all ages and levels. Adapting our own teaching approaches is an ongoing process of discovery and hopefully gamification ideas can help both students and faculty.

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Effectiveness of Learning Objectives Articulated in Some of the Undergraduate Textbooks in Developing Entrepreneurial Skills in the Students

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Abstract

Entrepreneurs are needed in great numbers for economic growth and economic development since they are increasingly recognized as a driving force for innovation and job creation. To achieve this, the teaching and learning of entrepreneurship should be given the centre stage. A paradigm shift from a salaried society towards an entrepreneurial society should take place. Entrepreneurial students need to be more entrepreneurial in their thinking to effectively contribute to job creation. Hence, why many institutions are greatly interested in teaching entrepreneurship to solve the problem of unemployment. However, little is known about how entrepreneurship textbook objectives assist in developing skills, argumentative minds, creativity, and critical thinking in students. Textbook objectives have a significant impact in improving courses and increasing student learning and satisfaction. The study presents a content analysis of 92 objectives of an entrepreneurship textbook which is prescribed by three universities in a developing economy. The results revealed that entrepreneurship textbooks need more development to be more effective in developing entrepreneurial skills and innovative minds. The analysed textbook only has 7.7 % of the desired entrepreneurial skills are covered. There is a shortfall of 92.3 % of appropriate objectives. It is recommended that entrepreneurship teachers should prescribe textbooks with objectives and topics which focus on the development of entrepreneurial skills and prepare students to become real entrepreneurs not business managers. Secondly prescribed textbooks should follow a constructive alignment process where the learning objectives represent what the student would gain from the experience.

Keywords: Effectiveness, Objectives, Entrepreneurial Skills, Undergraduate

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Introduction

Recently, researchers have shown an increased interest in entrepreneurship education as a factor of economic growth and job creation. In terms of economic uncertainty and jobless growth, entrepreneurship should become a viable career path (Bohlmann, Rauch and Zacher (2017). Educational institutions should make sure that textbooks and all the resources they use promote the development of entrepreneurial mindsets. Prescribed textbooks as the main resources used in teaching and learning need to be regularly assessed for suitability and relevance. Analysing textbook objectives is, therefore, vital to find out if they develop skills they are intended to develop in each discipline because learning objectives are guided by national goals as indicated in the national curriculum document. The study, therefore, aims to evaluate the effectiveness of entrepreneurship objectives in developing desired entrepreneurship skills. It is of great importance to assess objectives particularly entrepreneurship objectives because the discipline is viewed as the major conducive factor to economic growth, Schumpeter (1934) quoted in Abdullah, (2020). On the other hand, learning objectives assist learners in developing requisite skills apart from guiding the learner's reading. It is, therefore, imperative to assess textbook learning objectives since they play a vital role in directing the focus of the lesson (Simon, Budke, & Sch€abitz 2020).

Additionally, learning objectives help students improve their learning strategies to promote academic independence and excellence. It is of paramount importance to analyse and evaluate textbook objectives because they are intentional targets created for a specific activity of what students should know and able to do at the end of a chapter or a unit.

With this present research, I wish to contribute to the body of knowledge by making textbook writers and educators aware of the importance of learning objectives. Textbooks still play a pivotal role in teaching and learning by providing useful ready-made material to both teachers and students (Charalambous 2011). It must be noted that if textbook objectives are not well written they de-skill students and their teachers especially novice teachers. Learning objectives also play a major role in learning and teaching because they drive student learning and enhance their understanding and they develop the desired skills in students. Objectives are as powerful in learning as well as measuring worth. In general objectives give focus and enable the readers to extract the main content from their reading. Conversely, some researchers are of the opinion that entrepreneurial education is "unteachable" (Abdullah, 2020). This opinion is opposed by Huang-Saad, Bodnar and Carberry (2020) who are of the notion that entrepreneurship is built upon active learning that is problem-based learning. Stemming from this argument problem-based learning equips students with skills and knowledge to approach challenges and difficulties using a variety of ways (Huang-Saad et al 2020).

It is, therefore, imperative to assess textbook learning objectives since they play a vital role in directing the focus of the lesson and they are taken as a process that must be deeply thought out and justified with cogent argument (Simon, Budke, & Sch€abitz 2020). Precisely objectives define what we should be teaching and assist students in the mastery of some fundamental academic skills. This then makes this research worthily because curriculum developers and textbook authors must take cognisance of this when formulating objectives especially the idea of aligning learning objectives with national curriculum document of the subject. More importantly good objectives should aim at encouraging students to take a deep approach to reading the subject content.

The major tenet of this article is to make teachers, publishers and curriculum developers realise how important textbook objectives are in developing desired skills. Prescribed textbooks should therefore follow a constructive alignment process where the learning objectives represent what the student would gain from the experience. On the other hand, textbook objectives should aim to provide academic guidance which helps students improve their learning strategies to promote academic independence and excellence in developing competences. In terms of entrepreneurship education objectives should develop an entrepreneurial mindset. This is taken a step further by Huang-Saad et al (2020 p. 9) who mentioned that “entrepreneurial minded learning leads to a broader set of professional skills that can be gained through entrepreneurial mindset development”. Textbook learning objectives should not be taken for granted in any learning environment. The next section illustrates the importance of objectives in teaching and learning of entrepreneurship education.

The importance of learning objectives

The use of learning objectives in instructional design results in more efficient use of instructional time and, therefore, improves learning since they assist in capturing the content that enables ongoing improvement (Dean 1994 cited in Combs 2008). This, therefore, alludes to the fact that the effectiveness of textbook objectives has a significant impact on improving courses and increasing student learning and satisfaction (Combs 2008). Textbook objectives are fundamental in the teaching and learning of any subject content in the textbook alongside pedagogical strategies. Successful lessons stem from good learning objectives hence textbooks should have clear formulated challenging objectives. This is vital because learning objectives are not only an instruction or a sentence, but are part of a production context (Simon, Budke, & Sch€abitz 2020). However, pedagogical studies are beyond the scope of this research study.

Learning objective analysis is not only essential for cognitive processes but also facilitate the acquisition and deepening of the development of entrepreneurship skills and knowledge processes in students. Objectives also cultivate active learning, critical thinking, independent learning, collaborative, and participatory learning (Simon, Budke, & Sch€abitz 2020, Mokhtar et al 2010, Ristanto 2020). Objectives which promote such type of thinking are higher order objectives according to Bloom’s taxonomy. Higher order objectives are linked to active learning strategies or approaches used to improve students’ interests and often lead to deep level understanding (Mokhtar et al 2010). Active learning will, consequently, lead to the acquisition of the learning outcomes of a course. Ristanto (2020) confirmed that objectives provide an opportunity to develop analytic, inductive, and deductive thinking skills to solve fundamental event-related problems. These are the type of objectives needed to develop entrepreneurial skills in students. Therefore, textbook objectives should strive to encourage the development of such skills and mindsets in students in order promote the culture of enterprising.

In support entrepreneurship education objectives should focus on cultivating the attributes of an entrepreneur (Cooney 2012, Bohlmann, et al 2017, Kouakou, Akolgo and Tchamekwen, 2019). Entrepreneurs are individuals or teams who can create employment opportunities where others do not and attempt to exploit those opportunities (and Huang-Saad et al 2020). Bohlmann, et al (2017 p. 1) further remarked that, entrepreneurship knowledge assist students in evaluation and exploitation of opportunities to create new and useful products and services. This strongly points out to the focus of this research that; entrepreneurship education

objectives should be taken seriously by textbook writers, curriculum developers and educators. Moreover, other researchers such as, Rogan (2015) and Fellnhofer, (2017) seem also to point out that the knowledge of entrepreneurship education is central to value creation which drives capital markets to economic evolution. According to economic evolution theory, the economy is always in the process of change, and the change needs to be manipulated by people with creative and innovative minds (Nelson 2008). As a result, learning objectives used in entrepreneurship lessons should aim towards developing such skills in students. Conversely critics argue that entrepreneurial education is “unteachable” (Abdullah, 2020). This is opposed by (Jiminez-Moreno & Wach (2014) who discovered a link between entrepreneurial education and positive attitudes toward entrepreneurship. In support Sherkat, & Chenari, (2022) argue that entrepreneurship is a skill that can be taught and learnt.

The knowledge of entrepreneurship with its emphasis on critical thinking, independent learning can produce a graduate who are agile to economic challenges. Entrepreneurs are asserts globally especially considering the downsizing and restructuring activities in the 1980s and 1990s, the 2008 economic crisis and the effects of COVID-19 pandemic. Research of this nature can positively improve the teaching of entrepreneurship education and encourage students to be entrepreneurs in a world where employment is difficult to come by. Apart from that the research can assist educators to see the nature of the objectives to be included in the entrepreneurship textbooks. It is of fundamental importance to choose textbooks with a significant coverage of entrepreneurial skills.

Problem statement

The world needs doers, makers, and cutting-edge thinkers to create the companies that will provide long-lasting employment for the country’s citizens (Rodov and Truong 2015). The same sentiments are echoed by Fellnhofer (2017) whose recent evidence suggests that entrepreneurship education does not only benefit the entrepreneur, but it contributes to economic growth, increases societal resilience and personal growth as well. That implies that learning institutions should focus on developing entrepreneurship skills among their students. Textbook used by students is a good indicator of such an intent. This research sought to find out how the learning objectives in one of the prescribed entrepreneurship textbooks develop entrepreneurial skills in undergraduate students. The analysis of learning objectives can be useful in assisting textbook authors and educators to identify and formulate objectives which develop entrepreneurial skills and critical thinking. There is relatively little research around the importance of learning objectives in the teaching and learning particularly in the teaching of entrepreneurship. The study presents an analysis of 92 objectives of an entrepreneurship textbook which is prescribed by three universities in a developing economy.

The following three research questions were central to this research:

- What is the focus of the objectives given in the textbook?
- Which higher order objectives are used in the textbook to develop entrepreneurial skills?
- Do the analysed textbook’s objectives focus on entrepreneurial skills?

Methodology

The focus of this study was to gain insight on the importance of learning objectives stated in the textbook in cultivating entrepreneurial skills in students. Content analysis was adopted to

analyse learning objectives and to answer research questions. Analysing textbook learning objectives is useful for promoting the development of comparison competencies and argument on entrepreneurship content. (Simon et al 2020). A prescribed textbook was chosen because most of the content, class activities as well as examination focus come from prescribed books. The textbook was purposively selected on the basis that it is prescribed by three higher education institutions for undergraduate entrepreneurship students in a developing country. The researcher found the analysed textbook on the websites of these institutions through google search.

According to research, learning objectives should cultivate active learning, critical thinking, independent learning, collaborative learning, and creative learning (Simon, Budke, & Sch€abitz 2020, Mokhtar et al 2010, Ristanto 2020). A considerable amount of literature has confirmed that these attributes equip students with desired entrepreneurial skills (Ristanto 2020). This research article paid particular attention to these five entrepreneurial skills to assess the objectives of the 16 chapters of the analysed book. The following section presents data analysis.

Data Analysis

As alluded earlier the researcher analysed objectives from an undergraduate entrepreneurship prescribed textbook which has sixteen chapters and 92 objectives. The analysis was done chapter by chapter paying attention to the focus of objectives in each chapter (see table 1). The first question is “What is the focus of the objectives given in the textbook?”

Table 1: The focus of the objectives

Book Title	Basics of Entrepreneurship	
Chapter and Topic	Number of objectives	The focus of the objectives in each chapter
Chapter 1 Topic: Basic business concepts and the business environment	8	Students are exposed to the business environment with no focus of the development of any entrepreneurial skill in students. See the analysis given in table 7.
Chapter 2 Topic: Entrepreneurship and small medium and micro enterprises (SMMEs) in perspective	4	The chapter introduces students to aspects of small medium and micro enterprises (SMMEs) in perspective. One objective cultivates critical thinking (see table 7).
Chapter 3 Topic: The identification of feasible business ideas	7	The focus of the learning objectives in this chapter is to make students aware of the importance of creativity. A significance perspective of entrepreneurship agenda is pushed in this chapter. There are 7 objectives and four of them do have entrepreneurial aspects in them.
Chapter 4 Topic: The viability of a business idea	8	The objectives in this chapter focus on need analysis, the calculation of break-even point and the drawing of a cash budget.
Chapter 5 Topic: The business Plan	7	Objectives in chapter 5 focus on the importance of a business plan which is a good skill to purpose but no objective is aligned to the desired skills.

Chapter 6 Topic: Product decisions what to offer to customers	6	The focus in this chapter is around the definition and description of a product. Only one objective is relevant see table 7.
Chapter 7 Topic: Price decisions	5	The objectives focus on the importance of pricing. The topic is good, but the formulation of objectives is not entrepreneurial.
Chapter 8 Topic: Distribution: getting the product to the customer	4	The objectives in this chapter focus on the general knowledge of distribution and types of distribution.
Chapter 9 Topic: Promotion: communicating with your market	4	The importance of promotion and various promotional mix are discussed in this chapter. No objective is aligned to entrepreneurial skills.
Chapter 10 Topic: Advertising your small business	4	The chapter is about the importance of advertising. Only one objective out of four cultivates entrepreneurial skills.
Chapter 11 Topic: Operations management	14	Students are exposed to the operations management, but no objective develops the desired skills.
Chapter 12 Topic: The human resource function	5	The importance of human resource function is the focus of the objectives in this chapter. Not even a single objective develops entrepreneurial skill.
Chapter 13 Topic: An introduction to financial management for entrepreneurs	7	The importance of financial management and various financial activities. This is an important topic, but objective cultivates entrepreneurial skills.
Chapter 14 Topic: financing the capital requirements of a small business	4	Objectives in this chapter make students aware of the different types of sources of capital.
Chapter 15 Topic: The break-even analysis	6	The calculation and advantages of break-even analysis is stressed in this chapter.
Chapter 16 Topic: Budgets	6	Objectives in this chapter focus on the general knowledge of a budget.

Table 1 displays the topics of the textbook and the focus of each chapter's objectives. However, chapter topics were not analysed, the analysis was based on objectives. The analysis shows that the focus of the objectives is not aligned with the development of entrepreneurial skills. The title of the book is even misleading because objectives do not even focus on developing basic entrepreneurial skills. What emerges in the analysis is that the content of this textbook focuses on teaching students to be managers not entrepreneurs. The topics and objectives are more of business management not entrepreneurial skills.

Most of the learning objective are lower order objectives. Objectives which develop entrepreneurial skills fall in the higher order category and these are the ones which develop critical thinking. Higher order objectives should be central in the teaching of entrepreneurship since they promote, creativity and innovation. Creativity and innovation are fundamental in developing entrepreneurial skills. Several researchers have reported that entrepreneurship students should be equipped with problem solving skills (Ristanto 2020). To encourage problem solving skills objectives should be higher order objectives. Higher order objectives are poorly represented in this textbook. The question to ask is therefore, "Which higher order objectives were used in this prescribed textbook?" Perhaps, also considering how effective

they are in developing desired skills. The researcher did this by considering higher order verbs used in this textbook. Higher order verbs in this textbook's objectives include, analyse, discuss, determine, and create. Tables 2 to 6 show how these verbs are utilised and how effective the objectives are in developing entrepreneurial skills. Samples of the objectives are given as well.

Table 2: Objectives with the verb analyse

Chapters	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total
Number of verbs	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

The verb analyse was used in the following objective:

- Analyse the relationship between the business and its establishment.

Based on Table 2 results, the verb analyse appeared only once in chapter 1. There is nowhere the verb is used again in the textbook. The verb should have been used for case study analysis of which there are no case studies in this textbook, instead students were asked to analyse the content given in the chapter which has nothing do with the development of entrepreneurial skills.

Table 3: Objectives with the verb discuss

Chapters	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total
Number of verbs	0	0	0	0	0	0	1	0	1	0	0	0	0	1	0	0	3

The verb discuss was used in the following objectives:

- Discuss the various pricing adjustments.
- Discuss the steps in developing a promotion plan.
- Discuss the typical problems experienced by a small business in obtaining finance.

Based on Table 3, it can be inferred that the verb discuss was not fully utilised. The verb was used once in three chapters, 7, 9 and 14. This might be due to the absence of topics which can lead to the interrogation of different types of business ventures. Such topics give students an opportunity to discuss the pros and cons of different business ventures to make informed decisions when starting their own businesses. Discussion sessions develop critical thinking which is related to a well-organized mental process (Ristanto 2020). Furthermore, discussion platforms lead to critical thinking which "plays a role in the decision-making process to solve problems by analysing and interpreting data in scientific inquiry activities" (Ristanto 2020, p 4). This attribute was not adequately developed by these objectives. The development of entrepreneurial skills should be the focal point when formulating teaching objectives. The following section looked at the verb determine.

Table 4: Objectives with the verb determine

Chapters	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total
Number of verbs	0	0	1	3	0	0	0	0	0	0	0	0	0	0	0	0	4

The verb analyse was used in the following objectives:

- Determine the break-even point of a business.
- Determine whether a need exist for a product or service.
- Determine the break-even point of a business.
- Determine whether a sustainable profit can be made.

Table 4 shows that determine was only used in chapters three and four. The verb determine is crucial because it can develop the potential of individuals to be more creative, critical in their thinking and effective in problem solving. In chapter 3 students are asked to determine their own level of creativity in identifying feasible business ideas. The verb is appropriately used in objective 4 which is in line with critical thinking. In this objective, students are encouraged to think broadly to determine factors which contributes to a successful business.

Table 5: Objectives with the verb create

Chapters	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total
Number of verbs	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2

The verb create was used in the following objectives:

- Define creativity.
- Determine your own level of creativity.

To develop entrepreneurial skills objectives should cultivate creative minds to bring entrepreneurial ideas into real platforms (Kassean, Vanevenhoven, Liguori, and Winkel, 2015). This is the verb which should be used in objectives to trigger student's innovative and creative minds. Table 5 analysis indicates that students were not asked to create anything. The verb is used in two objectives in chapter 3 as shown in displayed objectives. The second objective provokes a bit of thinking, if we assume students were asked to showcase their innovation minds and creativity explaining what they did and what they were planning to do to show creativity in terms of product or service creation.

Table 6: Objectives with the verb explain

Chapters	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total
Number of verbs	3	0	0	0	1	2	1	0	1	0	1	1	6	1	2	0	19

The verb explain was used in the following objectives:

From 19 objectives which utilised the verb explain only one objective from each chapter was taken as a sample.

- Explain the motive for starting up a business.
- Explain the character of a business plan.
- Explain the function of packaging.
- Explain the objectives of pricing.
- Explain the three main objectives of promotion.
- Explain the dynamics of operation management.

- Explain the concept of human resource maintenance.
- Explain the most important financial activities in a business.
- Explain what is involved in choosing the applicable sources of finance.
- Explain the break-even concept using a graph.

Table 6 depicts how the verb explain was used in this textbook. The verb “explain” was used 19 times in the textbook, appearing 6 times in chapter 13. To some extent the verb was overused in this textbook. There was great emphasis on learning objectives with the verb explain which is a shortfall in terms of the development of critical thinking in students. There is no solid knowledge building and critical thinking. The verb explain does not cultivate critical thinking instead it encourages recall, where students are asked to recite what they would have read in the chapter. The other verbs which were repeatedly used in the textbook to emphasize the notion that the textbook encouraged the recitation of information are, list, define and name. Such objectives are repeated in several objectives of the textbook. The following table presents textbook objectives benchmarked with the desired entrepreneurial skills.

Table 7: Textbook objectives benchmarked with the desired entrepreneurial skills (n=92)

Chapters	Number of objectives	Objectives Which promote active learning	Objectives Which promote critical learning	Objectives Which promote independent learning	Objectives which promote collaborative learning	Objectives Which promote creative learning
1	8	none	none	none	none	none
2	4	none	1	none	none	none
3	7	1	none	1	1	1
4	8	none	none	none	none	none
5	7	none	none	none	none	none
6	6	none	none	none	none	1
7	5	none	none	none	none	none
8	4	none	none	none	none	none
9	4	none	none	none	none	none
10	4	none	none	1	none	none
11	14	none	none	none	none	none
12	5	none	none	none	none	none
13	7	none	none	none	none	none
14	4	none	none	none	none	none
15	6	none	none	none	none	none
16	6	none	none	none	none	none
Total	92	1	1	2	1	2
Percentage		1.1%	1.1%	2.2%	1.1%	2.2%
Percentage of the desired skills.	7.7 %					

Table 7 displays the number of objectives that promote desired entrepreneurship skills chapter by chapter matching them with the five skills which many researchers considered to develop skills. The skills which most researchers agreed that they promote entrepreneurial skills include cultivate active learning, critical thinking, independent learning, collaborative learning, and creative learning. Objectives in this prescribed textbook were benchmarked with these ones. See the analysis in table 7. According to the analysis there is a limited coverage of entrepreneurial skills in this prescribed textbook, see table 7. Most of the objectives do not seem to focus on developing entrepreneurial skills. It is evident that this

prescribed textbook does not promote skills needed by entrepreneurs. Learning objectives should be formulated in such a way that students develop a specific skill. More importantly good and well-structured objective cultivate an attitude of self-confidence in students which is extremely important in entrepreneurship education (Mensah, Zeng, Luo, Xiao, & Lu 2021). Objectives in this textbook develop less than 10 % of the desired entrepreneurial skills. Entrepreneurship education must be coupled with content that is rich in learning principles, innovation, and reflection to enhance ventures' effectiveness (Elmuti, et al 2012). This is all missing in this entrepreneurship textbook. This is rather essentially problematic for a textbook under the title of "entrepreneurship" to actually be called an "entrepreneurship" textbook. Why are they calling it such when the objectives of the textbook are not entrepreneurial in nature? There should be an underlying philosophy that informs book publishers to call a textbook entrepreneurial. Unless one argues that the term entrepreneurial has many layers to it and that what one may call entrepreneurial may not be so in light of another. The analysis, however, clearly indicates that learning objectives in this textbook do not focus on cultivating comprehensive entrepreneurial skills in students.

Discussion of the results

The textbook only covered 7.7 % of the desired skills by the entrepreneurs according to the benchmarked ones. Critical thinking skills in entrepreneurship learning could be developed through creative learning, active, learning, and critical learning but in this textbook critical thinking is not encouraged, only 2 objectives require critical thinking which is 1.1 % of the 92 objectives (see table 7). All the objectives lack simulation. Simulation is very important in developing skills; this is supported by Farashahi and Tajeddin (2018) who argue that students perceive simulation as the most effective way of developing their interpersonal skills and self-awareness followed by case study and lecture, respectively. In this textbook this is all missing and critical thinking is not even taken as a priority though students with critical thinking are assets to every nation. Research has confirmed that, students with good critical thinking skills are more agile to socioeconomic, scientific, and practical problems (Ristanto 2020). More importantly good and well-structured objective cultivate an attitude of self-confidence in students. Having suffered from the ills of COVID-19 educational systems should internationally produce graduates who are fit for purpose especially in the field of entrepreneurship for economic growth and job creation.

Learning objectives in this textbook promote theoretical thinking, there is no practicality, like looking at case studies of those prominent entrepreneurs and role play and the invitation of guest speakers or site visits to see and appreciate what other people are doing. Site visit is one of the several activities in the scientific approach include observing, asking, trying (Ristanto 2020). Indeed, students are more interested and engaged in learning when local experiences and global or extra local perspectives are connected (Klein, 1995, p. 365; Roberts, 2014, p. 193 quoted in (Simon, et al 2020). It might be argued that some of the factors might be reflected through pedagogical strategies. It is appalling that most of the learning objectives are about managing the existing business like they are being taught management skills. Students are not even encouraged to critique case studies or compare case studies and reflect on their strengths and weaknesses.

Furthermore, most of the learning objectives analysed do not promote critical thinking or argumentation see the focus of the objectives in table 2. About 92.3 % of the objectives do not develop entrepreneurial skills at all. There is a great shortfall around entrepreneurship advancement. Learning objectives were oriented towards the extraction of simple knowledge

from the text. This is supported by Abdullah (2020) who observed that the entrepreneurship courses offered at various academic levels are run with the aim of teaching 'about' entrepreneurship rather than to 'create entrepreneurs' in the true sense of the term. This really relates to the findings of this research.

In this textbook learning objectives are simple cognitive learning objectives. This might be because textbook writers who are not aware of the complex needs of the curriculum as well as the nation. This is line with Simon et al (2020), who researched on geography tasks and found out that tasks had only simple cognitive objectives and were not oriented towards competency acquisition. Hence researchers like (Young, 2014, p.20; Maude, 2016, p. 75) suggest that to be able to critique or debate on subject content, students must have access to the “epistemic tools provided by the discipline to construct knowledge” to acquire not only procedural knowledge, but also “knowledge on their own knowledge”, and therefore “powerful knowledge”. Learning objectives need serious thought application not reproducing what is in the text. There is a need to develop learning objectives that encourage the use of teaching and learning approaches which develop practical skills, values, and attitudes in students, which are functional in the world of work where innovation is key (Shumba, 1993; Nziramasanga, 1999 quoted in Matorevhu 2020).

The analysis clearly evidenced that learning objectives in this textbook do not instil in students the desire to become entrepreneurs and they do not cultivate entrepreneurial skills. Most of the objectives do not encourage deep learning, critical analysis, and the application of knowledge. See tables 1 to 7. This raised questions about the authentic of this textbook in developing entrepreneurship skills, the textbook is more of a management of business textbook because all the chapters and the objective are silent about the development of entrepreneurship skills. The teaching of entrepreneurship should assist in uncovering the hidden traits in students and develop them sufficiently to become a successful entrepreneur” (Elmuti, Khoury & Omran 2012). Like any discipline entrepreneurship can be learned because innovation is not an activity limited to a special group of people with family business. Conversely entrepreneurs also should have personal skills such as innovation, risk taking, and persistence students can learn these skills through an effective entrepreneurship education to become successful entrepreneurs (Henry et.al, 2005 quoted in (Elmuti et al 2012).

It is of great importance that curriculum designers and textbook writers should come up with strategies for designing curriculum, content and objectives that are instrumental in exposing graduates to skills that enable them to function effectively in their chosen professions as entrepreneurs. If these stakeholders take this into consideration entrepreneurship objectives should create in students a culture that foster entrepreneurial hunger and determination.

Conclusion

Based on the research findings, it can be inferred that the objectives in this entrepreneurship prescribed textbook are not effective in enhancing entrepreneurial skills. Also, the results were that, while the 16 analysed chapters had learning objectives, they are only simple cognitive objectives and were not oriented towards competency acquisition. There is a great shortfall for instance, there are no case studies and students are not exposed to role play and no fieldwork nor invitation of motivational speakers. Furthermore, learning objectives are not learner centred. There was no apparent reference to skills development and the development of skills related to entrepreneurship are not taken note of. The learning objective are mostly

lower order objectives aligned to business management. Objectives in entrepreneurship textbooks should focus on developing entrepreneurial skills. Also, further research could consider analysing the exercises and pedagogical strategies used to develop entrepreneurial skills. The recommendation is that textbook writers should be subject specialists and experts in formulating learning objectives and instructors should thoroughly examine the appropriateness of a textbook before prescribing it.

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University ESL Students' Challenges and Insights Towards Online Learning Amidst COVID Pandemic

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Abstract

The sudden change of English language learning and teaching from face-to-face classroom interaction to blended learning activities using digital platforms has initiated numerous challenges for English as Second Language (ESL) students in the various universities in the Philippines including Mindanao State University- Marawi City; hence, examining these learners' challenges and their insights of the online learning activities is extremely necessary. This study, therefore, aimed to identify and analyze the ESL students' challenges and insights in online learning during the COVID-19 pandemic. Utilizing the data collected using self-written reflections and semi-structured interviews from two hundred thirty-seven (237) University ESL learners, the results revealed that the primary challenges faced by the learners include poor/weak/slow/unstable/unreliable internet connection, lack of time management, financial problems, mental health issues and lack of motivation and engagement. Such results further depicted several valuable insights from the students to cope with those challenges such as a change of perspectives and habits like having a positive outlook on the situation by accepting and embracing the new normal way of learning, managing their time properly, and strengthening social support. Finally, the outcomes of this study contribute to providing understanding as well as awareness for English teachers, ESL students, and school administrators to enhance and advance the efficiency of online teaching and learning activities, especially in times of crisis.

Keywords: ESL Learners' Challenges, Learners' Insights, Online Learning, COVID-19 Pandemic

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Introduction

The COVID-19 pandemic has greatly impacted nations worldwide; it has inconveniently caused not only loss of lives and disruptions to the economy but also abrupt and overwhelming changes in the educational systems, with the longest school closures combined with an intimidating recession. Students, schools, colleges, and universities have been severely affected. These disruptions to educational systems over the past years have driven substantial losses and inequalities in learning to students in particular- both curricular/co-curricular, and extra-curricular. According to the United Nations Educational, Scientific and Cultural Organization (UNESCO), the pandemic affected more than 1.5 billion students and youth with the most vulnerable learners being hit the hardest. Similarly, World Bank (2021) also expressed that the disruption of education caused by the pandemic was considered 'learning poverty'. World Bank also reported that with the spread of COVID-19, among many interruptions to normal life, more than 160 countries have mandated temporary school closures, leaving 1.6 billion children and youth out of school.

The employment of online teaching and learning has become one option, if not the only option, explored by academic institutions around the world, including the Philippines to ascertain the continuity of education. Interestingly, that was deemed to be the 'best solution' in the new normal setup despite some noted impediments. In this approach, instruction and learning take place in a remote and technology-dependent environment using different technological tools and materials including synchronous and asynchronous communication tools such as Google Classrooms, Zoom, and Moodle. The availability of such tools as well as their convenience for both the teachers and students became the basis for their selection.

However, while other educational institutions in the Philippines resorted to solely online teaching and learning or exclusively modular distance learning, Mindanao State University-Main Campus, an institution of higher learning in the city of Marawi, Philippines, adopted the blended learning approach in conducting all academic activities in response to the call of the government thru Republic Act No. 11469 otherwise known as the "Bayanihan to Heal As One Act", wherein the government in an effort to prevent the spread of Covid-19 directed everyone in the country, among others, to adhere strict observance of the preventive measures and health protocols which includes but not limited to physical distancing, avoiding large gatherings, and wearing of face mask. Moreover, to comply with the Inter-Agency Task Force for the Management of Emerging Infectious Diseases (IATF) and the Commission on Higher Education (CHED) guidelines in ensuring the health, safety, and well-being of students, administrative personnel, and other constituents of the university, the faculty were directed to observe the following guidelines in conducting classes: (1) the distance/remote learning, which could be delivered either as a synchronous or asynchronous or combination of both, shall be adopted as the main approach in conducting classes; (2) Limited face-to-face (F2F) mode of conducting classes may be employed by the faculty when circumstances warrant in accordance with the IATF guidelines and CHED advisories; (3) Administration of examinations and assessments may be conducted either online or F2F at the option of the faculty. The F2F examination and assessment, however, may be deferred by the faculty until circumstances warrant in accordance with IATF regulations; and (4) Laboratory classes, which require F2F/hands-on involvement, shall be offered in the Second Semester (AY 2020-2021) assuming that the existing IATF restriction on F2F classes is already lifted. However, laboratory classes that can be done virtually may be offered in the First Semester (AY 2020-2021). Indeed, these changes have brought massive challenges to the students.

It must be noted that online learning is not something that has just recently come about. In fact, studies show that teaching and learning through digital platform has gained popularity among higher education institutions throughout the years because of the following: (1) it offers ease and comfort; (2) it allows flexibility of access; (3) it presents a non-discriminating environment, (4) it enables 'limitless' education; (5) it allows learners to be updated with latest trends; and (6) it is relatively affordable.

Further, many studies claim that online learning provides exceptional benefits in the learning process including English language learning. For instance, Kuama and Intharaksa (2016) cited several studies that support such idea, namely: Clarke and Hermes (2001) posited that online learning is student-centered because students can control their own learning pace, and activities can be flexible to better suit a student's preferred learning style; in the same vein, Dolence & Norris (1995) also postulated that online learning creates opportunities for active learning; and still, Harasim, Calvert & Groeneboer's study (1997) stated that with good online learning applications or software, students have opportunities to participate in the discussion, express opinions, and share knowledge equally regardless of classroom size and time.

Moreover, Lao, et.al (2005) indicated that knowledge of the online process, understanding the potential of using a web-based course instructional platform for teaching, and being aware of the responsibilities involved in teaching online courses can help facilitate a meaningful and positive experience for learners. Nonetheless, other studies also revealed that the popularity of online learning and teaching and its extensive practice remains to be isolated in some countries, especially in developed ones; however, the case does not hold true in the Philippines in which it can be noticed that the Philippine Educational System favors so much the traditional approach of education. Online learning, therefore, is in its infancy in the country, and its introduction to instructors and students did not gradually happen; instead, it was done in haste due to the pandemic; hence this posts a certain concern. Thus, investigating the challenges and insights of ESL learners in online learning was indeed an important task.

This study, therefore, aimed to identify the challenges encountered by ESL learners in online learning amidst the COVID-19 pandemic. It also sought to determine which of those challenges was the most difficult. Finally, it explored the insights of ESL learners towards online learning. Various studies have already been conducted regarding the challenges encountered by teachers in online classes during the pandemic, yet few were done about those faced by learners, specifically, English language learners; hence, this present study. This was significant as it would provide awareness and understanding of the challenges faced by ESL learners in online learning as well as their insights which can be considered by language teachers in offering solutions to such challenges. Besides, this could also prove to be insightful for ESL teachers who are still developing the online mode of learning.

Methodology

In identifying and analyzing the ESL learners' challenges and insights, the descriptive research design was employed because this kind of research design allows the researcher to describe a profound understanding of the phenomenon being studied. Self-written reflections as well as semi-structured interviews were employed in collecting the data in which learners were requested to write their short reflections about the learning challenges they faced during online learning. Additionally, semi-structured interviews were done with selected students to come up with an in-depth understanding of the phenomenon being studied.

Participants

The participants of this study were two hundred thirty-seven ESL learners (176 females and 60 males) who were taking varied courses from the different colleges of the Mindanao State University- Marawi Campus, Philippines. They were all enrolled in the Purposive Communication course during the duration of the study. Their ages range from 15-25 years old.

Instruments, Data Collection and Data Analysis

This study employed two instruments, the self-written reflections as well as the semi-structured interviews to get the data needed. The first instrument- the self-written reflection, which is a written account template composed of three (3) questions was given to the participants thru Google forms in order to express and disclose freely their experiences about online learning challenges and insights during the COVID-19 pandemic. The participants were required to write their responses to the questions given. The collection of data using this instrument was administered from August 2020-January 2022 when classes were done through online teaching. The second instrument—the semi-structured interviews, which were employed following the results of self-written reflection, were conducted with selected participants who were invited to validate their challenging experiences written in their reflections. Such interviews were conducted via google meet and call phone. The interviews were then recorded using an audio recording and transcribed for the sake of data analysis.

In analyzing the data, several stages were done. First, the data obtained both from self-written reflections and semi-structured interviews were tabulated, then classified based on several themes based on the research questions, which are the ESL learners' challenges and insights. Such themes were reviewed and analyzed which led to the results of the data analysis.

Findings and discussion

The analysis disclosed that the participants of this present study encountered difficulties when attending online classes during the COVID-19 pandemic. In fact, attending online classes is itself a great challenge for them as they have not been used to it. Based on the findings, the learners' challenges lie in their struggle to adapt to online courses, their problems with internet connectivity, their lack of direct contact with their professors, their difficulties with their finances, their lack of motivation to attend classes, their issues with mental health, and their time management; hence prevalent themes include poor/weak/slow/unstable/unreliable internet connection, lack of time management, financial problems, mental health issues and lack of motivation and engagement. Such findings concur with the findings of other studies regarding the challenges faced by students in online classes; thus, the list of challenges should be considered by course coordinators and program chairs by offering solutions to these challenges.

It is interesting to note that the responses of the participants of this study to the questions being asked seemed to be similar and interconnected, which gave the researcher the opportunity to classify them smoothly and conveniently. Several significant responses during the semi-structured interviews as well as the self-written reflections revealed the following:

“Online learning is totally new to me. I have not prepared myself.”

“Language learning has become different in online learning. Many students may like it but not me. I am always stressed; I lose my motivation; I am having mental problems not to mention financial problems.”

“I live in a far-flung place where internet connectivity is very poor and unstable. This made me very sad and disappointed as I can hardly join in our Google Meet with my Purposive Communication Class.”

“I encounter innumerable challenges in online learning, and I cannot focus on my studies because of them. The unstable internet connection in particular really affects my performance in class.”

“I've been struggling a lot when we're having google meet and when doing my homeworks because the internet connection was not stable. I've been doing household chores also- taking care of my little sisters and nephews, cooking for them food for every meal, attending a seminar for our barangay (I am the SK Treasurer of Brgy Cabasaran), and so on. It has been so hard for me, really but I had to endure it for my parents. I want them to be proud. I also had to go to Cagayan de Oro when Exams are coming just to have a better internet connection. I booked a flight to Manila using my savings and stayed there for a month just to focus on studying. I have no time to hang out with my friends or watch new kdramas. I've been stressing my mind and that gave me anxiety. I've put too much time into my study and forgot that I had to take good care of my health too.”

“I have been experiencing mental breakdowns since online learning started because I'm having trouble grasping and understanding all our lessons.”

“There are so many activities that our instructors are giving us, and I cannot manage my time doing all those.”

“I found the poor internet connectivity as the most difficult challenge for I cannot control it. It is something I blame for not learning more effectively in an online class. I do hope the government will do something in addressing our needs, especially since we are on a pandemic.”

“The challenges I've encountered during online classes were adaptability, technical issues, self-motivation, and self-discipline. It was challenging for me to adapt to this new normal, flexible learning since I've spent my entire student life learning in the traditional way. I've also encountered some technical issues since I live in Marawi City where the internet connection is often an issue and there's always a power interruption. Motivating and disciplining myself has also been one of the challenges I've encountered. Unlike in the face-to-face classes, I somehow lost my motivation to learn.”

“Everything about online classes is new to me and I tried my best to get used to it, however the frustrating internet connection hinders me to participate well in my classes. The unavailability of stuff like gadgets, flash drive because of downloading numerous files and videos sucks sometimes as it caused poor phone storage.”

“Online class has never been easy for me, and it still surprises me until now. I have encountered new things in my school life that I've never had during face-to-face classes. First, self-doubts. I've doubted myself and my capacity. Second, mental breakdown. Last, I lost myself and my dreams.”

“The challenges that I have encountered in the past semester in relation with online class is having a poor internet connection and being left behind. Since we're doing online classes, I find it very hard to communicate with other people, like finding a group chat for my subject and asking my instructor for clarification. Even though I find it hard to communicate with my classmate, I still try my best not to get left behind. I always check my phone for updates so that I would get informed about the new task given by the teacher.”

“Since my parents provided most of the things I need, I only had problems on things that they cannot control. It was troubling when the internet connection suddenly got weak while I was doing my online school tasks. I also had problems with the environment, our neighbors were doing activities sometimes that produced loud sounds which distracted me.”

“It was hard for me to cope during this pandemic because my mental health was getting worse every day. It was hard for me to do the Return Demonstration videos which led me to drop the subject. I noticed that I can't finish my classwork when it's piled up and it's hard for me to balance it all.”

“I have been struggling these past few months because of many factors that really affect me as a student of this new online session. These include anxiety, depression, poor Internet service, and unfavorable home learning environment, which were aggravated when we are marginalized and from remote areas.”

“I had been struggling attending online classes. I partly blame it on the internet connection that we have at home. The online class is a struggle for me who is not a virtual person. I prefer interacting with my classmates and teachers Face-to-face than by entering a gmeet that makes me shy as a student. Another thing is that whenever I am submitting my work, especially the videos, it takes too long to submit. Examination is also hard for me as the gform keeps on updating when the internet connection gets lost making me consume more time in answering my test. Overall, my life as an online class student has been so hard for me. I am still trying to adjust and hopefully my life in 2nd semester gets better than the previous one.”

Moreover, findings showed that among the challenges encountered by the participants during online classes, the most difficult ones included poor internet connectivity, mental health issues, and lack of motivation. However, most, if not all of the participants discerned internet connectivity issues as the most difficult for they have no control over it. Truly, such was a perennial problem that must be addressed by the authorities as it greatly affected the ESL learners' experiences in the new normal. Some of the interesting yet crucial responses from the participants were shown below:

“Based on experience, online class is indeed challenging, and having a data connection problem is the most difficult for me because once there's a problem in data connection, I missed all discussions given.”

“The poor internet speed in our place is the biggest hindrance in my online classes journey. Even how interested and motivated I am to participate in class discussions, but I always lost my interest because of the weak and unstable internet signal.”

“I know that countless challenges came our way which are all difficult to deal with, but for me, the most difficult challenge that I have encountered is when having a slow or unstable internet connection because the internet is the most essential thing which has a vital role nowadays. For instance, I can't do research or submit my class works on time especially if it has a large number of size files or even can't take or finish a particular exam because of having slow internet connectivity. This could be the reason why students like me can't cope with our class or cannot join live meetings or synchronous classes.”

“The most difficult challenge for me that I've encountered in the previous semester is anxiety, the feeling of fear, dread, and uneasiness. I have this fear of having failing grades at the midpoint of the semester. The activities got very difficult and the pressure from my father was so much that it made me feel like I was just breathing, not living anymore.”

“I can say that having a too slow internet connection is the most difficult challenge in online classes. I can't participate in the synchronous class, sometimes I can't even understand anything in the discussion. When I lost internet connection, I see myself being left behind because I don't know a thing about the activities given and that caused anxiety to me.”

“Online classes worsen my anxiety. I became really anxious when I heard a notification from my phone. Everything is affected.”

“Among the various challenges I encountered, I consider self-motivation and discipline as the most difficult challenge so far. Since I have struggled so much to adapt to this new normal, I have lost almost all of my motivation and that has caused me to have such a hard time disciplining myself. Along with that, there are also other struggles I've dealt with at home, with family and friends, and with myself, which affected my academic performance.”

“The internet connection in our area was really bad and instead of having enough time to sleep I have to set my alarm clock at 2:30 A.M. to submit, upload files and download learning materials in our google classroom. It's very challenging when taking exams and whenever there's an oral recitation in google meet because the signal is kind of troublesome. That's the hardest part of it.”

“Staying up all night to wait for the time when internet signal will be okay is the most difficult challenge for me; I always lack enough sleep and I fear I might get sick because of that. I wish we go back to face-to-face classes.”

“Staying in our hometown that has a poor internet connection is my most challenging experience. I had to traverse 2-3 puroks in our barangay and sometimes to other municipalities just to get a stable internet connection in order to participate in class. It's time-consuming, expensive, and risky, especially for my health. I had to endure everything just to do online learning.”

“The challenges I consider the most difficult is the time management because it's really hard for me to manage my time; there are a lot of tasks to do online, yet only short time to do them plus the slow internet connectivity in our place, it's hard to control my time.”

The results further depicted several valuable insights from the students to cope with those challenges such as a change of perspectives and habits like having a positive outlook on the situation by accepting and embracing the new normal way of learning, managing their time properly, and strengthening social support throughout creating groups on Facebook and other social networking sites, which enhance collaboration and teamwork among them, thereby fostering camaraderie and harmonious relationships. The findings highlighted the crucial role of family support especially the parents on the learners' journey in the new normal mode of learning, emphasizing that students become stronger, more resilient, and more motivated to learn when they are fully supported by their parents. In addition, the attitudes of the students towards the online learning greatly matter in coping with the challenges they are facing. Having an optimistic view on the situation even how demanding it is and accepting such condition sincerely even how tough it is turned out to be the weapon of some of the participants in combatting the hectic challenges encountered.

Several significant responses from the participants are shown below:

“When we're having a bad connection in our place, I look for a place where there's a good internet connection even if I had to go to the city that is a farther place. Sometimes it was really hard because I get too far away, yet I sacrifice for I had no choice. This is the new normal and I have to accept it; otherwise, I'll be left behind.”

“I cope with those challenges by going with the flow and accepting the situation to avoid stressing myself. Every time I needed to attend a class, I always go to the vulcanizing shop to seek for a signal because there's no other place where I can find a stable signal. And I put the full volume of my phone every time the environment will get noisy and lower the volume if the environment gets quiet.”

“I believed that every problem has a solution, all we have to do is to find that solution to solve our problems. I am grateful because every time I had problems, my parents are there to guide and support me. This new normal really tried our ability to take innumerable challenges, but I believed that MSUans are survivors not quieter. I don't easily give up during hardship although yes, sometimes, I feel down and cried a lot but still fighting because I was not the only one who felt this way and I also believed that all of my emotions are valid because I am just a human being. I learn to accept the new normal, do my best in online classes, and let the Almighty Allah S.w.t do the rest.”

“I cope up with those challenges through having a positive mindset and being patient all the time. As much as possible, I indulge myself in online forums and learn more from those knowledgeable people. The strategies that I've been doing is look information about our certain lessons, read and understand all the time because in this time of challenges, I can only rely to myself and my own knowledge and takeaways.”

“I always remind myself that every challenge is an opportunity to grow. I voiced out my thoughts and fears to my best friend and siblings. I tried to manage my time, I

sought help from people who had more knowledge than me in terms of answering difficult activities, and I prayed to God to help me face those challenges.”

“The beginning is always the hardest! My Aunty and some seniors in our school are always giving me advice regarding the things that I need to know, and what I need to do. They always answer my questions and inquiries and everything. As time goes by, I learn and understand how it works. So, I just continue doing my best in my studies and I try to join social groups even on Facebook so that I can explore more this new journey and know myself better. Through that, I found new friends that have the same experiences as me.”

“What helped me really was nurturing my spiritual life. I offered my sufferings to my source (God). It helped me persevere because I know I have a God that will never abandon me. Thus, during difficult times when I wanted to give up on my studies and on myself, I prayed earnestly that He may give me strength. Through His guidance, I learned to have grit and just go on, no matter the circumstance. Nurturing the soul heals its vessel — the body.”

“There is nothing I can do about the Internet connection but in terms of the power interruptions, I bought a pocket wifi that I can use though it only works in our rooftop and performs poorly but at least I still have something to use, it is better than having nothing to use at all because data doesn’t work in our place, even the service itself is barely available.”

“There isn't much of a solution for my biggest problem. I can only double down on the efforts and time I've spent on my online classes. I'm trying to create a better support system for myself by allowing myself to be helped by others and by not bearing the weight of all my problems. I'm trying to create better accountability for myself by joining study spaces online like on Facebook and informing the people around me about my exams and my performance in the said exams. Moreover, I employed productivity apps (like app blocker) in my phone to help discipline myself.”

“I have a productivity plan which includes rock-solid time management system, and planning that helped me find the light out of every tunnel. I also have reading as my personal-favorite escapism as well as daily journaling after waking up and before going to bed to declutter my mind, to reflect on the outcome of my day, and equally important, to relegate how I feel. Remarkably so, I meditate for 10-15 minutes especially when I'm very frustrated and about to explode to fine-tune my breathing and let my negative emotions dissipate.”

“I cope with those challenges by praying and motivating myself though it's not easy. Joining social groups has helped me a lot. I was able to express my thoughts and feelings when sharing our experiences. We build genuine friendship and solidarity.”

“Online learning was never easy for me and my classmates; We may enjoy some of the activities given by some of our instructors, yet there are those that startle us and lower our motivation because they do not address our needs and interests. We hope the activities given by our teachers will primarily be focused on us so we can easily cope with the various challenges that we encounter in online learning.”

The last statement uncovered one essential finding of this study, which contradicts the findings of the previous researchers mentioned earlier which stated that online learning is student-centered as it gives students the opportunity to decide what material they learn and how they learn it. Instead, some participants of this study exposed that in their online learning, some of the activities are teacher-centered and this affected the participants' English language learning; hence, ESL teachers are suggested to create meaningful activities that are student-centered to address the student's individual needs.

Conclusion

The present study elucidates the challenges and insights of selected University ESL learners on online learning during the COVID-19 pandemic. Drawing on the data collected from the participants using self-written reflections and semi-structured interviews, the results revealed that ESL learners encountered difficulties when attending online classes, and the primary challenges they faced included among others, poor/weak/slow/unstable/unreliable internet connection, lack of time management, financial problems, mental health issues and lack of motivation and engagement. Further, it was also shown in the findings that issues with internet connectivity appeared to be the most difficult among the challenges encountered. In light of the challenges, several valuable insights were provided by the learners in coping with those difficulties such as a change of perspectives and habits like having a positive outlook on the situation by accepting and embracing the new normal way of learning, managing their time properly, and strengthening social support throughout creating groups on Facebook and other social networking sites, which enhance collaboration and teamwork among them, thereby fostering camaraderie and harmonious relationships. Finally, English teachers, ESL learners, school administrators, and the University, in general, are suggested to reflect on the findings of this study to come up with better strategies and techniques to enhance and advance the effectiveness and efficiency of online teaching and learning activities, especially in times of crisis.

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Teachers' Perspectives on Digital Technologies and Educational Practices: Challenges and Resilience in a Brazilian Public Educational Context

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Abstract

The current paper aims to present and discuss some of the results obtained between May 2020 and December 2021 by the coordinator of the inter-institutional project "Digital Technologies, Society and Culture: educational interfaces from the literacies studies perspective". The data shows teachers' accounts on their own working contexts and praxis with digital technologies which were mobilized as both part of a public state curriculum syllabus and an instructional medium. The selected samples focus on teaching experiences developed during the remote teaching period in pandemic times in different public schools in a Brazilian city in the outskirts of the state of São Paulo. It is a qualitative and interpretative investigation methodologically supported by Participatory Action Research (PAR) and underpinned by literacies studies. The discussion suggests that - acting under several syllabus and social demands to sustain education during social isolation - the participant teachers had to face a myriad of challenges such as: i) a visible inequality in terms of internet access and hardware/software resources available to both educators and students, ii) a deficit in teacher education concerning the access to and the application of digital resources and iii) the overwhelming pressure to work extensive ours added to what can be seen as previously underprivileged teaching conditions. It also points out that, even in the face of a critical and sociocultural shattering period, some teachers still prove to have been able to find out digital solutions and professional practical development due to their own dedication and resilience.

Keywords: Literacies, Digital Technologies, Teacher Education

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Introduction

The current paper aims to present and discuss some of the results obtained between May 2020 and December 2021 by the coordinator of the inter-institutional project "Digital Technologies, Society and Culture: educational interfaces from the literacies studies perspective". The Project counted on a solid partnership established between five researchers based on three different major universities in the state of São Paulo, Brazil, and two different area coordinators from the state educational department. The original project aimed at focusing the Seduc-SP Technology Manuals for the different school years. The investigation procedures were meant to start in March 2020 – which ended up coinciding with the spread of the covid pandemic. Luckily, the research was already based on a flexible design. Also, oriented by the listening-based nature of the proposal, the research team was able to review their previous priorities to bear in mind the participants' urge at that specific moment. Consequently, the Project took a turn, and the researchers opened their aims to include the participants' most urgent needs – which involved finding ways to cope with the eminent use of digital technologies to mediate the emergence remote teaching and learning processes.

Organized as a qualitative and interpretative investigation, the Project is methodologically supported by Participatory Action Research (PAR), and underpinned by critical literacy studies (Monte Mór, 2015). According to Kindon, Pain & Kesby (2007), PAR is a methodological approach that stimulates different thinking, whilst challenging the ways in which researchers relate to participants. It also "requires cultivation of mutual understanding and respect, sensitivity to differences on organizational cultures and goals (...)".

The data presented in this paper was generated and collected in two different ways: first, an on-line questionnaire powered by Google Forms was sent to prospect participants – elementary, medium, and high school teachers and coordinators who work in public state schools in the outskirts of the city of São Paulo, in São Paulo state, Brazil. The form also provided potential participants with an ethics statement which had been previously approved by the Ethics Research Committee at PUC-Campinas. Joining the investigation, participants were asked to answer a set of both objective and open questions, and then, they were invited to join in monthly meetings with the research team (which were conducted on-line, by videoconferences, due to the social isolation period, during the worst days of the pandemic). In such meetings, the research team actively listened to the participants' accounts on their experiences with teaching contexts in which digital technologies were the main content in their lessons and/or the means in which lessons were (somehow) taught.

In the scope of the Project, language is conceived as a social and dialogical practice (Bakhtin, 1986), and therefore, dialogue and discourse are keywords to the discussion. Drawing from Bakhtinian readings, Azzari et al (2021, p. 290), affirm that "a word (in an expanded sense, which encompasses any form of representation and/or semiosis, and not just the verbal) is a territory marked by conflict, multiple voices, and diversities". Following those lines, the authors explain that "meaning extrapolates the materiality of its representation and is negotiated and shared in a universe that is discursively, socially, and historically constituted. This universe – whose times and spaces mark tensions and disputes, power relations and searches for ruptures – is permeated by (and simultaneously a cradle of) ideological creations that invariably and irretrievably intertwine the processes of constituting meaning".

Azzari et al (2021), also state that "Luke (2019) highlighted that all forms of representation and interpretation are the result of complex and global/local combinations, and that school

classrooms, as well as domestic environments, are spaces inherently permeated by a plurality of voices/discourses, i.e., by different ways of seeing and interpreting ourselves and the world around us”.

Teachers’ perspectives on digital technologies and their own educational practices were observed by the researchers both in written and oral accounts, which were later submitted to an interpretative analysis that took into consideration the discussions of Luke (2019) about teachers’ narrative, discourse and educational policy, the appreciations of Cope & Kalantzis (2017), and the ideas exposed by Monte Mór (2015).

According to Monte Mór (2015), assuming new/critical literacies as a point of view for education requires us to put a premium on critical thinking so that, in educational environments, it becomes possible for educators and students to investigate the different ways in which meaning-making processes happen within digital contexts. Also, Monte Mór (2013) points out that (new/critical) literacies discussions should favor teacher’s and learner’s agency.

Discussion

Between June 2020 and June 2022, 220 participants answered to the Google Form questionnaire. There were 24 meeting between teachers and researchers, throughout 5 different Modules. Figure 1 presents an excerpt of the data collected during Module II (Aug-Dec, 2020).

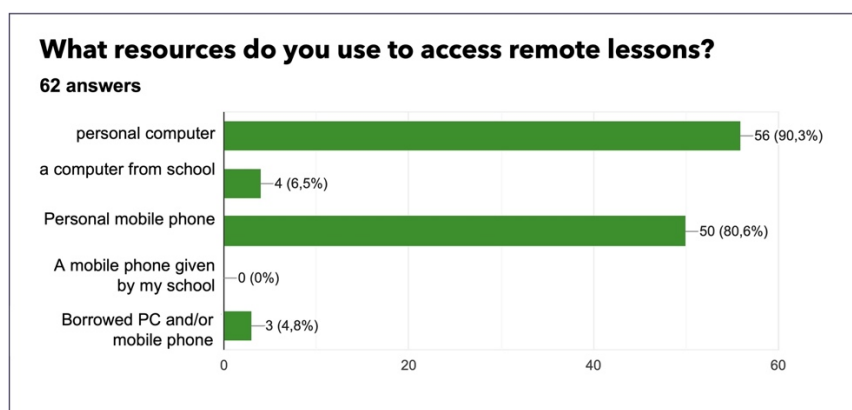


Figure 1: Results obtained in Module II. Retrieved from author’s research files.

The data results represented in Fig. 1 suggest that it took a great deal of resilience for those teachers to adapt to as well to adopt the technologies required in the implementation of the emergence remote education. Most of the participants reported that they had to resort to the use of their own personal equipment to keep in touch with their schools, coordinators, and students, and some of them had also to resort to other people’s equipment to work. This situation was prolonged longer, well into the beginning of 2021, when gadgets such as notebooks and internet connection ships started being distributed by the state government (though most of them arrived at schools too late). Figures 2, 3 and 4 report selected excerpts from the written accounts provided by the participants.

"I have been using multiple platforms: I've joined all of my students Whatsapp groups, I use Google Classroom to post activities, I've hold meetings at both Google Meet and Teams. Most of my activities are developed on Google Forms, and I also use audio and screen recording resources to give them instructions for the tasks.

(...) Few students recorded videos or attended the videoconferences, though, some of them claim to be "just shy", others simply lack interest, but most of them simply don't have fair equipments, such as a laptop or a mobile phone".

(A Middle and High school teacher who taught 300 students in 2020).

Figure 2: Written account obtained in Module II. Retrieved from author's research files.

"I'd never learned to use so many new [tech] tools, at the same time and that fast! I've noticed more and more the importance of a day-by-day usage of Technologies for a dialogic interaction with my students. I have been trying to presente my pupils with communication/aproximation opportunities with tech help on a daily basis, in my teaching context".

(A Middle school teacher with 150 students)

Figure 3: Written account obtained in Module II. Retrieved from author's research files.

"It's been challenging because I have to overcome so many atypical situations to teach Portuguese (literacy) and Technology to approximately 550 students".

(A Middle and High school teacher)

Figure 4: Written account obtained in Module II. Retrieved from author's research files.

The excerpts of the accounts transcribed in Figures 2-4 give us a glimpse at the amount of stress (both physical and mental) those teachers were exposed to during the emergence remote teaching period. However, it is important to highlight that they were already working under less than privileged circumstances, which can be attested by the number of students each educator had to take under their wings. It allows us to conclude that, apart from the lack of equipment and/or internet access – amongst other issues related to the use of digital technologies in their educational contexts/practices – those teachers had already been subjected to endure great duress in the face of their "regular" teaching conditions, which therefore demanded an even greater dose of *resilience* during the pandemic times.

Also, it is clear to see that they had to show an extra effort to further their own education, so that they were able to get acquainted with a great deal of (different) technological resources in such a short period of time.

In the light of the discussion, it is possible to assume that, although motivated by an emergence state, which affected people all over the globe, teachers were drawn to act on their agency. It also shows us that, in terms of (critical) digital literacies, there is still a long way for us to go in terms of both pre-service and in-service education in Brazil. It also brought light to the fact that the digital divide is very much an issue that needs to be carefully and steadily tackled by the Brazilian society.

Conclusion

The discussion suggests that – acting under several syllabus and social demands to sustain education during social isolation – the teachers who participated in the Project meetings reported that they had to face a myriad of challenges such as: i) visible inequality in terms of internet access and hardware/software resources available to both educators and students, ii) a deficit in teacher education concerning the access to and the application of digital resources and iii) the overwhelming pressure to work extensive ours added to what can be seen as previously underprivileged teaching conditions.

It also points out that, even facing a critical and sociocultural shattering period, some teachers still proved to be able to find out digital solutions and professional practical development due to their own dedication and resilience.

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Understanding User Feedback Through Negative Emotions: A Learning Experience

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Abstract

User feedback is an important topic to be taught in Software Engineering (SE) courses. Furthermore, it includes theoretical concepts related to questionnaires, the time elapsed, mouse movements, etc., that are used to understand the topic better. In this context, teaching and learning theoretical concepts in different courses are great challenges in education in universities, particularly in this topic, due to the lack of practical applications or examples in real-life problems. Therefore, it is important to adapt the theoretical concepts to the advancement of technology. In this paper, we propose an innovative methodology for teaching implicit user feedback through the analysis of actionable emotions (i.e., emotions triggered by the interaction with a software service). We apply our proposal during three sessions; in the first and second, students reviewed the theoretical concepts in class. The last one was carried out in the ICE-InnovaT studio, where a system recognizes negative emotions in real-time from a user who was interacting with a software service; in this session, the students were watching the results of the system during the user interaction. Our experience indicates positive results in the adoption of this new approach. Overall, students reported positive comments related to using emotion recognition technologies to understand implicit user feedback.

Keywords: Implicit User Feedback, User Emotion, Software Service

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Introduction

User feedback is defined as the relevant information obtained from the interaction between the user and an application or a software system (Suní-Lopez et al., 2020). In the last years, user feedback has become more important due to its variety of applications, for example, it is used for evolving software (Dzvonyar et al., 2016), the adaptation of service configuration based on user needs (Suní-Lopez et al., 2020), recommendation systems (Morales-Ramirez et al., 2015), etc. For that reason, undergraduate programs in several software engineering courses related to Human-Computer Interaction (HCI), include this topic as part of the syllabus (Ardis et al., 2015).

Teaching and learning processes are great challenges, especially in higher education, because teachers must deal with different students' learning styles and needs (Riding & Rayner, 1998); in addition, different topics inside one course could require different teaching methodologies, which makes the teaching process challenging. In this context, the user feedback topic includes various theoretical foundations, and commonly, these concepts are explained unlinked to practical applications. In this sense, we propose a methodology for teaching implicit user feedback (subtopic of user feedback) through a real-time application based on the analysis of negative emotions generated by the interaction between a user and a software service; this paper presents our experience teaching user feedback by applying our methodology in the HCI course of a Systems Engineering undergraduate program.

The paper is structured as follows: Section 2 presents the background; Section 3 describes the proposed methodology; Section 4 details the experiment conducted for the methodology evaluation. Section 5 shows the challenges faced and lessons learned. Finally, conclusions and future works are presented in Section 6.

Background

The topics inside the Software Engineering (SE) Programs have been traditionally taught through lectures, using slide presentations and blackboards to support the explanations. With the objective of improving the teaching process, there are some proposals to teach SE knowledge using specific teaching methods (Chen et al., 2009) or simulating the development of projects (Claypool & Claypool, 2005; Fiovaranti et al., 2018). However, there are some specific topics inside SE that are relevant due to their real-world applications; if students understand the topic, they can propose interesting projects and applications. One of the current important topics inside SE is “*user feedback*” due to their variety of applications (e.g., recommendation systems, software adaptation); however, it contains many theoretical concepts and foundations that are difficult to teach, and it can demotivate students to learn this topic.

User feedback can be divided into two important concepts: explicit feedback and implicit feedback (Suní-Lopez et al., 2020). Explicit feedback is information that is reported explicitly by users through filling out questionnaires, reporting an error, suggesting new functionalities, or ratings. On the other hand, implicit feedback is collected automatically during the interaction with the application, some sources of this feedback can be facial expressions, time on the page, click-stream, scrolling, or mouse movement. Explicit feedback is the most used in different applications and it is based on form filling by the users. However, implicit feedback enables more sources for capturing information that can require applying modern technology and concepts.

In this sense, the proposed methodology is based on implicit user feedback that includes modern and interesting concepts for SE students, such as facial emotion detection (i.e., negative emotions), deep learning, and artificial intelligence. This combination of theoretical concepts of SE and modern concepts is suitable for improving the learning process in Software Engineering. The understanding of SE concepts is important for the development of real-world projects; for that reason, our methodology considers showing the execution of an application in real-time as well as the corresponding explanation during the user interaction, where students can see at the same time the relationship between user's emotions and implicit user feedback.

Live lectures

We propose an innovative methodology for teaching implicit user feedback through the analysis of actionable emotions (i.e., emotions triggered by the interaction with a software service). For this purpose, we carried out three sessions; in the first two sessions, students reviewed the theoretical concepts. We applied our proposal in the last session, which was carried out in the ICE-InnovaT studio, where a system recognized negative emotions in real-time from a user who was interacting with a software service; in this session, the students watched the results of the system during the user interaction.

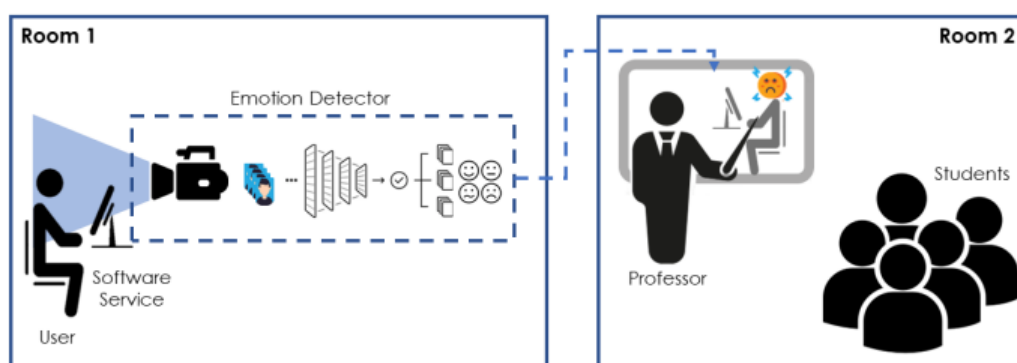


Figure 1: Pipeline of the proposed methodology

Figure 1 presents the pipeline of our proposal which takes place in two rooms; in the first one a user interacts with the software while the professor and students are in the second room. The following subsections present more details about this distribution.

Room 1

As it was presented in Figure 1, the experiment with the user and a software service (i.e., an e-commerce web service) is carried out in Room 1. Regarding the instrumentation, a quiet room was equipped with a computer, cameras, a desk, and a chair. In relation to the procedure, firstly, the subject was asked to read and sign the informed consent form, and an explanation was given about the objective and structure of the experiment. Afterwards, we requested him to stay quiet and relaxed for five minutes; then, the subject performed three different tasks (i.e., to try buying three items).



Figure 2: Setting up of Room 2. Left image shows the professor and the students, and right picture is the output of the emotion detector.

With the objective to analyze the user's emotions that are generated by the software service, we use a facial emotion detector that applies the web camera to collect facial images.

The emotion detector is based on MorphCast HTML5 AI SDK¹ which is a native JavaScript engine based on deep neural networks that recognize seven emotions (i.e., angry, disgust, fear, happy, neutral, sad, and surprise). Additionally, to stimulate the different scenarios of analysis (i.e., negative and positive emotions), we intentionally modified the software service functionalities to generate negative emotions in the user.

Room 2

Room 2 was implemented with two large TVs, one showed the user's face, and in the other, the real-time user's emotions were shown (see the right image in Figure 2). In this room, the professor explained the theoretical concepts of implicit user feedback to the students using and interpreting real-time user's emotions generated by interaction with the software service. Basically, when a negative emotion (e.g., anger, disgust, fear, or sadness) was dominant, the professor analyzed the relationship between the negative emotion and the current functionality that was being used.

Evaluation

With the objective to evaluate our proposal, we conducted a survey to understand the students' perception as a result of the proposed methodology for learning user feedback. In this survey participated 21 undergraduate students (2 female and 19 male aged 19 to 25 years old) enrolled in the Human-Computer Interaction course at Universidad de Lima, Peru. This survey was answered by them at the end of the third session, and it was composed of nine questions (see Table 1): seven mandatory Likert scale questions (their results are presented in Figure 3), one mandatory single-choice question, and one optional open question.

Analyzing the results for the Q1 question, the motivation to learn about implicit user feedback, most of students (85%) agreed this new methodology had motivated them. Also, only one student (5%) neither agreed nor disagreed. The 10% of students mentioned the methodology did not motivate them. Additionally, when we compared the students' comments, we noticed there exists a preference to motivate the theoretical classes with real applications (e.g., experiments). Concerning learnability (Q2), the 80% of the students

¹ <https://www.morphcast.com/sdk/>

considered the methodology permits them to clearly see the objective of the sessions and consequently acquire knowledge about implicit user feedback. For this case, the 10% remained in disagreement. Contrary to the Q1 question, the undecided increased to 10%. In addition, students commented that in theoretical sessions it was difficult to understand what the objective was.

Question	Type
Q1 Did you feel motivated to learn about implicit user feedback with the proposed methodology?	Likert scale
Q2 Did you consider you learned what you were looking for through the proposed methodology?	Likert scale
Q3 Did you consider it is important to see the feedback analysis in real-time?	Likert scale
Q4 Did you consider this methodology allowed you to concentrate better during the learning process?	Likert scale
Q5 Did you believe that the use of this methodology influenced your learning process?	Likert scale
Q6 Are you motivated to deepen your knowledge about implicit user feedback?	Likert scale
Q7 Can you clearly see the importance of user feedback?	Likert scale
Q8 If you could choose the way to learn about implicit user feedback, which modality would you choose?	Single-choice
Q9 Do you have additional comments, criticisms or suggestions regarding the methodology used in the HCI course?	Open

Table 1: List of questions included in the survey.

Regarding the importance to analyze user feedback in real-time (Q3), 90% of students agreed the proposed methodology allowed them to recognize the importance of implicit user feedback to measure the quality of the software service. In this question, we did not have any undecided; but it resulted that 10% of the students were in discordance. Analyzing the student's comments, they easily understood the importance of collecting user feedback with the real-time application. Analyzing the Q4 question related to whether the proposed methodology allowed them to concentrate, 71% of the students agreed and 10% disagreed. However, we got an increase to 19%, who neither agreed nor disagreed. Doing the correlation with the student's comments, we found that since the practical session was carried out outside the regular classroom, in the ICE-InnovaT studio (open class), it allowed them to learn in a practical way, but also it was easy to get distracted.

As far as the influence of the proposed methodology in their learning process (Q5), 76% of students agreed, little high percentage of undecided (14%) remained, and 10% disagreed. As well, the students commented on the impact of watching a real-time experiment, which allowed them to create a connection between user experiments and the theoretical concepts learned during the session. When we asked whether the proposed methodology motivated

them to deepen and continue studying (Q6), 80% of the students agreed, and 10% reported undecided and disagreed. According to the comments, the students indicated after the third class they were influenced to search for more information about implicit user feedback and how the user's emotions can be used to measure software service quality and user experience.

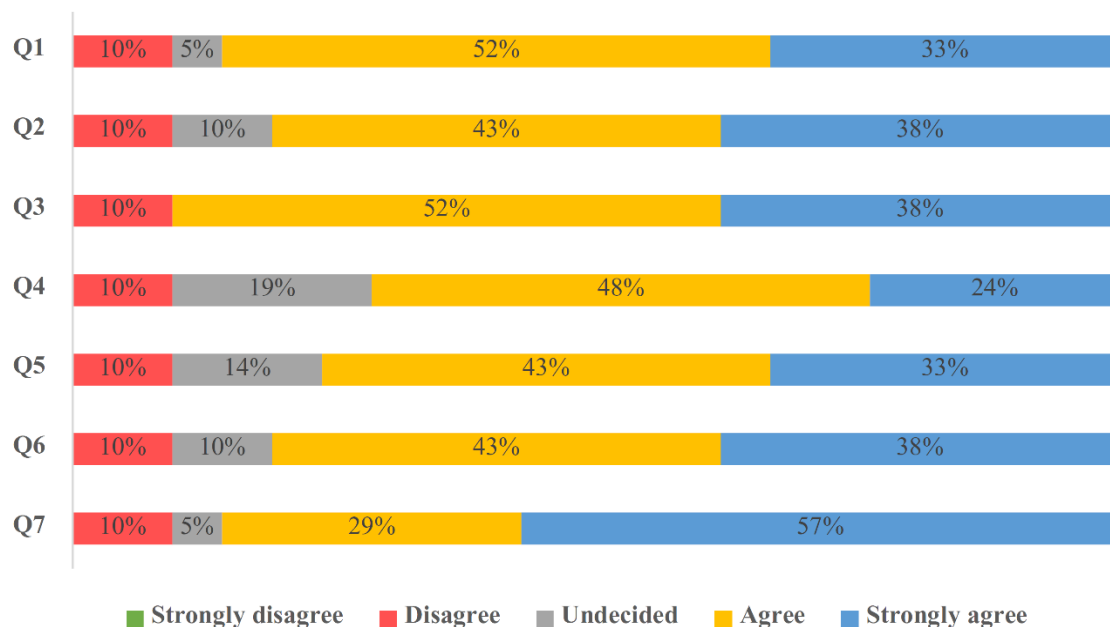


Figure 3: Summary of the obtained results for the seven questions that applied the Likert scale.

Regarding whether the approach allowed to clarify the importance of user feedback (Q7), most of the students totally (56%) or partially (29%) agreed with this statement (in total 85%); this result allowed us to infer that besides seeing the importance to analyze the user feedback in real-time, the proposed methodology allowed them to understand the importance to obtain user feedback because that information could be used to improve the software service quality. On the other hand, some students disagreed (10%), and some others were not sure (5%). Finally, the Q8 question was applied to ask students if they preferred to learn theoretical concepts with the proposed methodology or the traditional way, most of the students (95%) indicated they preferred this teaching methodology. However, we also obtain some students (5%) that prefer the traditional way. In summary, most of the students consider the proposed methodology as innovative and it allows them to learn about the "user feedback" topic. Additionally, this methodology has the potential to improve learnability and concentration during the session and motivates self-learning about the topic.

Challenges and Lessons Learned

In this section, we discuss the challenges identified by applying this methodology and what we learned as professors. The challenges we can mention are:

- **Student's background:** as the experiment was carried out with undergraduate students, one of the main difficulties was the difference in their profiles; each student has different objectives in the course (e.g., some students want to learn, and others only follow the course to complete the mandatory courses of their program). Additionally, the student's prior knowledge impacted the learning-teaching processes

since some had greater skills to design and run user experiments while others had a very basic vision. Even though refresh sessions for key concepts were carried out, the difference in the needed skills of the students proposed a challenge.

- **Experiment settings:** According to Suni-Lopez et al., (2020) we could test the software service properties on the user's emotions. For the teaching objectives, it is challenging to define which software service's functionality must be modified to generate adequate case studies (as we explain in Section 3, we modified some features of the software service to generate negative emotions in the user); also, as most variables were controlled by the experiment, the students analyzed a fictitious case study. However, as the objective was to show how to use negative emotions to measure a software service, we think that this challenge was managed according to the study's objective.

Conclusions and Future Work

This paper presented an innovative methodology to teach implicit user feedback topic, which is part of the Human-Computer Interaction course, discussing its use as a supporting method for teaching and learning intricate theoretical concepts. The novelty of this methodology is the use of actionable emotions in a real application. According to the survey, our proposal has the potential to help learnability and concentration in the students, and also it motivates students to learn by themselves. In general, students were enthusiastic and positive about this methodology due to the combination of theoretical concepts with interesting modern concepts (e.g., deep learning, image processing, emotion recognition) in a real-time application. As future work, we intend to conduct more evaluations, such as forming student groups according to their background to evaluate the importance of student profiles in the learning process about user feedback; also, reducing the variables controlled in the experiment settings to see the application in a real context. In addition, we intend to measure the effectiveness of our proposal regarding the general learning process of the topic.

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***Involvement of Experts From Practice in Practical Laboratory Teaching –
A Way to Increase the Competencies and Skills of
Science Study Programs Graduates***

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Abstract

The current society requirements need close interconnectedness between children's and young education process and the labour market, namely in industry and services. Workers in the 21st century must have the skills to process information, including reader literacy, mathematical literacy and problem-solving skills. Today, the school is only one of the places where students learn. In this context, the role of dialogue between schools and employers is increasingly recognized. These time requirements should also be addressed to educational institutions in chemical professions. The subjects of practical education in the area of natural education are crucial for the readiness and applicability of graduates in the labour market. The social situation in Slovakia shows that connection between the young people education and practical experiences from industry and services is necessary for a future prosperous society. Practical training must develop skills important for the workforce living in a technologically advanced economy. Based on these requirements, in cooperation with employers, Institute of Chemistry PF UPJŠ in Kosice is preparing a new professionally focused study program for future students. The new study program will meet European educational standards and will also include compulsory electives and elective courses, which will be partially attended by experts from practice. Students' professional practice lasting three months in contracted laboratories of industry and services is a compulsory subject. The paper will present our previous experience in creating new professionally focused study program "Chemical Laboratory Technician - specialist" as well as in involving experts from practice in contact teaching.

Keywords: Practical Education, Experts From Practice, Collaboration

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Introduction

Human society has changed more than ever in the last 50 years. This change is about our lifestyle and labour market and also about employers' requirements for young school graduates. The 21st century workers must have information processing skills including literacy, numeracy and problem-solving skills. In addition, they must also have "generic" skills, such as interpersonal communication, independence, and ability to learn. Today, school is only one of the places where students learn.

Today, we often encounter challenges to support the principles of partnership and cooperation of all parties that are involved in education and training. Therefore, the role of dialogue between schools and employers is increasingly recognized. These connections are requested in all areas of the economy, such as automotive, chemical, food, and pharmaceutical industries, but also service areas such as healthcare and education. The goal of the connection is to significantly reduce the departure of young people from Slovakia who are looking for work abroad.

Educational institutions in chemical fields should also respond to current social and labour requirements. Practical subjects in the field of natural science education are significant to the readiness and applicability of graduates on the labour market. Since the current trend in the chemical economy is to prefer accepting prepared graduates without the willingness to finance their practice, universities must respond to these needs. Based on these requirements, we connected the content of the practical exercises at the university with the content of works that are done directly in companies laboratories, and we incorporated their to the practical laboratory exercises of study programs of the fields of chemistry (inorganic chemistry, analytical chemistry, physical and biochemistry).

The aim of this connection was to develop the scientific and digital skills of graduates necessary for employment on the labour market, such as creating hypotheses, designing solution procedures, experimenting, collecting data, formulating conclusions, argumentation, working in a team, as well as skills such as critical thinking, problem solving, cooperation, because these are in direct proportion to the economic growth of countries (1).

The Institute of Chemistry at Faculty of Science of Pavol Jozef Šafárik University in Košice took place several meetings of teaching staff and experts from practice, where the participants exchanged their experiences (pedagogical staff informed the experts from practice about the content and methodology of the practical laboratory exercises, and experts informed about chemical-technological procedures, which are implemented directly in production or laboratory operations in the companies).

Teachers and experts from practice proposed specific methodological procedures used in practice which they implemented in practical laboratory exercises:

Basic laboratory practices from Inorganic chemistry (2):

1. Limestone analysis - according to STN (Slovak technical standards) 72 12 16 (determination of CaO, MgO, non-decomposable fraction)
2. Determination of the content of nitrous gases (NO_x)
3. Determining the degree of conversion

4. Quality parameters determination of technical nitric acid HNO_3 (HNO_3 content, HNO_2 , chlorides, Residue determination after annealing)
5. Determination of the quality parameters of calcium nitrate (CaO content, granulometric composition, ammonia nitrogen content, total nitrogen content, water-soluble fraction content)

Laboratory practices from Physical chemistry (3):

1. Chemographic proof of post-shot waste products
2. Microscopic examination of textile fibers
3. Analysis of trace amounts of explosives by the ion mobility spectrometry

Laboratory practices from Analytical chemistry (4):

1. Titration determination of alkalinity of decontamination agents containing potassium hydroxide
2. Titration determination of the content of active chlorine in calcium hypochlorite
3. Spectrophotometric determination of Pb, Cd, Cu, Al in water leachates, as waste from technological process
4. UV-VIS spectrometry using special reagents forming with toxic chemicals coloured product
5. Identification of paraffins, dyes and other substances in the form of stains on the surface of products for hygiene, which show a technological error, with the use of Raman and infrared spectroscopy

Basic laboratory practices from Biochemistry (5):

1. Making latent dactyloscopic traces visible by chemical and physico-chemical methods
2. Taking a comparison set of fingerprints on a dactyloscopic card

Based on the pilot verification of work procedures, other forms of student involvement in practical companies' education were proposed, in the form of short-term internships directly in the companies or in the institutes. For the implementation of the internship, pilot program of students' work activities was proposed, in the form of so-called Educational plan of professional practice of the student (6). This proposal also includes the education schedule. To support the feedback principle, we also included formative assessment tools (e.g., self-assessment card, survey, exit ticket) in the work procedures of the laboratory exercises, which pointed out misconceptions and positive and problematic aspects of the implemented experiments (2, 3).

The experience gained during the cooperation of companies and the university led to the proposal to create a professionally focused study program.

To offer for students a high-quality study program, we took place an analysis of the teaching status of such or similar study programs in Slovakia and abroad. We carried out analysis in secondary schools, universities, and in industry companies and institutions.

Based on meetings with teachers at vocational secondary schools, who in the past participated in the education of chemical laboratory technicians in Slovakia, we found out that such a field of study is currently missing in Slovakia. Secondary schools provide

vocational complete secondary education in accordance with the State educational program for vocational education and training for the group of study and teaching fields Technical and applied chemistry in the study fields (6):

- Biotechnology and pharmacology
- Technology of environmental protection and creation
- Chemical informatics
- Control analytical methods
- Chemical production
- Operator of rubber and plastic production
- Chemist operator
- Chemistry and environment
- Pharmaceutical production operator
- Chemical and pharmaceutical industry

Moreover, we also took place a survey directly among the teachers at secondary schools who ensure the implementation of such training. We carried out a pedagogical survey using the questionnaire method (we prepared 15 questions) (7).

In addition, we also accomplished an analysis of universities similar study programs abroad to see if they offer such a study program (or a similar one). Based on this information, for example, we found out that it is possible to study a specific study program called "Laboratory diagnostics in health care" at the CTU in Prague at the Faculty of Biomedical Engineering.

At the Masaryk University in Brno, at the Faculty of Science, the Institute of Chemistry, there is also a program called "Analytical Chemist - Manager of a Chemical Laboratory" in the offer of bachelor study programs.

At the Palacký University in Olomouc, they take place the study program "Chemistry analyst specialist".

At the Metropolitan University of Applied Sciences in Helsinki, they train bachelors in the study of laboratory sciences. The program is called the Laboratory Science Study Program and provides students the skills and know-how for professional and practical tasks in various areas of laboratory science. Bachelors of Laboratory Services are experts in laboratory operations and they know how to perform their work according to common quality systems (7).

To find out whether industrial companies or relevant institutions are interested in such graduates, we also took place a survey in these companies and institutions (we prepared 12 questions) (7).

Based on the facts mentioned above, the aim of our work is to prepare and offer to young people a new professionally focussed study program. The intensive cooperation of various resorts in Slovakia (secondary schools, universities, and companies (from the field of production or services) is necessary (Fig. 1).

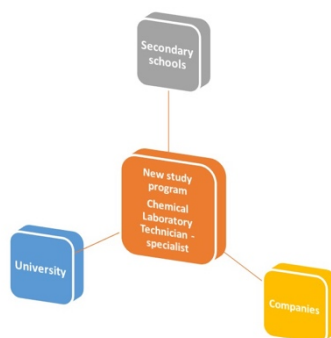


Figure 1: Cooperation between secondary schools, university and companies leads to the creation of a new study program.

Conclusion

Conclusions of analysis and survey in secondary schools

Based on the analysis of the State educational program for vocational education and training in the study and training group 28 Technical and applied chemistry, obtained conclusions from the pedagogical survey in the form of a questionnaire as well as personal interviews with secondary school teachers, it can be concluded that currently the interest of young people in studying these fields is less than it was in the past. Besides that, teachers of vocational subjects' state that the technical security of secondary schools as well as the legislation itself do not allow schools to operate a technical and instrumental infrastructure with a demanding need for service as well as operation and maintenance. Vocational secondary schools provide teaching in those fields for which they have at least adequate material conditions, they would prefer internships, excursions, while their students would also gain knowledge from working with modern devices, techniques, etc. Such training of experts at secondary schools is insufficient for the training of chemical laboratory technicians who would be prepared for modern laboratories at the same time.

Conclusions of the analysis at universities

Based on information obtained from available sources as well as personal experience from visits to universities, we found out that the Chemical Laboratory Technician study program or its related fields has either been intensively implemented in the surrounding countries for several years (Germany, Finland) at universities or started to be implemented in the last years (Czech Republic). It is clear from the offer of subjects as well as the topics of the final theses that the programs are built with the needs of laboratory practice in mind at the same time and provide students with a huge space to ensure high-quality and competent skills for laboratory work and work with high-quality, top-quality infrastructure that is currently being used in industry. healthcare, pharmaceuticals and many other services require.

Conclusions of analysis and survey in companies

The analysis among experts from practice provided information that in operational or institutional laboratories there are employees close to retirement age and that job positions have recently been difficult to fill because Chemical Laboratory Technician graduates are lacking on the labour market. Based on this, employers fill these positions with graduates of the 2nd level and even the 3rd level of study, while such high expertise is not necessary for

the requests of normal laboratory practice. On the contrary, potential employers rather need graduates adequately prepared for operational work in a modern laboratory, which uses top laboratory technology in the 21st century. The meeting and survey also revealed that potential employers themselves are looking for ways to educate a new generation of experts for routine laboratory chemistry practice.

They organise various excursions and short-term trainings, and in some cases, they also directly participate in the preparation of final theses.

At State chemical institution in Michalovce, under professional supervision, approx. 40 bachelor or diploma theses were defended. Active cooperation is carried out with UPJŠ Faculty of Science Košice, Technical University Košice, University of Prešov, Slovak University of Agriculture Nitra, University of Economics Bratislava.

The Company Chemko, a.s. Slovakia provided dual education and professional practice for the Secondary Vocational School of Technology in Humenne. They also participated in the subject Chemical Management (UPJŠ in Košice - Faculty of Sciences, study program Inorganic Chemistry) in the form of external lectures on the real picture of the management of operations and companies, business-production strategy, and marketing of individual industries, and they also accomplished excursions.

The Company Kovohuty Krompachy, a.s. participated in the training of a student from TUKE in Košice, from the Faculty of Mining and Ecology, Management and Geotechnologies as part of a bachelor's thesis entitled "Proposal of statistical regulation of processes in metallurgical production".

The Criminalistics and Expertise Institute of the Police Force takes place excursions and short-term internships for UPJŠ students at their workplace.

Based on the above-mentioned analysis, survey and the involvement of experts from practice in teaching, we are compiling a new professionally focused study program Chemical Laboratory Specialist in Slovakia.

Proposal for a new study program:

Mandatory subjects

1st year

General chemistry
Chemical calculations I
Chemical nomenclature I
Basics of mathematics
Basics of physics
Basic methodologies in the chemical laboratory
Analytical chemistry
Chemical calculations II
Inorganic chemistry
Practical course in inorganic chemistry
Organic chemistry
Practical course in analytical chemistry

Chemical nomenclature II
 Basics of chemical technology

2nd year

Practical course in organic chemistry
 Biochemistry
 Physical chemistry
 Practical course in physical chemistry
 Practical course in biochemistry
 Analytical chemistry in practice
 Quality management and good laboratory practice
 Instrumental laboratory practice
 Basic methodologies in the chemical laboratory II
 Basics of chemical engineering

Compulsory elective subjects

Safety regulations in chemistry
 STN standards of chemical industry products
 Chemical technologies (contribution of all departments)
 Basics of electroanalytical methods
 Basics of separation methods
 Basics of optical methods
 Environmental chemistry
 Basics of chemical production
 Green analytical chemistry and measurement automation
 Instrumental practicum (contribution of all departments)
 Chemical industry
 Basics of economics
 Basics of law
 Basics of management

Elective subjects

Industrial ecology
 Biotechnologies
 Basics of pharmaceutical chemistry
 Nanotechnology
 Battery and hydrogen technologies
 Basics of mineralogy
 Basics of bioanalytical chemistry

3rd year

Instrumental laboratory exercise in practice	block*
Professional stay	block**
Professional stay	block***

* Block exercises in the first half of the semester - (rotating around the contracted laboratories, a different external workplace every week)

******professional internship at contracted workplaces in the winter semester - (each external workplace would have one maximum of two students)

*******professional internship at contracted workplaces in the summer semester - (each external workplace would have one maximum of two students)

State final exam (SFE)

Subject SFE

Chemistry

Final thesis

Defence

The content of most subjects is available in the information system of the university (8), but new practically focused subjects have information sheets in the stage of creation.

As an example, we present the syllabi for the block subject Professional internship, which will be implemented at external workplaces in companies or state institutions:

- Initial health and safety rules training and fire training
- Getting to know the organizational structure of the company and the system of organizational guidelines
- Operation of the production of nitric acid (fertilizers, steel, copper, etc.) depending on the place of implementation of the practice - conditions of production, management of the technological process, interoperation methods of production control to ensure its standardization, management of production documentation
- Quality control methods of input raw materials, materials and finished products
- The student's own work on the assigned task
- Analytical and statistical processing of results
- Elaboration of the protocol

Other subjects closely related to processes in real operating and attestation chemical laboratories are Chemical technologies, Chemical engineering, STN standards, Occupational safety, etc. and will be part of the new study program. Moreover, we are interested in approaching colleagues from other faculties in providing subjects related to operational management of laboratories (Basics of economics, Basics of law, Basics of management).

At the moment, intensive work is being done on the preparation of their content, and at the end of next year, we plan to apply for the rights to implement education within the new professionally focused Chemical laboratory technician - specialist.

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Metacognitive Strategies in the Preparation of Future Chemistry Teachers

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Abstract

The research aim was to verify the efficiency of a metacognitive strategy called Post-Test Reflection (PTR), implemented into Chemistry Teaching Students' Training. This research was performed in the 2020/2021 academic year during a course in Chemistry Didactics. The sample consisted of 22 Chemistry Teaching students in the 1st year of their Master study. First, students took a test focused on selected topics of general chemistry didactics. The results showed that students had superficial knowledge and misconceptions, which was related to their learning methods. Students were asked to review the test questions at home in order to identify the errors they made, explain why these errors occurred, and how they could be removed, which promoted deeper understanding of the subject matter. At the end of the semester, students completed their course in Chemistry Didactics by taking a second test and an oral examination. The PTR self-assessment metacognitive strategy showed efficiency. PTR promoted the development of cognitive understanding in the students, which led to changes in their learning strategies. After PTR, the students proceeded to achieve better academic results as confirmed by the results of the second test as well as the oral examination taken during the Chemistry Didactics course. The research showed that metacognition promoted "deep understanding" and increased students' motivation to learn.

Keywords: Metacognition, Metacognitive Strategies, Self-Assessment, Post-Test Reflection, Chemistry Teaching Students

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1. Introduction

Formative assessment (FA) is a process, which is planned and continuous; based on regular interactive evaluation of students' work provides feedback on students' learning and their progress towards achieving the determined goals. It also helps identify what needs more attention and what steps need to be taken to achieve progress. Therefore, FA contributes to an overall learning improvement (CCSSO, 2018).

The goal of FA is to obtain information on students' learning, i. e. reveal, and diagnose shortcomings, mistakes, difficulties and their reasons (Cowie & Bell, 1999).

FA allows the students to develop their cognitive as well as metacognitive strategies. Formative assessment classroom techniques (FACTs) can be used to identify preconceptions, engage students, activate their thinking, stimulate scientific discussion, promote metacognition, self-assessment and much more. Many of these FACTs initiate the use of metacognitive skills and promote deeper student thinking. This study investigates the effect of FACTs implementation on the development of students' metacognitive skills.

2. Metacognition and Metacognitive Strategies

The Dictionary of Pedagogy (Průcha, Walterová, & Mareš, 2008) defines metacognition as one's ability to plan, monitor, and evaluate the processes through which they learn. This conscious activity allows one to realize how they proceed when they are learning about the world. Everyone has the ability to perform metacognition and its strategies, which improves as the person ages. Education is an important factor as students learn through completion of assignments and the subsequent feedback. This ability significantly develops when schooling starts (Mesárošová, Bavořár & Slavkovská 2018).

In terms of education, the term metacognition refers to the students' ability to analyse their own learning and control it efficiently (Flavell, 1979). The metacognitive ability determines the students' learning performance. It allows students to investigate their own learning processes, design the best learning procedures, influence their own interests and attitudes to the given task, problem, course, etc. (Wang, Haertel, & Walberg, 1993).

Metacognition plays an important role in academic performance as well. Extensive research on metacognitive and cognitive strategies has shown that learning about learning and thinking can help student improve their higher-order cognitive operations such as application, analysis, evaluation, and creativity (Hattie, 2009).

If a teacher wants to help students develop metacognitive strategies, they must be able to reflect on their own teaching process in the first place. Teachers are supposed to undergo life-long learning and constantly improve their knowledge and skills as well as their teaching practice in order to help students achieve the best academic performance possible (DESE, 2013).

In terms of metacognitive learning, students are active and in control of the process. Metacognitive learning transforms students into experts who can not only explain, but also analyse the knowledge, plan the related activities, verify their usefulness, and implement them in practice.

However, metacognitive strategies are rarely used in teaching. Students learn the subject matter, but little time is invested into teaching them how to learn. Students forget factual information quite quickly. In 2–3 years after leaving the school, they forget about 60% of it. Nevertheless, any further education or career require the individual to constantly deal with new problems that need to be solved, new information that needs to be comprehended, and new tasks that need to be completed. If we teach students how to learn, it can help them prepare for these future challenges (Mcelwee, 2009).

Metacognition in education offers the following benefits: improved teaching efficiency, improved self-study abilities; improved ability to track one's own progress, which allows the person to take control of their own learning during classes and outside school, and improved endurance. Identifying which strategies led to success and failure respectively improves student endurance in terms of self-improvement (Lovett, 2013; Mcelwee, 2009).

Self-assessment is one of the metacognition strategies. Through self-assessment, students can identify their progress on the way to their goal. They learn to take control of their own learning. Self-assessment is one of the most important skills for their future career and life-long learning (Taras, 2010; Wride, 2017).

Students play the key role in helping students develop self-assessment skills.

Besides the (revised) Bloom's taxonomy, there is also the new taxonomy of educational goals created by Marzano and Kendall (2007). In this case, focus has been paid to the student. In accordance with their taxonomy, students are to ask the following questions:

1. What is my learning goal? What new things will I learn? Here I monitor my own personal goals and benefits.
2. What usually helps me to learn? How have I handled a similar task in the past? In this case, I monitor my learning process.
3. What is not clear to me? What is it that I don't understand? Which part of the subject matter do I not understand? By asking these questions, students monitor the extent to which they understand the material.
4. What other information do I need to get? Where can I get the information I need? Students reflect on their future learning steps.

The formulation of the basic metacognitive strategies as formative assessment strategies can draw on the following questions, which help teachers as well as students to plan, teach, and learn: Where am I heading? Where am I right now? How do I achieve my goal? How to proceed? (Atkin, Black, & Coffey, 2001; Chappuis, 2009; Hattie, 2003; Hattie & Timperley, 2007).

3. Research Methodology

Implementation of Post-Test Reflection (PTR) into Chemistry Teaching Students' Training

The research goal was to verify the efficiency of metacognitive strategies (i.e. self-assessment) implemented in university teaching.

The research questions were defined as follows:

1. Does self-assessment performed using PTR actually influence the development of conceptual understanding in chemistry teaching students?
2. Does self-assessment performed using PTR actually change the learning strategy in chemistry teaching students?

This research was performed in the 2020/2021 academic year during a course in Chemistry Didactics at P. J. Šafárik University in Košice, Slovakia.

The research sample consisted of 22 chemistry teaching students in the 1st year of their Master study.

Figure 1 presents the stage of research design.

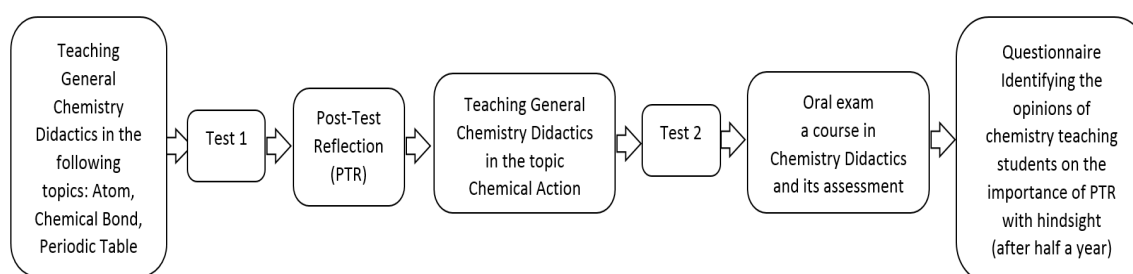


Figure 1: Stages of Research Design

Research Implementation Procedure

In the 2020/2021 academic year, chemistry teaching students completed 2 tests within the course in Chemistry Didactics. The first test aimed to check their knowledge of general chemistry didactics in the following topics: the atom, chemical bond, periodical table of elements. Test 1 showed that students had superficial knowledge and misconceptions, which was related to their learning methods. Students found it difficult to explain basic information taught at grammar school chemistry classes such as the structure of water molecule, benzene, periodicity of ionisation energies, electronegativity, the point of Rutherford's experiment, etc. The unsatisfactory results may have been influenced by the fact that remote teaching was used for two years prior (2019–2020). Students mostly memorised the content of the materials (provided on site or online). After test 1, students argued as follows: "We are not used to learn with deep understanding. During other classes, we are simply required to reproduce the subject matter and the teacher will correct the misconceptions." It was important to explain and convince them that as future chemistry teachers, they need to develop a deep understanding of the subject matter they would be teaching. As future teachers, they have to explain the subject matter fluently and without misconceptions.

Therefore, the Evaluation of the Post-Test Reflection (PTR) as a metacognitive strategy was implemented in order to improve their learning. Students were given back their test 1 and instructed to analyse their answers at home to identify the misconceptions, supplement and enhance their knowledge through study of further sources, and realise what they did wrong in terms of learning. Students were instructed to consider how to improve their learning and identify whether a change to their learning strategy is necessary to enhance their understanding.

The students' task was to correct their test 1 answers and answer the following questions in writing:

1. What seemed difficult about this task?
2. What will I do to improve my understanding of this problem?
3. Do I have to change my learning strategy? How do I change my learning strategy?

At the end of the 2021 summer semester, students took test 2 focused on chemistry didactics, specifically the chemical action topic.

Subsequently, students took an oral examination in Chemistry Didactics.

4. Results

4.1 Evaluation of the Post-Test Reflection (PTR)

The answers of the chemistry teaching students were grouped and coded for the purpose of frequency/quantity calculations.

Note: Some chemistry teaching students provided multiple reasons.

Below is a sample of the PTR evaluation of selected task of Test 1 (see Tables 1 to 3).

Question 1: What seemed difficult about this task?

Code meaning	Number
DF Difficulty formulating the correct answer	11
DC Difficulty comprehending the task instructions	10
LK Lack of input knowledge resulting from the previous learning strategy	8
DP Difficulty providing examples	6
NO No answer	5
LT Lack of time to complete the task	3

Table 1: The Number of Codes Assigned to Question 1

Question 2: What will I do to improve my understanding of this problem?

Code meaning	Number
DP I will learn with more comprehension (deeper learning)	13
MR I will use more resources such as videos and animations	11
NO No answer	2
LT Lack of time to complete the task	1

Table 2: The Number of Codes Assigned to Question 2

Question 3: Do I have to change my learning strategy?

Yes	Probably yes	No
12	5	5

Table 3: The Number of Answers to Question 3

How do I change my learning strategy?

- By studying more resources such as animations, I should also review the seminar materials.
- By using more imagination and allocating more time to studying.
- By revising aloud. Some chemistry teaching students realized they had been learning superficially by memorisation and if they are to explain the subject matter to their students in the future and provide specific examples, they have to actually comprehend the subject matter themselves.
- To improve their understanding of the subject matter, most chemistry teaching students need to revise it.

4.2. A Comparison of Test 1, Test 2, and Oral Exam Results in the Chemistry Didactics Course

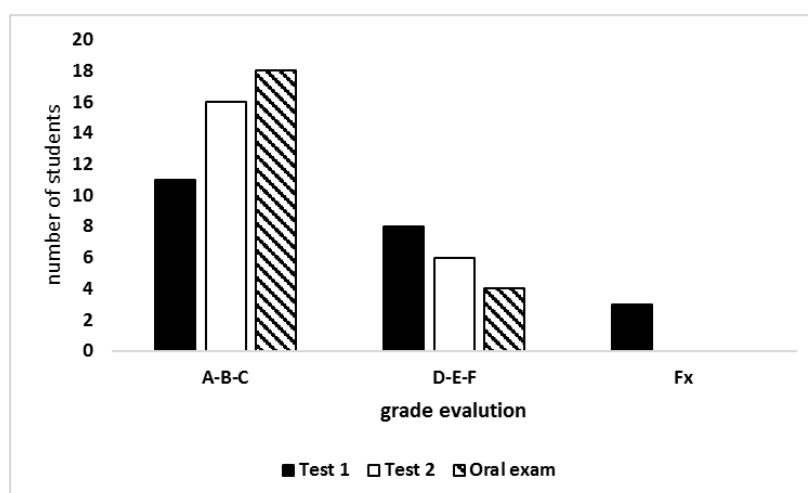


Figure 2: A Comparison of Test 1, Test 2, and Oral Exam Results in the Chemistry Didactics Course

The “A, B, C, D, E, Fx” grading scale was divided into 3 groups for the purpose of simplification.

4.3. The Importance of Post-Test Reflection (PTR) with Hindsight (half a year) – Chemistry Teaching Students’ Opinions

Six months after the research, the students filled out a short questionnaire with two questions.

Question 1: Did you find the Post-Test Reflection (PTR) during the Chemistry Didactics course meaningful in any way? If yes, please specify.

Question 2: Do you consider the Post-Test Reflection (PTR) meaningful for you as a future chemistry teacher in the long term?

All 22 chemistry teaching students responded positively.

The chemistry teaching students reported the following positive aspects of PTR:

- Analysing one's own learning process
- Improved understanding upon revision of the subject matter
- Gained more knowledge upon revision of the subject matter
- Identification of weaknesses and knowledge gaps
- Focus on the misconceptions

5. Discussion and Conclusions

The PTR self-assessment metacognitive strategy showed efficiency. PTR promoted the development of cognitive understanding in the chemistry teaching students, which led to changes in their learning strategies. After PTR, the chemistry teaching students proceeded to achieve better academic results as can be seen in the results of Test 2 as well as the oral exam taken during the Chemistry Didactics course. With hindsight (half a year), the chemistry teaching students evaluated the PTR strategy positively. It made them think about their attitude to learning, level of knowledge, and their own learning methods, i.e., students reconsidered the efficiency and usefulness of their methods. The experience gained is likely to be useful for them in practice when they start teaching themselves.

The research showed that metacognition promoted “deep understanding” and motivated students to learn. These findings are in lines with the following studies:

–Wang, Haertel, and Walberg (1990) have claimed that supporting the development of metacognition is an efficient way to help students succeed in their university studies. Students with strong metacognitive skills are able to learn more and perform better at school. Students with well developed metacognition can identify the concepts they do not understand and select suitable strategies to deal with them.

–Veenman, Van Hout-Wolters, and Afflerbach (2006) have pointed out that appropriate metacognition level can compensate for students' cognitive limitations.

–Ur-Rahmana et al. (2010) have investigated the impact of metacognitive awareness on student performance. In this case, metacognitive awareness significantly correlated with student performance. Science students with high metacognitive awareness performed better in the test.

Further research should focus on reading comprehension in chemistry teaching students as this skill is also closely related to the learning skills (see e.g. Pintrich 2002).

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The Effects of Lockdown on Undergraduate Training and the Well-Being of Pre-Service Teachers

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Abstract

The aim of the study was to examine the well-being of pre-service teachers during the first lockdown. The changes in learning and leisure time were observed in the context of subjective satisfaction with education and experienced emotions. A total of 297 pre-service teachers (80% women; aged 17 – 30, $M = 21.91$, $SD = 2.13$) participated in the study during the first wave of the COVID-19 pandemic. All participants filled out questions on the number of hours per day they spent on preparation and leisure, before and during the pandemic period, subjective satisfaction with the education, feelings of anxiety and lack of control concerning the coronavirus pandemic, perceived risk of coronavirus, and the Positive and negative affect schedule. Subjective satisfaction with education during the pandemic was average ($M = 3.18$, $SD = 1.20$); compared to the pre-pandemic period, pre-service teachers spent a third of an hour more in their free time, but they also spent one more hour preparing for school duties. Moreover, experience of positive emotions decreased ($t = 10.61$; $p < .001$; $d = 0.62$) and experience of negative emotions increased ($t = 6.81$; $p < .001$; $d = 0.39$) during first wave of pandemic. Regarding well-being, the threat of coronavirus, feeling of powerlessness and perceived risk of coronavirus related to negative emotionality; perceived risk of coronavirus was associated with hours spent studying.

Keywords: Pre-Service Teacher, Profession Training, Well-Being

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Introduction

In general, the pandemics affected people and most areas of life. In this context, since the beginning of 2020, the pandemic has stimulated a lot of research into the impact of the disease, quarantine, or pandemic on people's mental health and behavior (in October 2022, Google Scholar offered more than 40,000 links to scientific studies published since 2020 for the keywords "psychological effects" and "COVID"). Even before the COVID-19 pandemic, scientists warned that epidemics and pandemics often leave stronger and longer-lasting psychological than a medical consequence. The fear of the disease is present in more people than they get sick (a review of studies related to the epidemics of Ebola in 2014-15 and SARS in 2003-2004 is given by Taylor, 2019). Moreover, research from previous epidemics shows that global pandemics significantly affect people's mental well-being (Cheng et al., 2004; Sim & Chua, 2004; K. K. Wu et al., 2005; Yan et al., 2004). For example, increased anxiety, fear, or depression were reported during the swine flu and SARS epidemics (Cheng et al., 2004; Kanadiya & Sallar, 2011; Wheaton et al., 2012). Furthermore, some people show symptoms of post-traumatic stress disorder even after the crisis was over (P. Wu et al., 2009).

Similarly, because the COVID-19 pandemic resulted in a specific context worldwide, the pandemic has seriously affected the daily routine of every person, increased the general feeling of uncertainty and fear of illness and death, and the number of stress factors (e.g. (Brooks et al., 2020; Gruber et al., 2020; Mazza et al., 2020; Qiu et al., 2020; Wang et al., 2020). González-Sanguino et al. (2020) found at the beginning of the pandemic that during the first wave of the pandemic in Spain, 20% of people suffered from anxiety, 18% of people had symptoms related to depression, and 16% had symptoms of post-traumatic stress. In addition, women showed more symptoms of anxiety, depression and post-traumatic stress than men. Similar findings were also reached in China (Qiu et al., 2020; Ran et al., 2020; Wang et al., 2020), Germany (Petzold et al., 2020), Italy (Mazza et al., 2020), and Slovakia (Šrol et al., 2021).

During the COVID pandemic, one of the measures was to close schools. Although most countries have switched to online education, the ways to meet specific psychological needs and support the well-being of children and youth have been insufficient (Wang et al., 2020). The closing of schools meant a radical change in the daily routine of entire families. Orgilés et al. (2020) found that 86% of parents noticed changes in their children's emotional state and behavior during the quarantine (problems with attention, boredom, irritability, restlessness, nervousness, feelings of loneliness and worry). A survey (Gdovinová, 2020) among high school students showed that high school students worried about their health or the health of their loved ones, felt more tired and dissatisfied during online lessons, and had poor sleep quality, more frequent headaches and spine problems.

Undergraduates were exposed to similar stressors as children and high school students. Universities were closed, courses moved to the online space, and in-person activities were interrupted. Such conditions led to perceived uncertain professional training, and it resulted in increased stress and negative emotionality: young adults reported more symptoms of depression, anxiety, stress and fear in several countries (e.g. Debowska et al., 2020; Chinna et al., 2021; Lopes & Nihei, 2021; Maia & Dias, 2020; Meda et al., 2021). In other studies, psychological well-being and satisfaction with life were found to protect the undergraduates' mental health (e.g. Bhullar et al., 2014; Li & Hasson, 2020; Machado et al., 2018; Yüksel & Bahadır-Yilmaz, 2019).

In the present study, we focus how undergraduates spend their time (preparation for lessons, free time), what is their satisfaction, feeling of threat, lack of control, perceived risk of COVID-19, and experiencing positive and negative emotions. The aim of the study was to examine teachers' training and the well-being of pre-service teachers during the first lockdown. The changes in learning and leisure time were observed in the context of subjective satisfaction with education and experienced emotions.

Methods

A total of 297 pre-service teachers (80% women) aged 17 – 30 ($M = 21.91$, $SD = 2.13$). Participants were students in pre-gradual teachers' training and were asked to participate through e-mail. The study was conducted during the first wave of the COVID-19 pandemic (spring 2020) through on-line google form. After signing a consent form, all participants filled out questions on the number of hours per day they spent on preparation and leisure, both before and during the pandemic period, subjective satisfaction with the education processes, anxiety concerning the coronavirus pandemic, lack of control concerning the coronavirus pandemic, perceived risk of coronavirus, and the Positive and negative affect schedule. Participation was voluntary and anonymous, and the participants did not receive any reward for their participation. The study was carried out following ethical principles introduced by the American Psychological Association.

Participants answered questions about the amount of free time and estimated the number of hours (per day) they spent on preparation for lessons (0=less than one hour; 5=5 and more hours), both before and during the pandemic period.

Then participants assessed how they were satisfied with the system of distance education, with institutional support from headmasters, founders, and ministry, and their teachers on a 6-point scale (1=completely dissatisfied; 6=completely satisfied; (Ballová Mikušková & Verešová, 2020). The mean was computed for subjective satisfaction with the system of distance education and satisfaction with institutional support. The higher score indicated higher satisfaction and more positive feedback.

Feelings of anxiety and lack of control concerning the coronavirus pandemic were measured by 6 statements reflecting anxiety and 6 statements reflecting the lack of control over lives or health (Šrol et al., 2021) on a 6-point scale (1 = completely disagree; 6 = completely agree). Next, participants rated the overall dangerousness of COVID-19 (3 statements; (Šrol et al., 2021) on a 6-point scale (1 = completely disagree; 6 = completely agree). The mean score was computed for the anxiety, the lack of control concerning the pandemics, and the perceived risk of coronavirus (the higher score indicated more intense feelings).

Finally, the Positive and negative affect schedule (PANAS; (Watson et al., 1988) was used to measure prevailing mood and emotions before and during the coronavirus pandemic on a 6-point scale (1=not at all; 6=very often). The higher score indicated stronger positive/negative emotions.

Results

Descriptive statistics of all variables are presented in Table 1. Subjective satisfaction with education during the pandemic, as well as satisfaction with institutional support, feelings of anxiety concerning the coronavirus pandemic, and lack of control concerning

the coronavirus pandemic were average (mean from 3.18 to 3.66 on 6-points scale). Only perceived risk of coronavirus was stronger ($M = 4.31$, $SD = 0.99$).

Table 1 Descriptive statistics of all variables

	M	SD	minimum	maximum
age	21.91	2.13	17.00	30.00
preparation (before)	2.37	1.21	1.00	5.00
preparation (during)	3.40	1.47	1.00	5.00
free time (before)	3.33	1.39	1.00	5.00
free time (during)	3.66	1.53	1.00	5.00
subjective satisfaction	3.18	1.20	1.00	6.00
satisfaction with institutional support	3.63	1.33	1.00	6.00
feeling of threat	3.27	0.59	1.00	5.00
lack of control	3.22	0.65	1.67	6.00
perceived risk	4.31	0.99	1.00	6.00
positive emotions (before)	3.42	0.71	1.30	5.00
negative emotions (before)	2.10	0.67	1.00	4.20
positive emotions (during)	2.97	0.82	1.00	5.00
negative emotions (during)	2.29	0.74	1.00	5.00

Note: M – mean, SD – standard deviation

The amount of free time and estimated the number of hours spent on preparation for lessons increased during lockdown in comparison to the period before pandemic (for free time: $t = 3.75$; $p < .001$; $d = 0.22$; for preparation: $t = 8.04$; $p < .001$; $d = 0.47$). Similarly, experienced negative emotions increased ($t = 6.81$; $p < .001$; $d = 0.39$) and experienced positive emotions decreased ($t = 10.61$; $p < .001$; $d = 0.62$).

Correlations are presented in Table 2. Age correlated positively with experienced positive emotions and negatively with the amount of free time. There were positive associations among feelings of threat, lack of control concerning the coronavirus pandemic and perceived risk of coronavirus. Not surprising, experienced negative emotions correlated positively with those feelings (and positive emotions related to them negatively).

Conclusion

The main aim of the study was to examine the well-being of pre-service teachers (how undergraduates spent their time, their satisfaction, feeling of threat, lack of control, perceived risk of COVID-19, and experiencing positive and negative emotions) during the first lockdown (COVID-19 pandemic).

Table 2 Correlation of well-being variables and teachers' training variables
(only during pandemics)

	1.	2.	3.	4.	5.	6.	7.
1. age	—						
2. preparation	-.09	—					
3. free time	-.17**	-.44***	—				
4. feeling of threat	.04	.08	-.05	—			
5. lack of control	.02	.06	.01	.37***	—		
6. perceived risk	.03	.19***	-.01	.31***	.29***	—	
7. positive emotions	.19**	.00	.05	-.11	-.09	-.05	—
8. negative emotions	.00	.11	-.13*	.23***	.31***	.23***	-.19***

Note: * $p < .050$; ** $p < .010$; *** $p < .001$

As expected, pre-service teachers had more free time. It was not surprising: due to closed schools, limited social contacts and the possibility of temporary work, students had more free time. On the other side, students spent more time by preparing for school duties than in the pre-pandemic period. This finding is consistent with Capinding's study (2021); she found out that students spent 0.6 more hours studying during pandemic then before pandemic. In other study, Bongale et al. (2021) revealed an increase in students who studied for more than 4 hours and more than 7 hours compared to the period before the pandemic.

Next, positive emotions decreased, and negative emotions of undergraduates increased during the first wave of the COVID-19 pandemic. Although symptoms of anxiety, depression, or stress were not directly measured, present findings are consistent with other research (Brooks et al., 2020; González-Sanguino et al., 2020; Gruber et al., 2020; Mazza et al., 2020; Orgilés et al., 2020; Petzold et al., 2020; Qiu et al., 2020; Šrol et al., 2021; Wang et al., 2020) that had revealed an increase in the negative emotionality. Addressing the increasing tendency of negative emotions is necessary because negative emotions have an impact on motivation, achievement goals, performance, effort, learning, cognitive processes, self-regulation, and self-efficacy (for review, see Rowe & Fitness, 2018).

To sum up, the proven relationship between weak well-being (the threat of coronavirus, feeling of powerlessness and perceived risk of coronavirus) and negative emotionality is not surprising and should be a reminder to take care of students' psychological hygiene. Research revealed that challenging situations such as the COVID-19 pandemic disturb their well-being.

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Tunisian EFL Students' Awareness and Use of Metacognitive Strategies in Academic Reading

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Abstract

The purpose of the present study was to investigate the metacognitive reading strategy awareness and use of second language learners majoring in English in a Tunisian university. For this purpose, a sample of 113 Tunisian tertiary education students volunteered to answer an online survey based on a modified version of the MARSI inventory (Mokhtari et al., 2018). Additionally, four students were interviewed as a follow-up for a better understanding of their awareness and use of metacognitive strategies when reading academic materials, specifically in linguistics, culture studies, and literature. The modified MARSI version assesses three categories of strategies: (1) Global Reading Strategies, (2) Problem-Solving Strategies, and (3) Support Reading Strategies. The quantitative data analysis included both descriptive statistics and correlations between three factors via SPSS 23. The findings revealed moderate to strong correlations between (1) global reading and problem-solving strategies, (2) global reading and support reading strategies, and (3) problem-solving strategies and support reading strategies. Besides, the analysis showed a mismatch between the learners' reported high strategy use and good reading ability on the one hand and a predominantly low level of metacognitive strategy awareness on the other.

Keywords: Metacognitive Strategies, Academic Reading, Strategy Awareness, Strategy Use, MARSI

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INTRODUCTION

Reading is generally considered a purposeful and interactive process (Alderson, 2000; Carr, 2006; Grabe, 2002) during which a reader builds meaning through “visually encoded linguistic information” (Koda, 2013, p. 1). Empirical research has shown that reading involves the three processes of (a) decoding, (b) text-information building, and (c) reader-model construction. There is a consensus that fluent readers are engaged in a “rapid,” “interactive,” and “purposeful” process marked by “processing efficiency,” “strategic processing,” and “sufficient knowledge of language” (Grabe, 2000, p. 229). Additionally, readers should be able to engage in a higher and lower-level processing of the text at hand (Alderson, 2000; Grabe, 2000; Koda, 2005, 2013). Similarly, Carr (2006), Dabarera et al. (2014) and Teng (2019) contend that reading is a complex skill where a variety of elements come into play. It can be quite challenging for language learners to develop or use the reading skills that are needed in an academic context.

Empirical research has attended to the question of strategies and their importance to reading proficiency (Olson & Gee, 1991). It has outlined the different types of strategies students employ, how they do so, and under which contexts. This line of research has revealed that the use of different reading processes including metacognitive strategies and awareness boost readers’ comprehension. Despite the importance of metacognition to reading proficiency (Anderson, 2002; Kamil et al., 2010; Mokhtari & Sheorey, 2002; Mokhtari et al., 2008) little is known about L2 students’ awareness and use of metacognitive strategies in academic reading contexts. Research has confirmed the possibility of assessing learners’ “metacognitive awareness or perceived use of reading strategies when reading texts for academic purposes” (Mokhtari et al., 2018, p.222).

Doing research on metacognitive processing skills and strategies could be useful in many ways. It can provide insights on the design of learning to read and reading assessment activities, and tests (Mokhtari et al., 2018). The research outcomes in this area would contribute to the development of curricula philosophies for learners’ learning to read consciously and with a good command of reading strategies for academic purposes.

The purpose of this study was to explore English as a Foreign Language (EFL) higher education students’ awareness and use of metacognitive strategies in academic reading. It was expected that Tunisian students majoring in English would have a moderate to high level of metacognitive strategy awareness in academic reading. Presumably, these learners would have developed the necessary strategic competence allowing them to cope with academic reading demands. It was also expected that there would be an alignment between their degree of awareness and their strategy use.

LITERATURE REVIEW

Research into strategic reading in L2 contexts has received growing attention (e.g. Alami, 2016; Dallagi, 2021; Li & Wang, 2010; Teng, 2019). This line of research has witnessed a focal shift in the last four decades or so to broaden the reading-related research agenda (Kamil et al., 2010). It has relied on different instruments to elicit readers’ strategy use during or retrospectively to reading leading to several models of strategy use (Mokhtari et al., 2008; Phakiti, 2003). Reading research has also covered intervention studies to examine the effect of strategy training on reading proficiency and its benefits to reading development (Anderson, 2005; Nunan, 2002; Plonsky, 2011). Interestingly, most researchers (Grabe, 2002;

Mokhtari et al., 2018) have emphasized the central role of awareness of cognitive processes in comprehension. This awareness about one's thinking process is referred to in the literature as metacognition (Flavell, 1979). Kuhn and Dean (2004) define this concept as the "awareness and management of one's own thought" (p. 270). In a similar vein, Martinez (2006) describes it as "the monitoring and control of thought" (p. 696). Doing research on metacognitive strategies could be useful in many ways as strategic readers will have greater control over their reading processes and are better self-regulators. Research findings could inform both reading instruction and assessment (Mokhtari et al., 2018) through the development of philosophies underlying curricula aiming at improving learners' learning to read consciously and with a good command of reading strategies for academic purposes.

Various cognitive activities related to L2 learning depend on metacognition, which is defined as thinking about thinking (Flavell, 1979; Zhang, 2018). Metacognition or "thinking about thinking" (Anderson, 2002) denotes "one's understanding of any cognitive process," including the learners' "knowledge of strategies" and "control" over their learning process (Carrell et al., 1989: 650). The distinction drawn between these two aspects of metacognition is of utmost importance. Readers' metacognitive strategy use is also said to be dependent on their knowledge of such strategies that facilitate reading comprehension (Soodla et al., 2016; Zhang, 2018). Research has revealed that students with greater awareness of their cognitive processes during the reading process will have greater control over these processes and will be better self-regulators. Strategy research (e.g. Dallagi, 2021; Oxford, 1989; Oxford and Nyikos, 1989) has equally examined the different variables having considerable influence on learning strategies. Such variables include the language being learned, language proficiency, degree of metacognitive awareness, gender, attitudes and motivation. While studies by Oda and Abdul-Khadim (2017), and Rachmajanti and Musthofiyah (2017) have examined the gender variable confirming the significant role it plays in reading comprehension, other findings (e.g. Abu-Snoubat, 2017; Zhang, 2018) showed no difference between female and male students.

Mokhtari et al.'s (2018) MARSIR has been widely used in the literature as a framework in the investigation of learners' metacognitive awareness. This revisited Metacognitive Awareness of Reading Strategies Inventory, initially MARSIR (2002), was developed using factor analysis of the 30 items to produce the 15 MARSIR version with similar reliability and validity (Mokhtari et al., 2018). As displayed in Table 1, this revised version classifies the reading techniques into three major groups: Global Reading Strategies (GLS), Problem-Solving Strategies (PSS), and Support Reading Strategies (SRS).

Table 1: Different reading strategies

Label	Items
Global Reading Strategies	<ol style="list-style-type: none"> 1. Having a purpose in mind when I read 2. Previewing the text to see what it is about before reading it 3. Checking to see if the content of the text fits my purpose for reading 4. Using typographical aids like boldface and italics to pick out key information 5. Critically analyzing and evaluating the information read

Support	1. Taking notes while reading
Reading	2. Reading aloud to help me understand what I'm reading
Strategies	3. Discussing what I read with others to check my understanding
	4. Underlining or circling important information in the text
	5. Using reference materials such as dictionaries to support my reading
Problem	1. Getting back on track when getting side tracked or distracted
Solving	2. Adjusting my reading pace or speed based on what I'm reading
Strategies	3. Stopping from time to time to think about what I'm reading
	4. Re-reading to make sure I understand what I'm reading
	5. Guessing the meaning of unknown words or phrases

15

Overall

Research available to date on this question is still limited in the local context. In a study of Tunisian novice researchers and their difficulties with reading in English, Smaoui and Essefi (2015) assert that “the traditional methods are still in use during the secondary and tertiary levels” (p. 25). Dallagi (2021) studied Tunisian tertiary level students’ choice and frequency of reading strategies relying on Mokhtari and Sheorey’ (2002) reading strategies taxonomy. One of the key findings of relevance to the current study is that EFL learners do not differ much from each other in terms of their strategy use when reading in English even though they were found to be less comfortable with metacognitive strategies like GLOB and SUP compared to cognitive strategies. Another study by Ben Hedia (2020) revealed that Tunisian students’ insufficient metacognitive knowledge was partly behind their low writing ability in the target language. More research certainly needs to determine EFL learners’ metacognitive strategies awareness and use in a fundamental academic skill like reading. However, little is known about EFL students’ awareness and use of metacognitive strategies in academic reading in this educational context. Besides, teachers in this academic setting often complain about their students’ limited academic literacy skills.

RESEARCH QUESTIONS

1. To what extent are Tunisian EFL students aware of their metacognitive strategies in academic reading?
2. What are the metacognitive strategies that EFL students report using?
3. What is the relationship between the reading strategy categories?

The following section describes the methodology followed.

METHODOLOGY

Participants

The study was based on data from 113 tertiary level participants who were students majoring in English in different institutions belonging to the University of Tunis, Tunisia. These participants volunteered to take part in this study by signing a consent form. Female students represented about 78% and the majority (81.6%) were aged between 18 and 23 while more than half were third year students.

Materials

The participants were asked to answer an online questionnaire to report about their awareness of metacognitive strategies and use in academic reading. The researchers used an adapted version of the revised MARSI-R (Mokhtari et al., 2018) inventory that comprised 15 initial items. The questionnaire is divided into three parts with the first one collecting demographic data including the students' academic level, institution, gender and full name to be used in a follow up study. The participants also provided their age and their self-rated description of their profiles as readers using a four-point scale ranging from poor to excellent. The second part provided the respondents with 15 strategy statements to determine their level of awareness of each strategy using a five-point scale. The participants had to choose the options (1) I have **never heard** of this strategy before; (2) I have **heard** of this strategy, but I **don't know** what it means; (3) I have **heard** of this strategy, and I **think I know** what it means; (4) I **know** this strategy, and I **can explain** how and when to use it; and (5) I know this strategy quite well, and I often use it when I read. In the third part, the students rated the same list of strategies relying on a frequency scale ranging from never to always. The researchers used the same taxonomy to elicit information about the students' strategy use in academic reading.

Procedure

The first step in the study involved a convenience non-probability sampling technique after which an online version of a Google Form questionnaire was emailed to the students majoring in English at this university. To identify the level of strategy awareness based on the self-reported descriptions according to the pre-set scale, the researchers categorized the results according to Mokhtari et al.'s (2018) three codes described in the table below. These categories also served to interpret the results from the descriptive statistical analyses.

Table 2: Guide for the interpretation of scores on the MARSI-R instrument
(Mokhtari et al., 2018)

Scores	Interpretation
3.5 or higher	High level of awareness
2.5-3.4	Medium level of awareness
2.4 and lower	Low level of awareness

The researchers equally used a semi-structured interview in English with four students from the target sample to explain the questionnaire results. They developed well-defined questions while prompting the interviewees to talk about their reading processes. This instrument comprised five main questions derived from on the inventory. The researchers transcribed the recorded interviews which were coded according to pre-established themes derived from the study framework. These themes included the students' awareness and use of metacognitive strategies during academic reading.

Prior to any statistical analysis, different tests for various assumptions were checked to ensure that the data were adequate for inferential statistical analyses. As the data were deemed to meet the assumptions that the model must satisfy, meaningful conclusions about the population could be obtained from the sample. Hence, Pearson Product-Moment Correlations were computed. The inventory reliability was checked for internal consistency by computing Cronbach's alpha (α) coefficients. Generally, $\alpha \geq 0.7$ is considered as satisfactory. Table 3 displays the different factors, their internal reliability and their KMO.

Table 3: Different factors, their internal reliability and their KMO

Label	Items	Cronbach's Alpha	KMO
Global Reading Strategies	- Having a purpose in mind when I read	.726	.871
	- Previewing the text to see what it is about before reading it		
	- Checking to see if the content of the text fits my purpose for reading		
	- Using typographical aids like boldface and italics to pick out key information		
	- Critically analyzing and evaluating the information read		
Support Reading Strategies	- Taking notes while reading	.731	
	- Reading aloud to help me understand what I'm reading		
	- Discussing what I read with others to check my understanding		
	- Underlining or circling important information in the text		
	- Using reference materials such as dictionaries to support my reading		
Problem Solving Strategies	- Getting back on track when getting side-tracked or distracted	.784	
	- Adjusting my reading pace or speed based on what I'm reading		
	- Stopping from time to time to think about what I'm reading		
	- Re-reading to make sure I understand what I'm reading		
	- Guessing the meaning of unknown words or phrases		
Overall		.878	

The results are summarized in the following section.

RESULTS

Regarding the first research question on the extent to which Tunisian EFL students are aware of their metacognitive strategies in academic reading, after the calculation of the means on the basis of the MARSIR inventory interpretation guide (see Table 2 above), it was first deemed important to report the overall metacognitive strategy awareness across all levels (Figure 1). We can clearly see that about two thirds of the students had a low level of awareness that was below 2.5.

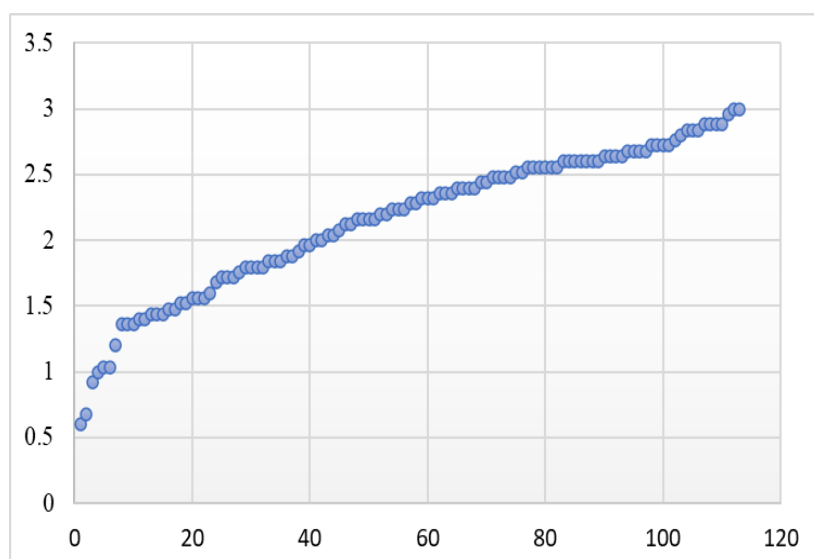


Figure 1: Scatter plot of means of metacognitive strategy awareness across all levels

For the second research question on the metacognitive strategies that these EFL students reported using, the results are displayed in Figure 2. It describes their GRS use with more than half of these students (24.8% always and 29.2% often) reported having a purpose in mind when reading. More than half of them were also found to be frequent users of “previewing the text” to see what it is about before reading it (28.3% always and 30.1% often). Similarly, for the third global reading strategy of checking if the content of the text fits their purpose for reading, only half of these students (31% always and 21.2% often) deployed it. However, less students (31% never and 20.4% rarely) use typographical aids like boldface and italics to pick out key information when reading. Finally, we can see that less than half of these students (18.6% always and 21.2% often) reported critically analyzing and evaluating the information read when reading for academic purposes.

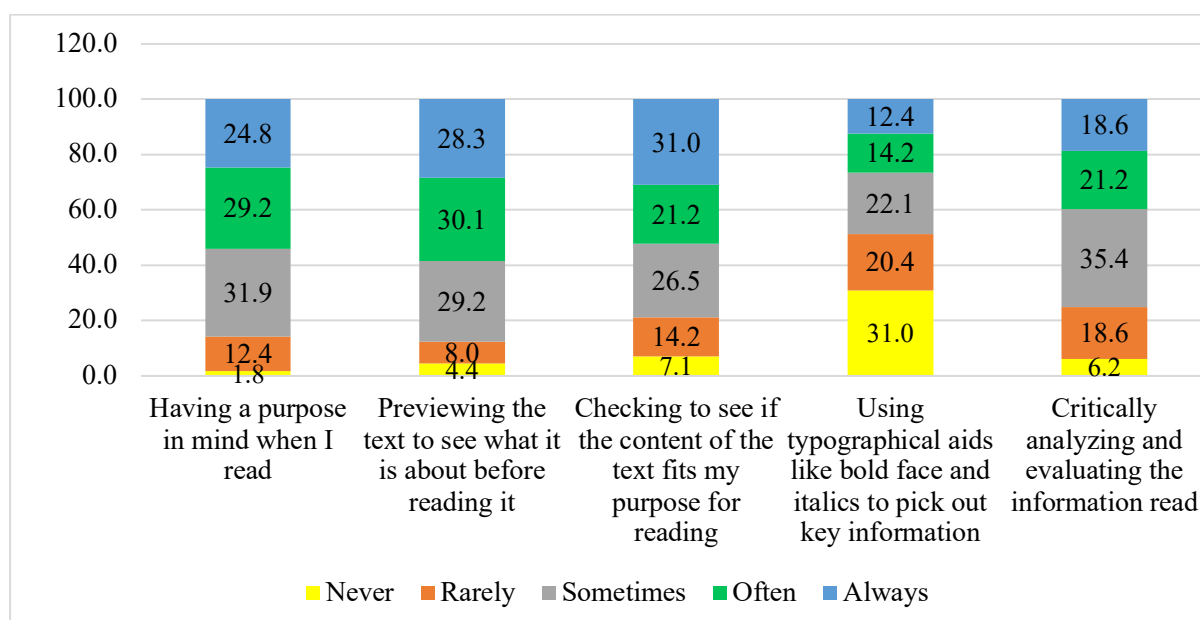


Figure 2: Percentages of global reading strategies (GRS) use

As displayed in Figure 3 and with regard to SRS, the participants reported the most frequently strategy use was underlining or circling important information in the text always

(41.6% always and 24.8% often). Equally important to the students in terms of use (25.7% always and 31% often) was the strategy of taking notes while reading as a support strategy for their reading process. While about one third (38.9% sometimes) use reference materials such as dictionaries to support their reading, they rely on discussing what they read with others to check their understanding less often (37.2% sometimes).

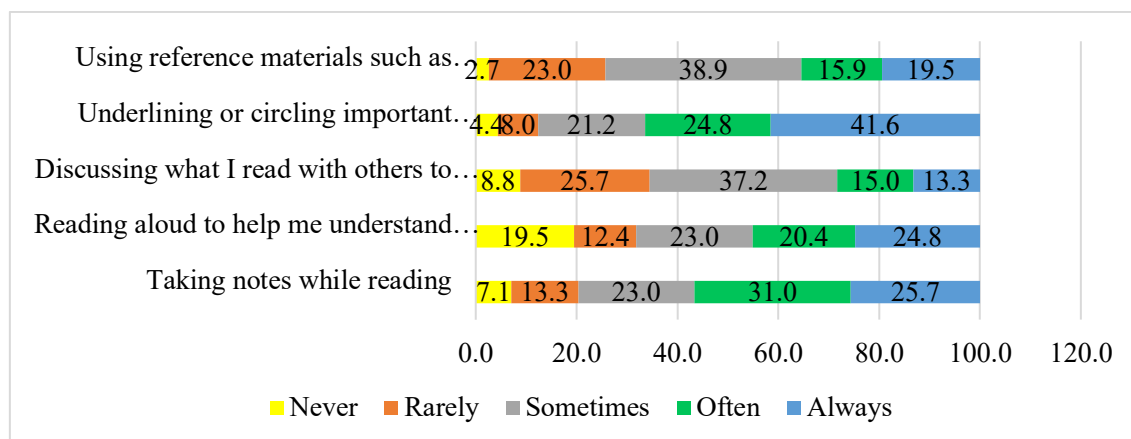


Figure 3: Percentages of Support Reading Strategies (SRS) use

Regarding the third strategy category (PSS), the participants reported being more frequent users of all five problem solving strategy types as displayed in Figure 4. In terms of re-reading to make sure they understand what they are reading, two thirds (46.9% always and 28.3% often) rely on this strategy. About 66% (28.3% often and 37.2% always) depend on guessing the meaning of unknown words or phrases when reading academic texts. Around 60 % of these students frequently (31.9 % always and 29.2% often) get back on track when they get side-tracked or distracted during the reading process. About half of these readers (29.2% always and 24.8% often) stated that they adjust their reading pace or speed depending on the nature of the text. While 24.8% always, 26.5% often stop from time to time to think about the reading process. This indicates that only half of them use this strategy frequently.

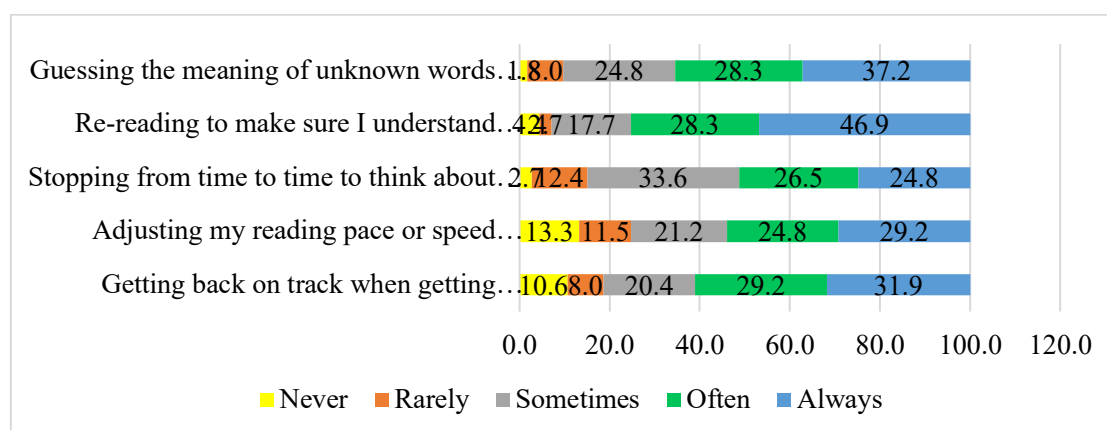


Figure 4: Percentages of problem-solving strategies (PSS) use

Table 4 displays the study participants' reported reading ability. As we can see 51.3% consider themselves as good readers while 38.1% rather average readers.

Table 4: Reported Reading Ability

	Frequency	Percent
Poor Reader	4	3.5
Average Reader	43	38.1
Good Reader	58	51.3
Excellent Reader	8	7.1

The qualitative analysis of the semi-structured interviews yielded interesting results providing better insights into the meaning of the descriptive statistical results reported above. As can be seen from Table 5, only one interviewee (Sofia, a female participant) seemed to be aware of the importance of GRS as a metacognitive strategy. This third-year student reported that she generally overviews the text topic by previewing its content (GRS 2) to facilitate her understanding of the text topic. For the second category of problem-solving strategies, only two male second-year students indicated relying essentially on PSS 4. As a matter of fact, Aly (a male student) referred to his use of “repeating the sentences to have a better” understanding (PSS 4) as he stops and reads the sentence again for better understanding. His statements reflected quite a good level of awareness of the importance of this specific metacognitive strategy. He states that “the first time won't be that good. the second time of course is going to be better when it comes to the third time there is fluency” (Aly, male). This indicates the student's awareness of the GRS of re-reading for better understanding. However, only one male student (Leo) reported the support reading strategy of “check[ing] with others to see if there's a similar understanding to the text”. The student explained that he simply asked his colleagues about their points of views “about specific parts” to check any differences, then discussed such ideas with them “to check understanding” (SRS 3). The four interviewees' responses were generally indicative of a partial awareness of metacognitive reading strategies that they might be using in academic reading confirming the questionnaire results. In terms of metacognitive strategy use, we can clearly see that it is quite limited for the four participants.

Table 5: Reported Reading Ability

Strategy category	
GRS	First, I usually skim the text from beginning to end. I overview the topic (<u>GRS 2: previewing text</u>) so that I can put myself in the mental state in relation with the text topic Skimming, scanning and detailed reading (Sofia, female) <u>GRS 2: previewing text</u>
PSS	By focusing, reading behind the lines and sometimes repeating the sentences to have a better view (Aly, male) (PSS 4) to be honest sometimes words like I don't know I stop there and read the sentence again just to make sure that... that I understand the context if you are going to always read when you encounter a text, the first time won't be that good. the second time of course is going to be better when it comes to the third time there is fluency (<u>PSS 4: Re-reading to help ensure I understand what I'm reading</u>) (Aly, male) then I re-read the entire text (<u>PSS 4: Re-reading to help ensure I understand what I'm reading</u>) I underline every difficult word. I usually ignore some of them then go back to some of them only just to complete the meaning. They are like puzzles. (Leo, male)
SRS	I do check with others to see if there's a similar understanding to the text I just

	ask for the point of view of my colleagues about specific parts and if there are differences I try to discuss. The most logical answer to me is the most accurate one (SRS 3, discussing what is read with others to check understanding) (Leo, male)
GRS	First, I usually skim the text from beginning to end. I overview the topic (<u>GRS 2</u> : previewing text) so that I can put myself in the mental state in relation with the text topic Skimming, scanning and detailed reading (Sofia, female) <u>GRS 2</u> : previewing text

To answer the third research question, Pearson correlation coefficients between the three metacognitive strategy categories were calculated. Table 6 clearly shows that there is a moderate (.456**) correlation between GRS and SRS, and SRS and PSS (.589**) and a strong correlation (.641**) between GRS and PSS.

Table 6: Correlations between different Metacognitive Strategy Factors

	GRS	SRS	PSS
GRS	1		
SRS	.456**	1	
PSS	.641**	.589**	1

CONCLUSION AND DISCUSSION

The study findings have first revealed these EFL students' low metacognitive strategy awareness and use in academic reading regardless of their academic levels. A mismatch was found between the reported high strategy use and good reading ability, on the one hand, and a predominantly low level of metacognitive strategy awareness on the other hand. At the same time, what was found to be problematic in this specific context is the gap between the expected level of metacognitive strategy awareness and their low to moderate one as reported by the participants. This confirms earlier research findings in the same educational context (Ben Hedia, 2020). Despite the description of their reading ability as average to good, these readers displayed insufficient metacognitive strategy awareness that could be behind their low metacognitive strategy use. This also confirms earlier findings about low reading proficiency in this academic context (Smaoui & Essefi, 2015). These results have implications for reading instruction to EFL students in Tunisia and other similar contexts. One of the pedagogical recommendations on the basis of these findings is the development of L2 readers' knowledge of cognitive processes. This in itself could favour skilled and fluent academic reading. Incorporating metacognitive prompts into process-based teaching is one strategy to develop reading cognitively. L2 learners can use self-regulated reading strategies to plan, integrate, monitor, and control their own reading processes, with the aid of metacognitive instruction, which is a worthwhile attempt to enhance current reading pedagogy. One of the limitations of this study was the absence of reading proficiency measurement with a test. Future research could compare reading test scores to strategy awareness and use.

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Evaluation of Secondary School EFL Textbook Used in Public Schools: A Case of Oman

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Abstract

Textbooks are undoubtedly the most important components of English language classrooms and fulfill a range of needs in terms of language acquisition. Considering their pivotal role in language learning, their routine evaluation is essential to confirm whether they are instrumental in achieving the desired outcomes or not. This study evaluated the secondary school grade 11 and 12 English language textbooks, 'Engage with English' (EWE), used in the Omani public schools using a mixed-methods approach. Sixty-one high school teachers evaluated the textbook using the adapted version of Cunningsworth's (1995) textbook evaluation checklist which comprises 38 items with the core areas including alignment with the curricular aims, design, organization, content, themes, methodology, and teacher's book. To get deeper insights, semi-structured interviews were also conducted with eight high school teachers and two staff members of the Directorate of Curriculum Evaluation, Ministry of Education, Oman. The student perceptions (n=100) were gathered using a short survey questionnaire. Quantitative data were analyzed using Smart PLS- Structural Equation Modeling while qualitative data were categorized and analyzed thematically. The findings indicate overall positive results in most of the areas assessed, however, there is scope for further improvement in developing writing skills, pronunciation practice, appropriate vocabulary, critical thinking skills, and study skills. The study has pedagogical implications for curriculum designers, researchers, teachers, and students.

Keywords: Checklist, Evaluation, Textbook, Oman

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Introduction

Textbooks (TBs) have been defined as tools of prominence and vital agents of teaching and learning in English Language Teaching (ELT) (Pasaribu, 2022) as they are the main sources of classroom learning materials, ideas, and activities (Cabrera, 2014; Shahid, Qasim, & Iqbal, 2021), save instructors' time and enhance the impact of teaching by providing teachers with materials that are professionally created and validated (Lei & Soontornwipast, 2020). TBs act as guides to the teachers in delivering the curriculum (Ayu & Indrawati, 2019) and "create scaffolding upon which teachers can build new communicative situations" (Cabrera, 2014, p.267). Cabrera (2014) further emphasizes that the importance of TBs cannot be ignored, more precisely, due to the movement to make students the center of language instruction. They are an effective resource for self-directed learning for students where they can find activities aligned with the curricular goals (Cunningsworth, 1995). Moreover, they are a vital resource for less experienced teachers who are yet to gain confidence. Abdelrahman (2014) states that TB is one of the three main elements of classroom teaching, where the other two are students and teachers.

The significance of textbook evaluation has been underlined by many researchers and educators (for example, Mohammadi & Hashemi, 2022; Riazi & Mosalanejad, 2010; Brown, 1995; Cunningsworth, 1995; Hutchinson & Torres, 1994). TB evaluation is considered a powerful tool of quality assurance that paves way for the improvement of learning opportunities (Abdel Wahab, 2013; Kiely, 2009; Antic, Ivic, & Pešikan, 2013). It is a dynamic process that examines different aspects of TB to improve its quality which allows "ongoing improvement of learning opportunities" (p. 100). It "involves measuring the potential value of a set of learning materials by making judgments about the effect of the materials on the people using them" (Tomlinson & Masuhara, 2004).

According to Al Mahrooqi, Denman, and Al Mamari (2016), both pre and post-use evaluations are beneficial and must be taken whenever it is possible. This will help TB developers to avoid the negative effects of using inappropriate TBs which may hinder the achievement of curricular goals and learning outcomes. They further mention that students and teachers have a better insight into the relevance of tasks and activities in a textbook and their suitability to the learners' cognitive and emotional levels. "In this way, they are also often in the best position to judge how curriculum goals and outcomes are addressed by textbooks, and what gaps, if any, exist that may threaten curriculum cohesion" (p.3). Considering their pivotal role in language learning, evaluation of TBs is necessary to confirm whether they are instrumental in achieving the desired outcomes or not (Mohammadi & Hashemi, 2022; Mosalanejad, 2010). Despite the significance post-use TB evaluation entails (Tomlinson 2003; Tomlinson & Masuhara, 2004), there is a distinct lack of relevant empirical studies on post-use evaluation of TBs (Mukundan & Ahour, 2010). Moreover, it is noted that most of the studies have relied on teacher evaluation of TBs with very few considering student perceptions (such as Pasaribu, 2022; Mohammadi, & Abdi, 2014; Susiati & Mufidati, 2020, Rezaee & Hashemi, 2017). Student voice in TB evaluation is equally important. "Advocates for student voice in higher education believe students should have the right and power to engage in much of the decision-making traditionally dominated by instructors or administrators" (Woodward et al., 2014). This study shall consider the voice of teachers as well as students in TB evaluation.

The remainder of the paper is organized into the following sections: the importance of TB Evaluation; theories and frameworks used for TB evaluation, TB evaluation in Oman; methodology; main findings; discussion of findings; and conclusion along with study limitations and pedagogical implications.

Textbook Evaluation Frameworks

Riazi and Mosalanejad (2010) cited from Ellis (1997) mention the three stages at which the evaluation may occur. These are *Predictive evaluation* – which determines the future potential of a TB, *In-use evaluation* – which examines material that is actively being used in institutions, and *Retrospective evaluation* – evaluating the material after it has been used at a particular institution.

In terms of methods of TB evaluation, three basic methods have been found in the literature. They are, as McGrath (2002) explains, the impressionistic, the checklist, and the in-depth method. The impressionistic method refers to the evaluation of a TB based on a general impression. It is also referred to as the implicit or fuzzy model, which is based on impressions or teacher insights (Mukundan, 2007). The in-depth method is used when a particular element within the textbook, like chapters, units or exercises are carefully examined (Husen, Robiasih, & Ghozali, 2020). The impressionistic method is effective if it is conducted by expert teachers (Mukundan, 2007). Therefore, the impressionistic method by itself is not sufficient “but [it] could be combined with for example the second method, which is ... the checklist method” (Abdel Wahab, 2013, p. 56), which Mukundan (2007) refers to as the explicit method. Most researchers of the TB evaluation have used checklists, “based on supposedly generalizable criteria” (Hashemi & Borhani, 2015, p. 48). Mukundan, Hajimohammadi, and Nimehchisalem (2011) define evaluation checklists as instruments that provide the features of useful and successful teaching materials. Moreover, checklists facilitate researchers to record and conduct a comparative analysis of data, as they offer a common framework for decision-making (Al Harbi, 2015).

Since the 1970s, there has been a movement to make learners the center of language instruction and it is worthwhile to view TBs as resources for achieving the objectives that are set according to learner needs. Therefore, every effort should be made to establish and apply relevant and contextually appropriate criteria for the evaluation of TBs (Cunningsworth, 1995). Many useful approaches and checklists for evaluation criteria have been developed over the years (such as Daoud & Celce-Murcia, 1979; Ellis, 1997; McDonough & Shaw, 1998; McGrath, 2002; Mukundan et al., 2011; Cunningsworth, 1995; Sheldon, 1988; Tomlinson, 2003). All of these have their own focused and prioritized areas that provide the criteria for in-depth and comprehensive evaluation of TBs used in their contexts. Some researchers (such as Laabidi & Nfissi, 2016) developed their research questionnaires using criteria from various other checklists. Yulina (2021) conducted the textbook analysis on the basis of second language acquisition principles using a slightly modified version of Littlejohn’s (2011) three-level framework for the analysis and evaluation of language teaching materials. Thus, there have been numerous checklists and criteria developed across the globe because teachers believe that the evaluative criteria need to be contextualized based on the requirements of the learning and teaching situations. However, many of the checklists used were not validated (Roberts et al., 2022). According to Mukundan (2007), “The desire for local considerations in

checklist criteria led to institutions around the world developing their own instruments and this in turn led to a proliferation of checklists. Most of these instruments are neither tested for reliability nor validity” (p.81). This paper shall be employing a systematic checklist method using the adapted version of Cunningsworth’s (1995) checklist to obtain teacher perceptions.

Textbook Evaluation in Oman

English language textbooks for public schools are designed by the *Textbook Production and Education Technologies Centre* of the Ministry of Education (MoE), Oman. ‘English for Me’ is used for Cycles 1 (grades 1–4) and 2 (grades 5–10), and ‘Engage with English’ (EWE) for Cycle 3 (grades 11 and 12). (Al Mahrooqi, Denman, & Al Mamari, 2016). British commercial writers were recruited to write the TBs for Cycles one and two while Omani authors developed Cycle 3 books (Al-Issa & Al-Balushi, 2012, 154). The pre-use evaluation was conducted by Omani officials from the English Language Curriculum Department who checked the content of all the TBs before their introduction into the curriculum. As part of the post-use evaluation process, regional supervisors and teacher trainers were offered an orientation program by the MoE in which they identified teacher weaknesses and requirements that should be considered during the TB revision stage (Al-Issa & Al-Balushi, 2012).

Despite the efforts made by the MoE, the existing evaluation of TBs is rather limited in Oman. Al Jardani (2012) discussed curriculum evaluation in Oman but did not focus on TB evaluation, in particular. However, he indicated the portending danger of existing textbooks being discarded or an obscure curriculum developing with teaching and learning continuing to take place in the manner that existed before curriculum reform. He also mentioned the establishment of the Department of Curriculum Evaluation in 2005 to address this concern (Al Mahrooqi, Denman, & Al Mamari, 2016).

Alimi (2006), Humaidi (2014), and Al Harrasi (2012) evaluated ‘English for Me’ which is used from grades one to ten. Alimi (2006), primarily focused on the use of the potential practicality of Sheldon’s (1988) evaluation checklist for curriculum evaluation in Oman, and Harrasi (2012) explored the use of stories as teaching aids in TBs. Al Mahrooqi, Al Mamari, and Denman (2019) used a corpus-based approach to evaluate the representation of prepositions in school TBs from Grades 1-4. None of these studies comprised the evaluation of EWE.

Al Mahrooqi, Denman, and Al Mamari (2015) evaluated all the English TBs used in public schools from grades 1 to 12 using a 15-item checklist comprising themes such as authenticity of reading texts, affective and cognitive engagement, level of challenge, the scaffolding of higher order thinking skills, use of communicative methodology and physical aids. The TBs were evaluated by two English language teaching (ELT) experts from a public university in Oman who confirmed that the TBs are positive in terms of visual elements, instructions for learners, and topics covered. However, the authenticity of texts and the design of tasks in terms of developing higher-order thinking skills and autonomy among learners was questionable. Al Mahrooqi, Denman, and Al Mamari (2016) used a sixty-nine-item, fourteen-category evaluation checklist to evaluate TBs by public school teachers and supervisors.

Most of the categories such as curriculum coherence, physical attributes, and availability of supplementary materials, received positive responses while the design of writing and pronunciation tasks received negative responses. The authors recommended the revision of existing TBs for improving the quality of English language teaching and learning in Oman. In another study Al Mahrooqi, Al Mamari and Denman (2016) employed a corpus-based approach to identify the probable issues around vocabulary teaching, specifically vocabulary load and lexical knowledge of students in Omani English TBs.

Although the three studies mentioned in the above paragraph are the only ones that considered the evaluation of EWE, these studies evaluated the entire spectrum of English TBs used in public schools and thus the focus was fairly broader. Additionally, the gender imbalance in Al Mahrooqi, Denman, and Al Mamari's (2016) study sample, with 98 females and only four male participants being a part of the evaluation process, could have affected the results. The checklist evaluation conducted in Al Mahrooqi (2015) was performed by only two ELT experts and neither of them worked in public schools in Oman, therefore, an insider's perspective was not considered. Besides, their study did not take into account student perceptions. Hence, a comprehensive triangulated evaluation of secondary school TBs including perspectives of teachers, students, and curriculum designers is the need of the hour. Findings from the present study will hopefully play a significant role in terms of informing changes and improvements that need to be made to ensure the upskilling of the secondary school TBs used in Omani public schools which will eventually result in strengthening the English language proficiency of students.

Methodology

A retrospective, post-use evaluation of EWE used in Omani public secondary schools was conducted from the teachers' and students' lenses using a mixed-method approach. Quantitative data were collected using a TB evaluation checklist for teachers and a student survey. Qualitative data were collected using teachers' and curriculum officers' interviews and a student focus group discussion (FGD).

Sample

A convenience sample comprising 63 secondary school teachers from Omani public schools evaluated EWE using a checklist.

Gender		Qualifications		Nationality	
Males	44%	BA	79.4%	Omani	74.6%
Females	56%	MA	17.5%	Egyptians	15.9%
		PhD	3.1%	Tunisians	6.4%
				Sudanese	1.6%
				Indians	1.6%

Table 1 Teacher Participants

As for the student survey, 101 respondents) from four schools (two male schools and two female schools), mainly from Muscat and South Al Batinah governorates, responded to the survey.

Gender		Governorate (Region)		Nationality	
Males	29%	Muscat	63.4%	Omani	95%
Females	71%	South Al Batinah	28.7%	Egyptians	5%
		Other	7.9%	Tunisians	
				Lebanese	
				Yemenis	

Table 2 Student Participants

Interviews were conducted with secondary school teachers (4 males and 4 females) from eight schools in Muscat and South Al Batinah regions and two staff members from the Directorate of Curriculum evaluation, MoE. FGD was held with a group of eight secondary school female students, however, its results are not included here due to the paucity of space.

Instruments

Checklist

The original version of Cunningsworth's (1995) TB evaluation checklist, which included eight categories comprising a) Aims and approaches, b) Design and organization, c) Language content, d) Skills, and e) Topic, f) Methodology, g) Teachers' book, and h) practical considerations, was modified by deleting and adding a few items to get teachers' feedback on the EWE. The final checklist (refer to Appendix A) used in this study comprised 38 items with the core areas including the following seven categories:

- a) Aims- 3 items
- b) Design and organization- 8 items
- c) Language content- 5 items
- d) Skills- 7 items
- e) Topics- 5 items
- f) Methodology- 6 items
- g) Teachers' book- 4 items

The main categories more or less were the same, as Cunningsworth's (1995), except for the removal of the last category on practical considerations regarding pricing and availability since TBs in Omani public schools are supplied by the MoE free of cost. A few other changes in sub-items under other categories were also made. A few items were merged, a few were revised, and some were deleted. A five-point Likert scale of agreement was used with the responses including 1 – Strongly Disagree; 2 - Disagree; 3 - Neutral 4; -Agree; 5 – Strongly Agree for the adapted version while the original checklist carried Yes or No as responses.

During the data analysis stage, the section on the teacher's book was removed due to the inconsistent results generated (validity and reliability issues) while running the data on PLS-SEM to create the measurement model. However, the feedback on the teacher's book was considered during the interviews. The checklist was uploaded on Google forms and the link was shared with prospective participants.

Student survey

The student questionnaire was extracted from a larger survey on factors affecting English language proficiency. The items focusing on TB evaluation from the section on learning resources are used in this paper. The main themes covered were relevance, usefulness, interest, and ability to engage learners through interactive activities. A five-point Likert scale of agreement, similar to the teachers' checklist was used. The questionnaire was validated by a team of experts and translated into Arabic. It was also statistically validated using PLS-SEM. The final questionnaire with both English and Arabic versions was uploaded on Google forms and the link was shared with the respondents.

Interviews

Semi-structured interviews were conducted with eight secondary school English teachers (four males and four females) and two Directorate of Curriculum evaluation staff members (one male and one female). The items used in the checklist formed the basis of interview questions. Each interview lasted for approximately 40/50 minutes.

Data analysis and Results

Partial least squares (PLS) analysis was conducted using Smart PLS 3.0 to analyze the checklist results. The reason for using PLS-SEM was due to its ability to perform intricate analyses and measure complex models. Two-staged analytical modules were used for Structure Equation Modelling (SEM) (Hair et al, 2014). First, the measurement model, which measures reliability and validity, was examined, and then the structural model was tested. The significance of loadings and path coefficients was investigated via bootstrapping. "Bootstrapping is a nonparametric method in which subsamples are generated with randomly derived observations from the original sample" (Khalil et al., 2021). For the student survey also the measurement model was examined for reliability and validity and then the analysis was conducted using simple statistics since only one section of a larger survey is being considered here. Qualitative data collected from interviews and FGD were categorized thematically and analyzed.

For creating the measurement model to check the validity and reliability of the TB evaluation checklist, estimates were generated via the PLS algorithm. The structural model was estimated using the bootstrapping option in SmartPLS. The estimated measurement model is shown below (see Figure 1). It portrays the approximations of how the construct (the latent variable) relates to its indicators.

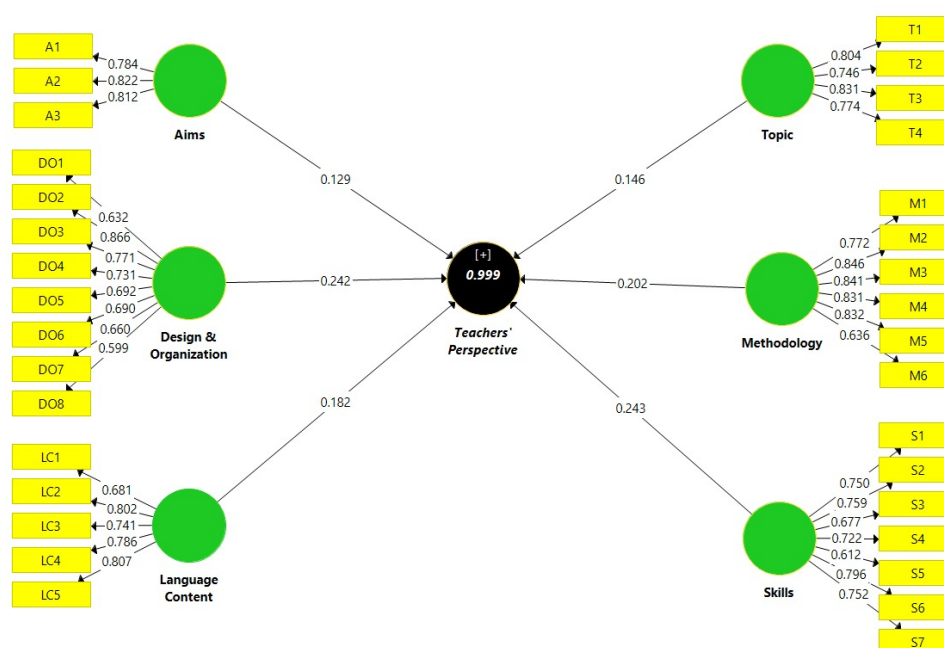


Figure 1 Measurement Model Results from the Textbook Checklist Survey

Convergent Validity

To evaluate the validity of the construct variable, confirmatory factor analysis (CFA) was performed. The convergent validity was measured using Cronbach's Alpha, Rho_A, Composite Reliability (CR), and Average Variance Extracted (AVE). The results are shown below.

	Cronbach's Alpha	Rho_A	Composite Reliability	Average Variance Extracted (AVE)
Aims	0.734	0.745	0.848	0.650
Design and Organization	0.856	0.869	0.889	0.503
Language Content	0.822	0.833	0.875	0.585
Methodology	0.830	0.893	0.912	0.634
Skills	0.850	0.860	0.886	0.527
Teachers' Perspectives	0.958	0.961	0.961	0.581
Topics	0.798	0.801	0.868	0.623

Table 3 Construct Reliability and Validity

The minimum criteria defined for acceptable convergent validity are that the values of Cronbach's Alpha, Rho_A, and CR must be above 0.7, while the values for AVE must be over 0.5. As can be seen from Table 3, the values of these factors for each of the variables fulfill the criteria, and therefore the model has acceptable convergent validity.

Discriminant Validity (Fornell-Larcker Criterion)

Discriminant validity verifies how allied (or insignificant) a variable is to itself and the other variables in the model. The Fornell-Larcker test measures the discriminant validity of the variables in the study. It is determined by the variance, where the indicators should have a higher variance with themselves than the others. As seen from the table below, all the parameters have relatively higher values of variance with themselves.

	Aims	Design and Organisation	Language Content	Methodology	Skills	Textbook Evaluation	Topic
Aims	0.806						
Design and Organisation	0.754	0.795					
Language Content	0.687	0.793	0.795				
Methodology	0.607	0.659	0.628	0.796			
Skills	0.721	0.755	0.808	0.777	0.726		
Teachers' Perspectives	0.811	0.897	0.881	0.849	0.931	0.663	
Topics	0.528	0.665	0.651	0.723	0.744	0.820	0.789

Table 4 Fornell-Larcker Criterion

Structural Equation Model

This model measures the relationship between different variables used in the study, similar to regression analysis which defines the significance of each factor on the topic of interest and how the variables relate to each other. The structural model represents each of the variables in connection to the other via a beta value that places a value on how the independent variables impact the dependent variable. This is further visualized using the arrows, which indicate the direction of the impact.

In addition to the beta value, the model also portrays the t- and p-values, which indicate how significant the relationship between two variables is upon the overall dataset and outputs. The parameters for a relationship to be significant are that the t-value must be greater than ± 1.96 or the p-value should be less than 0.05. The sign in the t-value is indicative of the direction of the relationship much like the directional arrows for the beta value. Another value used for structure model results is the R-square value, which defines how strong the relationship is between two variables. All of the above are useful further when predicting and analyzing future trends based on the study data and results. The structure model is shown below.

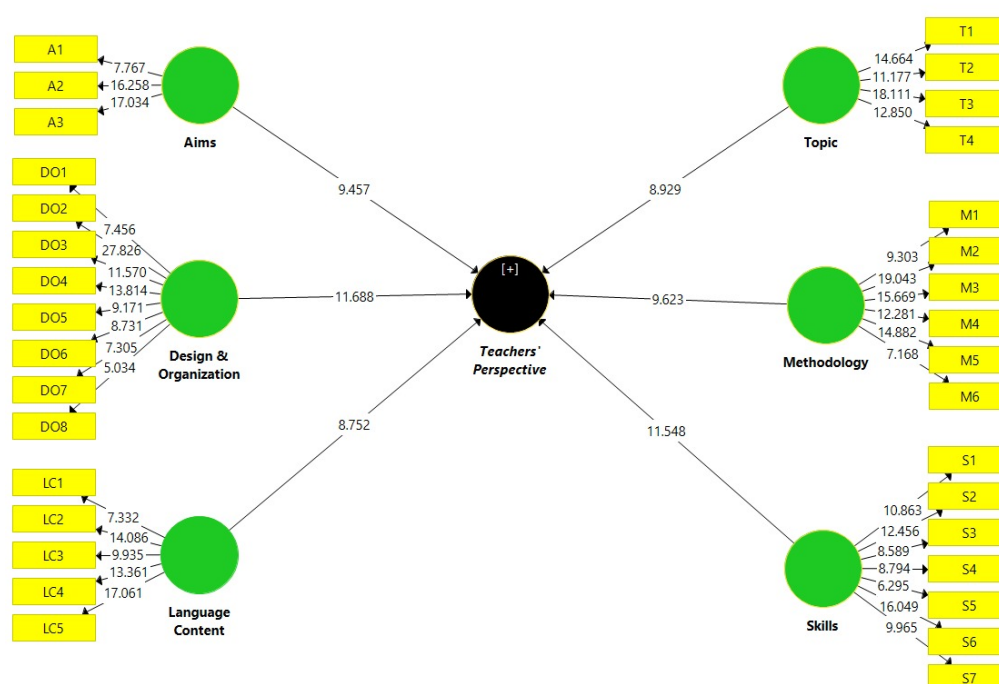


Figure 2 Structure Model for the Checklist Results

The values for the statistical parameters are presented in Table 5 below.

	Original Sample	Sample Mean	Standard Deviation	T- value	P- value
Aims → Teachers' Perspectives	0.125	0.124	0.013	9.999	0.000
Design and Organization → Teachers' Perspectives	0.245	0.245	0.022	11.013	0.001
Language Content → Teachers' Perspectives	0.181	0.180	0.020	9.046	0.003
Methodology → Teachers' Perspectives	0.203	0.203	0.020	10.183	0.002
Skills → Teachers' Perspectives	0.245	0.242	0.021	11.573	0.000
Topics → Teachers' Perspectives	0.144	0.144	0.016	8.945	0.001

Table 5 Structure Model Testing Results

The model is based on the impact of six different textbook-related variables on the evaluation of EWE by the teachers, i.e., the Teachers' perspectives variable (independent variable). As seen from Table 5 above, all the variables have significant relationships, however, the most significant relationships were those between Design and organization and Textbook Evaluation and Skills and Textbook Evaluation, based on the t-values (11.013 and 11.573 respectively) and sample Mean (.245 and .242 respectively). The p-values for both were also 0. The significance of the remaining parameters in descending order is Methodology (t-value=10.183), Aims (t-value=9.999), Language Content (t-value=9.046), and Topic (t-value=8.945). The p-values for all these parameters are <0.05. This indicates that the teachers consider the design and organization, and skills development in the TB as very good. They are also positive about the methodology propagated by the book (communicative approach), the alignment of aims with the curricular goals, language content, and topics covered. Thus, overall, the teachers' feedback through the checklist is positive. However, the qualitative results from teacher interviews are not compatible with the checklist findings.

Student Survey Validation

The student opinions on the textbook were gathered as part of a larger survey, where different factors were investigated considering their relation to the English Language Proficiency (ELP) of students. One of these factors was TBs. This survey was also analyzed using PLS-SEM. The measurement model was used to test the validity and reliability of the instrument. To establish the reliability and validity of the survey, parameters similar to the teachers' checklist were used. Table 6 below shows the values for the TB variable.

Statistical Parameter	Value
Cronbach's Alpha	0.828
Rho_A	0.841
Composite Reliability (CR)	0.876
Average Variance Extracted (AVE)	0.544

Table 6 Validity and Reliability

The conditions for the instrument to be valid and reliable are fulfilled as Cronbach's Alpha, Rho_A and CR are all above 0.7, and the AVE is greater than 0.5. Hence the survey is valid, and its results are reliable.

Student survey results

Item	Mean	Standard Deviation
1. The textbook is relevant in terms of achieving the curricular goals.	3.34	1.060
2. The textbook is very useful in developing my language proficiency.	3.46	1.081
3. The textbook is very interesting.	3.28	1.096
4. The textbook has a lot of interactive and engaging activities.	3.31	1.036
5. The textbook helps me prepare ONLY for the exams.	2.74	1.016
6. The teachers can complete the contents of TB within the given period.	3.46	1.153
7. Other resources are also used by teachers along with textbooks.	3.68	1.103
8. My feedback is taken for the review of the textbook and other materials	3.14	1.086

Table 7 Student survey results (Textbook section)

Descriptive statistics (Mean and Standard Deviation) for all items in the section on TB were calculated (see Table 7). Considering 3:00 as the mid-point (Neutral), it can be observed from the above statistics that overall, the students are slightly positive about the books. Seven out of eight analysis items recorded a Mean of above 3.00. However, the role of TB in preparing students for exams dropped below 3.00. The maximum Mean is observed for the use of additional resources by the teachers (3.68) followed by the role of EWE in developing English proficiency and scope of course completion within the given duration (3.46). The students are also not very positive about the TB being relevant (3.34) and interesting (3.28). The lowest Mean is observed for the role of TBs in preparing students for exams (2.74) which was further confirmed by the FGD where students mentioned that the TB contents are different from what they are asked in exams.

Key Findings from Interviews

The main findings from the teachers' and curriculum evaluation officers' interviews are summarized below:

Aims

- The aims are covered in the TB entirely.
- The aims are aligned with the curriculum/TB content.

Design and Organization

- The layout is attractive, but there is more room for improvement.
- The focus should be to group the skills and have a detailed focus on each, one by one.

Language Content

- There is a lot of vocabulary, but not always relevant. For example, there are authentic texts on various cultures but the vocabulary there is often not listed in the vocabulary development tasks. Moreover, the exams assess a completely different set of vocabulary.
- There are a few grammar rules which are not enough. The teacher has to teach more to the students since exams are beyond the content available in the book.
- Sufficient examples of writing, as required for exams, are not there. The exams have different writing genres than the TB.
- The teachers do not know what they should focus on, or what will come in the final exam, so they become lost.

Methodology

- Yes, the book follows the communicative task-based approach.
- The book is fine, but we don't follow it always since exams are different.

Skills

- The four language skills are covered in the book, but insufficiently.
- Speaking practice is there but conversational skills are limited. There are a few discussions and role-plays.
- There need to be more lessons to develop writing skills. We have to really work hard to develop writing skills. We provide samples and relevant activities ourselves.
- About individual sounds- stress in a word/sentence- nothing is covered. -if a student pronounces in a wrong way, we just correct it.
- Activities to develop critical thinking skills should be there but I do not find them. We have class discussions to develop these skills.
- Study skills are barely covered. Some reading tips are covered in the section called 'Top Tip'.

Topics

- The content is well structured, and the topics are relevant.
- The book needs to be updated in some areas. For example, the book still has letter writing which is outdated now. Some information also needs to be updated.

Teachers' Book

- The teachers' book is helpful in preparing lessons.
- The teachers' book needs extra material, it is not enough for all the teachers. Some more ideas and extra activities will be useful. We create our own materials.

Other Relevant Findings

- There is insufficient time in the class to complete all the material and train students for different skills. Six lessons (40 minutes each) in the whole week are not enough to achieve the desired learning outcomes.
- The assessments are not entirely aligned with what is being taught in the TB.
- There is no formal mechanism to take teacher or student feedback on TB.
- The 10th grade TB is updated and the exercises there are more challenging and updated than EWE. There is a huge disparity now between grades 10 and 11. The progression is erratic.

Key points from curriculum officers

- Curriculum is routinely reviewed and compared with other international curricula.
- Our curriculum is based on the tenets of our educational philosophy.
- We consult experts before authoring or designing the curriculum.
- There is a specific assessment document that we refer to regarding assessment design.
- We are developing an item bank that will be a reference for teachers as well as students. It will be available on the portal. It will have lexical bundles, grammatical sentence structures, exam skills, etc.
- We analyze the exam papers and check where our students need support. For example, when we found that 21st-century literacy skills are lacking in our students, we prepared a remedial plan and introduced an intervention program.
- We should have a large project to reform the English language of proficiency of Omani students.

Table 8 Key findings from interviews

Discussion of Findings

Looking at the overall results from both qualitative and quantitative tools, the EWE moderately fulfills the criteria set for evaluation. The checklist results revealed that the teachers are positive about the EWE. The design and organization (t-value-11.013 and 11.573) and comprehensive coverage of all the language skills received the highest ratings through teachers' checklist analysis followed by methodology, alignment of aims with the curricular goals, language contents, and topics. Al Mahrooqi, Denman, and Al Mamari. (2016) also reported moderately positive results (Means between 2.50 and 2.82 on a Likert

scale of 4) in twelve out of fourteen categories except for writing skills and pronunciation which need to be revised in EWE according to the teacher participants of this study as well.

During the interviews, a number of positive aspects as well as the areas for improvement were highlighted by the teachers. They mentioned that the aims need to be updated to align with the curriculum, more grammatical structures should be added, the exams are completely different from what the textbook covers especially regarding writing practice and vocabulary, there is hardly any pronunciation practice, conversational and critical thinking skills are very limited, and the study skills coverage is very meager. Mahrooqi, Al Mamari, and Denman's (2016) study on the analysis of lexicon in Omani public school TBs also found anomalies in vocabulary loading with regard to the introduction of words at appropriate levels. They concluded that a reference word list was not utilized during the TB development stage, and this can affect the quality of teaching and can lead to anxiety among learners and demotivate them. Al Mahrooqi et al. (2015) also recommended the design of tasks to develop higher-order thinking skills. Activities around the development of conversational skills are of utmost importance, especially when the book claims to be based on the principles of the communicative task-based approach. "There is far more effective participation in a conversation than performing a number of isolated speech acts. A conversation is interactional, and the participants work together in its development, mutually defining and evaluating each contribution; it is essentially a collaborative process and must be seen as such for teaching purposes" (Cunningsworth, 1987, p. 45).

The Means of student ratings of EWE range between 2.74 to 3.68 which reveals that the students are largely neutral to slightly positive about EWE. Considering 3 (Neutral) as the mid-point, none of the evaluation criteria recorded an overall Mean of 4.00 and above that would suggest highly positive evaluations. Looking at the other relevant findings from the interviews, the most alarming among them is that the grade 10 TB has been changed and is more advanced and challenging than grade 11 and 12 TBs. Al Mahrooqi et al.'s (2015) study also reported the previous version of grade 10 TB as the best that could be used as a model. Constructive alignment of curricular aims with TB materials and assessments is the most pressing issue which is reported by both teachers as well as students who mention that the exams are different from what TB covers. Moreover, one 40 minutes lesson per day is not enough to complete the course material and improve English language proficiency since the other subjects are taught in Arabic. Lastly, there is no formal mechanism in place to take teachers' and students' feedback on TBs.

The curriculum evaluation officers mentioned a number of efforts made by their directorate in terms of curriculum evaluation, review, update, and maintenance of TBs' currency. They mentioned the engagement of experts in curriculum design and evaluation, an intervention program for the activities focusing on the development of 21st-century skills, a pilot project focusing on phonetics, development of an item bank comprising activities related to language skills development which will be made available as an online resource on the MoE portal for teachers as well as students. This reveals that efforts in the direction of curriculum review are being made but the officers did not clearly indicate if the work on replacement or revision of EWE is in the pipeline or not.

Conclusion, Limitations, and Pedagogical Implications

Evaluation of TBs is of utmost importance to ensure that they are not only suitable but also capable of supporting teachers in achieving the pedagogical aims of the English language curriculum. This study sought to evaluate EWE, the TB used in grades eleven and twelve in Omani public schools, from the perspectives of teachers and students. The estimates generated via the PLS algorithm confirmed the reliability and validity of the measurement model thus confirming the fitness of the adapted version of Cunningsworth's (1995) checklist. The findings obtained from the quantitative instruments revealed that overall, EWE is suitable for grade 11 and 12 students. A moderately positive response was received from the study participants. The EWE fulfills most of the criteria mentioned in the teacher evaluation checklist, however, a number of potential areas of improvement were highlighted during the teacher interviews. The most pressing concern raised by the teachers as well as students is the lack of constructive alignment of curricular aims with TB materials and assessments. EWE will benefit from a thorough revision in terms of alignment of writing tasks with assessments, the inclusion of relevant vocabulary development exercises, more conversational practice, pronunciation practice, and exercises focusing on the development of critical thinking and study skills.

Although this study has been successful in providing insights into the strengths and weaknesses of EWE, there are a few limitations that need to be mentioned. The student perspectives were taken using a section of the survey designed for a larger study on factors affecting language acquisition. A more comprehensive survey covering more categories and items would accrue better results. The results of student FGD and sub-items under various categories of teachers' checklist cannot be added to this paper due to the paucity of space. Further research on finding a correlation between the findings generated from the current checklist with other checklists might also prove beneficial in arriving at more comprehensive results. The author urges the relevant authorities to consider the review report of EWE of this study and the studies conducted on similar lines at the earliest to allow for a more logical progression of content and materials from lower to higher grades. More importantly, there should be a mechanism to take regular feedback from students and teachers on TBs and this should form the basis of revision.

Acknowledgments

I would like to express my gratitude to the Research Council, Oman for funding the research project. I would also like to acknowledge the support provided by the project team members and research assistants for their assistance in data collection and analysis.

Appendix A

Textbook Evaluation Checklist

Aims	The aims of the textbook correspond closely with the aims of the curriculum.	SD	D	N	A	SA
	The aims of the textbook correspond closely with the needs of the learners.					
	The book is comprehensive and covers all or most of what is required for secondary school level learners.					
Design and organization	The components make up the total course package (students' books, teachers' books, workbooks, CD, etc).					
	The content is well-organized (e.g. according to structures, functions, topics, skills, etc.).					
	The content is well-sequenced (e.g. on the basis of complexity, learnability, usefulness, etc.)					
	The grading and progression are suitable for the learners.					
	There is adequate recycling and revision.					
	There are reference sections for grammar, vocabulary, and study skills development.					
	The layout is clear and the contents are easy to find.					
	The textbook is long-lasting and attractive in appearance.					
Language content	The textbook covers the main grammar items appropriate to each level, taking learners' needs into account.					
	The material for vocabulary development is adequate in terms of quantity and range of vocabulary.					
	The textbook includes material for pronunciation work including individual sounds, word stress, sentence stress, and intonation.					
	The textbook deals with the structuring and conventions of language used above sentence level, e.g., how to take part in conversations, how to structure a piece of extended writing, how to identify the main points in a reading passage.					

	The book familiarizes learners with appropriate language styles to be used in different contexts (e.g., formal and informal or academic and non-academic language).					
Skills	All four language skills (Reading, Writing, Listening, and Speaking) are adequately covered, bearing in mind the course aims and syllabus requirements.					
	The textbook carries material for integrated skills work.					
	The reading passages and associated activities are suitable for your students' levels, interests, etc.					
	There is sufficient reading material with a good selection of level appropriate texts on different interesting topics.					
	The listening material is well recorded, as authentic as possible, accompanied by background information, questions, and activities which help comprehension.					
	The material for spoken English (dialogues, roleplays, etc.) is well-designed to equip learners for real-life interactions.					
	The writing activities are suitable in terms of the amount of guidance/control, degree of accuracy, organization of longer pieces of writing (e.g., paragraphing), and use of appropriate styles.					
Topics	There is sufficient material of genuine interest to learners.					
	There is enough variety and range of topics.					
	The topics help expand students' awareness and enrich their experience.					
	The topics are sophisticated enough in content yet within the learners' language level.					
	Learners are able to relate to the social and cultural contexts presented in the textbook.					
Methodology	The textbook accommodates the communicative learning approach.					
	The textbook contains exercises that promote learners' creativity.					

	The textbook encourages learners to think critically.					
	The textbook develops the spirit of inquiry and encourages learners to research on their own to complete activities.					
	The material includes activities that develop students' study skills and learning strategies.					
	Students are expected to take a degree of responsibility for their own learning (e.g. by setting their own individual learning targets).					
Teachers' book	There is adequate guidance for the teachers who will be using the textbook and its supporting materials.					
	The teachers' book is comprehensive and supportive.					
	The teachers' book adequately covers teaching techniques, language items such as grammar rules and culture-specific information.					
	Keys to exercises are available and clear.					

Note: Strongly Disagree (SD), Disagree (D), Neutral(N), Agree (A), Strongly Agree (SA)

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Can Blended Learning Replace Face-to-Face Teaching in Machine-Knitting Courses?

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Abstract

Over the past two years, the COVID-19 pandemic has made unprecedented impacts on teaching and learning (T&L). In tertiary education, face-to-face classes were replaced by online teaching, while most of the hands-on classes and practicums were suspended. The transition was challenging yet it gave us a chance to rethink about the pedagogy and T&L direction in the future. The aim of this study is to compare the learning efficiency and students' learning experience of blended learning with face-to-face (f2f) teaching in the machine-knitting course. The blended learning course included online self-study modules and a training workshop to examine the learning outcomes. It was believed to maximise the learning effect yet reduce the total study hours. A pilot test was carried out on a group of knitwear design students who had taken f2f knitting classes before, so that they can compare the learning experience and efficiency between blended learning and f2f teaching. The students' learning outcomes were assessed by the knitting tasks in the workshops. Data and comments collected from questionnaires and interviews after the course were analysed. The results proved the effectiveness of combining self-learning with hands-on workshops, but at the same time it emphasised the important of hands-on training which was irreplaceable. This study could provide references for improvement on future course design and similar hands-on training courses in other institutes.

Keywords: Blended Learning, Online Self-Study Modules, Hands-On Training, Machine-Knitting Courses, Teaching and Learning

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Introduction

Over the past two years, the COVID-19 pandemic has made unprecedented impacts on our life in all aspects. It has brought about enormous changes in education sector, altering the format of teaching and learning (T&L). In tertiary education, face-to-face classes were replaced by online teaching, while most of the hands-on classes and practicums were suspended. The transition was challenging and the learning efficiency was affected in the beginning, yet students, teaching staff and universities showed quick response and tremendous resilience gradually (Naidoo et al., 2021; Thakur, 2020; Schwartzman, 2020). Both students and teachers have been well 'trained' and they start to get used to the new T&L approach. Such a shift also gives us a chance to rethink about the pedagogy and T&L direction in the future.

Blended learning could be one of the solutions under social isolation, especially for subjects with essential practical components. A number of empirical studies have proved adopting blended learning in education can raise students' learning effectiveness (Thai et al., 2017). Various approaches of blended learning have been proposed and investigated. Flipped learning is a kind of student-centred learning that suggests students study the teaching materials before class, enabling effective use of class time for problem solving and practicing with supports from the teacher (Long et al., 2019). It shifts the learning instruction to the pre-class activities, so students can interact and be more focus in the in-class activities (DeLozier & Rhodes, 2017). Integrating with thinking and reflection, they can have a better understanding of the learning content and teaching materials (Hwang & Lai, 2017). Although Flipped learning provides a good learning environment with lots of advantages, it requires a high level of self-motivation and self-discipline from students. To enhance the T&L model, Chang et al. (2022) proposed combining flipped learning with self-regulated learning (SRL), which requires self-planning, self-monitoring and self-adjusting. The integrated approach was proved applicable in hands-on training with significant improvement in students' learning achievement.

The aim of this research is to compare the learning efficiency and students' learning experience of blended learning with face-to-face (f2f) teaching in the machine-knitting course. Conventionally machine-knitting subjects are taught in f2f mode as students can only access to the knitting programme and operate the machines in the knitting lab. Having studied different approaches of blended learning, the knitwear teaching team of Institute of Textiles and Clothing carried out a pilot test in the advanced machine-knitting course to determine if the T&L efficiency of blended learning was same as that of f2f teaching. To maximise the learning effect yet reduce the total study hours, a series of online self-learning modules of STOLL ADF programming and machine operation was designed. It was followed with a training workshop to examine the learning outcomes. Learning analytics was applied to measure, collect and analyse the data through the entire T&L project (Siemens, 2013).

Methodology

Design of the blended learning course

After reviewing the existing advanced knitting course, a new blended learning course on STOLL ADF programming and machine operation comprising self-learning modules and training workshops was proposed to implement in semester two 2021/2022. Fifteen year-3 knitwear design students were asked to participate in this blended learning course. They had

experienced face-to-face knitting classes in semester one and learnt basic knowledge of machine-knitting. As the ‘end-users’, they had been informed the purpose and arrangement of the blended learning course in the beginning of semester one, so that they could compare the learning experience and effectiveness between face-to-face teaching and blended learning, contributing to the learning analytics in this T&L study.

The class components of face-to-face teaching and that of blended learning are structurally different (Figure. 1). The existing course outline includes 18 hours of class contact, i.e. total 6 weekly lessons and 3 hours per week, and 35 hours of student study effort. Usually the 3-hour class is split equally into the face-to-face teaching section, i.e. demonstration of knitting machine programming and operation, and the in-class practice, which students operate the knitting machine under the teacher’s or lab technician’s supervision. Students can ask the teacher or technician when they encounter problems and they can receive feedback or solutions immediately. Due to the limitation of class time, students used to practice and complete knitting assignments on their own after lesson. However, the technical support may be not that sufficient compared to the class time. In the propose blended learning mode, a series of online self-learning materials was prepared by the subject lecturer and experienced technicians. The learning contents were edited into 6 short modules (including jacquard using colour arrangement, plating, inlay, multi-coloured intarsia, devoré knitting and ADF machine operation) with clear written instructions and illustrations. The contents were streamlined and organised in a more readable way (Figure. 2). A knitting task was set at the end of each module to achieve the learning outcomes. The self-learning materials were uploaded on a shared drive for easy access. Students were expected to read through the learning contents within 10 hours before joining the training workshop for practice with technical support. The hands-on training was composed of 9 workshops in 2 hours each. Due to the limitation of class size under pandemic, students came in a group of three and only two groups of students can stay in the knitting lab at the same time, which is half of the maximum capacity of the lab. One experienced technician was assigned at a time to provide technical support to the students. However, they were expected to finish the knitting tasks and solve problems on their own unless there were serious technical problems.

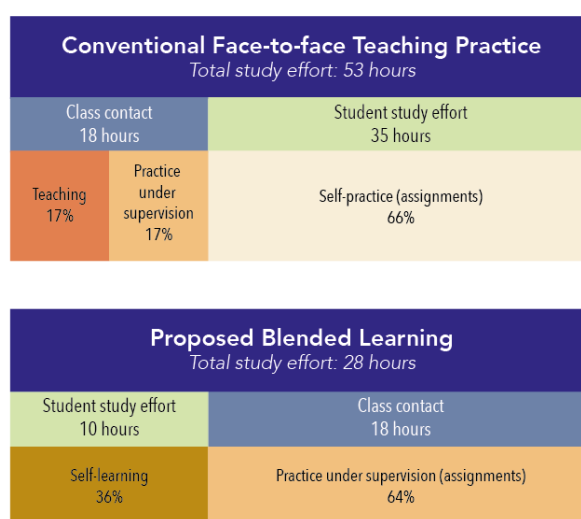
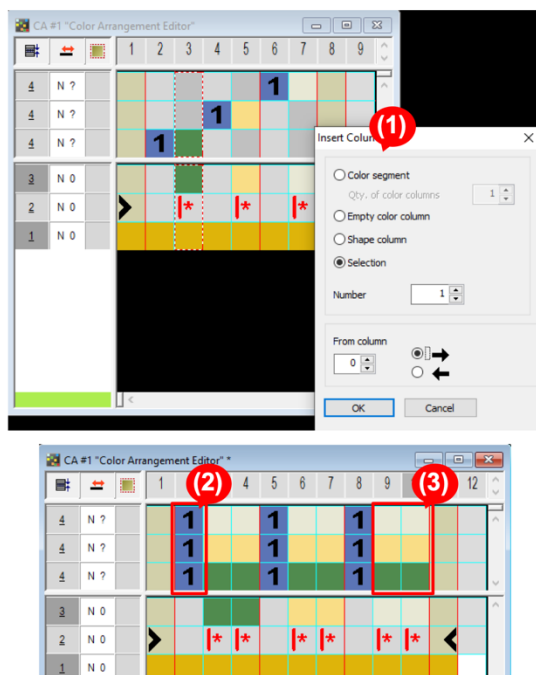


Figure 1: Comparison of course composition – the proposed blended learning approach increased the practice time under supervision yet shortens the total study hours.

Color Arrangement

Programming



1. Fill in the knitting actions of first row of each yarns
 - (1) Insert column of each color segment until it can become a repeat
 - (2) Fill reference number 1 into reference row
 - (3) Fill the suitable colors into the color segment
 - (4) Fill the knitting actions into the color segment according to the yarn path diagram
 - (5) Place "Repetition, starting from the left pattern edge" symbol into row of arrangement of knitting actions in pattern (as jacquard backing need to be repeated evenly in the whole fabric)

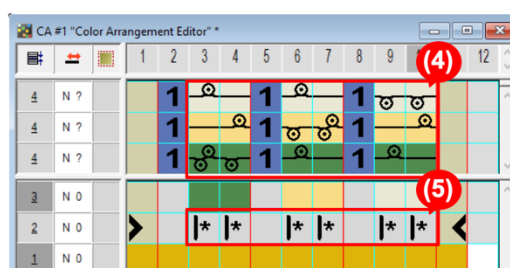


Figure 2: Example of the online self-learning materials, the instructions are clearly illustrated.

Implementation of learning analytics

Learning analytics(LA) was applied to measure, collect data and analyse the effectiveness of the proposed blended learning course in this study (Siemens, 2013). Referring to the process of SRL proposed by Zhao et al. (2014), the following aspects were reviewed and analysed during the course planning and implementation:

- Learning objectives – students' interest towards learning the new knitting techniques and motivation
- Learning resources – content of learning materials, arrangement of learning and technical support in the course
- Learning outcomes – understanding of course contents and ability of integrating the skills in knitwear design

A theoretical model was developed to predict the learning objectives, observe the learners' behaviour, achieve the learning outcomes and reflect the learning experience (Figure. 3). It suggested an iterative data collection, analysis and reporting process during design of learning resources and implementation of the course. In the beginning, the course planner predicted student performance before designing the learning materials and planning the course. The students' learning behaviour was observed and recorded during the implementation of blended learning. Learning effectiveness was assessed by the results, whether the students can achieve the learning outcomes, and reflections of all parties including the teacher, technicians and students participated in the course. The data collected could enhance the existing learning resources or alter the prediction of learning objectives.

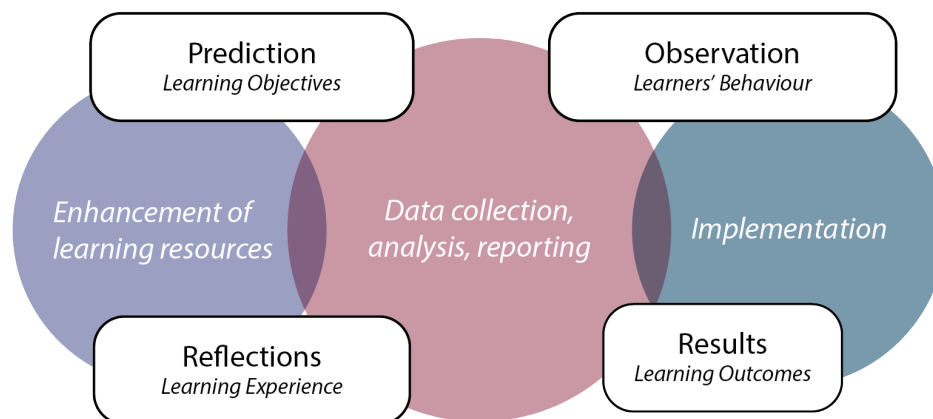


Figure 3: Learning Analytics Model for blended learning with hands-on training

In this study, data was collected by both quantitative and qualitative methods. Questionnaires were distributed to the course participants, investigating their expectations of the course, comments on the online self-learning modules and training workshops, as well as learning efficiency compared with face-to-face teaching classes (Figure 4). 5-point Likert scale was adopted in the questionnaire, with '5' referring 'strongly agree' and '1' referring 'strongly disagree'. To compare learning efficiency of blended learning with that of face-to-face teaching, the paired sample t-test was used to determine the mean difference between these two sets of participants' comments. The null hypothesis was assumed to be no significant difference between blended learning and f2f teaching.

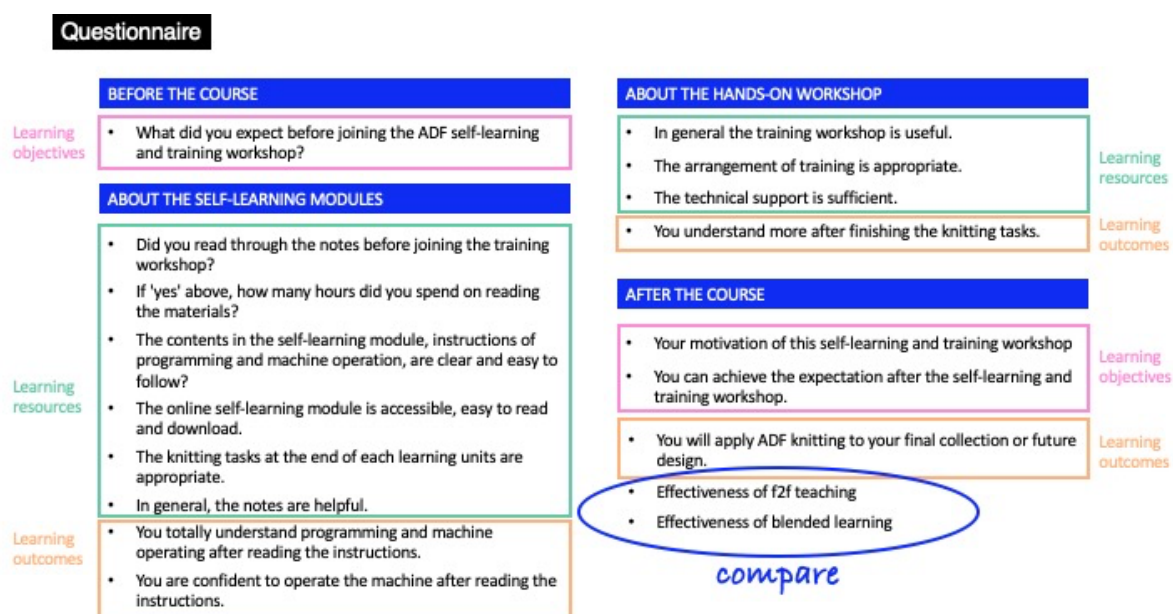


Figure 4: Questions in the questionnaire which were designed to collect comments on learning objectives, learning resources, learning outcomes, as well as comparing the effectiveness of the two teaching and learning approaches

An in-depth semi-structured interview with a focus group was also conducted. Four students (named as Student A, B, C and D) were selected randomly from the class and they were asked open-end questions about the arrangement of the course and their learning experience. The interview was recorded and transcribed to identify specific patterns of problems encountered by the students.

Findings and Discussion

Fourteen students submitted the questionnaires, the final findings were quite surprising. In general, the participated students found the self-learning modules and the training workshop useful, resulted in 4.43 and 4.07 out of 5.0 respectively. They were basically satisfied with the arrangement of training workshops, yet there was one interesting comment from one student - The number of classes should be reduced but the duration should be elongated so that it could reduce the traveling times to school. This made sense during the pandemic situation when people should lessen social activities and possible body contact. The students' learning motivation in this blended learning course was 4.0, which was quite similar to that in f2f teaching classes. The students mostly agreed they spent less time but they can achieve the expectation of this course and learning outcomes after the training workshop. Regarding the learning effectiveness, the two-tail p value was 0.08 (> 0.05), which indicated there was no significant difference between these two T&L methods in students' point of view (Table 1). However, the mean of effectiveness of f2f teaching (4.43) was slightly higher than that of blended learning (4.21).

	<i>Effectiveness of blended learning</i>	<i>Effectiveness of face-to-face teaching</i>
Mean	4.214285714	4.428571429
Variance	0.489010989	0.571428571
Observations	14	14
Pearson Correlation	0.83153075	
Hypothesized Mean Difference	0	
df	13	
t Stat	-1.882937743	
P(T<=t) one-tail	0.041138433	
t Critical one- tail	1.770933396	
P(T<=t) two-tail	0.082276866	
t Critical two- tail	2.160368656	

Table 1 Results of paired sample t-test on learning effectiveness between blended learning and face-to-face teaching

The findings indicated that conventional f2f teaching was still more effective and preferable. This could also be explained from the feedback of focus group in the interview. Student A and Student C reflected that f2f teaching and learning was easier to understand, students could raise questions about knitting problems and get the solution immediately from the teacher. The interviewed students also agreed hands-on practical classes were essential,

which could deepen the impression of machine operation. ‘I spent less time but I can achieve the expectation of this course and learning outcomes after the training workshop.’ Student B said. Last but not least, there was an interesting comment from Student D about the arrangement of workshops (9 sessions of 2-hour workshops), ‘The number of classes should be reduced but the duration should be elongated so that it could reduce the traveling times to school.’ It was particularly critical during the pandemic as it may increase the chance of infection.

Conclusions

The COVID-19 pandemic has brought about a global revolution in teaching and learning. Conventional f2f teaching in the classroom was changed to online or hybrid teaching in order to continue T&L practice under the circumstances. However, subjects with essential hands-on learning components are not possible to be replaced by online teaching or self-learning. To remedy the situation, different blended learning approaches have been proposed and applied to hands-on training courses by education scholars in different fields. The pilot test conducted in this research proved the effectiveness of combining self-learning with hands-on workshops, but at the same time it emphasised the important of hands-on training which was irreplaceable. Learning analytics helped a lot in measuring, collecting, analysing and reporting data in the T&L research. The findings of this paper could provide references for similar hands-on training courses in other institutes.

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Enhancing Student Learning Experiences Through Recorded Presentation Using the “Gongyeh” System

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Abstract

Oral presentation is one of the core competencies of the higher education professional training. The use of oral presentation is a popular assessment in higher education. In response to the COVID-19 pandemic, there has been a shift from classroom learning to online or blended learning approaches where the class engagement is usually limited. This current study aims at investigating the undergraduate students' learning experiences and their perceptions towards the online collaborative platform “Gongyeh”, which is developed by the Hong Kong Polytechnic University in 2018. It is a web platform for sharing video presentation and allow teachers and their classmates to rate and comment on it. Questionnaire survey was employed to collect the empirical data and followed by statistical analysis. Five hypotheses were statistically tested. The present findings support that the online and collaborative recorded presentation platform has significant positive influence on student's learning enjoyment, learning reflection, peer interaction, learning motivation and student engagement on the subject respectively.

Keywords: Student-Centered Learning, Video Presentation, Peer Interaction, Gongyeh

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Introduction

Oral presentation is one of the key assessments in higher education and it is widely used in assessing student learning outcomes of the course contents and the acquired skills and knowledge (Ginkel, Gulikers, Biemans, & Mulder, 2015; Smith & Sodano, 2011). The ability to present information clearly, professionally and eloquently is the essential soft skill for an undergraduate student should acquire before graduation. In addition, employers also emphasize oral communication competency is the key criteria in the recruitment process. It therefore stresses the importance of oral presentation training in higher education, as does the need for students to self and peer assess their performances.

Given the importance of oral presentation, both students and teachers, however, face challenges and difficulties in optimizing the benefits of it. From students' perspective, they only received instructors' feedbacks and comments, but limited feedbacks from the audiences (their classmates). Besides, students' engagement in classmates' presentations is problematic. Some students may not be focused and did not pay attention to students' presentation, thus making the presenters feel uncomfortable and not-respected. Also, it was observed that some students were reluctant to criticize fellow classmates' presentation work and failed to provide reflective and immediate peer feedback. From teachers' perspective, students may make repetitive mistakes and adversely affected the teaching efficiency. The above situations were considered to get worse during the covid-19 pandemic period, as the class engagements were generally weakened due to the online learning environment. It therefore brings an urgent need to keep students engaged in online learning with innovative pedagogy.

This current study aims at investigating the undergraduate students' learning and their perceptions towards the online collaborative recorded presentation platform "Gongyeh", which is developed by the Hong Kong Polytechnic University in 2018. It is a web platform for sharing video presentation and allow teachers and their classmates to rate and comment on it. In the present study, 148 full-time undergraduate students were participated. They were enrolled to a subject in the School of Fashion and Textiles of the Hong Kong Polytechnic University in Fall 2021. Online teaching approach was applied in the course during the COVID-19 pandemic. Students were required to upload their group project oral presentation to the platform as one of their course assessments. Students were requested to comment or raise questions to other groups' presentation.

Proposed hypothesis

This current study aims at investigating the undergraduate students' learning experiences and their perceptions towards this online collaborative recorded presentation platform "Gongyeh". Five hypotheses were developed to assess the relationship between students' learning experiences and their attitudes towards this learning platform. The five hypotheses were proposed as below:

H1: The online collaborative recorded presentation platform "Gongyeh" significantly improve student's learning enjoyment

H2: The online collaborative recorded presentation platform "Gongyeh" has a significant positive impact on student's learning reflection

H3: The online collaborative recorded presentation platform “Gongyeh” significantly enhance student’s peer interaction

H4: The online collaborative recorded presentation platform “Gongyeh” significantly stimulate student active learning motivation

H5: The online collaborative recorded presentation platform “Gongyeh” significantly improve student engagement on the subject

Methodology

Participants

This study attempts to examine student learning experiences and perceptions towards the online collaborative recorded presentation platform “Gongyeh”. There were 148 participants in this study. All the participants were the full-time undergraduate students of School of Fashion and Textiles of the Hong Kong Polytechnic University, who were enrolled to an elective class ITC4207M Fashion Entrepreneurship Management in Fall 2021. All the participants were come from fashion business major and were final year student under the 4-year curriculum.

Procedures

The course was taught throughout the Fall 2021 semester. This is a compulsory course with intermediate level and targets to all fashion business students. At the beginning of the course, the subject instructor has mentioned the current research and introduced the scope and requirements of the class project which included student online collaborative recorded presentation platform “Gongyeh”. As part of the course requirement, students were required to complete a group project with oral presentation by the end of the course. Each group of students was required to post their recorded group presentation and raise some reflective questions to other groups on the platform (refer to Figure 1). The quality of the questions was then assessed by the instructor with detailed evaluation rubrics.



Figure 1 Example of the peer feedback and interaction on Gongyeh platform

Data collection and analysis

Quantitative research method was applied in this study. User-administrated questionnaire survey was employed. In total, 148 questionnaires were distributed during the class and 25 valid responses were obtained, yielding a 16.9% response rate. 5-point scale rating was employed to measure the students' perceptions towards the online collaborative recorded presentation platform "Gongyeh".

The data gathered through questionnaire survey were analyzed by statistical analysis software SPSS 28.0. Various statistical tests including descriptive statistics, one-sample t-test, and correlation analysis were employed to determine the significant impacts of the online collaborative platform towards students learning experiences. Reliability test was also applied to evaluate the internal consistency of the tested items. In this study, all the calculated Cronbach's coefficient alpha values of the five variables were higher than 0.85 (Table 1), which were regarded as acceptable (Churchill, Brown, & Suter, 2010).

Table 1 Reliability scores of the variables

Variables	Cronbach's Alpha	No of items
Learning enjoyment	0.913	25
Learning reflection	0.887	25
Peer interaction	0.895	25
Learning Motivation	0.882	25
Engagement	0.948	25

Results

Descriptive statistics

Table 2 summarizes the descriptive statistics (mean, standard deviation and standard error mean) of the students' perceptions towards the online collaborative recorded presentation platform "Gongyeh". The overall mean scores (Mean) related to the variables were 3.36, 3.7, 3.7, 3.77 and 3.79 respectively.

Table 2 Descriptive Statistics of the Students Perceptions towards "Gongyeh"

	Number of respondents	Mean	Standard deviation	Std. Error Mean
Learning enjoyment	25	3.37	0.771	0.154
Learning reflection	25	3.77	0.684	0.137
Peer interaction	25	3.7	0.743	0.149
Learning Motivation	25	3.79	0.680	0.136
Engagement	25	3.36	0.550	0.110

Hypotheses testing

In the next stage, one-sample t test was applied to test the below five hypotheses, and the tested p-values were shown in Table 3.

Table 3: Results of the Tested Hypotheses

Tested Hypotheses	p-value	Result
H1: The online collaborative recorded presentation platform “Gongyeh” significantly improve student’s learning enjoyment	0.012	Supported
H2: The online collaborative recorded presentation platform “Gongyeh” has a significant positive impact on student’s learning reflection	<0.001	Supported
H3: The online collaborative recorded presentation platform “Gongyeh” significantly enhance student’s peer interaction	<0.001	Supported
H4: The online collaborative recorded presentation platform “Gongyeh” significantly stimulate student active learning motivation	<0.001	Supported
H5: The online collaborative recorded presentation platform “Gongyeh” significantly improve student engagement on the subject	0.002	Supported

Remark: Significant at the 0.05 level

All the tested p-values of the five variables were smaller than 0.05, which confirms that the above five hypotheses (H1 to H5) were supported. The results suggest that online collaborative recorded presentation platform Gongyeh have significant positive influences on student’s learning enjoyment, learning reflection, peer interaction, motivation and student engagement on the subject respectively.

Then, we also examine the relationship between each variables of students learning behaviors of the online collaborative recorded presentation platform Gongyeh o. According to Table 4, it is revealed that both peer interaction and learning motivation were the significant contributors to enhance students learning enjoyment, as the p- values were lower than 0.05. Secondly, students’ learning reflection could be explained by the peer interaction and learning motivation of students. Thirdly, peer interaction could be significantly explained by learning reflection and motivation. Moreover, learning enjoyment, learning reflection and peer interaction were significantly influenced students’ learning motivation. Lastly, the results implied that student engagement was correlated with all other factors.

Table 4 Correlation among variables (N=25)

<i>Variables</i>	Learning enjoyment	Learning reflection	Peer interaction	Learning motivation	Engagement
Learning enjoyment	1	0.746**	0.693**	0.825**	0.508**
Learning reflection	0.746**	1	0.883**	0.939**	0.534**
Peer interaction	0.693**	0.883**	1	0.886**	0.53**
Learning motivation	0.825**	0.939**	0.886**	1	0.503**
Engagement	0.508**	0.534**	0.53**	0.503**	1

**, correlation is significant at the 0.01 level ($p < 0.01$)

*, correlation is significant at the 0.05 level ($p < 0.05$)

Conclusion

The online collaborative recorded presentation platform “Gongyeh” has been found to be beneficial tools for education. In this experiment, learning enjoyment, learning reflection, peer interaction, learning motivation, student engagement could be enhanced by using this online and collaborative recorded presentation platform.

The results demonstrated that student learning enjoyment and peer interaction could be improved when it applied the online and collaborative recorded presentation platform. It is because students can challenge and interact one another via the recorded presentation platform. In the online learning environment, peer participation is usually lower. Students now could interact with one another by raising interesting questions and exchange their views on the Gongyeh platform. With more peer interaction, their learning enjoyment could be enhanced, which results with a favorable learning experience.

On the other hand, the results confirmed that students’ reflection could be enhanced. Reflection is always the critical and powerful component in the learning process. Learners could examine and interpreted the learning materials themselves and gain new understanding. From this study, there is evidence to show that recorded presentation platform could stimulate students’ enthusiasm for a more quality presentation work.

To conclude, it is suggested that online collaborative recorded presentation platform has beneficial impacts to students overall learning behaviors. Educators are suggested to include it into the course teaching and learning activities.

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Escape Room in Pre-School Education Learning

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Abstract

This paper analyzes the use of ICT in education, which is demanding in the new generations, who must be involved from an early age. To this is added a virtualized education, due to the pandemic by Covid-19. For these reasons, this research aims to demonstrate that the Escape Room can be used as an effective strategy to bring early childhood education children closer to the use of ICT and the acquisition of meaningful learning, enriching educational opportunities. For this purpose, the quantitative approach and the literature research modality were considered, for the theoretical support of the two research variables; the descriptive and field to obtain data through the survey technique with its respective instrument that allowed the understanding of the problem and provide answers to the research questions. According to the data obtained, it is concluded that the implementation of the Escape Room is highly viable, since the teachers in training show interest, have knowledge of what the Initial Curriculum establishes and carry out activities (challenges) physically, which constitutes a strength to take these aspects to the virtual environment, so that the activities that are proposed in the Escape Room would strengthen it. Based on the criteria expressed by the experts and training teachers at the validation of the proposal, the viability of the proposal is established, which, in addition to being an innovative strategy, is considered a necessary alternative to be used in current virtual education.

Keywords: Learning and Development Areas, Escape Room, Initial Level, ICT

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Introduction

For this study, teaching in digital environments was considered as a research line, because it was intended to contribute to the improvement of educational quality at the initial level to generate more meaningful learning, considering that infants today are digital natives. A recent study, IPSO, 2011 [1] "has found that the age of three years constitutes a milestone in the use of technology, at which many children get rid of many of their non-digital toys". This shows that the early years are the most appropriate ages to approach technology. This research considered the use of the digital Escape Room as an innovative educational product that allows this approach of infants and educators to the new reality of virtualized education that was implemented by the pandemic.

This research work is based on the norms and regulations related to education: such as what is established by the United Nations Organization (2015) [2], in the "2030 Agenda on Sustainable Development", where it mentions: "It is urgent that children, youth and adults acquire throughout life the flexible skills and competencies needed to live and work in a safer, sustainable, interdependent, knowledge-based and technology-driven world".

Harnessing innovation and ICTs is essential for strengthening education systems, disseminating knowledge, providing access to information, promoting the quality and effectiveness of learning, and providing services more effectively. In addition, it was based on what was established by the National Secretariat for Planning and Development [Senplades] (2017) [3] in the "National Development Plan 2017 -2021 -A lifetime" in Axis 1: Rights for All Throughout Life mentions: "Education is the basis for the development of society (...). In this sense, it is necessary to find the differentiated impacts of illiteracy, such as showing the high incidence of this problem in adult women, especially in the indigenous population".

In this context, access to initial education is another critical area for children's development. In 2016, 44.6% of children under five participated in early childhood programs-public and private, so the important challenge is to improve the quality of this level of education, as well as access and significantly expand coverage.

In accordance with the foregoing, this work is expressed and developed in which the Escape Room is proposed as a new didactic strategy in Initial Education, where the incorporation of ICT as part of the structure of a class is given priority, innovation, creativity, and the attention it demands to generate new knowledge. This strategy also focuses on gamification, which has been an activity previously used at different educational levels.

Theoretical Framework

Extensive research has been done on the subject and its references in the different digital repositories, as well as in indexed journals and other university or educational repositories. This research has provided information about the use of the Escape Room in education, particularly in the field of gamification, those which helped develop this research. Regarding the use of the Escape Room as an aid for the learning process in Ecuador and Latin America, no specific research on this topic was found, in fact the information that was used originated in several European countries, this background helped the research; however, as the sociocultural, educational and technological context is different from continent to continent, the theoretical postulates of European research and the learning development, which is one of

the variables of the study, were taken into account to provide a general contextual framework on this topic.

Given the above, we found that contributions about the use of the Escape Room in education are important for this study. According to García (2019) [4] in the article "Escape Room as a gamification proposal in education" gamification is a learning methodology that should be indispensable in the pedagogical training of future teachers, which states that these gamification experiences and the use of ICT can be carried out in early childhood education classrooms, which would help students to have meaningful learning. The Escape Room is a resource that promotes creativity, imagination, logical thinking, and deductive reasoning. Which can undoubtedly contribute to research since its purpose is to improve the teaching-learning process. According to the vision of Caridad and Fernandez and Sanchez (2019) [5] in their article Gamifying the university classroom. "Analysis of an Escape Room experience in higher education" shows how the Escape Room can be applied to the learning process and they state that the Escape Room can promote different emotion types in students, such as: fun, motivation, and anxiety, during the resolution of the proposed enigma, these emotions allowed, that the students who performed this Escape Room test, managed to learn an unknown topic. This learning process was facilitated due to the immersion in collaborative work and the joint search for information on phones and tablets, also highlighting the value of the students' predisposition to learning mediated by mobile technologies.

The importance of the Escape Room is highlighted in the paper presented by Castro-Garcia (2019) [6] where it is shown that the Escape Room is a relevant teaching method for the learning process, and indicates that it is possible to apply this methodology and emphasizes that for the Escape Room to work as an educational process it is necessary to know the type of students to whom it is addressed and the type of reward that is obtained by achieving the objective. He also concludes that the puzzles and problems proposed during the development of the Escape Room should be designed taking into account the theoretical classes of a subject.

Muñoz (2020) [7] also contributes to the subject in the article "Gamified Virtual Learning Environment for the Ecuadorian curriculum" evidencing that, by using a technological resource with game characteristics, higher levels of academic performance can be demonstrated and recognizing that gamification is a trend that achieves active processes whose main objective is to improve the learning process.

Theoretical development of the object and field

Gamification

The implementation of the Escape Room within education is based on some principles developed by gamification, in fact, this methodology "Today, it is a very valuable tool in the classroom and, over time, will be a fundamental tool to foster innovation in the educational context" (García Lázaro, 2019, p. 73) [8].

To understand gamification, an idea by Llorens et al. (2016) [9] read in a publication by García (2019) [10] was considered where it mentions that gamification is "the use of strategies, models, dynamics, mechanics and typical elements of games in contexts outside of them". This concept of gamification was applied to the educational Escape Room as an innovative teaching - learning strategy.

Cortizo 2011 [11] points out the benefits of gamification in university students: it rewards the effort, punishes the lack of interest, informs about the involvement of each student and suggests procedures to improve the grade of the subject. On the other hand, Werbach and Hunter 2012 [12] analyze the use of gamification and justify it through the active involvement of the student when performing a task (engagement), second, states that the student works constantly over time (experimentation) and finally positive results (results).

Learning neurophysiology

Once what learning means has been theorized, it is also necessary to understand its biological basis. (Ormrod, 2015, p. 22) [13] mentions that "many aspects of our daily functioning, such as attention, memory, learning or motor skills depend on multiple areas of the brain". It emphasizes that learning is not a simple process of learning or thinking because it occurs in such a way that the acquired information is distributed in different areas of the brain (Ormrod, 2015) [14]; but, knowledge is generated in the brain before birth, in fact, it is known that synaptogenesis begins approximately at the end of the last trimester of prenatal pregnancy however this process continues after birth and reaches its maximum at two years of age (Rohlf, 2017) [15].

According to Rohlf, 2017 [16], understanding this allows identifying that even the act of memorizing something like the mother's voice that a newborn identifies immediately at birth implies learning, a newborn has not only memorized the mother's voice, but has identified it, it is the same with smell, touch, a newborn learns to identify its mother, what in the animal world would be an act of survival, for humans is a learning process, which occurs in the brain.

Learning in children (4-5 years)

There has been a lot of discussion about when a child should start learning, but what we do know is that once that process starts, it is necessary to consider the appropriate ways in which the child should acquire knowledge. The idea is that children from 3 to 5 years old when entering an educational institution of the initial level begins the process of socialization and development of potentialities guided by a teacher himself who uses different teaching resources, methodologies and tools to accompany the process of training children (Pauccara, 2019) [17].

Game-based learning

Returning to the idea that learning is a process that requires the participation of the learner, in this case the infant, it is also necessary to understand that especially at this age the success or failure of this process can be summarized in the motivation, which must be immersed in the content presented.

Techno-pedagogical integration

Techno pedagogical integration can be defined as the efforts that educators have made to implement technology in their teaching methods, the same that have raised a new model for the learning process and why not for the same learning styles that from a systemic perspective it is possible to better situate learning considering different contexts (Torres, Infante, & Torres, 2015) [18] in this case the interaction between technology and the child

before entering the Educational Center presents a different context and the possibility of using different tools also as the Escape Room. It is in this theoretical context in which the present research is based and in which the Escape Room was developed as a tool for teaching.

Escape Room - Concept and origin

To understand the concept of the Escape Room, Dietrich's idea read in Baena and Ruiz (2019, p. 288) [20] was considered, where he says that "an escape room consists of giving a certain time to a group of people so that, through enigmas and clues, they manage to solve riddles to leave from a certain place".

The origin of the Escape Room can be established in 2006, in Silicon Valley, United States where they created Origin, it is an interactive game in an enclosed space whose objective was to give life to Agatha Christie's novel, although that Escape Room was not the one that is known now, it gave the bases that would finally be used in Asia and Europe to generate escape rooms based on solving problem and searching tracks.

Importance and benefits

Aside from the fact that the Escape Room was built to entertain escape rooms, they currently generate many benefits that can be applied in pedagogy, these are: teamwork development generated through the participants, the organization functionality is essential to operate in an organized manner and advance in the game, the memory use while finding clues or solving riddles in the Escape Room, proposes a system of codes memorization, work under pressure and meaningful decision making during the game; time is a determining factor for participants to make more effective decisions in the shortest possible time. These are some of the benefits that can be extracted from a traditional Escape Room.

The importance lies on the use that can be given to these benefits in the teaching field. Escape Rooms can be used as tools in the teaching-learning process to generate innovative content and attract the attention of students with the implementation of new contexts to obtain learning.

Methodological design

The present research was based on a quantitative approach, since a process of collection, analysis and interpretation of quantitative data was carried out to respond to the problem statement and achieve a broader and deeper perspective of the two variables to be treated as: the escape room and learning. Through this approach, various sources and types of data were considered to understand the reality investigated.

Research modality

For this project, a descriptive and field research was considered to obtain data through the survey technique; since generation of knowledge was intended with direct application to the problems that currently arise in initial education, such as the improvement of the learning process due to the class virtualization for under 6 years children. The process of linking theory and product was addressed, that is, between the ICT use at the initial level and the escape room implementation as a learning strategy at this level, to promote meaningful

learning and an approach the use of ICT in early childhood. For the data processing, descriptive statistics were considered, which allowed to collect, analyze and describe the characteristics of the population under study.

Population

To carry out this study, 22 training teachers from seventh and eighth level of the Human Sciences of Education and Social Development Faculty, from a University in Quito's city were considered, who carry out their practices in different educational establishments.

Table 1 *Study Population*

Units of analysis	Participants	Percentage %
Teachers 7th	11	50
Teachers 8th	11	50
TOTAL	22	100

Source: Higher Education Institution

Analysis and Results Interpretation

1. Does the teacher plan activities to reinforce physical and mental activities?

Table 2 *Classes with physical and mental abilities*

	Frequency	Percentage	Surveyed People
1	ALWAYS	23 %	5
2	USUALLY	50 %	11
3	SOMETIMES	18 %	4
4	HARDLY EVER	9 %	2
5	NEVER	0 %	0

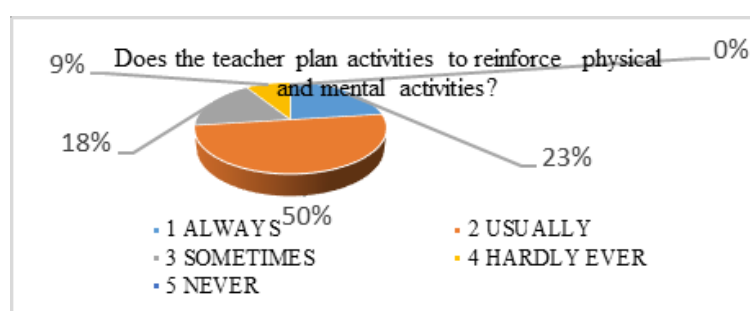


Figure 1 Classes with physical and mental abilities

Analysis and interpretation

According to the survey results, it can be evidenced that 50% of teachers specify that they usually use activities that promote physical and mental skills development in children, while 23% always use it. In this case the graph allows to note that most teachers consider in their planning the use of the aforementioned activities, which would indicate that they have knowledge of the Initial Education Curriculum, however, it is worth mentioning that these

activities have the same application in virtualized education. Both Shunk (2012) [21] and Ellis (2015) [22] mention that the teaching-learning process should be not only a process of information exchange but also encourage different physical and mental skills development.

2. Does the early education curriculum have challenges in learning environments?

Table 3 *Contents of the Initial Education Curriculum*

	Frequency	Percentage	Surveyed People
1	ALWYAS	36 %	8
2	USUALLY	23 %	5
3	SOMETIMES	9 %	2
4	HARDLY EVER	32 %	7
5	NEVER	0 %	0

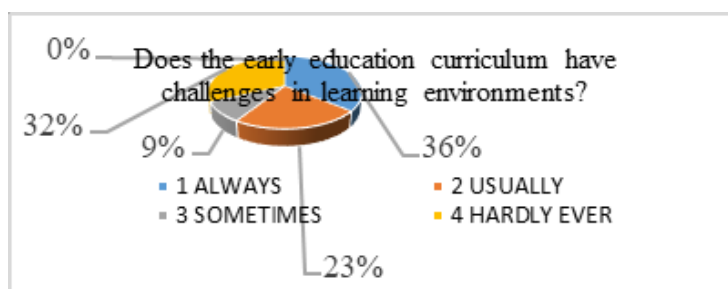


Figure 2 Contents of the Initial Education Curriculum

Analysis and interpretation

The graph shows that 36% of teachers, claim that content from the initial education curriculum can always be addressed when planning challenges in learning environments, and 23% mention usually, and 9% sometimes. While 32% show that a group of teachers have difficulty integrating the contents of the Initial Education Curriculum when planning activities that constitute a challenge. The Technical Team of the “Dirección Nacional de Currículo” (2014) [23] mentions that the educational curriculum is carried out with flexible approaches because it allows the teacher through his preparation and creative capacity to propose activities in which they cover one or more areas of development and learning. Within these activities, challenges that will contribute to children's learning must be contemplated.

3. Does the teacher use games to create challenges to get children's higher participation in group or individual in the learning environments?

Table 4 *Use of challenging games*

	Frequency	Percentage	Surveyed People
9	ALWAYS	41%	
10	USUALLY	45%	
3	SOMETIMES	14%	
0	HARDLY EVER	0%	
0	NEVER	0%	

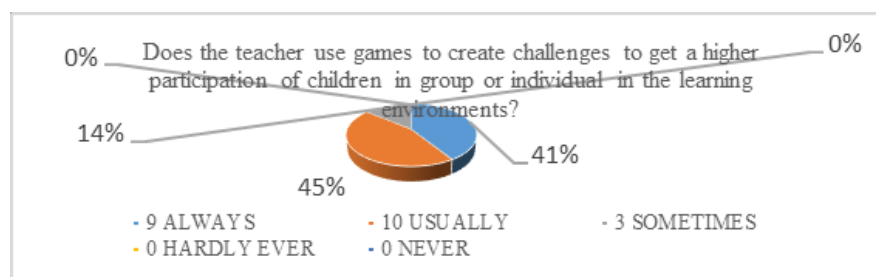


Figure 3 Use of challenging games

Analysis and interpretation

According to this graph, 41% of teachers always use challenges games to encourage greater children's participation of either individually or in groups, 45% usually do it, while 14% sometimes. It is evident that most teachers use games that constitute challenges in learning environments, however, there is a small group that does not do it frequently.

Hence the need for teachers to know about gamification to use it in virtualized education, since it allows to generate this type of challenges that help children in themselves learning.

4. Do you know how to carry out challenges throughout Escape room?

Table 5 <i>Challenges through the Escape room</i>		
Frequency	Percentage	Surveyed People
3	SI	14%
19	NO	86%

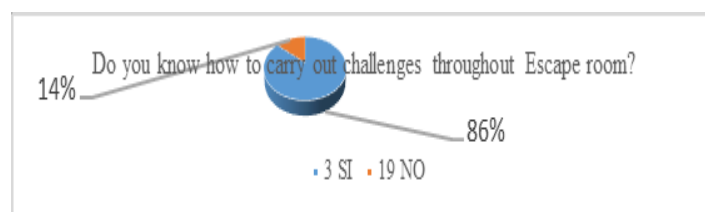


Figure 4: Challenges through the Escape room

Analysis and interpretation

The graph shows that 86% teachers do not have knowledge regarding how to implement challenges through the escape room and 14% admit to having little knowledge. Face with this graph, the need to educate teachers about innovative strategies such as the escape room is clearly observed since they state that they do not have enough knowledge for its implementation in the classroom, which was a key factor when deciding on the implementation of the escape room in the virtual classes for children. The implementation of this strategy becomes even more evident taking into account that the paradigm of learning has changed, children born together with technology, and require from their teachers other types of teaching strategies to which teachers have had to be coupled according to the current need; having a child in front of the computer is not the same as teaching face to face especially if he is a digital native, requires more stimulus.

Conclusions

Once the survey of 7th and 8th year teachers of Human Sciences of Education and Social Development Faculty of a University in the city of Quito was carried out and analyzed, the following was identified:

It was found that teachers have knowledge about the use and benefits of the ICT application, frequently mention innovative learning strategies, in addition to considering gamification "very relevant" since they reveal the use of activities that promote physical and mental skills and increase the child's participation. In the same way, they agree on the importance and feasibility of incorporating challenges in virtual teaching, so they show openness and total availability to receive training in relation to the implementation of innovative teaching and learning strategies, especially in relation to the Escape Room.

However, they also claim that they lack a better understanding of how to achieve the challenges that involve sequential resolution and that they have difficulty incorporating content from the Early Education Curriculum into the activities they plan; they also report not knowing how to use or apply games or challenges that encourage teamwork and promote the development of thinking, attention and will in a virtual way. Therefore, teachers also report not having knowledge of how to implement challenges in the Escape Room and therefore do not know how to implement this innovative learning strategy.

Finally, in relation to the knowledge and skills possessed by the teachers together with their weaknesses in some subjects, they are complemented with the motivation and openness to be trained in the Escape Room as a learning strategy, generating the appropriate environment for the application of this strategy in the Institution.

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Teaching Without Borders: A Gamification Paradigm for Practical Subjects

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Abstract

Practical activities, unsuitable for a digital curvature centered on remote activities, have been particularly penalized by the pandemic. Our response was the study and implementation of a series of hybrid learning units, based on gamification strategies, to allow mechanics involved students not to lose contact with practical activities, keeping the laboratorial subjects at the center of the processes. The idea was to transform a series of laboratory exercises into a movie set for a detective film, in which the student's skills and knowledge are necessary to solve a puzzle. An educational unit was designed and built, whose final product was a Google Form, suitably equipped with multimedia inserts, through which the student is transported into a role-playing game, in which he plays the role of a private investigator dealing with a murder case that took place in a mechanical workshop. To solve the case, the player will have to rely on his observation skills and on his knowledge and skills developed in the mechanics related curricular subjects. In fact, he must be able to solve problems related to the means of transport present in the workshop and, if able to detect and correct the anomaly, he will obtain clues that will allow him to identify the guilty. Goal of this approach was to increase technical-methodological skills, indispensable for a professional maintenance technician in the automotive sector. The students really appreciated this approach and we look forward to release new episodes of this "crime series", blending them with real manual activities.

Keywords: Gamification, Practical Subjects, Innovation

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1. Introduction

During the 31st “Didamatica” conference, held in Rome in May 2017, the authors of this paper presented a work focused on a series of good practices adopted by their home school, necessary to integrate the adoption of new technologies which, in order to how innovative they were, alone would not have been sufficient to ensure a significant impact on teaching and, consequently, on students’ academic success. On that occasion, it was shown how the development of a teaching centered on the profile and needs of the student could improve their attention, motivation and involvement. As an operational example of what was theorized, first, and then realized, a dedicated work environment was presented, called the “Easy” classroom, in which a group of teachers, adequately trained, designed a teaching oriented to the personalization of the students' paths, to promoting their academic success, promoting their inclusion and recovering situations of disadvantage, focusing activities on discovery, experimentation and research, using tools more similar to the languages and communication styles of the students.

The experience of the “Easy” classroom was the springboard for extending the aforementioned good practices to the whole Institute, guaranteeing, in the following two years, collegial homogeneity on the didactic methodologies adopted and consequent achievement of the objectives set with the work of the 2017:

- Increase of the academic performance of each pupil, from the point of view of profit and participation.
- Decrease of the impact of absences on the results obtained.
- Reduction of the phenomenon of school dropout.

2. The winning choice

The sudden arrival of the pandemic, with repercussions on traditional teaching, was a real tsunami that wiped out teaching methodologies consolidated for decades.

In this real revolution of the paradigm, only the schools that, in time, had equipped themselves with innovative tools and alternative methodologies, were able in a short time to react and respond to the emerging needs.

Our Institute, one of the first in Italy to integrate the use of cloud systems into its technical-IT equipment for staff work routines, having invested over the years in designing and training staff, has succeeded in a few days, to transfer all traditional teaching to distance learning and, finally, to find the right balance between the two.

Starting from pilot projects and best practices already illustrated in the paper by the same authors *"A school without borders: solutions for the redefinition of learning in a suburban school"*¹, extending the winning solutions to the entire didactic program, the training proposal for students has not undergone significant changes.

For years the authors, in collaboration with the “Futura” project of the Italian Ministry of Education, have been carrying presentations around Italy to train teaching staff on the use of tools for integrated teaching.

¹ https://www.aicanet.it/documents/10776/1476921/Didamatica17_paper_14.pdf/

These methodologies had already been put in place to cope with some calamities that have hit Liguria over the years.

Among the most important, which requested to modify the teaching by replacing the on-site one with the remote one, we remember the storm in the Gulf of Tigullio and the collapse of the “Morandi” bridge in 2018.



Figure 1 - Press review Gulf of Tigullio storm

3. From theory to practice

3.1 Integration between learning and logistic

In light of the continuous regulatory changes linked to the pandemic, the timetables of the individual classes (often divided into subgroups) and, consequently, the working hours of the teaching staff, have undergone continuous variations, some with minimal impact (exchange between classes in the management of the entrance brackets), others with effects extended to collectivity such as, for example, the migration from an architecture to entire classes that alternate moments of presence with others of remote activity to one that envisages the temporal contemporaneity of the lessons, but not the spatial one, with a percentage of pupils per class, linked the attendance coefficients indicated by the Government, Scientific Committees and the Liguria Region, remotely linked to the lesson held in the classroom by the teacher and the team ni. The aim of guaranteeing fair rotations for all students and teachers in terms of work in presence / distance and advancement in the individual disciplines has made school time management particularly complicated. In the final balance, numerous versions of the timetables themselves were developed, most of which never came into force, in an attempt to adapt the logistical aspects to the educational paradigm of the Institute, already strongly characterized by the use of integrated digital teaching. The engine of these continuous variations was the search for an optimal solution, which could safeguard the didactic-disciplinary continuity, without distorting the structure of distance learning developed and consolidated in previous years (later taken as a model by many Genoese and non-Genoese institutes), not failing to provide continuous support to staff, students and their families.

3.2 Digital Divide - The Cloudready solution

A need that emerged in adopting Integrated Digital Learning was to find devices on the market.

The *Digital Divide*, as noted by the Italian Institute of Statistics ISTAT, was the main obstacle in the use of education during the pandemic.

Digital Divide

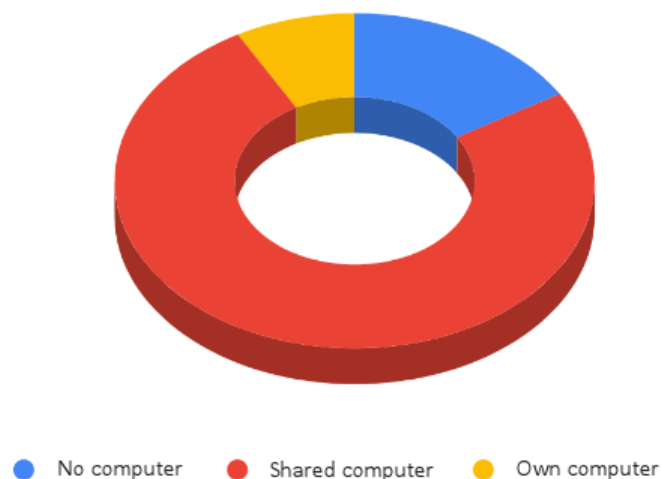


Figure 2 - ISTAT Detection on Digital Divide

The procurement of devices, mainly notebooks, was a problem, not due to financial shortcomings, sufficiently guaranteed by the State, but due to difficulties in supplying them on the market.

To overcome this difficulty, our Institute has decided to recycle old devices that have been abandoned due to age.

It was decided to use a derivative of the Chromium OS open source project, called Cloudready, as an Operating System.

This choice made it possible to find, at no cost, about twenty devices to be entrusted, on loan for free use, to students without a device.

Furthermore, with the ministerial grants, packages have been purchased to guarantee Internet connectivity.

In this way, the students were able to use a functional and modern device for the entire school year and enjoy a connection to be able to follow the synchronous lessons online.

3.3 Focus on manual activities

The above processes, linked to organizational aspects as well as strictly didactic ones, were easily metabolized as regards the theoretical disciplines, in which the learning levels achieved

were in line with the theorized estimates. Greater difficulties were foreseen, and the facts have shown the sensibility of this forecast, in laboratory subjects, at the center of the interests of students who choose a path in professional education and, also at the level of literature, considered to be disinclined to a focused digital curvature, also, on activities carried out remotely. Our challenge was to keep the laboratories of the sector (thermo-hydraulic, electrical and mechanical) at the center of the learning processes, bypassing the walls of the "prison" in which they were confined due to the pandemic.

4. Gamification in practical subjects (laboratory is a playground)

The Gamification technique, "*The use of elements, dynamics and mechanics of the game in contexts other than the game*"², is increasingly adopted also at company level in employee training, as it is recognized as an extremely effective tool for achieving the following target:

- Increase the ability to use new digital technologies in processes.
- Increase awareness of processes.
- Improve the attitude to search for innovative solutions.

The use of Gamification in school education is extremely incisive, as the *stakeholders are particularly* inclined to the world of games.

The four keywords of Gamification (*Motivation, Involvement, Learning, Research*) are widely reflected in an educational context, focused on the manual skills and competences of learners.

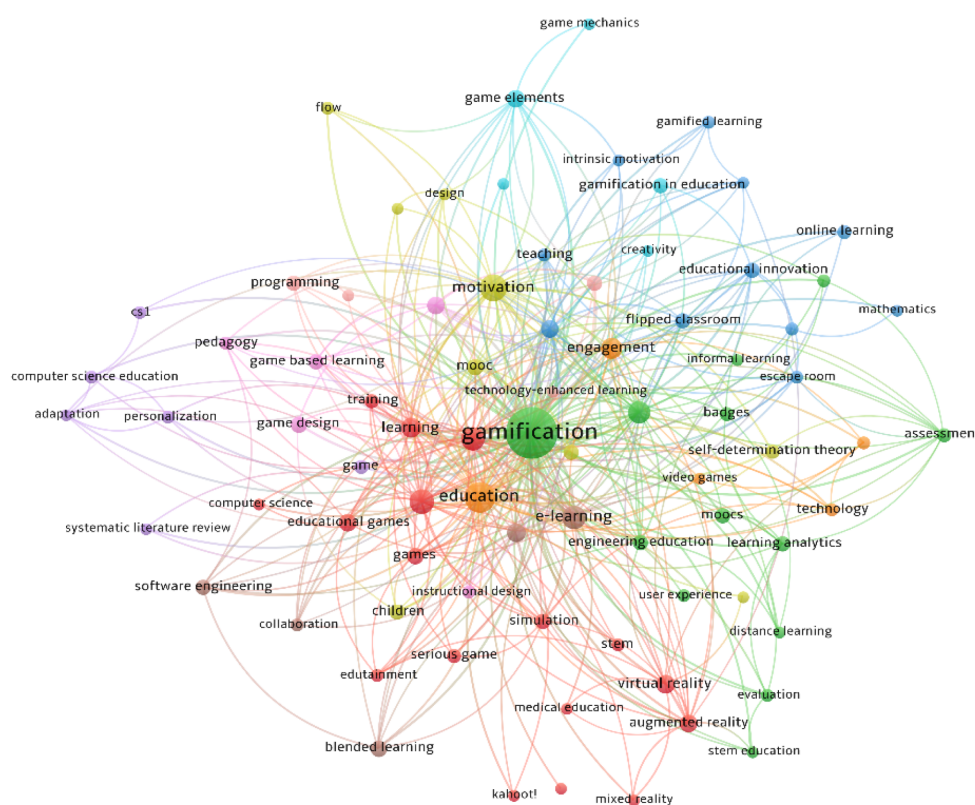


Figure 3 - Words cloud around Gamification

² Deterding et al., 2011

Motivation

The challenge, inherent in the “game”, is a very effective means to increase the student's motivation to reach the final goal, deconstructing the concept of grade, transforming it into success and personal satisfaction.

The use of familiar tools, mainly the smartphone, and of comprehensible communication methods, videos and images, make the use of the product pleasant.

Involvement

According to Werbach and Hunter, our brains are programmed to solve puzzles and constantly need the feedback stimuli and experiences that games provide.

The authors state that: *"In study after study, games have been shown to increase dopamine levels in the brain, an organic molecule associated with pleasure, and also found parallels between the brain's response to games and the process of involvement."*³

Learning

Tom Malone⁴, considered the precursor of Gamification, was the first, in 1980, to analyze a new application of video games, trying to study its use in the world of education. The author demonstrated how the degree of learning of children increased exponentially due to the integration of pedagogical exercises through the use of video games.

Research

In any playful context, if the game is exciting and the rules are not too complicated, the participants will be continuously motivated to improve their results, not only through known strategies, but induced to develop new and different approaches to find optimal solutions. This spirit of constant innovation is perfectly scalable in the school environment, as well as at the basis of new research strategies in business contexts.

A fundamental role in achieving the expected learning objectives, is covered by the narrative which, therefore, must be thought and designed with a lot of attention, both in terms of subject and screenplay, and of result.

The strength of gamification is the opportunity to combine content, teaching and learning skills in a familiar environment. The teacher will provide specific content with a process adapted to the learning context and the students' profiles, motivating them and making teaching more attractive and inclusive.

The idea behind this project was to transform a series of laboratory exercises, planned for a mechanical workshop of a professional institute, into a set of a detective film, in which the skills and knowledge of the student are stimulated and strengthened to solve a puzzle.

³ Werbach & Hunter, 2012

⁴ Malone, TW, 1980. What makes things fun to learn? A study of intrinsically motivating computer games (Doctoral dissertation, ProQuest Information & Learning)

The need to make up for the decrease in hours of laboratory practice, due to the teaching adopted during the pandemic, was the starting point for using a new approach, to guarantee the learning of the fundamental knowledge of technical-practical subjects, central to the educational process of adolescents who have chosen to train as highly professional figures.

5. An hybrid Learning Unit “Murder in the garage”

To implement what was highlighted in the previous paragraph, a learning unit was designed and built, the final product of which is a Google module suitably equipped with multimedia inserts. To present the activity to the students, a sample form was created, answering the questions of which the student is transported into a role-playing game, in which he plays the role (*identification*⁵) of Josh Ritacchi, a private investigator dealing with a case of murder that took place in a mechanical workshop. The following figure 4 shows the cover image that opens the adventure.



Figure 4 - Murder in the garage

To solve the case, the player will have to rely on his observation skills and his skills in the mechanical-laboratory field.

During the investigation, in fact, Ritacchi will be faced with anomalous situations with respect to the normal functioning of the vehicles present in the workshop and, if able to detect and correct the anomaly, he will obtain clues that will allow him to eliminate, in a sequential manner, the suspects. gradually cleared of the clues themselves.

In this way, those which, in reality, are real disciplinary questions, strictly linked to the subjects of address, are masked as plot moments. These questions have been classified according to their complexity and, consequently, the positive or negative effects associated with each answer are closely linked with the difficulty coefficient of the question. By mistaking the first question, for example, the one classified as the simplest, the killer will be able to escape and the case will not be solved. For the subsequent ones, on the other hand, the investigation continues even in the event of an error but, having reached the end of the same, the investigator will lack some clues necessary to identify the culprit with certainty. For the more complicated questions, however, the protagonist has a sort of "bonus" at his disposal, linked to the possibility of consulting a mechanics manual, before tackling the problem.


⁵ Cohen, J. (2001). Defining identification: A theoretical look at the identification of audiences with media characters. *Mass communication & society*, 4 (3), 245-264.

Figure 5 represents the first of the puzzles that the protagonist will have to solve. The investigator, after observing the symptoms of the fault on the processing sheet relating to the victim's car, will be called to identify the component of the engine tampered with by the killer. Since this question is classified as "simple", any wrong answer to it would imply the killer's escape and the relative failure of the investigation.

LA SCENA DEL CRIMINE

Girando per l'officina trovi una fantastica FIAT 124 del '68.
 Leggi la scheda di lavorazione e, tra i guasti segnalati, trovi "problemi di scoppietto" e "difficoltà di accensione".
 Qualcuno ha già lavorato sul motore e, forse, controllando tra i componenti sostituiti, troverai un indizio.

In base ai sintomi riportati dal cliente quale componente pensi possa essere stato sostituito? *



☐ I carburatori

☐ La calotta dello spinterogeno

☐ Il collettore dello scarico

☐ Il coperchio delle punterie

Figure 5 - Disciplinary question

Regardless of the complexity of the question, each proposed solution is followed by a link that justifies the correctness or otherwise of the answer given. In this way, students are provided with real feedback and not just mere performance information. Only by solving all the puzzles correctly, the investigator will have the entire set of clues at his disposal, in order to cross them with the information that characterizes the individual suspects (both relating to their physical appearance and their personal and professional attitudes), to then being able to identify the culprit without the possibility of error. The application provides, in case of uncertainty, the possibility of carrying out a recap of the clues collected, at the end of which, in any case, Josh Ritacchi, nailed to the great responsibilities imposed by his profession, will be called to accuse one of the suspects, as represented in the following figure 6.

CHI E' IL COLPEVOLE ? *

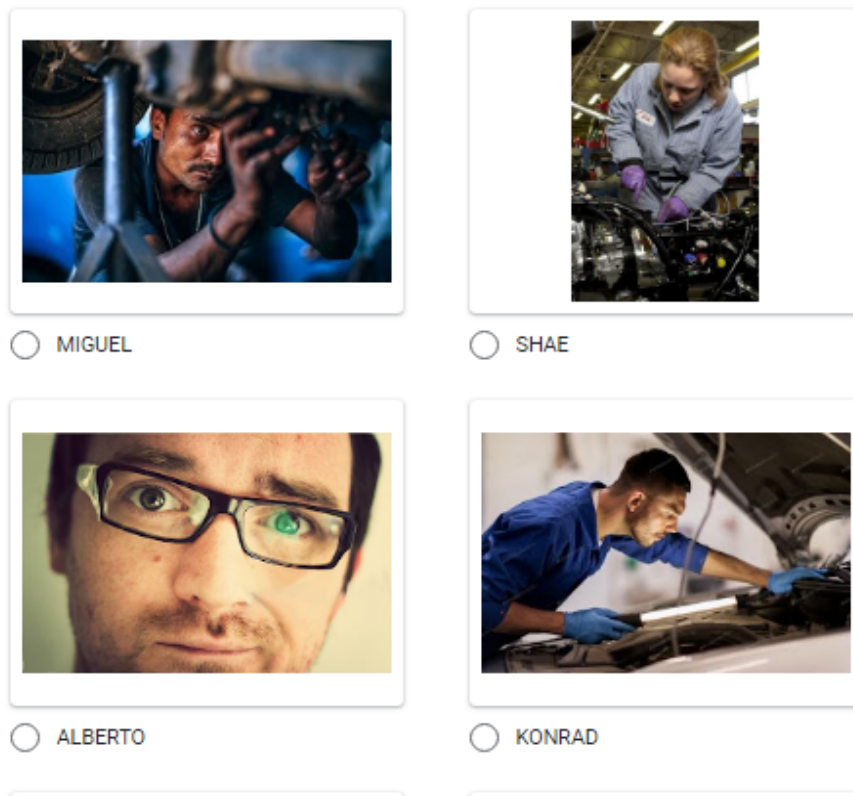


Figure 6 - Guilty accusation

The following figure, on the other hand, represents an extract of the graph on which the adventure was modeled, relating to one of the questions with a high coefficient of difficulty and to the player's possible choice to rely on a manual before choosing the answer.

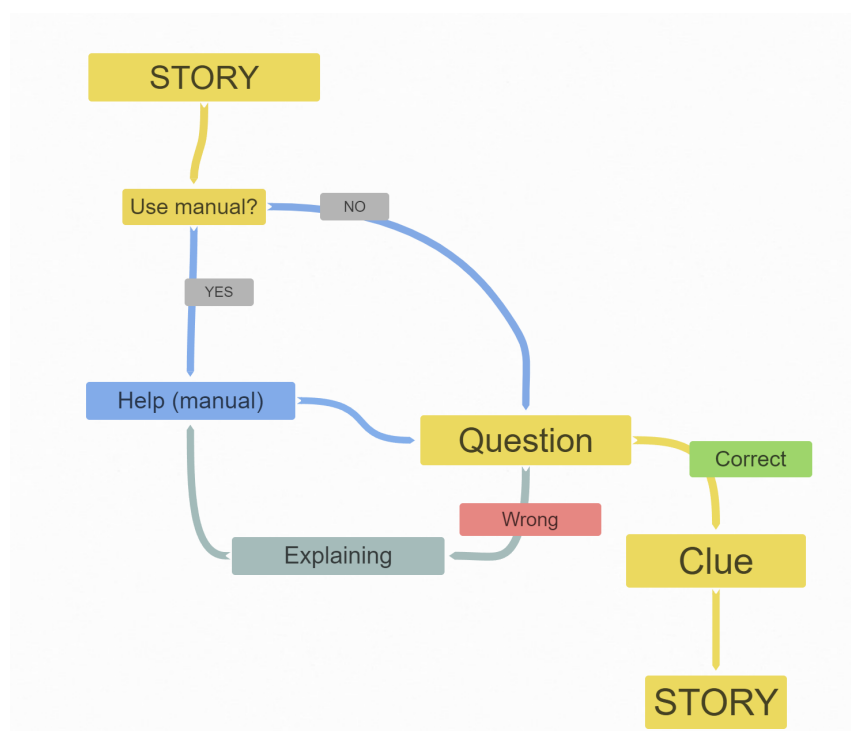


Figure 7 - Tree-lined graph extract

After presenting the prototype to the students, they were entrusted with the delivery of a dedicated learning unit. The assignment of activities within the working groups, managed independently by the students, was based on the transposition of what was proposed in the setup phase into a cinematic environment. The adventure starring Josh Ritacchi, in fact, can easily be imagined as the plot of a film noir and, consequently, the activities in which to outline the realization of the finished product can be compared to the various stages of processing a film. With this in mind, the following tasks were assigned to each working group, so that the members could divide into subgroups with a specific target:

- Subject - Choice of the context in which to play the story, of the characters and of the main events (Sessions brainstorming of the entire group)
- Direction - Transposition of the plot of the story onto a graph and creation of the module that reproduces it
- Screenplay - Writing of the textual parts
- Scenography - Research and creation of multimedia elements to accompany the work
- Assembly - Insertion in the module created by the subgroup " Direction "of the contents found and created by the groups" Screenplay "and" Scenography "
- Post Production - Test of the connections between the various sections

From the details of the assigned tasks, the hybrid characterization of the proposed learning units emerges, as the completion of the individual activities both the use of digital tools and “unplugged” work moments. By way of example, the directors will work both with pen and paper, to trace the graph of the story, and with digital devices, for the electronic drafting of the final version of the graph and for the creation of the module that replicates the planned paths.

In the following figure, the applications made by some students.

From the discussion to understand the effectiveness of the proposed teaching method, it emerged that the students felt more motivated in learning, in light of their direct involvement, conveyed by the game mechanism.

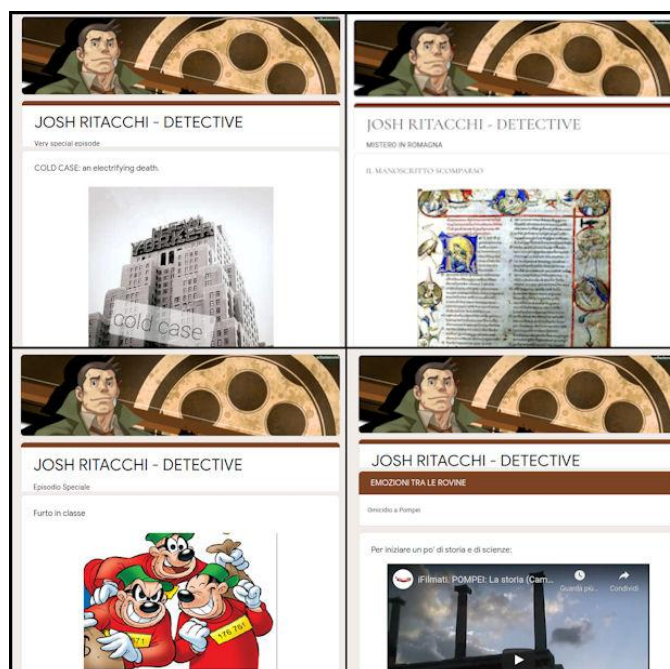


Figure 8 - Adventures made by students

6. Conclusions

The Otero Institute has always placed the needs of students, who are often hindered in the learning process by affective, socio-economic and cultural at the center of the educational paradigm on which the educational offer is sufficient.

The explosion of the pandemic has accentuated the discomfort of users, with the risk of increasing the rate of early school leaving, due to impediments in the use of digital content and, more generally, of everything related to the concept of integrated digital teaching. In response to this, a group of three teachers acted as a flywheel in a process of deconstructing and reconstructing the learning units linked to the practical disciplines, restoring the balance necessary to achieve academic success for young people who have chosen an education path that privileges learning by doing.

The following figure shows the display on the mobile device of the application created, accessible at the link: <https://forms.gle/P5hr4JDAQtQnXp8A7>

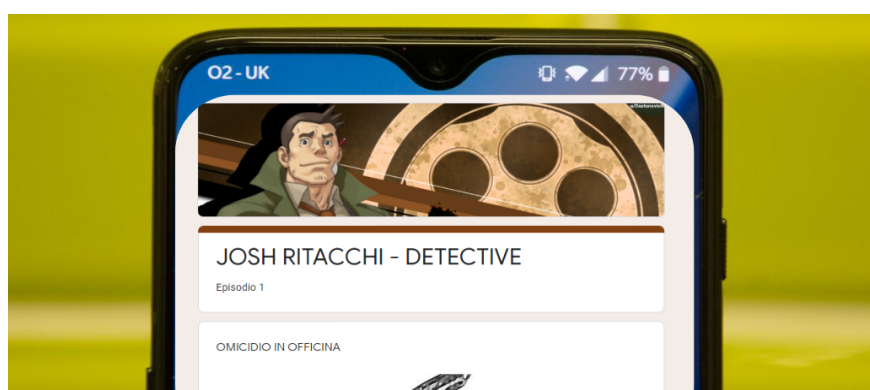


Figure 9 - Application on mobile device

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Developing English-Speaking Skills of Engineering Students Through Project-Based Learning in Uzbekistan

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Official Conference Proceedings

Abstract

Traditionally, engineers are known as problem solvers as they deal with various kinds of issues and suggest possible solutions. One of the vital aspects is to enhance their problem-solving skills from the first year of their studies at the university and at the same time improve their English language skills. Project-based learning is a method that allows students to work in teams and come up with novel ideas and modern solutions to a particular problem. This paper will discuss the efficiency of project-based learning in improving speaking skills in English as well as developing the soft skills of engineering students in Uzbekistan. The freshman students of New Uzbekistan University are provided the chance to present their startup projects to solve the problems they discover in the country. Teams worked together to identify a problem, search for possible solutions, and present their ideas. The process required a month to prepare for the project. This task was assigned to students who were willing to participate in this project. After the presentation, a post-survey was conducted to find out the results of the project-based learning. The participants stated that they improved their English speaking as well as reading skills in the process of preparing the projects. In addition to this, students claimed to have developed their public speaking, teamwork, and communication skills during the project.

Keywords: Project-Based Learning (PBL), English Speaking Skills, Reading Skills, Public Speaking, Teamwork

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Introduction

The English Language is used worldwide as an international or Lingua Franca in many countries. English is the language that helps people with communication, business, and other purposes. One more essential sphere where English is widely used in Education. Many universities and institutions' instructional language is English as this language is appropriate to learn about science, law, business, and engineering. New Uzbekistan University is one of the universities in Uzbekistan which conducts all lectures and labs in English. The students are acquiring knowledge according to the curriculum which is taught by top universities in the world focusing on providing quality knowledge to students.

Most higher education institutes and universities started to focus on developing students' hard skills as well as soft skills such as problem-solving, teamwork, and creativity. Usually, the universities in Uzbekistan equip students with hard skills, however, after graduation students face problems as employees. The reason for that is the lack of personal skills which should be developed along with hard skills. In order to decrease these issues, New Uzbekistan University actively practices Project-based learning, Task-based learning, and Problem-based learning in the process of teaching so that students develop the skills to use at their workplace. Project-based learning is a method that is related to presentations which are considered a form of student-centeredness in teaching (Brown & Lee, 2015). The empowerment provided to students during projects, the process of problem-analyzing, problem-solving and suggesting solutions increases student engagement and active participation (Wurdinger, Haar, Hugg & Bezon, 2007). The utmost goal of the curriculum is to equip students with meaningful knowledge and skills required in the real life. These skills are usually developed in practice by giving the learners real problems to solve. According to Thomas (2000), the project focuses on five aspects:

1. Centrality
2. Questioning
3. Investigation
4. Autonomy
5. Realism

Four major characteristics provided by Kubiak and Vaculova (2011) are:

1. Self-responsibility for learning and thinking
2. Consciousness of social responsibility
3. Use of scientific principles in thinking and action
4. Connection of group activity and output with professional practice

To make the project successful, team members work in collaboration, investigate possible solutions to the problem, think critically, use their creativity, invent or innovate a product and present it. The process requires time, cooperation, responsibility, and dedication. Language learning also does not happen in one hour and involves a long time for learners to reach ultimate attainment (Lightbown, 2000).

As Uzbekistan is a part of expanding circle English Language is learned as a foreign language and the opportunity to use the language at home or outside the classroom is low. Projects are beneficial for communicative purposes and at the same time develop the public speaking skills of the students as they are asked to present their projects in front of the audience.

The observation of educators in Uzbekistan shows the majority of freshman students tend to be shy with low self-confidence in speaking and sharing their ideas. According to Brown (2003), speaking is the result of creative construction and shows language ability in other language skills. It is crucial to help them to confront and overcome their fears and increase their confidence during their university years.

As Ur (1996) stated, there are four main problems with students' speaking during the classes such as 1) being worried to make mistakes, 2) lack of general knowledge to speak about different topics, 3) limited time to speak during the class, 4) speaking in L1 during the class. By implementing PBL with the participants we aimed to decrease the problems students usually face in speaking.

In this study two research questions will be reviewed:

- 1) Is Project-based learning an effective way in developing students' speaking skills?
- 2) What soft skills can learners develop through PBL?

Methodology

Participants

The population of this research is 50 foundation-year students of New Uzbekistan University in Tashkent, Uzbekistan. Students are 17-18 years old and are from different regions of the country. The participants are future software, chemical, and mechanical engineers. The language skills of the students are from pre-intermediate to upper-intermediate as students submitted their IELTS test results during the application process.

They worked in groups of five to find an existing problem in the region and suggest innovative ideas to solve it. The groups presented various topics such as Alternative Concrete, Vertical Farming, Trash to Treasure, Techno Vein, Eco-cooling, Building the Future, and Next Generation batteries.

Findings

The participants filled out the post-survey with the questions to find out their opinion about the progress they made during the process. Three major questions were the focus of the observation.

Question 1

In your opinion, do you think that you improved your English-speaking skills while preparing your project?

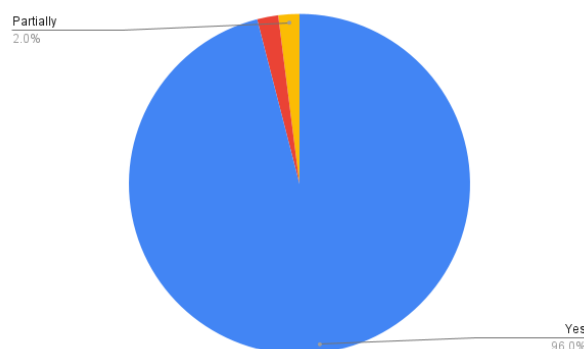


Figure 1: Responses of the participants to Question 1

96 % of the participants stated their progress in speaking skills and only 2 % responded that they do not think so. 2% of the participants observed partial progress in their speaking.

Question 2

What other language skills have you improved during this project?

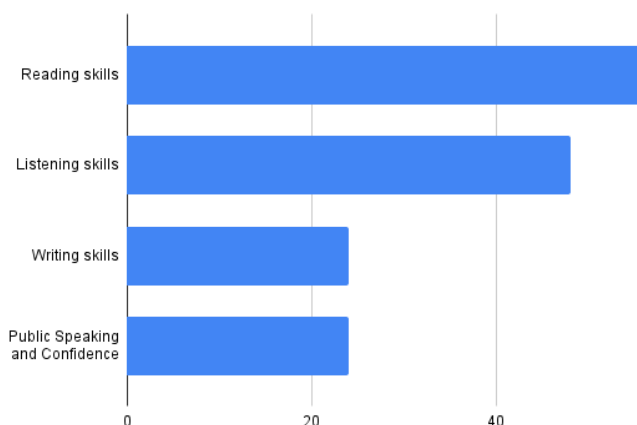


Figure 1: Responses of the participants to Question 2

The chart illustrates other skills students think they developed in the process of preparation. Almost all students developed their reading skills. The majority of students (45 participants) stated the progress in their listening skills. 25 students confirmed the improvement in writing, public speaking, and confidence.

Discussion

The study demonstrates that students make progress in their language skills, especially in speaking and reading during project-based learning. The beneficial side of this approach is students are given empowerment to choose the topic and suggest real solutions. By doing this, the educator motivates students to use their library skills, research, and acquire language. Participants work in collaboration with their teammates which makes the project engaging and productive.

Although, the study has its limitations such as the number of participants and methods in data collection/analysis, the observations of the educator and the results of the survey depict the advantages of Project-based learning for engineering students to enhance their language

abilities and some of the soft skills. In the future, the study can be conducted with a greater number of students and detailed analysis with pre- and post-surveys and tests.

Conclusion

Preparing for the presentations allows students to negotiate the meaning, and interact using authentic topics interesting to students (Celce-Murcia, 2014). The students showed a positive attitude towards working on projects in small groups and presenting their innovative ideas. Project-based learning is an effective way in advancing students' English-speaking skills as they learn a plethora of new vocabulary and practice active reading skills. Additionally, it is efficient in enhancing skills such as reading, listening, and writing. The participants emphasized that they improved soft skills such as confidence and public speaking.

The students with the projects successfully participated in the Start-Up projects competition organized by the university and five winning teams visited the Technical University of Munich in Germany and Sejong University in South Korea for short-term internships.

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Assessment for Learning in Tunisian Higher Education: English Language Teachers' Self-Efficacy and Knowledge Base

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Abstract

Assessment Literacy (AL) has been shown to determine the way assessment is carried out in various teacher-led assessment contexts. Presumably, language teachers should be able to implement theory and policy-supported recommendations for more learning-driven assessment. Following the 2006 higher education reform in Tunisia, research has revealed that teachers either have a limited understanding of language assessment or misconceptions about its pedagogical role. In line with the proliferation of the Language Assessment Literacy (LAL) literature, this study sought to examine English language teachers' Assessment for Learning (AfL) knowledge base and their self-efficacy about their roles as formative assessors relying on an online survey with 153 university teachers. The analysis of the quantitative and qualitative data revealed these teachers' rather deficient AfL knowledge marked by a general uncertainty and misconceptions about assessment purposes *for* learning. Additionally, the participants' self-efficacy was found to be moderate-to-low. This may hamper assessment reform initiatives in this educational context. Thus, this study is a call for further professional development and the adoption of clearer assessment guidelines during reforms.

Keywords: Assessment Knowledge, Language Assessment Literacy, Assessment for Learning, Self-Efficacy Beliefs

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Introduction

New forms of assessment have been gaining ample ground in the last two decades calling into question conventional teacher-led assessment. This has contributed to turning attention towards more “pedagogically-oriented assessment” (Flaitz, 2011; Leung, 2005; Tsagari & Banerjee, 2014) forms. This is referred to as “learning-oriented” or process-oriented assessment (Carless, 2007, p.57). From this perspective, classroom assessment has been redefined to encompass Assessment *for* Learning (AfL) (Assessment Reform Group, 1999; Black & Wiliam, 2006; Bennett 2011; Brown, 2019; Xu & Liu 2009). AfL has been often used interchangeably with Formative Assessment (FA) in the related literature as the outcome of a paradigm shift (Davison & Cummins, 2007; Inbar-Lourie, 2008) in the role of assessment in the language classroom. While formal, more traditional assessment primarily seeks to judge students’ learning outcomes for accountability purposes (Shepard 2000 p.4), AfL is described as a “process of seeking and interpreting evidence” about learning (Assessment Reform Group, 2002) whereby teachers enhance learning through assessment.

This paradigm shift from a “culture of testing” to a “culture of assessment” (Inbar-Lourie, 2008; Lynch, 2001; Shepard, 2000) is grounded in recent epistemological and pedagogical theories. Knowledge has been recently perceived as individually-constructed, constantly changing and contextually-bound (Hofer & Pintrich, 1997). Grounded in socio-cognitive theory (Bandura, 1991), teachers should be able to facilitate their students’ ability to develop (Laveault & Allal, 2016; Nicol & Macfarlane-Dick, 2006; Clark, 2012; Shepard, 2000). There is a consensus in the educational and language assessment literature that “the purpose of AfL is to monitor the progress of the learner toward a desired goal, seeking to close the gap between a learner’s current status and the desired outcome” (Clark, 2012, p. 208). This has been further supported by Assessment as Learning (Earl, 2013) to attribute an even more central and active role to the learner. This highlights the benefits of addressing AfL from a multidimensional perspective including the teachers’ role in knowing and adopting its principles.

Background

To cope with this paradigmatic shift it has become mandatory for practitioners to develop the necessary “assessment literacy” (Stiggins, 1991) for AfL adoption and implementation. Baseline research on assessment literacy in educational assessment (c.f., Stiggins, 2001) and language assessment (Vogt & Tsagari, 2014; Taylor, 2009) define LAL as knowledge and skills with the first construct encompassing the knowledge of “assessment purposes, content and methods” (Xu & Brown, 2016, p.156) in a specific educational context. As part of their professional development and in order for teachers to become “assessment-capable” (Wyatt-Smith et al., 2017, p.304), they need to learn about AfL both theoretically by conducting teacher learning research (Coshran-Smith & Lytle, 1999) and practically by participating in professional training (Vogt & Tsagari, 2014; Fulcher, 2012). In addition to their “pedagogical knowledge about learning and assessment” (Engelsen & Smith, 2014, p.92), teachers’ knowledge base should encompass methods of implementing assessment to support students’ learning (Shepard, 2017). This entails a recognition of assessment as a dynamic process embedded in learning (Kozulin & Garb, 2001; Poehner & Lantolf, 2005).

Most recent research has identified LAL as including a knowledge base (Stiggins, 1991; Taylor, 2009; Xu & Brown, 2016) that teachers need to develop to be able collect, analyse and interpret evidence from assessment and adapt instruction accordingly (Black & Wiliam,

1998; Gottheiner & Siegel, 2012; Laveault, 2016; Lee et al, 2012). LAL has been framed within a much broader perspective of serving learning through the role teachers should be able to take in *informing* and *improving* subsequent learning through assessment (Broadfoot & Black, 2004; Fox, 2008). In fact, Xu and Brown's (2016) model of Teacher Assessment Literacy in Practice (TALiP) encompasses key specific types of knowledge of assessment purposes, content, methods, and feedback, in addition to student involvement in assessment. Interestingly, this model attributes a key role to assessors' *knowledge base* as it is "the basis of the teacher conceptions of assessment", "teacher assessment literacy in practice" and "assessor identity (re)construction" (p.155). A dearth of research has addressed the question of assessment knowledge (Ölmezer-Öztürk & Aydin, 2018) in general and the link between this knowledge base and AfL in particular (Abell & Siegel, 2011; Frey & Fisher, 2009; Laveault, 2016; Michaeloudes & Tsagari, 2016).

Research has shown that the shift in classroom assessment practices is partly dependent on the key stakeholders' knowledge of AfL. Teachers often struggle with understanding FA (Heritage et al., 2010; Michaeloudes & Tsagari, 2016), thus, impacting its implementation (Torrance, 2012). Even when assessment policies promote the benefits of AfL, the teachers' knowledge gap may impede its effective implementation (Leung, 2004; Stiggins, 2002) and even lead to teachers' resistance to change (Deneen & Boud, 2014; Feldman & Capobianco, 2008; Popham, 2009; Vogt & Tsagari 2014). Even in educational contexts where AfL could be partly carried out, "success depended on teachers' determination, pedagogical knowledge and their choice of mediating artefacts" (Webb & Jones, 2009, p.182). This further accentuates the determining role knowledge may play in implementing the necessary assessment changes alongside other personal and contextual factors.

In some testing-dominated contexts, this assessment knowledge base should be viewed in the light of key personal, social, and cultural factors (Inbar-Lourie, 2008). Teachers' adoption of AfL practices as recommended by policy statements have been shown to be problematic partly because of a lack of "professional learning" (DeLuca et al., 2012; Popham, 2009). This has been found to relate to the three factors of "time, ownership and understanding" (Gardner et al., 2011, p.109). Alignment with AfL is often dependent on assessors' identity (Looney et al., 2018; Wyatt-Smith et al., 2010) from assessors of learning to assessors for learning (Xu & Brown, 2016). From a socio-cognitive perspective (Bandura, 2010) self-efficacy also has a mediating role in teachers' conceptual shift. As a motivational factor, self-efficacy may be defined as teachers' *personal beliefs* in their ability "to plan, organize, and carry out activities that are required to attain given educational goals." (Levy-Vered & Nasser-Abu Alhija, 2015, p.383). Assessment knowledge could also be influenced by the prevailing "assessment culture" (Shepard, 2000) through knowledge sharing in the educational community (Inbar-Lourie, 2008). For Xu and Brown (2016), it is important to attend to contextual assessment factors like "policy, cultural values, [and] social norms" (p. 155). Leung (2009) argues that "there may be a system-wide theory-practice gulf between assessment policy and more powerful social and cultural beliefs which militate against any form of non-psychometric assessment" (p. 28). This tension may make the conceptual shift towards AfL more complex in these educational contexts.

This study is carried out using Wiliam and Thompson's (2007) framework (Assessment Reform Group, 2002). The framework includes three key processes about where the learner is going, where the learner is now, and how to achieve learning goals. This is possible through "formative interaction" whereby learning conditions lead to a growth in cognition (Black & Wiliam, 2009, p. 11) to make new learning happen (Shepard, 2017). To bring about change in

terms of learning (Heitink et al., 2016), and “to bridge the gap between the learner’s actual level and the learning goals (Wiliam & Thompson, 2007) assessors should specifically use assessment to connect “objectives, goals, and strategies” (Clark, 2012, p.221) during learning. This is dependent on an adoption of roles as “assessors for learning” (Hopfenbeck, 2018). For AfL to be implemented effectively, teachers should be knowledgeable about five key strategies identified by research. This framework suggests a collaborative process where teachers’, learners’, and peers’ joint efforts (Clark, 2012) make it possible for learning to develop in a *guided*, motivating (Bandura, 2010; Black & Wiliam, 2009) and self-regulated (Nicol & Macfarlane-Dick, 2006) way. This framework particularly attributes a central role to teacher and learner feedback.

The present study was motivated by the lack of domain-specific research on teachers’ LAL development (Fulcher, 2012; Maaoui & Tsagari, 2020; Leung, 2009; Tsagari & Banerjee, 2015) pertinent to the paradigm shift in assessment. Indeed, little is known about whether Tunisian teachers, qua assessors, are aware of the new roles they are required to play (Brown, 2019) in their own tertiary educational contexts. Empirical evidence is specifically needed to determine whether their present knowledge base reflects a preparedness for the implementation of AfL in the current educational context. Therefore, this study addresses the following research questions: What do Tunisian teachers know about AfL principles; 2) How do they conceive of AfL practice; and, 3) What self-efficacy beliefs do they hold about their roles in AfL?

Method

In tune with the change in learning paradigms and instructional frameworks promoting learner centeredness at the turn of the 21st century, the Tunisian Ministry of Higher Education introduced significant language assessment policy changes with an orientation towards formative assessment. It calls for the new system to inculcate a culture of effort where students are encouraged to monitor and self-regulate the progress of their knowledge and “know-how” (Tunisian Ministry of Higher Education, 2006). The introduction of a new higher education curriculum in Tunisia at the turn of the century paved the way for other forms of assessment (Tunisian Ministry of Higher Education, 2006). It is worth noting that the curriculum includes interesting but limited information about some of the assessment orientations policy makers sought to put at the forefront. It is clearly stated that this reform seeks to attain international «standards», to reinforce quality assurance; modernize pedagogy; and guarantee employability (Drissa, 2006).

Data were collected from a random sample of 153 EFL full-time higher education lecturers affiliated to English language teaching departments. They were a majority of female teachers (74%) who responded to a questionnaire online via Google Form. Less than half (43%) of the sample held an MA degree as a qualification while the remainder had either a BA or a doctoral degree. Besides, more than half of them asserted having no certifications in addition to their higher education degrees. Many members of the teaching staff at university have been even described as “unqualified” (Labassi, 2009, p. 249) raising issues of language teacher professionalism.

Based on Wiliam and Thompson (2007), this paper examines language teachers’ AfL knowledge base using a self-developed questionnaire with a high Cronbach alpha coefficient of 0.935. Quantitative and qualitative data were collected with a view to answer the research questions and were interpreted while accounting for five main aspects reflected in the

different sections: (1) knowledge of assessment purposes; (2) language assessment background; (3) knowledge of AfL principles; (4) self-efficacy and AfL; and (5) demographic data. The data were gathered from EFL teachers from the eight Tunisian universities of Tunis, Carthage, El Manar, Sousse, Manouba, Monastir and Gabes. A content analysis of the answers to three open-ended questions (Section 3, on the purposes of using assessment results and scores, and Section 4, on their ability to link assessment results to learner improvement) was conducted in addition to descriptive statistical analysis.

Results

The teachers' language assessment background

With regard to the study participants' language assessment background, the majority of these language teachers (68.42%) reported having good to excellent knowledge and understanding of language assessment in general. As displayed in Figure 1, the responses reflected a specific pattern of knowledge of assessment purposes. In fact, about 24% strongly agree and 30% agree about the importance of "checking learner progress through assessment". However, 37% of the respondents demonstrated a lack of confidence about "enhancing learning" as an assessment goal. Likewise, 34% were *uncertain* about whether assessment aimed at grading test takers' performance and/ or ranking them. These teachers could not take a clear stand as to such matters. This is further confirmed by 37.7% of the teachers who were uncertain about the role assessment plays in motivating learning.

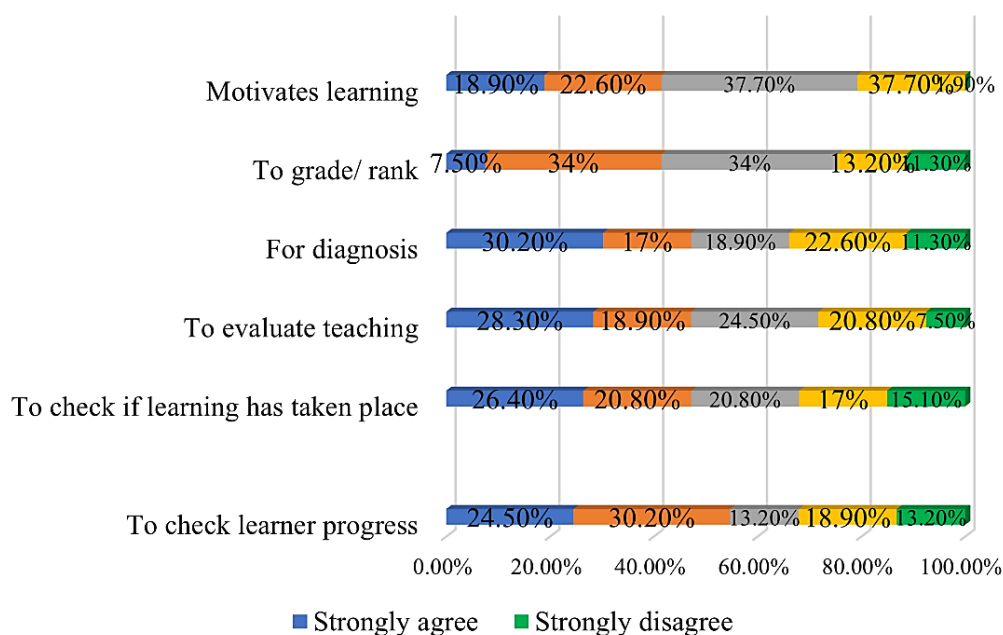


Figure 1. Knowledge of assessment purposes

Knowledge of AfL principles

Figure 2 displays the teachers' reported knowledge of assessment principles. More than half of the participants knew about the importance of feedback and its role in improving learning (62.2% strongly agree). However, less than half (17% strongly agree and 18.9% agree) of them adhere to the principle that peer assessment is useful in checking one's learning. In line with this last finding, these language teachers also demonstrated a significant uncertainty

(34%) about the role of peer assessment in helping learners check the quality of their learning. Likewise, only half (22.6% strongly agree and 28.3% agree) of them were aware of the usefulness of peer-assessment. Besides, just half (24.5% strongly agree and 24.5% agree) of them seemed to know about the value of self-assessment.

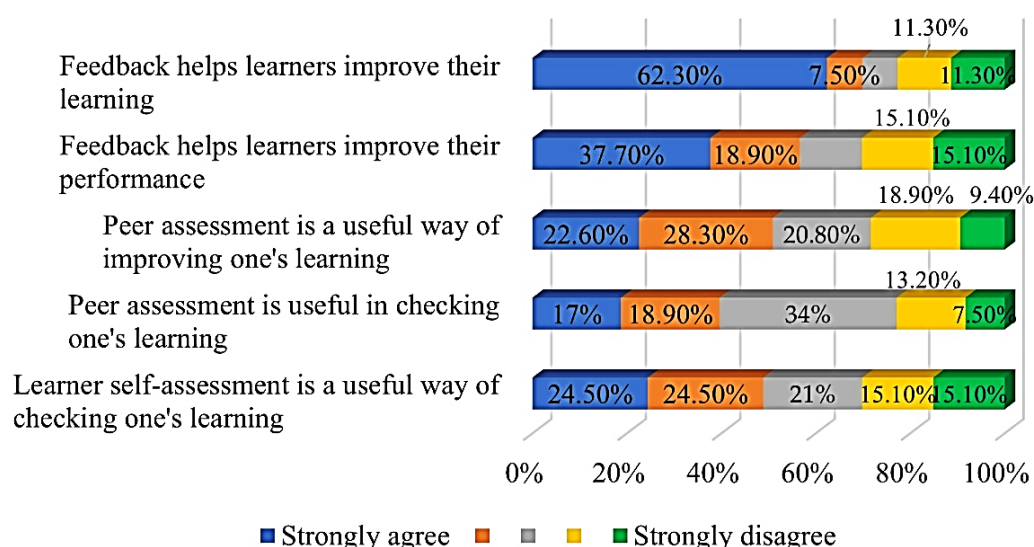


Figure 2: Knowledge of assessment principles

The qualitative question addressing specific assessment purposes (Section 5) was rather indicative of some inconsistencies. When the study participants were asked about the reasons for which they generally use assessment results and scores, their answers reflected different orientations. The count of each of the reasons stated by the participants is displayed in Table 1 below. Eighteen teachers out of the 125 teachers who answered the open-ended question referred to “accountability purposes” dictated by institutional requirements like “exam results”. Even when they mentioned the question of gaining knowledge about learning, 26 teachers mentioned concerns about who is understanding the course and following the teacher. Within the same vein, 36 teachers made the link between assessment and course evaluation. Most of the stated aims are rather product-oriented while only four teachers indicated that assessment guarantees more guidance and improvement of students’ learning. Only six teachers demonstrated knowledge of the role of assessment in enhancing students’ motivation. Meanwhile, “feedback” as a key assessment strategy seemed to be almost ignored.

Table 1: Teachers’ knowledge of assessment purposes

Product-oriented	Process-oriented
<ul style="list-style-type: none"> - To know who is understanding the course and following the teacher (26) - Administrative (6) - Exam results (6) - Written tests (3) - to pass classes (3) - Course evaluation (36) - Self-evaluation (10) - action research (3) 	<ul style="list-style-type: none"> - to cater for students’ needs (10) - to guarantee more guidance and improvement of students/ to enhance learning (4) to improve skills (6) - to enhance students’ motivation (6) - Feedback (2)

AfL assessment knowledge (Section 3) also comprised the teachers' views of techniques providing learning evidence (Table 2). More than half of them opted for AfL techniques like classroom questions (0.25) and learner feedback (0.28). In their explanation of other possible techniques, they did not mention AfL strategies like self-assessment or peer feedback. More than half of the answers reflected a tendency to rely on written tests (0.25) and test scores (0.20).

Table 2: Relative frequencies of the teachers' views of techniques providing learning evidence

Assessment techniques	Relative frequency
Classroom questions	0.25
Written tests	0.25
Learner feedback	0.28
Test scores	0.20
Oral tests	0.00
All of the above	0.00

It was equally important to examine the study participants' knowledge of teacher and learner roles in generating feedback. Figure 3 clearly displays an almost equal importance attributed to both of them. According to more than half of the study participants (54%), teachers should provide assessment feedback very frequently or frequently (37.7%). Almost half (52.8%) of them think that learners should provide feedback very frequently and 26.4% frequently.

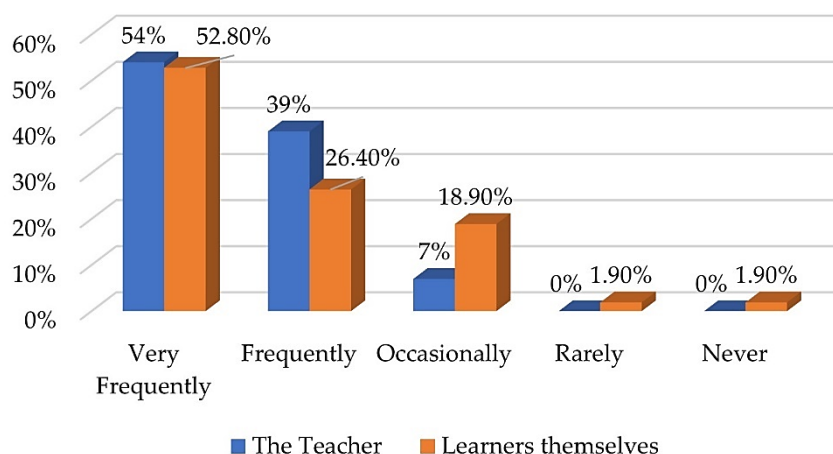


Figure 3: Feedback source and frequency

The teachers' self-efficacy beliefs as assessors

The fourth survey section concerned the degree of the teachers' self-efficacy beliefs of their role as assessors for learning. Figure 4 shows that less than half of them (43.4%) reported having strong self-efficacy about this role. Almost half of the remaining answers reflected a moderate (28.3%) self-efficacy in terms of being "assessors for learning" confirming previous research findings (Hopfenbeck, 2018).

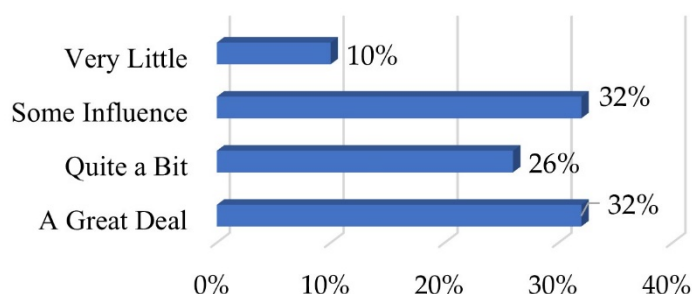


Figure 4: The Teachers' self-efficacy as assessors for learning.

Their self-efficacy as AfL was examined through an open-ended question in the same section. About one third of the participants referred to “formal assessment to improve learning” in a fuzzy way. For one teacher, “there is no direct link between learning and the outcome of formal assessment” because of “exam conditions”. Similarly, another teacher admitted that he can do this “in no way”. Another category (more than half) pointed out to the use of summative, achievement testing without explaining how this would serve their students' learning or if they *can* do this in the first place. This reflected a low self-efficacy in using assessment to drive learning for more than half of them.

About one fourth of the participants mentioned AfL related self-efficacy describing what they can do with their students to enhance learning. For instance, four teachers referred to their ability to “take care of their students” individually. Some (16) of the informants described their ability to enhance learning through assessment as they rely on “remedial work” (11), “backwash” (4), classroom “discussions” (3), “questions” (3) to check their progress in addition to raising their “students' awareness about their weaknesses” (2) and “errors” (6). However, only four teachers mentioned their ability to provide “feedback” to help their learners improve. Exceptionally, one teacher explained that he can “show whether the students have reached the learning objectives or not” and only one participant seemed to have the ability to encourage learner feedback. Nevertheless, none of these teachers mentioned their ability to use peer feedback. Surprisingly, only one teacher stated that “improvement can be measured through continuous assessment” for students' progress.

Conclusion

The results may confirm previous research findings on EFL teachers' insufficient assessment knowledge (Black & Wiliam, 1998; Fulmer et al., 2015; Maaoui & Tsagari, 2020; Tsagari & Vogt, 2017). This might be explained by the absence of “professional learning” (Popham, 2009) and academic training in this area. It could also be the outcome of the prevailing language assessment culture (Inbar-Lourie, 2008) that is more in line with accountability-based formal assessment. These findings have shown that the teachers were generally not knowledgeable about some key AfL purposes and principles like feedback. Without considering learners as “actors” in the learning process (Wiliam & Thompson, 2007), teachers may not be capable of using instructional strategies to “activate” learners as “instructional resources for one another” (p.64).

These Tunisian higher education teachers' moderate-to-low self-efficacy of their roles as assessors *for* learning have equally revealed some challenges bringing to light the teachers' difficulty to make the necessary conceptual shift to achieve the intended educational goals (Levy-Vered & Nasser-Abu Alhija, 2015). Various contextual and personal factors might

have shaped this knowledge. The teachers' responses and overall discourse confirms earlier research findings in the local context (Maaoui & Tsagari, 2020). It would appear that AfL cannot be introduced by policy change alone. A great deal of teacher development work is still required to enhance FA knowledge and implementation (Leung, 2004). The tension caused by the old and new paradigms of assessment *of* and *for* learning would not only lead teachers to a state of uncertainty but also widen their knowledge gap. This would in itself prevent the adoption and use of FA (Broadfoot & Black, 2004) for these teachers. Pedagogically, adequate assessment guidelines may help in providing frameworks for the adoption of AfL. Supporting a national agenda to raise the quality of EFL assessment in higher education institutions in Tunisia should be supported by clear *standards* for language assessment.

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Promoting Teacher Confidence With Technology Through Risk Taking and Organisational Changes: A Welsh Perspective

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Abstract

There is no doubt that technology is a powerful pedagogical tool, playing an important role in learning within and outside of the curriculum at varying levels of education. In Wales, the recent curriculum changes, and the emergence of the Digital Competence Framework (DCF) means that primary and secondary schools and teachers across are now responsible for creating “learners [who can] thrive in an increasingly digital world”. To nurture digital competence in school pupils in Wales, we need to understand how teachers feel about using technology in their teaching practice and how confident they are with promoting and cultivating digital competency amongst their learners. This paper aims to give a snapshot of how teachers are feeling, particularly after a disruptive shift to moving learning and teaching online during the COVID-19 pandemic. For many teachers, this dramatic shift in their practice took them totally out of their comfort zones and presented many challenges along the way. Through findings from a longitudinal qualitative study with one school in Wales, specifically through a series of semi-structured interviews, we learn that taking risks is an integral part of changing teachers’ practice with technology. Whilst COVID-19 presented many challenges for teachers, positive experiences during this period has the potential to foster confidence amongst teachers for the future. The question now is, how do we support teachers to take risks with technology and make this change in their practice?

Keywords: Online Learning, Teacher Confidence, Best Practice, Risk Taking

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Introduction

The ongoing development of digital technologies is undoubtedly one of the most prominent features of the past thirty years and although education is an integral part of the ever-changing contemporary world, it is impossible to ignore its connection with technology (Selwyn, 2012). Teachers are being challenged to improve student learning by effectively integrating new pedagogies and technologies (Beetham & Sharpe, 2013).

Previous research into technology in education has highlighted that many approaches to technology integration offer a one-size-fits-all approach when, arguably this does not always fit teachers' existing pedagogical beliefs and practices (Mishra & Koehler, 2007).

It has been argued that the most common reasons teachers are often most reluctant to using technology is largely down to existing beliefs and a lack of knowledge and self-efficiency (Ertmer & Ottenbreit-Leftwich, 2010). The challenges faced by teachers when using technology for teaching and learning have been largely exacerbated during the COVID-19 global pandemic (Crick et al., 2020). During lockdown and school closures, learning, teaching and assessment was delivered solely through the means of technology, presenting a whole new wave of challenges for teachers across the education sector.

It's no surprise that school closures due to the pandemic have increased teachers' engagement with technology. While access to technologies has significantly increased and some teachers have rapidly adopted this new practice, adopting new technologies and related teaching practices still presents significant challenges for many teachers and continues to cause considerable uncertainty and anxiety. Altering teacher beliefs is one of the key challenges of adopting the use of technology and it has been suggested that this immediate change may begin with developing teacher confidence (Ertmer, 2005).

When a teacher is asked to use technology, it is suggested that at least some degree of change is required (Ertmer & Ottenbreit-Leftwich, 2010); risk is an integral part of change (Howard and Gigliotti, 2015). Teachers' concerns about technology integration are indeed related to confidence, beliefs and attitudes about teaching and technology (Ertmer, 2005; Petko, 2012); but it is also about how teachers feel about taking risks and experimenting in their practice. In the following sections, the authors of this paper will address how teachers can be encouraged to take risks with technology. In particular they will, use the experiences and lessons learned from the study as a motor for increasing teachers' overall confidence with using technology effectively in their practice.

Literature Review

Leadership and risk taking

Educational leaders play a pivotal role in determining a school's climate and reputation; it is this culture that forms the environment within which teachers and pupils work. Leithwood (2009) found that successful leadership can play a highly significant and frequently underestimated role in improving student learning. Sun & Leithwood (2015) discussed that this learning/ impact happens directly through the teachers. In their study they 'identify four distinct teacher emotions which have significant effects on student learning—collective teacher efficacy, teacher commitment, teacher trust in others, and organisational citizenship behaviour' (Sun & Leithwood, 2015, p.1). Indeed, resilience in teachers is not just a personal

attribute or trait, it is something that is nurtured by the intellectual, social and organisational environments in which teachers work and live (Day & Gu, 2013). The culture of a school for teacher's learning, attitude and confidence building is crucial. However, like most similar initiatives 'encouraging collaborative teacher inquiry focused in classrooms and finding strategies to facilitate 'double-loop learning' at school level, is challenging and demands the development of cultures and structures of support' (James et al., 2007, p.1).

COVID-19 increased this challenge and teachers more than ever needed the support within their schools to be able to take risks to ensure that their pupils were educated (i.e. challenged, nurtured and encouraged). In their study, Wahab et al. (2020), show that there was a significant relationship between the headmaster instructional leadership practice and the performance of the teachers. Virkus & Salman (2020) identified 'encouraging open communication and creating a positive and collegial work atmosphere' as one of six of the effective leadership behaviours within a higher educational setting. Countering this, when there is the absence of leadership, the demands often exceed the worker's abilities, causing exhaustion, depression and/or stress (Saldaña Orozco, 2019). In this current online learning climate, teachers need the confidence to be able to try a new software application or a new online communication platform etc. But more than this, they need an open dialogue in their schools, a culture to be able to plan for risk taking and the ability to leverage a community to share best practice. As Radloff et al. (2019) found there are four types of perceived risks which included practical, pedagogical, conceptual, and personal; these varied between different generations of teachers. Significantly, they found that the benefits of risk-taking include increased student engagement, improved self-confidence, and greater teacher collaboration across generations (Radloff et al., 2019). Furthermore, Slavit et al. (2016) highlight the power of doing and risk-taking in teacher development, particularly in the ways in which teacher collaboration advances curriculum and instruction. In their research, Grohnert et al. (2019, p.1) emphasises 'Learning from errors is crucial for individuals' as well as organisations' performance. In terms of education, school leaders need to give teachers the freedom to take risks, to make mistakes and to evolve and learn (i.e. to be actively encouraged to figure out what works for them).

Sharing best practice and creativity

The rapid increase in the number of school pupils, particularly during COVID-19, that needed flexible and remote digital learning experiences, highlighted the limited teaching resources, skills and often confidence of many teachers to deliver these experiences. For example, in their paper, Asgari et al. (2021) talk about urgent and careful planning that was needed to mitigate negative effects of the pandemic on education (engineering) that has been traditionally content-centered, hands-on and design-oriented. Indeed, teachers being compelled to the online format of delivery and content creation during COVID-19, added a new layer of complexity to their teaching. As Maslow's hierarchy of needs highlights our motivations are dictated mainly by the circumstances, we find ourselves in, and there are certain 'lower' needs that have to be satisfied before we are motivated towards 'higher' achievements (Green, 2016). In this instance, teachers were firstly motivated by the need to establish online communications links with their pupils, secondly, if they had the capacity/motivation/ability they looked at making these communications (and the content shared during these communications) engaging and creative. In the aftermath of COVID-19, we are finding a strong need to support schools/school leaders to think about how they need to create a culture for teachers that will facilitate learning about online technology and pedagogy from one another.

In the physical and face to face classrooms, teachers have successfully engaged in varied practices to promote and develop creativity in learners and amongst one another for years. However, when everything went digital during COVID-19, things were turned upside down for many teachers. Jones & Kessler (2020, p.1) described it as ‘the COVID-19 pandemic has caused the nation's teachers to enter into a shocking, and at many times painful, natural experiment’. They wrote about ‘Teacher education is at a crossroads’ (Jones & Kessler, 2020). As Al-Rasheed & Berri (2017, p.1) note, computer technologies have reshaped the roles of instructors and this in turn ‘engenders new experiences of teaching that need to be gathered and capitalised as teaching assets to be shared among communities of instructors’. It is true that the rapid development of technology can demand innovation and creativity in learning activities (Rachma et. Al, 2020). And, for many teachers, it has been like a weather whirl wind that caught them off guard. However, many organisations are pushing the sharing of good practice and lessons learnt to support each other through this age of digital transformation (Reimers, 2020). This is encouraging some teachers to even capitalise on the digital development of technology enhanced teaching to increase the experience of connectivity and creative communities within their schools (i.e. HWB, google classroom, Microsoft teams etc.). By creativity we mean the ability of teachers to confront learners with ‘challenges in which they need to share knowledge and experience with others in order to figure out and make sense of these in new and innovative ways’ (Kop & Carroll, 2011, p.5). In their study, Apak et al (2021) found that that teachers' creativity-nurturing behaviour is significantly different according to teaching experience. They discussed how ‘teachers should stimulate positive changes in pedagogical practice to transform the classroom into a more active learning community with greater potential for creativity’ (Apak et al.,2021, p.1). For example, during Covid-19 Carpenter et al. (2021) shared collaborative models to empower the sharing of ideas, resources, best practices, and emotional support; and ultimately guide their campus communities to success.

Moving to an innovative mindset

However, it seems educators have lost their passion for innovation and creative engagement, perhaps because of the incessant requirements through pandemic emergency teaching that requires a high level of learning, passion and supporting of students ((Kunnari & Ilomäki, 2016). So, how do we balance these new demands of being online educators, who are expected to be working 24-7 online, with still being enthusiastic for the facilitation of creative and active engagement? Can understanding how academics innovate, for instance by understanding how they move from a fixed mindset to being geared towards a growth mindset (Dweck, 2015) actually help learners become engaged in a similar process, from being outcomes based towards being process based. Are there commonalities in how academics are innovating, who they are, or what they are innovative in, contributing to how an academic department supports evolutionary practices to become more widely adopted? How important is the taking of risks in this transition?

The purpose of education

But before discussing how teachers might feel more confident in using technology in creative ways, it is important to reflect on the purpose of and how this might relate with technology. Biesta (2015) highlighted the purposes of education; to have three components: accreditation (working towards a diploma), socialization (supporting people in society) and as third what he called subjectification, in effect encompassing human growth. These three components should be kept in mind when developing educational experiences as all three are vital in our

work, to help institutions, students and society evolve. In the past educators have emphasised that it would be desirable to move the control over the educational experience from the institution to the learner (Illich, 1971, 1972). Illich's ideas of 'community webs' can be seen as examples of how to arrange the connections people might foster during the learning process and are a strong precursor to the online networks envisioned by Siemens (2005) and Downes (2019) that they say could break the institutional grip over learning and foster the development of informal personal learning ecosystems with the learner firmly in control over their own intentions, activities and interests. Moreover, Freire emphasised already some time ago (Freire & Macedo, 1999) the need for teachers to help people's conscientisation, becoming aware of the unequal power relations in society and how to teach and learn in ways that help people work toward achieving more just outcomes in society. This involves being a teacher in the sense that Palmer (1998) describes as: "being present with heart and soul"; being authentic in the work as teachers and ensure a personal connectedness with the students. This is a very different role than that associated with a facilitator in an online environment, or as a node on a network. It means that in the complex everchanging context of education, the role of educators is not simply to transfer knowledge or facilitate information sharing, but rather it involves the engagement in dialogical interaction with learners and to ensure the active engagement of learners in their own learning process with support from knowledgeable others.

Research Design and Methodology

Purpose of the study

This study forms part of a wider in-depth longitudinal PhD research programme, exploring Welsh secondary school teachers' understanding, perspectives of and attitudes towards digital competency and using technology in their teaching practice, in light of the new DCF (2018) for Wales.

This study has revealed some interesting findings around how enabling teachers to take risks with technology and positive experiences of technology use during the pandemic has helped teachers' grow their confidence and practice with technology. In particular, this paper will share some key findings from one school (School Z) in Wales who has been involved in the wider PhD research programme.

Approach

This longitudinal (Mar 2020 – Mar 2022), qualitative study used a Design-based research (DBR) approach; Often the challenge with research in education is the detachment between the research and practice in context (Shulman, 1999). DBR has the ability to posit a synergy between research and real-world practices (Wang & Hannafin, 2005) and affords greater teacher input and agency in the design of desired outcomes/recommendations (Zinger et al., 2017).

An initial online survey was sent out to participants and was used to gather teachers' initial thoughts on using technology in their practice which was then followed by a series of semi-structured interviews to provide deeper insight into teacher attitudes and perceptions towards using technology and their own digital competence. These were followed by a series (4) of action learning workshops which were designed to provide participants with an opportunity to share their thoughts and experiences of using technology and to identify successful

approaches to effective technology integration in the curriculum. This paper will discuss the results from the interview data alone, which highlights some interesting findings about the importance of encouraging teachers to take risks with technology and how positive experiences of COVID-19 have fostered confidence amongst teachers for the future.

Participants

Secondary school teachers often have fewer digital skills and exposure to technology for learning and teaching than their primary colleagues and therefore may be less prepared to deliver the DCF with confidence and ability (Estyn, 2018). Traditionally, the use of information communication technologies (ICTs) in secondary school tends to sit discretely in the ICT department presenting fewer opportunities to effectively embed technology across other areas of the curriculum. As a result, secondary teachers from other subject disciplines are likely to be less familiar with using technology and less experienced. Adapting convenience sampling, secondary schools who were happy to participate in the study were invited to distribute the initial survey to their teaching staff.

One secondary school in Wales agreed to take part in an in-depth case study as part of the wider PhD programme. From the individual school, (p=26) participants completed the initial survey and those that were happy to be contacted following the survey were invited to a semi-structured interview (p=3) and a series of action learning workshops (p=5). It was important that a range of subject disciplines were represented across the participant group and participants included teachers of Art, Computer Science, Mathematics, and members of senior management within the school.

Findings and Discussion

The findings of this study demonstrate how risk taking is an integral part of developing teachers' practice with technology. Findings reveal how taking risks with technology, positive experiences of technology use during COVID-19 and sharing of good practice with others can foster teachers' confidence with using technology in their practice. A thematic analysis using NVivo identified several themes from the interview data, the results are presented in the form of discussions below.

Supportive styles of leadership encouraging 'play time' with technology

Semi-structured interviews revealed the importance of positive and influential styles of leadership that foster confidence and trust amongst teaching staff within a school. School Z recently appointed a new assistant head teacher before the COVID-19 pandemic. Teacher participants (P2) (P3) during the interviews made comments on the impact that this change has had on the organisational culture of the school and the increased support for using technology. There was a real sense of positivity around how changes in leadership encouraged staff to experiment and 'play' with technology. One participant discussed in detail how the changes in leadership within the school was integral to how the school adapted to teaching and learning online during the pandemic.

'[our new head] has been integral and has pioneered a lot [during COVID]' (Participant 02).

The same participant also discussed the benefits of the supportive leadership style within the school, emphasising how being encouraged to make mistakes and learn from them, having

greater agency in decision making and being involved in new initiatives (digital working groups, digital champions) has enabled them to try out new ideas and learn from others. This in turn, has impacted teacher confidence and self-esteem across the school with using technology. Indeed, as Day & Gu (2013) suggest, teacher resilience is not just a personal attribute but something that is nurtured by the organisational environment.

‘[he] allows you to empower your own learning and gives you the freedom’ (Participant 02).

Members of the leadership team within the school were also interviewed as part of the data gathering process and revealed the importance of giving staff the ‘space’ to try new things, encouraging them to make mistakes and learn from them, in order to grow their confidence with technology. For school Z, whilst COVID-19 presented many challenges, it also presented many opportunities to use this time to try out new technologies and a new way of working. Very early on during the pandemic, the leadership team within the school set up several initiatives (digital working groups, digital champions, digital newsletters) to encourage staff to share their challenges and try out new ideas.

‘...it’s about doing lots of experimenting and lots of deleting/redrafting things’ (Participant 03).

‘many staff will say they are ‘not very confident or not very experienced [with technology] ...it’s not my thing. But at the end of the day, if we drag the majority of this staff body, a majority of teachers are slowly getting more confidence using technology more making mistakes and learning from them’ (Participant 03).

The style of leadership in school Z emphasised the importance of providing reassurance to teaching staff, both during a time of challenge (COVID) but also to enable teachers to grow their confidence using technology, a key driver for implementing the DCF in Wales. One participant (P1) made comments on the importance of embracing a non-judgmental approach to leadership and one that encourages innovation so that teachers feel well-supported and confident to try new ways of teaching with technology.

‘I think the habit of teachers having that feeling of being judged in everything they do, and judged along very narrow KPI’s, the shackles are slowly coming off, you know’ (Participant 01).

Embracing a change in ‘culture’

It is evident that, when teachers’ are asked to use technology, at least some degree of change is required (Ertmer & Ottenbreit-Leftwich, 2010). This study revealed that this is not just about teachers’ change in practice, but the culture change of an organisation and the way in which teachers’ are supported and encouraged to develop their practice.

Participants with a leadership role at School Z made many references during interviews to ‘embracing a change in culture’ when talking about teachers use and experiences of technology and preparing for the DCF in Wales. One of the participants suggested that a core ingredient for effective use of technology ‘is that culture of being supportive and non-judgemental’ (Participant 03) and suggested that in order for teachers to use technology effectively, they need to think differently. This same participant made further comments on the importance of embracing a non-judgmental approach to leadership and one that

encourages innovation so that teachers feel well-supported and confident to try new ways of teaching with technology, without worrying if they get it 'wrong'.

'we need to create a culture that is non-judgemental...that is supportive and that encourages innovation and encourages risk taking...[and think] right so it's not the end of the world, where did it go wrong' (Participant 03).

Another participant (P1) during the interview made comments about the intense pressure that teachers are often working under and made comments to suggest that teachers' creativity and willingness to try new things is often down to workload and feeling 'judged'.

'there is a habit of teachers having that feeling of being judged in everything they do, and judged along very narrow KPI's' (Participant 01).

When talking about the approach to leadership within the school, it was clear that senior managers were keen to encourage and not stifle innovation with technology. The same participant (P1) made comments on how they could see the positive impact of the non-judgemental and supportive approach to leadership had on teaching staff in the school.

'the shackles are slowly coming off, you know' (Participant 01).

The importance of sharing best practice and learning from each other

Participants discussed a number of new initiatives to promote best practice with technology that have emerged in school Z since the pandemic started. These included a digital working group, a series of digital champions, a digital library, and other means of encouraging teachers to work together, share good practice ideas and learn from each other.

'thankfully, due to COVID and there's not many things that are thankfully due to COVID but we've got our own digital library [offering] tutorials and resources' (Participant 02).

'Staff themselves run tutorials for other staff and upload these to the digital library' (Participant 03).

'we've got staff giving each other hints and tips and problem solving and questions and answers' (Participant 03).

All participants commented on how these new initiatives have had a positive impact on staff confidence with technology and stressed the importance of how being able to connect and collaborate with other colleagues gave them the confidence to try out new ideas and 'give it a go'. One participant (P2) discussed the benefits of being involved in the digital working group specifically and commented on how this has improved teacher agency in decision making across the school. This group was used as a vehicle to discuss developments with technology across the school and was used to identify teacher needs and requirements to integrate technology effectively in their teaching and responded to those needs.

'being part of that group...was really interesting, really good stuff' (Participant 02).

Participants also discussed the importance and benefits of engaging with external networks i.e., other schools to share good practice and ideas. Participants discussed the benefits of

working with colleagues from other departments and schools, not only did this help provide teachers with a strong support network during COVID but has also been a key factor in preparing for the DCF and the new curriculum in Wales.

‘we’ve actually learned from other schools and what we’ve looked at so starting from scratch made it easier in some ways’ (Participant 02).

‘Through the new curriculum we have to collaborate with other departments and other subjects ...and those conversations are taking place’ (Participant 01).

This collaboration and the making of connections between teachers from different subject areas can lead to cross fertilisation of good practice, heightened creativity which in turn can influence the design of effective learning experiences and the sharing of novel teaching innovations.

Conclusion

Given that this research only demonstrates a single case in Wales, although not generalisable, it is vital that teacher confidence with technology is nurtured and supported by senior leaders. Of the lessons learned, teachers must be encouraged to take risks with technology and schools need to adopt a culture that is non-judgmental and supportive, a culture that can inspire change. The COVID-19 pandemic has presented many challenges across the education sector and has no doubt pushed many teachers outside of their comfort zones with using technology. But in turn, this turbulent time has been a key vehicle in driving change amongst the sector, specifically relating to the use of technology for teaching and learning. Teachers' positive experiences of technology use during the pandemic and the significant growth of communities to share best practice amongst the profession has, inevitably increased teachers' confidence with using technology and offered many lessons than can inform innovative practice in the future.

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Fostering the Academic Transition of International Students Who Are Ethnoculturally and Linguistically Diverse in Postsecondary Education

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Abstract

The need for more services and support for the academic transition of international students is evident as their population continues to increase in postsecondary institutions. There is also need for faculty to have a deeper understanding of how international students transition academically, and how they can use the knowledge to guide academic support development. This phenomenological study examined the personal experience of international students who are Ethnoculturally and linguistically diverse (ECLD) with academic transition to postsecondary education. The focus was on international students with educational backgrounds and experiences outside of Canada and how they adjusted to academic writing and teaching approaches in a Western Canadian university. Data were collected using semi-structured interviews with eight purposefully selected international graduate students. A content analysis of related documents from the location of the study was used for data triangulation. All data were analyzed using an interpretative phenomenological analysis, resulting in the creation of the following superordinate themes: teaching and learning approaches, challenges, types of support and suggestions for improvement. Findings from this process revealed that disparities in one's social and educational background may conflict and critically affect an international students' academic transition.' The findings brought to bear culturally responsive practices that postsecondary institutions can adopt as they develop programs and academic support services for students. The study also provided recommendations that can be implemented to ensure the smooth transitioning of all international students.

Keywords: Academic Transition, International Students, Postsecondary

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Introduction

In recent years there has been a steady increase in international student enrolment in Canada. Ranked as the third-leading destination of choice for international education (El-Assal, 2020) the country recorded its highest recruitment of over 720,000 international students across all educational levels in 2018 (Government of Canada, 2019). There are now over 220 nations represented amongst the international student population and a large portion of these students are registered in postsecondary institutions (Canadian Bureau for International Education [CBIE], 2018). In addition to the demographic changes, international students have also deeply enriched the learning experience of all students (Sui & Bill, 2014). International students produce and disseminate knowledge (Guo & Chase 2011) by giving global perspectives on classroom discussions (Gold, 2016) and also bring new perspectives to research (Trice, 2003) that serve as a long-term intellectual benefit to their respective institutions. Additionally, their presence allows increased intercultural interactions on the campuses (Sui & Bill, 2014; Trice, 2003).

While the enrollment of international students continues to rise, there is a growing body of literature on academic transitional issues they face in postsecondary institutions. The academic challenges include poor academic writing (Cennetkusu, 2017; Maguire, 2011), conflicting learning and teaching styles (Ding, 2016; Gu et al., 2010; Huang & Klinger, 2006; Keefe & Shi, 2017; Huang & Klinger, 2006; Quan & Sloan, 2016 & Xu, 2015), cultural dissonance (Furnham, 2004; Rientes et al., 2012; Keefe & Shi, 2017 & Kovton, 2010) and language barriers (Ding, 2016; Gu et al., 2010; Huang & Klinger, 2006; Keefe & Shi, 2017; Quan & Sloan, 2016). With these matters in mind, Hughes and Smail (2015) pointed out the need to establish adequate services to address issues concerning *academic transition*. For the purposes of this study, *academic transition* refers to the process of adapting to a new learning environment. Adjusting to a new environment is a multifaceted process which literature has proven to be complex experience for international students.

International students are from diverse ethnocultural, linguistic and educational backgrounds who should not be treated as a homogenous group (Popadiuk & Arthur, 2004). Differences in educational experiences, cultural norms and expectations are all factors that significantly affect their adjustment to their new academic environments (Kovton, 2010). Therefore, host institutions should influence the integration of international students (Brunsting, Smith & Zachry, 2018) through faculty functioning as bridge builders, community creators, and facilitators to enhance their learning experience (Gay, 2010). Although postsecondary institutions have restructured pedagogy to assist the academic transition of international students, Bygrave et al. (2014) argue that there are faculty members who are not amply trained to facilitate the diverse learning needs and concerns of the international students. Dimitrov and Haque (2016) agreed with this claim and added that this is because they are inadequately prepared to work with the variety of cultures and languages that have recently joined their classrooms.

Postsecondary leaders, including the instructors and administrators, should be aware of struggles that international students face and how their learning is shaped by their previous experiences (Xu, 2015). Interestingly current literature is silent on how postsecondary leaders should effectively support the academic transition of ECLD international students. It is against this background that this qualitative study explored the learning experiences of international students and the root factors that affect their adjustment to the postsecondary institutions. Focus was on students with educational backgrounds and experiences outside of

Canada and how they adjusted to academic writing and teaching approaches in a university in Western Canada.

The Conceptual Framework

The conceptual framework in this study applied Schlossberg et al.'s (1995, 2012) transition theory as a systematic framework for understanding the academic transition of ECLD international students. As illustrated in Figure 1, Schlossberg's (1995) original model framework for transition theory was modified to portray how academic transition for international students occur in three phases (moving in, moving through, and moving on): approaching transitions, the 4 S system (situation, self, support, and strategies), and taking charge. This study supported Schlossberg et al.'s (1995) stance that an in-depth exploration of these three phases will unveil the essence of academic transition.

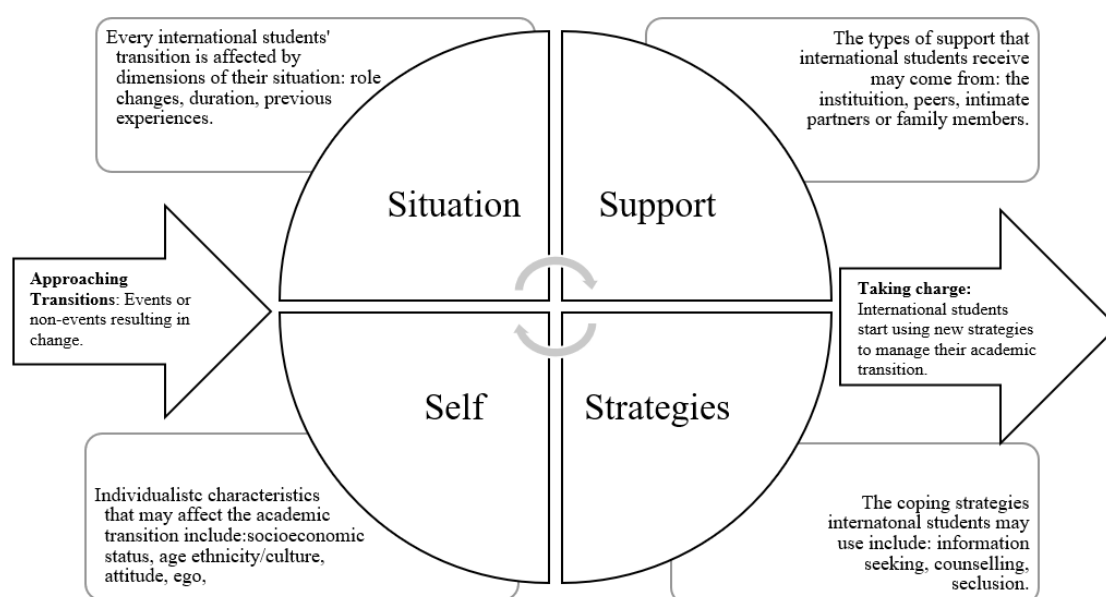


Figure 1: Conceptual Framework: Academic Transition of International Students who are Ethnoculturally and Linguistically Diverse

Methodology

Phenomenology was used as methodological approach for data collection and analysis. Unlike the other research approaches that investigate the development of an event or situation (Mertler, 2019), this phenomenological research strived to describe and deeply interpret intense human experience of a particular phenomenon. For this study, the phenomenon in question, was academic transition- the process of adapting to a new learning environment. By examining in-depth individual experience of ECLD international students', this study at analyzed how various participants experienced the phenomenon with the aim of establishing the essence of the experience (Creswell & Poth, 2018; Okoko, 2019).

Eight international graduate students at a western Canadian university were purposefully selected for this study. Four students were enrolled in Masters' programs and the other four students were registered in PhD programs. The participants represented seven countries and three continents: Asia, South America, and Africa. Ten native languages were identified amongst the participants. Six participants had English as a Second Language (ESL), and the

other two were native English speakers. All students completed their previous education up to the undergraduate level in their home countries. Semi-structured interviews were used to collect data from participants in a university in Western Canada. A content analysis of documentary evidence that explained the phenomenon was also used for data triangulation.

Conclusion

The study provided much-needed insight into the essence of the academic transition of ECLD international students in postsecondary education. Conducting a phenomenological study of this nature, required an in-depth examination of the participants' lived experience to make sense of the academic transition of international students. After a thorough analysis of the data, four themes were discovered that encapsulated commonalities across the participants' stories and unearthed the essence of the academic transition of ECLD international students.

The study revealed academic transition of ECLD international students was intrinsically linked to the following aspects: i) teaching and learning approaches, ii) challenges, iii) types of support and iv) suggestions for improvement.

Teaching and Learning Approaches

It was evident that the influences of previous educational and cultural experiences were central to ECLD international students' academic transition experience. Therefore, adjusting to postsecondary education that had unfamiliar and, in some cases, divergent principles and practices took time and effort. For instance, participants found the teaching and learning approaches in Canada to be more interactive and inclusive as instructors utilized more learner-centred teaching approaches. Instructors would encourage students to participate in open classroom discussions where students would give their perspectives on academic topics, deliver presentations, and contribute to group activities. Aside from class participation, writing was also a significant component of graduate studies. Participants learned how to write with a more authoritative style that displayed critical thinking, had substantive sources, and upheld academic integrity.

Challenges

Experiencing change can also be difficult, as the participants recalled being faced with transitional challenges mainly at the beginning of their programs. Most participants were novice to learner-centred teaching approaches, as their previous schools had more teacher-centred classrooms. Participants explained that in their teacher-centred classroom, the instructor played a more active role; they would present new information to the class, and the student's main role was to listen. Therefore, adjusting to a learning environment where there was an apparent difference in the academic culture was challenging for some participants. The study revealed linguistic, social, and cultural factors that affected the participants' transition.

Types of Support

Over time the participants were fortunate to have access to various avenues of support which helped them overcome their challenges with academic transition. Students received support from the university, peers, and family members; occasionally they also relied on themselves.

Most academic support came from the university, which provided various support services through faculty and student volunteers.

Suggestions for Improvement

Although they held in high regard the level of support they received from the university, it is evident from the findings participants felt there was more they could have done to improve the transitional experience of ECLD international students. Participants suggested that the university elevated transitional support by creating more opportunities for social integration with domestic students, recruiting more experienced student volunteers, enhancing pre-arrival support, introducing mandatory intercultural training for faculty, and improving strategies for teaching multilingual learners. By creating more holistic opportunities for social integration between international and domestic students, universities could dissolve international students' feelings of isolation. Additionally, it creates more cultural awareness among the student population and helps normalize more intercultural activities on school campuses. While it is important to have student volunteers in academic support units, the participants remarked they would have benefited more from other international graduate volunteers. Participants also expressed that the introduction of elevated pre-arrival support could also drastically improve international students' transition to the school environment. By pairing them with other registered students before arrival, they could arrive on campus feeling more prepared and focused on their academic transition.

Participants also voiced that increased enrollment of diverse international groups requires mandatory intercultural training for faculty and staff. This training will improve faculty and staff's understanding of the students' previous learning experiences, and that knowledge will encourage their teaching strategies. Finally, participants appealed for instructors to revamp their teaching strategies for multilingual learners. Using more neutral language and speaking at a slower pace will enhance ESL learners' classroom experience. Overall, the study has met its objectives and has filled a gap in the literature on the academic transition of international students at the postsecondary level. The results of the study confirm useful information for educational practitioners and policymakers to consider when making decisions about supporting international students.

Implications

Findings from the research helped to achieve the study's purpose of examining international students' academic transition in postsecondary institutions. The results also have implications for practice, theory, and future research on the academic transition of international students who are ethnoculturally and linguistically diverse in postsecondary education.

Implication for Practice

With plans to increase the intake of international students at the university, this study has brought to the fore implications for practice. University officials and educators must become more aware of international students' experiences. University officials and educators should start by increasing conversations with international students to learn more about what factors affect their adaption to the learning environment (Perry, 2016). This study proved that an in-depth review of ECLD international students' experience at the university revealed cultural, social, and linguistic factors that affected their academic transition. Gaining insight into international students' experiences will inform the university's decisions around developing

more effective transitional support initiatives. International students bring to the classroom varied learning experiences and expectations. Postsecondary educators should therefore demonstrate pedagogical skills effective for teaching across cultures (Dimitrov & Haque, 2016).

Finally, there should also be mandatory intercultural training for faculty, staff, and students. The training should have a curriculum that explores country-specific cultural backgrounds and discussions on developing inclusive learning and teaching practices. Intercultural training would help the school community to connect with the international students' experiences. The courses would encourage educators and policymakers to evaluate their practices to ensure they are aligned with recommended internationalized principles and procedures. The training should also be a safe space for addressing challenges faced with facilitating intercultural needs and how they can be resolved.

Implication for Theory

Although academic transition differs among international students, Schlossberg et al. (2012) posited that a stable framework would be essential for understanding their experience. Influenced by Schlossberg's (1995, 2012) original transition model, the conceptual framework that examined academic transition by exploring three phases of the learner's transition: approaching transition, the 4 S system and taking charge. According to this study's findings, approaching transition which identifies the nature of the transition being faced, was the international students' process of relocation to Canada for graduate school. As displayed in Figure 2, at the core of the conceptual framework, is the 4' S System (situation, self, support, strategies) which are the factors identified in the findings that directly influenced how the students coped with academic transition; the figure lists a few of the examples given by the students. The final component, taking charge, covered the usage of new strategies used by the participants to cope with academic transition.

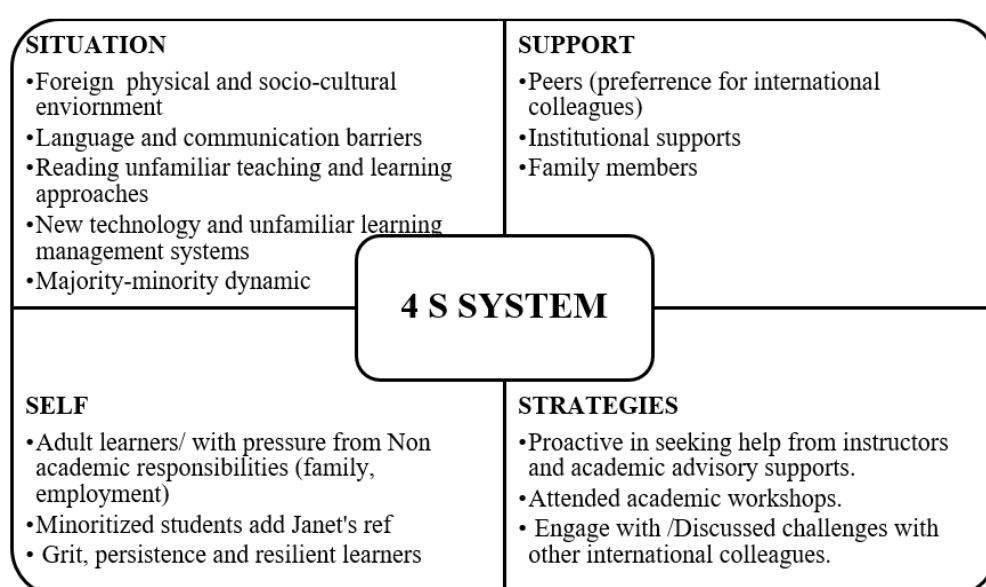


Figure 2: The 4 S System: Factors listed from the Findings

This conceptual framework will promote a more practical way for researchers to examine how international students experience academic transition in postsecondary education. It has

the potential of eliminating the homogenization of an increasingly diverse international student population and their experience with academic transition in post-secondary education.

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***Autoethnography:
Preserving the History of the Resilient U.S.-Mexico Border Peoples***

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Abstract

When deconstructing our surrounding environments to bridge diversity in a constantly shape-shifting world where capital interests and global perspectives are at the forefront and are often at odds with social interests, autoethnography can be a tool that provides both agency and voice to its users. Through these personal experiences, an autoethnographer can critique practices, policies, and cultural constructions that shape a population's understanding of the surrounding world. Thus, the methodology opens a wider lens on the world, avoiding the constraints of what constitutes meaningful research while providing a singular perspective in a collective understanding of culture, place, and identity.

Keywords: Autoethnography, Teaching, Inclusivity, Creative, Writing

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Introduction

Using autoethnography as a research methodology, the U.S.-Mexico Border people's personal stories can become narratives with a purpose. These narratives can help examine how knowledge production has developed over time and how identity has formed and situated itself in society. Through a critical and strategic introduction to autoethnography, an autoethnographer and student can re-examine literary works through an autoethnographic lens while approaching this self-reflective technique on their writings as they pertain to voice and subjectivity.

Teaching Autoethnography as a Method

First, the theoretical foundations are discussed and evaluated, and then, a range of approaches are assessed due to the different variables that each combination of factors brings to the equation. As students create their autoethnographies, they seek to produce an evocative work that is engaging and opens the door to a discussion while manifesting an aesthetically pleasing work that is a visual representation of their personal history and interpersonal experiences. Through initial field research, consisting of field notes, interviews, photographs, and original documents and artifacts, the U.S.-Mexico Border autoethnographer will begin to identify specific patterns from these types of evidence produced by cultural experiences.

Approaching their curated evidence, as a screenwriter would a film, screenwriter Diane Lake suggests in her article, "Adapting the Unadaptable," that finding a new way of telling the story comes down to choices. For Lake, her methodology is simple: Choose moments that "make for good visual representation" and create a "visual line in the margin" that marks the scene and links those moments together (Cartmell, 2014, p. 409). Once the evidence is mapped out, the story will begin to take shape. Thus, the responsibility of the autoethnographer is to make a personal experience meaningful and a cultural experience engaging. Only then will they be able to reach wider and more diverse mass audiences, making personal and social change possible for more people (Bochner, 1997; Ellis, 1995; Goodall, 2006; hooks, 1994).

What makes autoethnography as a research methodology successful with multicultural populations and peoples in diasporic flux is the ability to deconstruct movement and motion in the text as it elicits societal change. With various definitions and approaches, the methodology utilizes personal experiences to understand and critique practices, policies, and familial and cultural constructions that shape someone's relationships with the surrounding world. Thus, autoethnography takes on two roles: a process and a product (Ellis, Adams, & Bochner, 2011). The process promotes self-reflection and understanding of multicultural others (Chang, 2008). By way of product, it creates an evocative, engaging story that helps fill the knowledge gap in existing storylines (Ellis & Ellingson, 2000; Ellis, Adams, & Bochner, 2011).

Autoethnography opens a wider lens on the world, avoiding the constraints of what constitutes meaningful research while providing a singular perspective in a collective understanding of culture, place, and identity. This specific approach also helps a student understand how the kinds of person they claim to be influence interpretations of what they study, how they study, and what they say about that topic (Adams, 2005; Wood, 2009; Ellis, Adams, & Bochner, 2011). As a result, autoethnography captures the nuances of subjectivity,

emotionality, and someone's influence on their research, rather than hiding from subjectivity and emotionality or assuming they do not exist (Ellis, Adams, & Bochner, 2011).

Some have begun to acknowledge that different people have different assumptions about the wider world because conventional research methods were narrow, limiting, or insular. These differences can stem from class (hooks, 2000), education (Delpit, 1996), gender (Blair, Brown, & Baxter, 1994, 1994), race (Anzaldúa, 1987), or religion (Droogsmas, 2007), among others.

Autoethnographers can use methodological tools to search literature when analyzing an experience and consider how others have encountered something similar; they can use personal experiences to illustrate aspects of cultural experiences and, in so doing, make the characteristics of a culture familiar to insiders and outsiders. Accomplishing this often requires comparing and contrasting personal experiences against existing research (Ronai, 1995, 1996), examining relevant cultural artifacts (Boylorn, 2008; Denzin, 2006), or conducting interviews (Foster, 2006; Marvasti, 2006; Tillmann-Healy, 2001).

Once the U.S.-Mexico Border autoethnographer has become familiar with the process, they can unpack their personal stories, create narratives, examine how identity is formed and situated in society, and establish their place in it. Through autoethnography, they can retrospectively and selectively jot down their epiphanies drawn instinctively from their roles and position within a culture or by having a particular cultural identity.

Discussion

When autoethnography becomes an interdisciplinary writing course, students and their educators engage in a self-directed form of ethnomethodology where the lives and histories of these students become part of that scholarship that elicits social change. Such an approach to scholarship is essential because it allows people from various ethnicities to retain and transmit their culture. As Donaldo Macedo (2000) explains, "open societies" may have more sophisticated forms of censorship — omission. A selective choice of bodies of knowledge, bordering on censorship," is often to blame for the lack of "significant contributions to the field of education" (Freire, p. 16). This refocusing is now critical in the United States when considering the inclusion of multicultural heritage in an array of disciplines, for example, with the increasing spotlight on the U.S.-Mexico Border, lest this heritage is forgotten.

Such a refocus on America's borderlands includes the perspectives of authors like Gloria Anzaldúa and Cherrie Moraga. Anzaldúa's *Borderlands/La Frontera: The New Mestiza* (1987) is a hybrid scholar-autobiographical work exploring the Chicana and Latina experience through the lens of issues ranging from gender to identity to race to colonialism. Anzaldúa's use of "borderlands" refers to the geographical, geopolitical, and geocultural space that reinforces what she conceptualizes as *mestizaje*. To Anzaldúa, the in-between space of the Border is an open wound between the U.S. and Mexico, not fully belonging either wholly or nationally, but rather a hybridization of the two spaces. This hybridization happened through two distinct periods, through a process of systemic violence that was epistemically and physically oppressive.

In Moraga's *Native Country of the Heart: A Memoir* (2019), the mother-daughter story depicts the similarities and differences between her mother's Mexican immigrant story and Moraga's American story. The story offers great critical reflection and, ultimately, a

revelation. The narrator uncovers her indigenous origins and embraces her cultural loss by deconstructing her past. While told personally, the story also chronicles the larger story of Mexican American diaspora.

This introspection and example of autoethnography add to the discourse that defines who and what Americans are. Many who insist upon the favored form of conducting and writing research advocate a “White, masculine, heterosexual, middle/upper-classed, Christian, able-bodied perspective” (Ellis, Adams, & Bochner, 2011, p. 3). By default, this implies that anything deemed as “other” is invalid. Following these conventions, students often disregard “other ways of knowing.” There is a vast difference between the knowledge production of the essential participant and what scholar Terry Goldie terms “non-essential participant” (Ashcroft, Griffiths, and Tiffin 174). Conversely, autoethnography expands the lens on the world, avoiding rigid constraints of what constitutes meaningful and useful research; while providing students agency in the kind of person they claim to be, what they choose to study, how they study it, and what they say about a topic (Adams, 2005; Wood, 2009).

In the United States today, Latinx and Hispanic people are integral constituents of the population and are intrinsically woven into the tapestry of the national identity. The U.S. Census statistics noted that the Latinx or Hispanic population, including people of any race, grew from 50.5 million (16.3% of the U.S. population) in 2010 to 62.1 million (18.7%) in 2020. Moreover, slightly more than half (51.1%) of the total U.S. population growth between 2010 and 2020 came from growth in the Hispanic or Latino population (Jones et al., 2021). The diversity within the group is wide-ranging, as are their stories, which often remain untold. The complex social and political ontology has made places like the U.S.-Mexico Border a unique geocultural, geopolitical, and geographical location between two nations. The coming together of these cultures in this Border super-region.

Moraga (2019) amplifies the need to recognize how interwoven the past is with the present and that to understand ourselves; we must locate our ancestors, who are an extension of who we are. *Native Country of the Heart* makes powerful statements about what is gained and lost in the pursuit of the American dream and how the same place that affords privilege and opportunity also demands sacrifice and surrender” (González, 2019). The transnational operations that have taken place on both sides of the Border have created a new population and identity that could result from “transculturation,” as one of many processes that have transpired in this vast stretch of land.

Conclusion

The amalgamation of voices here must tell the stories of these processes: hybridization, transculturation, exclusion, repatriation, and Americanization. Encouraging students to tell these stories about how they saw and experienced them via autoethnography is vital to bridging the knowledge gap and adding to the scholarly discussion of their sense of place and space. For one, Lee (1994) has come to believe that speaking from an authentic place means speaking from your own “space-lessness” (p. 67). Epistemic violence has culturally impacted the U.S.-Mexico Border people and their knowledge production. Dismissing this violence as modernization or essentialism dismisses its history and the histories of border populations throughout the world. Embracing these histories and circumstances provides the future with works that will live on through authentic words and lived experiences.

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Negotiating the Place for Human Rights in Education- Implications for Curricular Integration

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Abstract

Human rights have long been an area of concern and active research since the inception of the Universal Declaration of Human Rights (UDHR) in 1948. The World Programme for Human Rights Education (2005-2014) has also re-emphasized the need for integrating human rights in school education as well as in the professional training of teachers through its inclusion in the teacher education curriculum. The role of education in building a rights-based perspective among young learners is crucial for imbibing human rights, building requisite attitudes and skills, and seeking its day-to-day applications & relevance in one's own life as well as the life of others. The present paper takes into account the diverse curricular strategies for integrating human rights within different school subjects. The sample for the present study included pre-service educators who are pursuing master's in education course at a university in Delhi, India. The main objective of the study is to collect and analyze pre-service educators' perceptions about the curricular integration of human rights in the school curriculum. Lesson planning was used as a tool to collect and analyze pre-service educators' perceptions about integrating human rights in different subject areas. The lesson plans constructed by the educators depict the integration of human rights within different curricular areas at the school level. The paper also provides concrete suggestions for integrating human rights within the mainstream curriculum at the school level and has implications for teachers, teacher educators, curriculum developers, and textbook writers.

Keywords: Human Rights, Human Rights Education, Teacher Education, Curriculum

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Introduction

Human rights are inalienable and indivisible rights that are bestowed upon every human being. The UDHR (1948) vehemently highlights the 30 human rights articles comprising most importantly right to life, freedom, liberty, equality, freedom from servitude, non-discrimination, employment, education, etc. These rights are indispensable for the all-around development of any child/human being. However, many-a-times children are not aware of these rights as a result of which their rights are at stake in cases of human rights violations, human trafficking, hatred, gender-based violence, etc. that severely hamper the growth of children. Often these human rights do not find a mention in the curricular materials, such as textbooks, workbooks, and other documents which leads to their side-lining even from the classroom transactions and discourse. This creates a gap in the understanding of these rights and their application in daily life. However, a major step in this direction has been taken by the National Education Policy (NEP) 2020 which mentions in its vision the adherence and responsible commitment to human rights in the making of a truly global citizen. The policy further refers to the integration of human rights within the school curriculum for equitable & inclusive education. As a result of the policy implication, the teacher education programmes across the country both at undergraduate (Bachelors of Education) as well as postgraduate levels (Masters in Education) have included a separate credit-based course on human rights education. The present study takes into account the perceptions of pre-service teacher educators (students of Masters in Education course) about integrating human rights education within different school subjects. The tool used to collect data comprises lesson plans developed by pre-service teacher educators who have integrated human rights within school subject areas. The lesson plans reveal pre-service teacher educators' perceptions about integrating human rights within the school curriculum. The different lesson plans indicate diverse approaches to integrating human rights with school subjects. This is also a reflection on the course on human rights education which they have studied as part of their Masters in Education programme.

Theoretical Framework

Human rights have been a neglected area of study in the school education system. Human rights are directly related to social justice and protecting the marginalized and vulnerable (Fitchett et al, 2011). Human rights education can be defined as a conscious effort both via content and process to develop among students awareness about their rights and responsibilities as well as to sensitize them toward the rights of others. This is to encourage a responsible action for protecting and securing one's own rights as well as the rights of others (Bittner, 1991). ***HRE declares a commitment to those human rights expressed in the Universal Declaration of Human Rights of 1948, the UN Covenants, and the United States Bill of Rights.*** It asserts the responsibility to respect, protect, and promote the rights of all people. In 1993 the World Conference on Human Rights in Vienna reaffirmed the importance of human rights education, training, and public information, declaring it ***“essential for the promotion and achievement of stable and harmonious relations among communities and for fostering mutual understanding, tolerance, and peace.”*** The General Assembly proclaimed the period 1995 to 2004 the UN Decade for Human Rights Education.

There are two essential objectives for developing effective human rights education programme, which is learning about human rights & learning for human rights. Learning about human rights is mostly cognitive in nature and includes human rights history, the study of important documents, and implementation mechanisms with respect to human rights. All

segments of society need to be aware as well as understand the provisions of the UDHR and how these international standards affect governments and individuals. Learning for human rights involves understanding and embracing the principles of human equality and dignity and the commitment to respect and protect the rights of all people. This would mostly involve values clarification, attitudinal change, development of solidarity, and the skills for advocacy and action (Flowers et al, 2000). The ultimate aim of education for human rights is **empowerment**, by giving people the knowledge, skills, and attitudes to take control of their own lives and the decisions that affect them.

Earlier human rights were not institutionalized as part of the state or national curriculum frameworks (Bittner, 1991). With the formulation of the World Programme for Human Rights Education established by the UN General Assembly's resolution 59/113 (10 December 2004), the inclusion of human rights within the state and national curriculum, as well as teacher education programmes, got a new fillip. Recently, National Education Policy (2020) has further highlighted the role of human rights education in building a sustainable and peaceful nation.

There could be different approaches for integrating human rights within education, such as, few researchers have found elementary grades to be the ideal learning stage for human rights where certain elements of human rights education such as working in groups, sharing, taking turns, respecting the rights of others, and fair play (1982). Teachers also use certain interactive strategies for human rights education, such as cooperative learning, conflict resolution, role-playing, and simulations (ibid.). At the secondary level, human rights should transcend the disciplinary boundaries and could be taught in a more thematic way such as by including human rights violations, concepts of discrimination, prejudice, and international agreements (ibid.).

Research Design

The present research considers pre-service teacher educators' perceptions about integrating human rights within the school curriculum. Around 30 pre-service teacher educators were included as part of this study. These pre-service teacher educators have been exposed to and completed a course on human rights education. They were asked to develop a lesson plan while integrating human rights concepts within different curricular areas. The lesson plans developed by pre-service teacher educators were carefully scrutinized on three parameters – *approach toward integration of human rights, content for human rights included in the lesson, and level of awareness generated about human rights*. The research method adopted for analyzing the lesson plan is mostly content analysis around the aforementioned parameters and generation of themes.

Findings & Discussion

The lesson plans developed by pre-service teacher educators can be divided into subject-wise streams, such as science, social science, language, and mathematics. The following are subject-wise presentations of the approaches and content of human rights integrated across the curriculum.

SUBJECT	TOPIC/ SUBTOPIC	DESCRIPTION	PRINCIPLES OF HUMAN RIGHTS TO BE INTEGRATED	DIRECTIONS FOR FACILITATOR
Social Science	Freedom of Expression	Everyone has the right to freedom of opinion and expression; this right includes the freedom to hold opinions without interference and to seek, receive and impart information and ideas through any media and regardless of frontiers.	UDHR Article 19; CRC articles 13,14 -Freedom to express -Freedom to think and act consciously	To mediate the students from point A to B where A is the fill-in-the-blanks sentence and B is the child's own thought and how they're going toward compiling the two.
Social Science	Festivals and Traditions	Everyone has the right freely to participate in the cultural life of the community, to enjoy the arts and to share scientific advancement and its benefits.	UDHR Articles 16,20,27; CRC Articles 9,10,15,31 To be able to be a part of any cultural community Protection of moral and material interests of each individual	The teacher shall facilitate the craft work to take place, distribute the material, facilitate the student's thought in the focused direction if needed and observe the performance of every student.
Science	Air Pollution	Humans can survive for some time without food, but we cannot survive even for a few minutes without air. This simple fact tells us how important clean air is to us. When air is contaminated by unwanted substances which have a harmful effect on both the living and the non-living, it is referred to as air pollution.	Consensus-based decision-making: Remind students that in order to ensure their own rights are met, they must be responsible for their actions and how they affect others	The facilitator will start the discussion by asking the question about the rising temperature of the city and its possible causes. The teacher will relate the uneven distribution of resources to human rights violations and probe them to figure out the examples from daily life.

Social Science	<p>UNDERSTANDING MARGINALIZATION:</p> <p>Introduction on three main communities as a case study to understand their marginalization. (Adivasis, Muslims and Dalits)</p>	<p>Equality is a value and right that has to be deepened and taught to be respected.</p> <p>This lesson looks more closely at the ways in which inequality affects certain marginalized communities by excluding these communities from mainstream society. This exclusion is both the cause and consequence of inequality.</p>	<p>Human rights are universal and inalienable; indivisible; interdependent and interrelated. They are universal because everyone is born with and possesses the same rights, regardless of where they live, their gender or race, or their religious, cultural or ethnic background.</p> <p>RIGHT TO EQUALITY</p> <p>as the fundamental human right guaranteed to every Indian citizen by the constitution of India is violated during the marginalization of certain communities.</p>	<p>The teaching-learning process shall include the use of a variety of pedagogic tools already given in the book like, storyboards, data, poems, and case studies. Deliberation around these already mentioned tools and additional activities will ensure the achievement of the objectives of human rights education.</p>
Science	Water Pollution	<p>The teacher will teach chapter 18 'Pollution of air and water' through lecture-cum-discussion method. The lecture will include the following pointers,</p> <p>Awareness about water scarcity.</p> <p>Definition of water pollution.</p> <p>Water pollutants and human's role.</p> <p>Case Study - Ganga Action Plan.</p> <p>Potable water and Water Purification.</p> <p>Measures to reduce water pollution.</p> <p>Activities like focus group discussion can be conducted in the classroom as well as the use of TLMs (PowerPoint presentation & documentaries).</p>	<p>Right to Health</p> <p>Right to a Healthy Environment</p> <p>Right to an adequate standard of living</p> <p>Right to clean water</p>	<p>The teacher will begin the lesson by engaging students in discussions.</p> <p>Teacher will prompt the learner's prior knowledge about pollution through a question-answer method.</p> <p>The teacher could use documentaries of case studies and climate change.</p> <p>The teacher can engage students in focus group discussion through which they can come up with measures to reduce water pollution.</p>

Science	Food	<p>The right to food is an inclusive right. It is not simply a right to a minimum ration of calories, proteins and other specific nutrients. It is a right to all nutritional elements that a person needs to live a healthy and active life, and to the means to access them.</p>	<p>Universality and Inalienability: All people everywhere in the world are entitled to them. The universality of human rights is encompassed in the words of Article 1 of the UDHR: “All human beings are born free and equal in dignity and rights.”</p> <p>Right to food as a human right means food must be available, accessible, and adequate; here Availability means that food should be available from natural resources either through the production of food, by cultivating land or animal husbandry, or through other ways of obtaining food, such as fishing, hunting or gathering. On the other hand, it means that food should be available for sale in markets and shops.</p> <p>Accessibility requires economic and physical access to food to be guaranteed. Economic accessibility means that food must be affordable. Individuals should be able to afford food for an adequate diet without compromising on any other basic needs, such as school fees, medicines or rent. And Adequacy means that the food must satisfy dietary needs, taking into account the individual’s age, living conditions, health, occupation, sex, etc.</p>	<p>Here the teacher should try to discuss the right to food through day-to-day examples and help them in understanding what it means to have the right to food and the means to practice it.</p>
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Language (English)	Bholi's struggles as a child	Bholi's sense of self-concept is very Negative and self-esteem is quite low because of her physical appearance (disfigured body due to dark small-pox pock marks), mental backwardness due to the injury to her head, and late speech acquisition with stammer- which has led to bullying, neglect and discrimination due to which her growth and development is hampered.	Equality and Non-Discrimination All individuals are equal as human beings and by virtue of the inherent dignity of each human person. No one, therefore, should suffer discrimination on the basis of race, colour, ethnicity, gender, age, language, sexual orientation, religion, political or other opinion, national, social or geographical origin, disability, property, birth or other status as established by human rights standards.	The facilitator will make the students read the paragraphs where this problem has been highlighted, and explain to them the importance of respecting and treating oneself and everyone else with care, empathy, kindness, and dignity through open discussions in the classroom
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Table 1: Subject-wise Integration of Human Rights in the School Curriculum

Approach toward integration of human rights

From the pre-service teacher educators' responses on the lesson planning sheets, it is clear that they have a clear concept of human rights as given in the UDHR (Universal Declaration of Human Rights) document. Also, they are able to integrate well the concept of human rights within different curricular topics. The pedagogical approaches adopted by pre-service teacher educators are mostly discussion, debate, case studies, and activity-based approaches in order to integrate human rights within different curricular areas. Few elements of critical pedagogy (Freire, 1970) are also evident in their responses especially when they said,

The teacher should try to discuss the right to food through day-to-day examples and help them in understanding what it means to have the right to food and the means to practice it.

Thus, the lesson plans aim at fostering critical thinking and problem-solving abilities among the learners with respect to bestowing the right to nutritious food to each and every person.

Another example of critical pedagogy can be cited as follows,

This lesson looks more closely at the ways in which inequality affects certain marginalized communities by excluding these communities from mainstream society. This exclusion is both the cause and consequence of inequality.

The above statement in the lesson tries to build a critical understanding among the learners with respect to unequal treatment faced by the marginalized sections of society. Further, it will stimulate the learners to think about ways of removing such inequalities from society and promoting equal rights for all.

Content for human rights included in the lesson

The content for human rights as presented in the lesson plans that the pre-service teacher educators intend to include in their lessons includes the human rights as mentioned in the UDHR (1948) & United Nations Convention on the Rights of the Child (UNCRC, 1989). While integrating the concept of human rights with diverse curricular subjects, the lesson plans display a seamless integration of subjects such as science, social science, and language. It was found that mathematics was not opted by pre-service teacher educators as a subject for integrating human rights. This suggests that teachers find science, social science, and language as primary subjects for integrating human rights. The content usually includes topics such as equality, democracy, marginalization, freedom of expression, air pollution, food, etc. All of these are global issues of concern that are also essential to achieving the SDGs by 2030 (*Transforming Our World- The 2030 Agenda*, UN). The content of the lesson plan also includes a few interesting activities based on human rights principles while integrating the curriculum subject. These activities are thought-provoking and reflective in nature and aim at sensitizing the students toward various categories of human rights. Some such activities are provided in annexure-1 & 2.

Level of awareness generated about human rights

The level of awareness generated among the students depends on the level of engagement with the topic/area. In the case of human rights, there are different levels of awareness for different levels of learners. Learning about human rights is largely cognitive, including human rights history, documents, and implementation mechanisms. Some of the groups in formal education especially emphasize the cognitive and attitudinal goals for human rights education (Flowers et al, 2000). As per the review of literature in the field of human rights, the following levels of awareness are recommended at each level of education.

Level of Education	Level of Awareness	Skills to be fostered
Primary level	Development level needs of children education, health, hygiene, and safety. First aid and a healthy environment basic can be included in the content for human rights	Listening skills, communication skills, reading skills
Middle level	Development of mind and body in this stage requires teachers to give directions about virtue, work behavior, and reflection	Tolerance for other's opinions & cultures, peace-building,
Secondary & Senior Secondary level	Students' behavior should conserve human rights; achieving these others rights will be automatically protected. <i>Speeches and debates on problems related to human rights- war, abuse, kidnapping, theft, murder, etc.</i> should be conducted	Value clarification, attitudinal change, conflict resolution, taking responsibilities

College level/University	Create an environment of awareness, so that every student is aware of his/her right. Incultation of <i>generosity and high morals</i> , not just for self-development but also for the <i>national and global development</i>	Empowering self & others, strategizing appropriate responses to injustice, active citizenship
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Table 2: Levels of Awareness about Human Rights at different Education Levels

The present study takes into account the level of awareness aimed at while developing lesson plans for school students. The content analysis of the lesson plans reveals that the main focus of lesson plans is on the following aspects:

- Development of basic understanding with respect to human rights education
- Discussion & debate around human rights for preserving one's own rights & rights of others
- Incultation of values of tolerance, empathy, justice, democracy, non-discrimination, and peace-building
- Communicating and promoting human rights through campaigns, seminars, dialogue, etc.

Conclusion

The present paper provided insights into the metacognitive world of pre-service teacher educators regarding their understanding and perceptions with respect to the integration of human rights within the school curriculum. The lesson plans developed by the sample pre-service teacher educators represent their ideas and pedagogical approaches coherently with regard to integrating human rights within the school curriculum. The data in the form of lesson plans and activities suggest that teacher educators are able to link human rights with diverse curricular areas at the school level, such as democracy, equality, reproduction, employment, food, marginalization, air pollution, etc. Since these pre-service teacher educators have also undergone a course on Human rights education, they are better able to integrate the human rights concepts with school subjects. This reiterates the importance of introducing human rights education courses at the teacher education level. The case studies and activities integrated into the lesson reflect the rights-based approach recommended for human rights education including the key principles of participation, accountability, non-discrimination, empowerment, and legality (UNICEF, 2007).

The lesson plans and the activities designed by pre-service teacher educators can provide ideas for developing textbooks for various school subjects while integrating human rights. This is also one of the important policy recommendations of the National Education Policy (NEP) 2020. Therefore, the teacher education programmes, as well as school curriculum, should emphasize human rights education whether through formal or informal means within the curriculum so as to bring about awareness and empowerment among youth in making them responsible global citizens.

Acknowledgments

I hereby acknowledge all the M.Ed. (Masters in Education) students who actively participated in this study and developed lesson plans by integrating human rights in different subject domains.

Appendix-1

Activity 1

Topic: Air and Water Pollution

Sub-Topic: 1) Importance of air and water in our life

2) Effect of human activities on our natural environment

Level: Secondary

Human Rights Education Theme: 1) Importance of Human Rights in our life

2) Awareness of Human Rights

3) Introducing the Right to a healthy life

Material Required: sheets, pen, questionnaire layout, poster samples, colors, pencil, etc.

Objectives:

- 1) To explore awareness of people about their role in environmental pollution
- 2) To help students understand the importance of Human Rights (right to a healthy environment in general).
- 3) To spread awareness about human rights and the protection of the natural environment.

Process: After teaching the lesson ‘Pollution of air and water’ the teacher will give students a task to interview 3-5 people each. Students will be given the freedom to choose these people at their convenience. These people could be school staff, family, friends, neighbors, etc.

Instructions for an interview -

- The students will be asked to interview the selected people about their awareness of environmental pollution.
- The teacher can provide a layout and guide students to ask questions like -
How many vehicles do you and your family own?
How often are they put to use?
Do you practice carpooling or prefer using public transport?
What is the average amount of water you and your family consume daily?
Do you try to reuse the water for watering plants or other purposes?
- Apart from factual data students will also be asked to collect subjective opinions of people regarding the increase in environmental pollution.
- Students will be asked to record their data in written form.

After the task is complete, the teacher in the next class will engage students in discussion or ask students to present their data and their experience.

Later the teacher will explain about Human Right to a healthy environment along with other Human Rights like the right to Health, the right to an adequate standard of living, right to clean water and sanitation.

The second task following human rights teaching will be to make posters that could help in spreading awareness about the same. Students will be shown samples of some posters that can help encourage people to fight for their rights and work towards a healthy and safe environment.

Learning Outcomes: Through this activity, learners will be able to,

- Understand the need to spread awareness about both environmental pollution and human rights.
- Sensitise people around them and encourage them to work on protecting the environment for future generations.
- Respect the human rights of every citizen of the world.

Appendix-2

Activity 2

Topic/Sub-topic: Minorities and Marginalisation

Level: Secondary

Human Rights Education Theme: Equality, the constitution of India provides safeguards to religious and linguistic minorities as a part of their fundamental rights.

Objectives: The objective of the activity is to help students identify the factors that contribute to the marginalisation of minority groups and to be able to empathize with them.

Process:

Helping the class develop a definition of “Minority group”.

- Are they always in a minority mathematically?
- In what ways do minorities usually differ from the majority or dominant population?

The term minority is most commonly used to refer to communities that are numerically small in relation to the rest of the population. However, it is a concept that goes well beyond the numbers. It encompasses issues of power, access to resources and has social and cultural dimensions.

Brainstorm with the class a list of contemporary “minority groups”, starting with the local community. Be sure to include minorities based on class, ability, sexual orientation and other non-racial factors.

- Do these minority groups experience discrimination? In what ways?
- Senior students could eventually do case studies to find out about the size, location, history, culture, contemporary living conditions and key claims of specific minority groups.
- What are some circumstances that create minority groups in a population (e.g. indigenous peoples, immigrants, refugees, migrant workers)?

Learning Outcomes:

The students will be able to identify the umpteen factors that lead to the marginalization of minority communities and will also be acquainted with the significance of safeguards to protect the minority communities against the possibility of being culturally dominated by

the majority. They will learn to accept and appreciate diversity in all its manifestations.

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Representation of the Student's Controllable Performance Features Based on PS2CLH Model

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Abstract

Nowadays, the number of studies measuring and representing students' learning and performance has increased. However, there remains a lack of research that represents and measures factors or features within students' control that impact their performances. For university managers, subject tutors and academic mentors, it is essential to represent, measure, analyse and monitor student performance alongside controllable factors affecting their academic achievement to enhance the student experience. This research evaluates the connection among students' performance and their lifestyles, particularly the controllable factors. Controllable factors incorporated in our PS2CLH model are the perspectives of Psychology, Self-responsibility, Sociology, Communication, Learning and Health & wellbeing. This paper proposes a controllable performance features representation in three-dimensional space based on the PS2CLH model. A cluster presentation of the features allows for targeted interventions for students who need additional support. It also indicates clearly where each student stands by using a student web profile and the necessary direction each student needs to take to get to the desired cluster. Initial data presents a clear pattern of creating a diagonal of seven clusters or students' stages from the bottom (0, 0, 0) to the top (100, 100, 100) and leading to the use of filters or queries to represent better features such as sleep-problem, stress, practice exercises and time management. Preliminary results highlight patterns of best-performing students with specific factors/features located in the highest clusters on the rank. This insight facilitates data-driven decisions leading to effective student interventions.

Keywords: Representation, Students' Controllable Features, Performance

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Introduction & background

A clear picture representing the extent of a specific issue gives us clues to find the best interventions to solve it. Accordingly, in our research dealing with student performance, remains a lack of research that represents or gives a big picture and measures factors under students' control which impact their performance.

However, there are works in education that measure teaching and learning performance, such as "*Measuring teaching and learning performance in higher education*" (Muda, H., et al., 2017) and "*Effect of learning management system on Student's performance in educational measurement and evaluation*" (Oguguo, B.C.E., et al., 2021). This study determined the effect of a Learning Management System (LMS) on students' performance in educational measurement and evaluation courses. Furthermore, in 2018, Hattie's Visible Learning research synthesised findings from 1500 meta-analyses of 90,000 studies (Hattie, J., 2018). Then, Rossi and Montgomery's model focuses mainly on societal student's context, which points to two distinct scenarios. Firstly, the community environment and home quality, secondly the quality of the school, such as the classroom conditions, curriculum and student's incentives (Akama, E., 2017). A research group led by Dunlosky from Kent State University in 2013 presented ten years of literature indicating the possible enhancement of student accomplishment in different conditions (Ericsson, A. & Pool, R., 2016). Lastly, the "Chemer, Hu, and Garcia's model" is a longitudinal study developed by Martin M. Chemers, Li-tze Hu, and Ben F. Garcia at the University of California. They inspected the effects of optimism and academic self-efficacy on students' achievement, commitment to continuing in school, health and stress (Chemers, M., et al., 2001).

The representation of the student's controllable performance features was based on the PS2CLH model (Almada, A., et al., 2019). The PS2CLH model was inspired by the child development and early learning field (Landry, S. H., 2014). This field develops children's critical skills through interactive play in a safe and engaging environment. However, what are students' controllable factors that affect their results: It may be seen as students' lifestyle, habits, and daily life issues/problems/concerns, which are under students' control and influences their academic performances. In the same way, the PS2CLH model was developed to bring university students the necessary awareness of the controllable issues that affect their performance in ways they can act upon. In addition, looking to help university managers build a clear landscape of students' factors, we propose a new representation of the students' controllable performance features.

In our case, the controllable performance features are extracted from the PS2CLH model, which contemplates the perspectives of Psychology, Self-responsibility, Sociology, Communication, Learning and Health & wellbeing. For each perspective, we have a range of features. For instance, from Psychology's perspective, features that affect students' performance include stress, anxiety, fear and loneliness. Those features mentioned before were factors used in the author's previous paper (Almada, A., et al., 2019) applied to predict students' performance and cluster into groups of students with similar factors.

Referencing Bhargavi and Gowda, *Clustering aims to group data into coherent groups based on the nearness of samples in multiple feature space where the coherency enriches the uniqueness of the clusters with respect to others* (Bhargavi, M.S., & Gowda, S.D., 2018). In this study, we applied the K-means cluster algorithm to group students with a similar number of factors. Thus to Xin Jin and Jiawei Han, the procedure of k-means clustering is the

following: *Given an initial but not optimal clustering, relocate each point to its new nearest center, update the clustering centers by calculating the mean of the member points, and repeat the relocating-and-updating process until convergence criteria (such as predefined number of iterations, difference on the value of the distortion function) are satisfied* (Jin, X., & Han, J., 2011). Using clusters of the students' controllable performance features aims to give university decision-makers more data to take better decisions concerning their students.

Looking at data-driven decision-making, according to a survey of more than 1,000 senior executives conducted by PwC, highly data-driven organizations are three times more likely to report significant decision-making improvements compared to those relying less on data. Data-driven decision-making (sometimes abbreviated as DDDM) uses data to inform your decision-making process and validate a course of action before committing to it (Stobierski, T., 2021)(Barbu, S.J., et al., 2022)(Namvar, M., & Intezari, A. 2021).

Representation of the Student's Controllable Performance Features

In recent years, there has been a growth in the number of studies measuring and representing students' learning and performance. However, there is a lack of research on defining, measuring and monitoring controllable factors affecting students' performance. From an assistant or mentor's point of view, measuring, visually representing, and keeping track of the student's performance alongside factors that affect their academic achievement is essential. The problem identified by this research is a lack of research that represents and measures factors within students' control that impact their academic success. For university managers, subject tutors and academic mentors, it is essential to measure, visually represent, analyse and monitor student performance alongside factors affecting their academic achievement to enhance the student experience.

In this study, we collected data from students' controllable factors which affect their performance using a web multi-choice self-evaluate questionnaire. The population sample target was around 500 students from different courses and ages between 20 to 25 years old. With considerable knowledge about Universidade Católica de Angola students, we prepared the place to collect data. After the collection process, the clean data process was done, and we had around 432 students. This study aims to represent the students' controllable features in a student's three-dimensional space features representation using the PS2CLH model.

It is essential to point out that we use 66 features from the PS2CLH model in this experiment, which means that the standard representation of the features should be 66 dimensions. However, two essential concepts in data science may confuse us with what we will present. First, feature extraction is a method of reducing the dimensionality by which an initial set of raw data is reduced to more manageable groups for processing (Subasi. A., 2019) (Umamaheswari C., et al., 2018) (Guyon, I., & Elisseeff, A., 2006). The other concept is feature selection. Feature selection is the process of selecting specific variables to increase efficiency in choosing the most relevant features to apply in model construction (Ramesh, A., et al., 2022)(De Silva, A.M., 2015)(Das, T., et al., 2021). At this point, we introduce a new way to represent all these controllable features' performance, in which we use all the features or factors to build the coordinates. Please look at our previous paper to learn about those 66 factors or features (Almada, A., et al., 2019).

Students' controllable features performance 3D representation

It would be a natural question at this point to choose the type of visualization of student clusters. Why visually represent students? And why 3D, not 2D, 4D and 5D? Answering the first question, we can argue that our goal is to help students throughout their studies, and we need to know how much impact the student assistance has been. Therefore, we measure the student's evolution at the level of clusters. It is necessary to have an initial reference of the student's status and thus create a history of their trajectory in their academic life.

The second question concerns the most efficient way to represent the students in the cluster, so we think the 3D representation is ideal for our data. If we meant 2D, we would lose information given the number of areas we have. That is, we would have to group 3 areas to coordinate. In addition, considering the number of students at the university, there would be an overlap in the 2D representation, which is ineffective. Finally, the representation in 4D and 5D would be too complex to read the data. Therefore, we conclude that 3D representation is ideal for our data and the PS2CLH model.

Figure 1 below presents a part of the questionnaire used to collect the students' data. The question types are multiple-choice and a 5-point Likert scale response; we used the radio button for student responses. The questionnaire was constructed in ways that each question has a value depending on the student's answer.

Please, provide Psychological concerns

I feel stressed frequently.

☐ Strongly_disagree ☐ Tend_to_disagree ☐ Do_not_know ☒ Tend_to_agree ☐ Strongly_agree

Frequent symptoms of stressed students: Headaches and Stomachaches, Sleep Issues, Sweating, Changes in Socialization, Dry mouth, Changes in appetite, Increased Irritability and Impatience, Difficulty Concentrating, Excessive worry and negative thoughts, [know more](#)

Regularly, I am anxious or fearful.

☐ Strongly_disagree ☒ Tend_to_disagree ☐ Do_not_know ☐ Tend_to_agree ☐ Strongly_agree

Feeling nervous, restless or tense. Having a sense of impending danger, panic or doom. Having an increased heart rate. Breathing rapidly (hyperventilation) Sweating. Trembling. Feeling weak or tired. Trouble concentrating or thinking about anything other than the present worry. [know more](#)

I have low standards in my academic results.

☐ Strongly_disagree ☐ Tend_to_disagree ☒ Do_not_know ☐ Tend_to_agree ☐ Strongly_agree

Accepts mediocrity. Do not care about low academic results. Below standard. [know more](#)

I might have low self-esteem.

☐ Strongly_disagree ☐ Tend_to_disagree ☒ Do_not_know ☐ Tend_to_agree ☐ Strongly_agree

Apologizing Too Much. Afraid to Express Differing Opinions or Ideas. Fear of Making Mistakes Believing Others Are More Capable. [know more](#)

I regularly feel depressed.

☒ Strongly_disagree ☐ Tend_to_disagree ☐ Do_not_know ☐ Tend_to_agree ☐ Strongly_agree

Depressed mood or irritable - You feel down or irritated most of the day, nearly every day. Decreased interest or pleasure - You lose interest in doing things you used to enjoy, such as sports, hobbies, movies, or hanging out with your friends. [know more](#)

Usually, I feel Loneliness.

☐ Strongly_disagree ☐ Tend_to_disagree ☐ Do_not_know ☐ Tend_to_agree ☒ Strongly_agree

Spend a lot of time alone. Constantly Checking Social Media. Are unproductive. Get stuck on the negatives. Seem to be sick or ill frequently. Seem overly attached to your possessions or hobbies. [know more](#)

NEXT

Figure 1: A part of the questionnaire used to collect the students' data.

This research proposes a visual representation and measure of a student-controllable learning factor that affects their performance, based on the academic model that combines psychology, Self-responsibility, Sociology, Communication, Learning and Health & wellbeing (PS2CLH). We associate psychology & self-responsibility (coordinate/axes X), social & communication (axes Y), learning and health & wellbeing (axes Z). It results in student representation of a point in three-dimensional space 3D. Consequently, it will be possible to represent students into different clusters, effectively monitor their issues, and understand the PS2CLH's model patterns, leading to a better understanding of academic performance.

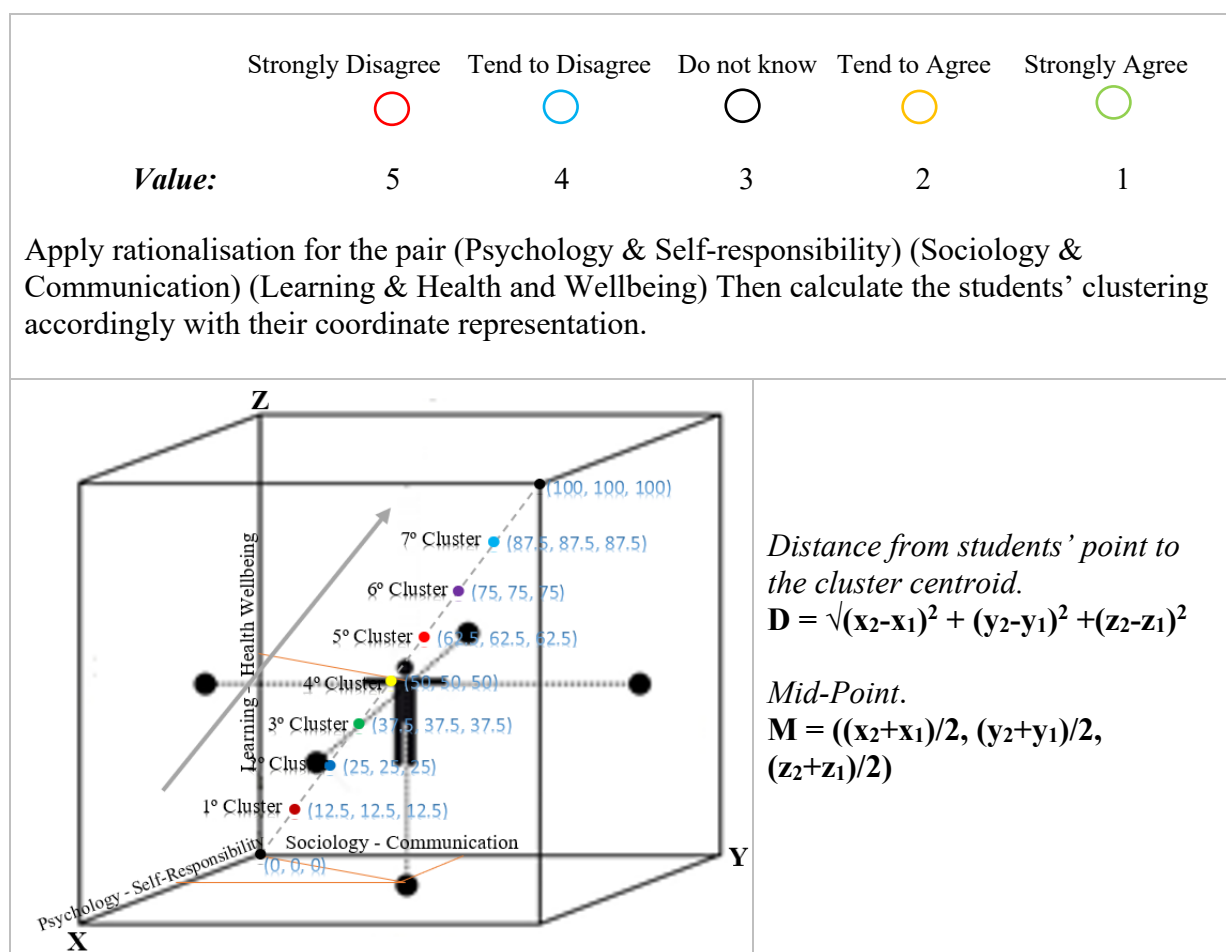


Figure 2: PS2CLH Visual 3D representation.

The figure above introduces the students' 3D representation. When Students fill in the questionnaire, there is a value for each answer. Their Sum makes the coordinate, and when they finish filling in, it automatically calculates their clustering. In the questionnaire, each question has a weight. According to the answer, this weight is attached to that question in ways that each area weight will be the sum weight of questions, having six areas. In Psychology, Self-Responsibility, Sociology, Communication, Learning and Health-wellbeing, we put a pair of two areas representing a coordinate: PS coordinate X, SC coordinate Y and LH coordinate Z.

To monitor students' evolution or growth, we need to represent and observe the initial state and then monitor their evolution through clusters. Expressing in a 3D students' factors that affect their performance allows the system to know the distance among each student, leading

us to build clusters of students—clustering students into groups according to the student controllable learner model and students' questionnaire.

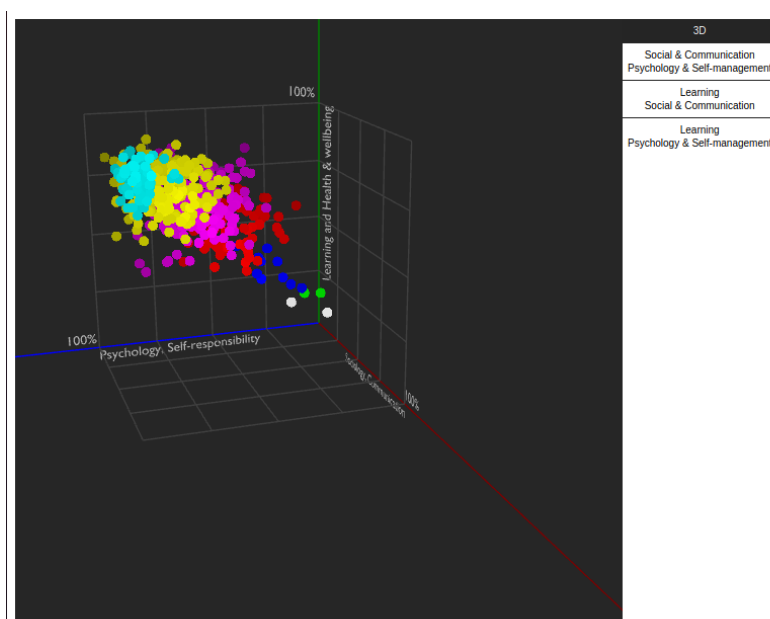


Figure 3: Students represented into PS2CLH Visual 3D representation.

In figure 3, there are clusters, and different colour represents one cluster; each point represents one student. Meaning students using the PS2CLH model in a 3D visualisation based on these students' controllable factors has the following implications. With the representation of students, it will be possible to visualise the students' clusters, thus showing the groups needing more help. This view will also show the pattern and set of the best students, which can guide university decision-makers to act proactively. In addition, the visual image of the student's academic factors that affect students' performance allows lecturers to have a visual idea of their student's academic controllable factors, which affects their performance.

Conclusion & Future works

Initial data presents a clear pattern of creating a diagonal of seven clusters or students' stages from the bottom (0, 0, 0) to the top (100, 100, 100) and leading to the use of filters or queries to represent better features such as sleep-problem, stress, practice exercises and time management. In addition, preliminary results highlight patterns of best-performing students with specific factors/features located in the highest clusters on the rank. This insight facilitates data-driven decisions, creating an intelligent tool for university managers and giving a clear picture of the students' controllable factors, allowing decision-makers to take proactive action leading to effective student interventions.

The proposed future work is: With a clear representation of different clusters, the proactive chatbot (Almada, A., et al., 2022) can have other behaviours related to a particular group of students. This approach gives the flexibility to pay attention to students who need the most and clearly understand where each student stands and the direction. Students must take the necessary steps and phases to reach the desired cluster. Results show that the best students are in clusters six and seven, with fewer problems or factors that affect their performances.

Therefore, the goal is to work with the individual student during their academic year to tackle their problems leading them to move to clusters six and seven.

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Digital Learning Assistants in Higher Education Environments: A Qualitative Focus Group Study

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Abstract

Digital technologies have become increasingly important for educational institutions since the Covid-19 pandemic. In this paper, we present an artificially intelligent assistant system that supports students and prospective students on different levels. In addition to an AI-based chatbot as the central communication element, the virtual guidance system includes planning, study analysis, and motivation applications. To evaluate how the assistant can best address students' needs, a qualitative focus group study with eight current students was conducted in April 2022, involving first a user testing of the chatbot prototype and second an assessment of different concept sketches for the planner and motivator applications. Results from the user testing of the chatbot suggest the importance of a vivid persona and appealing design, accurate, guided, direct answering, and optional push messaging. In the second part concerning planner and motivator, the students expressed the wish to integrate predominantly functions, which help to prepare on time for exams and ideally bundle the applications on one platform to avoid switching between different platforms. Furthermore, participants voiced privacy concerns, as well as an increase in distraction and competitive pressure through gamification. The findings were used to further develop and refine the digital assistant before launch. They give detailed insight into why and how integrated, digital assistants can be successful in educational settings and can be used for future research in the emerging research field of AI in teaching and learning.

Keywords: Digital Learning, Study Assistant, Educational Chatbot, AI

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Introduction

Many bachelor students in Germany drop out of university before completing their degree (Autor:innengruppe Bildungsberichterstattung, 2020). Students who lack motivation have an increased risk of failing their studies (Heublein et al., 2017). With the rise of digital learning since the Covid-19 pandemic, this situation has been further aggravated, as students have fewer opportunities to interact with each other and the teaching staff (FIDL, 2021). Furthermore, digitalization results in an increasing supply of information and educational resources, often unstructured and of inconsistent quality (Schurz et al., 2021). At the same time, media and information competencies are important future skills for students. However, traditional learning formats hardly promote such skills (Mebis, 2018). By leveraging artificial intelligence (AI) technology, the DIAS project at Ansbach University of Applied Sciences aims to address these issues with a digital assistant, who steers information in a targeted manner. In addition to an AI-based chatbot as the central communication element, the virtual guidance system includes planning, study analysis, and motivation applications. DIAS offers students added value through a robust information platform and the opportunity to effectively plan and pursue their studies, while simultaneously creating more resources for individual support by relieving the burden of email traffic for the administration.

The early-stage evaluation of the project aimed to explore the assistants' feasibility and acceptability. The central question was to assess how the DIAS system can best address the student's needs and identify opportunities and risks from the student's perspective, thus enabling the research team to refine the digital assistant before launch further. A qualitative focus group discussion was chosen as a research methodology to explore answers to this question and stimulate new ideas that haven't been considered.

In the first part of this paper, the theoretical background to the DIAS system is introduced, explaining how each of the four key components is supposed to contribute to the project's objectives. The second part will detail the methodology and research procedure of the focus group. Finally, results with their respective implications and limitations are presented and discussed.

Theoretical Background

Related Work

Despite concerns about privacy issues, the relevance of digital assistants for the educational sector has increased in recent years (Alexander et al., 2019). Particularly since the Covid-19 pandemic, universities have invested more than ever in digital technologies such as AI-based assistants (Fulton et al., 2022). An intelligent assistant can take on different forms. However, in general, the term describes an artificial intelligence system that can use natural language in communicating with users (Windiatmoko et al., 2021). While most of the assistants focus on communication components in the form of chatbots, they can also include other applications such as peer support modules, content quizzes, or recommender modules (Song et al., 2019, Schurz et al., 2021). Conversational AI can provide interactive learning, ranging from knowledge tests to encouragement, learning advice, and reminder functions. A particular benefit of digital assistants in educational environments is the personalized learning experience, as they can individually adapt to the student's way and speed of learning. (Clarizia et al., 2021) Literature suggests different quality criteria for educational assistants such as humanity, affect and accessibility (Radziwill & Benton, 2017; Smutny &

Schreiberova, 2020), as well as usability, motivation, and technical correctness (Hobert & Meyer von Wolff, 2019) among other factors.

Prior, empirical research supports the successful use of conversational AI in different educational settings (Pérez et al., 2020). Thus, potential students are more likely to finish the matriculation for their chosen study program on time when using an AI-based assistant with personalized messaging. In addition, the effort of university administrative staff can be reduced considerably. (Page & Gehlbach, 2017) A quasi-experimental study revealed that teaching models using conversational AI can lead to better academic results than traditional teaching models in language courses. Students in the experimental group highlighted the easy usability and flexibility among other benefits (Vázquez-Cano et al., 2021). A study on the use of chatbots in mentoring processes suggests a positive perception of chatbots that support students with feedback and guidance in reading and writing tasks during their self-study (Neumann et al., 2021). While research on chatbots in educational institutions is growing, there are only few empirical studies on planning, analyzing and/ or motivation applications, yet with mostly positive results. Jeong et al. (2012) for example report an improvement in learning effectiveness and student satisfaction after using a study assistant for curriculum planning. In a focus group on a digital recommender tool, students found the recommendations for learning behavior based on personality tests, as well as the recommendation of academic contacts for learning exchange particularly helpful (Schurz et al., 2021). Likewise, empirical research on motivation applications shows that they can support engagement and academic performance (Pechenkina et al., 2017). To the authors' knowledge there has been no empirical research on integrated systems such as DIAS, which include all four application areas. In a first step, qualitative studies will be needed to answer why and how such integrated systems can be successful in educational settings. Similar research designs have been applied for digital assistants in other disciplines, particularly in the health sciences (Beilharz et al., 2021; Høiland et al., 2020), however, are still rare in the field of education.

DIAS Components

Informational Component

The communication/ information component of the DIAS system is represented by a conversational AI, which will be integrated on different frontends e.g., on the university's website or in messaging apps. As a 24-hour support service, chatbots can facilitate academic information flow and meet the students' needs anytime (Alexander et al., 2019). DIAS can be classified as a "service-oriented" (Pérez et al., 2020) chatbot and according to the framework of Wollny et al. (2021) assumes an assisting pedagogical role, with the objective of increasing efficiency of education through answering FAQs. Unlike teaching-oriented chatbots, service chatbots do not impart subject-specific knowledge, e.g. on language learning (Pérez et al., 2020). In the first development phase teaching and administrative staff collected quality-assured standard answers, which were integrated into the conversational AI in a rule-based approach. In the second phase, the chatbot will be trained for AI-based answer generation to deal with individual (non-standard) questions based on a self-uploading knowledge base. The chatbot's design, character traits, and conversational tone were based on a pre-developed persona, which is supposed to create a more personalized conversation experience (Braun & Alt, 2020). Apart from answering standard and individual questions from students and prospective students, the chatbot will also share unrequested information

such as exam reminders and learning advice (e.g., push messages) in the subsequent development stage and will therefore be not only responsive, yet also proactive.

Planning Component

Since the start of the Covid pandemic in 2019 and the shift to online learning, students are increasingly required to be more self-organized and self-regulated to manage their studies successfully. That includes the ability to “control, manage, and plan their learning actions” (Broadbent & Poon, 2015, p.3). Thus, a meta-analysis of different self-regulation strategies revealed that time management and consciousness of one’s learning behavior, among other techniques, have a significantly positive effect on academic achievement, i.e. result in better grades (Broadbent & Poon, 2015). In a first design thinking workshop with participants from the research team, a to-do list and a calendar were identified as essential time management and self-monitoring tools. Another crucial element of self-regulation is the setting of personal goals. Academic performance can be increased if students write down specific, personal, and/or academic goals. (Schippers et al., 2020) The DIAS system will address this with a learning planner, which students can use to specify and track their academic learning goals. To-do list and calendar should be integrated with the learning planner and gamification elements in a mobile application.

Motivational Component

Motivation is a critical factor in study success and can positively influence academic performance (Kusurkar et al., 2012). One way of increasing student motivation and thus changing behavior is gamification, as “the use of game design elements in non-game contexts” (Deterding et al., 2011, p.10). Since games and gamification promote social connections, autonomy, and mastery, they can be an essential motivational driver. Educational games can thus motivate learners and facilitate the expansion of knowledge in a subconscious way. Among the different types of game elements such as avatars, quests, and gifting, the DIAS project chose the use of badges, leader boards, (success) points, and levels since those elements are already available in the university’s established learning management system Moodle and can be easily explained to students. (Success) points are supposed to be awarded for the submission of coursework or successful completion of learning games. Based on the gathered points, different levels can be reached and placements on leaderboards or rankings accordingly. Badges can be awarded for the completion of a course or also for the achievement of a certain level. (Buckley et al., 2018)

Analytical Component

The analytical function of the system leverages the educational technology of learning analytics by collecting and processing information of the learner. Thus, learning processes can be optimized, and the student is better equipped to reflect on his/her learning progress. Teachers can also use the information to support their students better and give them actionable feedback. (Galko et al., 2018) In the DIAS system, students can voluntarily choose to be shown their study progress and receive warnings if their progress does not match their plans based on the required ECTS.

Furthermore, teachers are supposed to receive anonymized reports of their course participants. Thus, they would be able to track learning status, offer further support if necessary and optimize their courses in the sense of constructive alignment. This teaching-

learning scenario design aims to better align learning outcomes, content, and assessment (Biggs & Tang, 2007). The analyzer is supposed to be implemented alongside the other functions on the learning platform with access to different databases.

Methodology

Research Instrument

The evaluation concept of the project defined several phases, for which qualitative and quantitative methods will be applied. For the initial, exploratory research phase, a qualitative focus group discussion was chosen for several reasons. First, a focus group offers more potential to generate new ideas through impulsive contributions in the group discussion compared to an individual interview. Thus, the research team expected to stimulate suggestions for improvement of the chatbot and ideas for planning and motivating functions. Furthermore, influencing factors through the interviewer/ moderator can be reduced due to the size of the group, and participants can share knowledge on which they can base their answers in return. (Schulz, 2012)

Participants

The eight participants of the study were approached through a university course and volunteered to participate in the focus group in April 2022. All students were enrolled in the “Applied Artificial Intelligence and Digital Transformation” Master's study program. Among them were four males and four females. Due to the limited research funds, there was no reimbursement for the focus group participation.

Data Collection

The research team prepared a semi-structured interview guideline to guide the focus group. Several categories were developed, based on prior literature research of similar studies in the educational field (Schurz et al., 2021), but also in other disciplines (Beilharz et al., 2021; Høiland et al., 2020). The semi-structured design of the focus group was supposed to allow for further discussions and flexible development of the conversation. The focus group was conducted online via Zoom. Since both the chatbot prototype and concept sketches of the motivator and planner functions¹ were discussed, the focus group was divided into two parts with slightly different approaches. The first part was initiated with a short brainstorming on the students' associations with artificial intelligence in general. Students were then asked to test the DIAS chatbot from the perspective of a student as well as from the perspective of a prospective student. The categories for the first part of the interview focused mainly on usability aspects such as the perception of the chatbot character or the conversational flow (see table 1). In the second part, the participants were supposed to discuss the different ideas for the planner and motivator, which were presented to them in the form of concept sketches.

¹ The analyzer function did not allow for an inclusion in the focus group, due to its development status when the study took place. The planner and motivator applications were also still in the idea stage, however, concept sketches of the two functions could be used in the discussion.

Table 1: *Semistructured interview guideline*

Question Category	Explanation	Example Question
Part I: Chatbot prototype testing		
Chatbot character & design	Questions concerning the persona and gender of the chatbot (conversational tone, language style, etc.), as well as the visual presentation (colors, logo, etc.).	How do you perceive the use of emoticons in the chatbot text?
Content	Questions concerning the content quality (answer accuracy, answer frequency, learning tips, etc.)	How would you like it if the bot sends you unrequested messages such as learning tips?
Conversation flow	Questions dealing with aspects of navigation through the interview, links, suggestions in the form of selection buttons, but also readability through simple sentence structure and short text length, etc.	How do you feel about the navigation/ guidance through the conversation?
Overall impression	Questions that refer to the overall impression of the DIAS chatbot or chatbots in general and the associated risks & opportunities	What do you like most about the chatbot?
Part II: Planning and motivating functions		
Utility of the application	Questions concerning the utility of each of the presented application elements such as to-do list, learning planner, calendar, etc.	Why would you consider the learning planner helpful or not helpful for your studies?
Handling of Moodle (LMS)	Questions concerning the current usage of the learning platform Moodle as well as the supposed usage of applications that would be implemented on the platform	How do you currently use the learning management system Moodle?

Data Analysis

The data was analyzed based on the qualitative content analysis according to Kuckartz (2016), since this method was considered to best address the research objectives and circumstances. The evaluation was conducted in two steps as suggested by Hilpert et al. (2012). First, the research team transcribed and reviewed the video recording several times. In a second step, the data were coded and grouped into categories, again reviewed, and adapted. The coding was done in a mix of deductive and inductive approaches. Before conducting the focus group, categories were formed (see table 1) as a basis for the semi-structured interview guideline. In the content analysis with the software F4analyse, this basic framework has been further developed; new categories were added, and/or old categories were removed. To ensure objectivity, the coding system was reviewed and adapted by other team members.

Results

In the following, the results of the focus group study are presented. Table 2 lists quotes for each defined category in the first part of the discussion. Table 3 displays the results for the second part, in which concept sketches of the motivator and planner functions were discussed.

Part I: Chatbot prototype testing

During the warm-up, students mentioned different associations with chatbots, such as “fast”, “intuitive” and references to chatbots in fiction. When it came to the user testing, design, use of emoticons, and the vivid conversational tone of the chatbot were largely well-received. Moreover, the majority perceived the chatbot gender neutral. Some participants wished for a more substantial visual reference to the educational context.

In terms of content, the response rate and accuracy often did not meet the expectations of students (both in their role as students and as prospective students). In particular, the wish was expressed that information, which can only be found on the website after clicking several times (e.g., opening hours), will be displayed quickly and accurately by the bot. Answers should vary; even if the question is not understood or there is no rule for it yet, there should always be a placeholder answer.

The built-in selection buttons and links were perceived positively for navigation. However, participants noted that answers should be shortened and there should be no loose ends to improve the flow of the conversation.

Push messages (e.g., study tips or reminders for deadlines, etc.) were found to be best applied if they are optional, i.e., students would ideally like to select whether they want to receive unsolicited messages from the bot at all, and if so, on which topic and with which regularity (e.g., once a week like a short newsletter). In addition, according to participants, it should be optionally adjustable whether these messages are sent with or without a pop-up sign on their smartphone.

With the current recognition rate and information basis of the chatbot, students see the risk that it conveys an overall negative impression of Ansbach University of Applied Sciences (especially since it offers degree programs in the AI field) and could discourage prospective

students from applying. However, provided that the recognition rate is further improved, students view the chatbot as an opportunity to make information quickly accessible or present it simply, which is currently not the case on the university's website. In total, the chatbot's personality, the links, as well as the selection options were best perceived and the chatbot was considered to be particularly helpful for first-year students.

Table 2: *Results from the first part of the focus group (chatbot user testing). Texts have been translated from German. Partly filler words were excluded in square brackets for better readability.*

Category	Definition	Quote (Example)
Chatbot character and design	All text passages that address aspects of the persona and gender of the chatbot (conversational tone, language style, etc.), as well as the visual presentation (colors, logo, etc.).	"I thought it was really cool that there are [...] emojis built in. It just makes it a bit more personal" (Focusgroup 1.1, para. 99)
Content	All text passages that deal with aspects of content quality (answer accuracy, answer frequency, learning tips, etc.)	"I didn't think the answers were so good, because no matter what I asked about semesters abroad, really no matter what, I always got the same answer." (Focusgroup1.1, para. 127)
Conversation management	All text passages that deal with aspects of navigation through the interview, links, suggestions in the form of selection buttons, but also readability through simple sentence structure and short text length, etc.	I thought it was really cool at the beginning that [...] modules were already given, so first I decide whether I am interested in studying or whether I am the student who has a question. And then the modules came automatically, where I can [...] select what I want, that is, do I want to know what the application deadlines are or so. That's pretty cool to get into it that way." (Focus group1.1, para. 101)
Push messages/tips	Text passages that refer to the use of push messages in the form of learning tips, event information, or exam reminders (as a pop-up or just in the course of the conversation)	"if I am bombarded with some kind of pop-ups, then I would just delete it directly." (Focusgroup1.1, para. 75)
Risks	Text passages that refer to a negative overall impression of the DIAS chatbot or chatbots in general and the associated risks for studying and the decision phase for a study program.	"I still see a big problem there. I think if he [the chatbot] is released in its current level of development somewhere publicly on the website of Ansbach University of Applied Sciences, [and] I were [...] looking for a bachelor or master, and communicated with him, then I would no longer wish to [study at] Ansbach University of Applied Sciences.

Opportunities	Text passages that refer to a positive overall impression of the DIAS chatbot or chatbots in general and the associated benefits for the studies and the decision phase for a study program.	Because I would think, wow, they're doing something with artificial intelligence and then I ask him something, get no answer, get a wrong answer, " (Focusgroup1.1, para. 168) "I think it just depends. If I'm a freshman and I have a really specific question, then I would definitely go to him right away because I think if he can answer it for me then it's really quick and then I don't have any more questions." (Focusgroup1.1, para. 166)
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Part II: Planner and Motivator Concept Sketches

To-do lists and calendar functions were found to be helpful for study and self-organization, especially when the calendar is linked to the lecture schedule. The calendar function was also mentioned as an alternative for learning organization in the learning planner.

The suggested use of badges was seen as motivating, as long as no performance judgment is associated with them (such as grades). The learning planner was considered to have a motivating effect by showing invested learning time and learning activities.

The reminder function appears to be particularly helpful for learning support (corresponding to the push messages via a chatbot) for the students to be reminded of upcoming exams, for example, and for them to start preparing well ahead of time and thus prevent exam stress. If the learning planner is applied correctly, it was also assessed to be a helpful feature to reflect on one's learning behavior and to support particularly first-year students in their exam preparation.

Furthermore, several participants noted that the basic framework (the bot) should be in place before planning and motivator functions are included as "nice-to-have" features.

Games and pop-ups (e.g., learning tips) were partly seen as distracting instead of promoting motivation and learning. The use of games and the documentation of learning time in the learning planner were perceived by some students as an additional effort instead of a motivational or organizational aid.

Rankings and levels were almost uniformly found to be unnecessary, as they might increase competitive pressure. Participants stated that if the learning planner was course-bound or the lecturer could access the learning plans, this could also lead to an increase in competitive thinking. Most of them confirmed that they would perceive it as a control and monitoring instrument and therefore experience performance pressure. Likewise, the publication (even if only within the course) of different performance levels through rankings was considered an invasion of privacy.

Regarding the usage of the learning platform Moodle, all participants confirmed that they mainly use it for filing and downloading documents. Integration of the to-do list and the calendar including the lecture schedule in Moodle was perceived as most helpful so that students do not have to switch between different platforms to view the lecture schedule.

Table 3: Results from the second part of the focus group reflect the feedback on concept sketches of the planner and motivator functions. Texts have been translated from German. Partly filler words were excluded in square brackets for better readability.

Category and Subcategory	Definition	Quote (Examples)
Opportunities	Sections that show the opportunities and advantages of the planner and motivator functions.	
Organizational support	Text sections that show how the DIAS functions discussed can support study and self-organization	"I actually have a bit of a different opinion, so if the calendar really already includes the lecture schedule, then I would like that because right now we have to use two ways, so to speak, somehow Moodle for all the documents and then the, I don't even know what it's called, the lecture page to just find your lecture schedule, and even there you really have to click through every time somehow until you get to your lecture schedule." (Focusgroup1.2, para. 38)
Motivational support	Sections that show how the DIAS functions can have a motivating effect on the students	"Or now I have, that one, I think [...] as a student one is actually never finished, one has always still something, that one can still do and learn. And then just to know, hey now I've invested so much time this week, now I can really take a break somehow or especially in the exam phase to know how much you actually really sit at your desk, I would actually find that really cool." (Focusgroup1.2, para. 26)
Learning aid	Sections that show how the DIAS functions can support learning and timely preparation for exams	"So, I think it could be helpful for someone who is still looking for his/her learning style. So, [someone] who is still thinking, where am I maybe wasting time or how much time am I investing in learning in the first place, it could be useful for that." (Focusgroup1.2, para. 24)
Risks	Texts sections that show the risks and disadvantages of the Motivator functions	

Distraction	Sections that show how the DIAS functions can distract from studying or from the learning process	"I see then again the danger if you are [...] somehow during the lecture [...] on Moodle and then you see, ah okay, there is a new game online and then somehow you deal with it rather than somehow dealing with the lecture. Don't know if that's really that helpful." (Focus Group1.2, para. 75)
Extra effort	Sections that show how the DIAS functions could represent an additional workload for the students	"I think it's nice to have. Whether you really want to make the effort [...], to fill it in, to set deadlines, to link that (um) that sounds somewhere also like paper whereby we really are already [going] in the direction of digitalization, already dare to take the step. I would try it, I also think it's a nice gimmick, nice to have, whether it will be used or not I don't know." (Focusgroup1.2, para. 28)
Competitive pressure	Sections that show how the DIAS functions can lead to competition and pressure to perform.	"I think studying is [...] partly already enough effort and [...] that one has a lot, so especially maybe when you start off with the Bachelor, so having this competitive thinking of, oh he/she is better, or, that person has better grades. And if you then see a ranking list on Moodle, I mean, as S3 also said earlier, some people work, they might not have the time to invest to climb higher on the ranking list and might feel rather demotivated. " (Focusgroup1.2, para. 62)
Privacy	Sections that highlight concerns about privacy and monitoring when using DIAS features	"see a little bit of a problem if one coordinates this [the learning plan] [...] with the professor then [...] this could slip into [...] monitoring." (Focusgroup1.2, para. 22)
Moodle use	Text sections that demonstrate how students use Moodle and how often they use it.	"so, I only use Moodle when I, [...] when I need content for my lectures. [...] I just go in to download it, then I leave." (Focus Group1.2, para. 4)

Discussion

The objective of this focus group was to assess how the DIAS system can best address the student's needs and to identify opportunities and risks from the student's perspective, thus enabling the research team to further refine the digital assistant before launch. Four main assessment criteria for the chatbot could be identified in the results of the discussion: character and design, content, conversation management and push messages. While character, design, and conversation management were mainly well-received, the feedback on

content and possible, future push-messaging with learning tips was more critical. The positive perception of the chatbot's vivid character and appealing design confirmed the intention to create a more personalized conversation experience using a chatbot persona (Braun & Alt, 2020). According to the participants' feedback, content should be more specific and accurate, yet still short. Any kind of unrequested messaging should be optional. In this context, the initial warm-up also showed students' high, partly fictitious expectations concerning artificial intelligence. Furthermore, students discussed the opportunities and risks of the use of a chatbot in an educational environment, which provided insight into the perception of their institution. Thus, students see the professional web presence of the university as a possible factor that can influence the decision of potential students for or against the institution. Especially with a research profile focusing on artificial intelligence, an AI-based chatbot should convey the university's expertise and act as a flagship for the university. They also illustrated the benefit of a chatbot answering routine questions, both from students and prospective students, faster and more conveniently than the study service or a search on the website. This supports the underlying assumption of the project and the perceptions evidenced in other studies on service-chatbots in educational settings (e.g. Page & Gehlbach, 2017; Pérez et al., 2020).

Several positive and negative aspects were identified in the discussion concerning motivational and planning support. Students saw opportunities in an integrated calendar, a to-do list, and reminder functions to support their self-organization and learning. The learning planner received mixed feedback. However, especially for first-year students, it could provide valuable help in finding their learning style. The functions that would remind and guide students to prepare on time for exams were seen as most helpful. In terms of motivational aspects, the students preferred the use of badges to other gamification elements, since they might also help them to identify other students who have taken the course previously and are hence able to engage in informational exchange. This supports previous findings on the positive perception of badges in educational settings (Hakulinen et al., 2015). Concern was expressed by students in terms of privacy issues when allowing teachers access to their learning plans and additional (competitive) pressure when it comes to gamification functions such as rankings and levels. These comments align with prior studies, which suggest that competition and peer pressure through games can reduce intrinsic motivation (Reeve & Deci, 1996) and result in feelings of stress and distraction (Ejsing-Duun & Skovbjerg, 2014). Lastly, students also expressed the wish to integrate the functions on one platform, to avoid switching between different systems. Since the learning management system (Moodle) is currently only used for access to lecture documents, it still has to be determined whether and how this platform can integrate the DIAS components and attract students to use them there.

Limitations

Despite the strengths of the empirical design, the study underlies some restrictions, which also offer potential for future research. Thus, a shortcoming of the design is the participant recruitment from only one course and study program, resulting in a low sample group diversity. Although a homogeneous group composition could also be seen as a positive aspect, since participants can discuss the subject matter based on similar knowledge levels (Schulz, 2012), perspectives from other study programs would have been important as well. Furthermore, the students had previously been in contact with the chatbot, which may have influenced their feedback in the focus group. As the group knew each other, social desirability could also have been an influential factor in determining their answers.

Therefore, future work in this field should consider recruiting a diverse participant base, with students from different study programs and possibly even different educational institutions.

Implications

Key insights from the focus group will be integrated into the further development of the DIAS project. To address the risk of keeping potential students from applying to the university, when faced with a prototype of the chatbot, the welcome message will include a statement on its research status and explain potential misunderstandings or lack of answers at this development stage. The focus group also highlighted the importance of training the chatbot for AI-based answer generation to deal with individual (non-standard) questions in the second development phase. This will also improve content quality, and recognition rate and allow for more diverse question-answering scenarios. In addition, the student feedback will be integrated into the design of the push messages or unrequested messaging, considering the wish for optionally selecting topics and frequency. Regarding the planner and motivator applications, the focus group showed the need to carefully assess which functions benefit students, and which might even have adverse effects on the student's motivation. Therefore, the research team decided to focus on fewer applications than initially planned, with a better adaptation to the student's most pressing needs, such as exam reminders and support in identifying and tracking their individual learning style.

Furthermore, the study also contributed to the practice of chatbot design, learning assistants, gamification and motivation in general. Two themes could be identified in this respect. First of all, there is a high need to educate on and clarify the benefits and limits of artificial intelligence, since, despite the participant's knowledge of the current development stage, expectations were higher than reality can currently provide, partly even fictitious. The second aspect relates to the student's concerns regarding privacy issues and (competitive) pressure. Particularly in educational settings, it is essential that students trust the provider of the digital assistant and are assured that the stored information e.g., on their course performance, cannot influence their assessment by teachers. Apart from that, the aspect of competitive pressure should be considered when designing gamification applications, especially, since there is still only little empirical evidence on the benefits of gamified learning (Antonaci et al., 2019; Hakulinen et al. 2015). Based on the findings and their consideration in the implementation, future quantitative research could aim to find evidence for positive effects on motivation, information transparency, and planning skills when applying an integrated system such as DIAS.

Conclusion

The study findings provide detailed insights into the students' preferences, such as their support of the assistants' vivid persona, an optional push messaging, and functions to help them prepare on time for exams. While many aspects of the system were received positively by participants, there were, however, also some risks and concerns mentioned, such as the need for privacy and avoidance of competitive pressure when designing a digital assistant. The focus group results were able to answer the initial question of how students' needs can be best addressed, and the participant's feedback could be used to further refine the system before launch.

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Innovative Lecturer: Using Digital Tools in the Study Process

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Abstract

The education system is still known as a conservative social system, which is notoriously resistant to change and is challenging teachers to innovate (OECD, 2016). However, the changing perceptions of education policy makers and educational communities about the future of children's education point to the need for changes in teacher education, with the content of studies focusing on the acquisition and enhancement of new skills such as initiative, challenge-taking, and organisation / management of the process, as well as on the use of personalised, active, motivating, and engaging learning approaches. This paper explores the definitions of innovative teacher and educational innovation in more detail. The aim of the research is to reveal what kind of innovations lecturers do apply in the study process. The research was carried out using a mixed-methodological approach, involving surveys and interviews with university lecturers of pedagogical studies. The results of the study reveal a high level of the use of innovative methods, the latest learning tools, scientific sources and theories in the study process.

Keywords: Innovative Lecturer, Innovations, Educational Innovations, Digital Tools

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Introduction

The modern world, characterised by terms such as the Internet of Things (IoT), cloud computing, artificial intelligence, and big data, is one in which imagination is becoming reality through innovation (Means, 2018). This changing world is transforming our personal and social values, our family lives, and the relationships between family and children, classmates, colleagues, and nations. Drastic changes in different areas of life are dramatically altering people's mental and social behaviour, their psychological perspective on life, their decision-making process, their level of knowledge and understanding, and their overall skill set and capabilities. We can also call this period the knowledge revolution, in which the human brain is both the most important commodity and the most valuable natural resource (Arieli, 2021). Means (2018) stresses that in the future, humans will live in a fully intelligent physical space, starting with robotic factories, smart cities and other tools created by society. In response to the changes in the world and society, it is important to ask how HEIs can not only catch up, but also be active in the Global Revolution 4.0? How can we create a modern school, and thus a school of the future? What kind of education could help prepare young people for the complex challenges we are facing? How should young people be educated for life in a future world where no one knows how to live. According to Bereiter & Scardamalia (2006), schools need to be radically transformed into organisations that promote knowledge creation, foster a culture that is innovation-oriented, and encourage creative thinking among 21st century learners. Research on cultures that influence innovation has gained attention in recent years (Tian et al., 2018). A cultural perspective is essential for understanding innovation (Jaskyte, 2004, O'Reilly & Tushman 1997), and an innovative culture is a predictor of organizational performance (Danks et al., 2017).

Research methodology

Although the discourse in educational science emphasises the importance of integrating qualitative and quantitative research (Creswell, 2003), common research practice is usually limited to a quantitative or qualitative paradigm. Given that the integration of innovation into educational practice is not only related to changes in the organisation of the educational process, but also to teachers' personal experiences and experiences of changing and organising the educational process, our research methodology was based on a mixed research design. The use of mixed methods is considered valuable in research in new fields (König & Dressler, 2021), and is therefore relevant for investigating how teachers apply innovative tools in their study process. Integrating the two types of research allows to increase the usefulness of the study, as the data are linked and complement each other to provide valuable insights (Creswell & Plano Clark, 2007).

A key feature of mixed research is the integration of different methodological paradigms. Mixed methods is defined as research in which the researcher collects and analyses data, integrates findings and draws conclusions by drawing on both quantitative and qualitative research perspectives or methods in a single study or research programme (Tashakkori & Creswell, 2007). The research is based on an Explanatory Design (Creswell & Plano Clark, 2007), which consists of first collecting quantitative data and then qualitative data to help explain or elaborate on the quantitative results. The quantitative data and results provide an overall picture of the research problem, and a more detailed analysis is needed to refine, expand or clarify the overall picture by collecting qualitative data.

In order to avoid research gaps, a mixed-methods study combining a questionnaire survey and qualitative reflective writing (Jasper, 2005; Shum et al., 2017) was conducted. The questionnaire survey was conducted between March and April 2021. The survey was administered to 58 lecturers in the university's pedagogical degree programmes. The purpose of the questionnaire survey was to find out: *To what extent do lecturers use digital technologies in their studies? How is the educational content developed and what didactic tools are used, and how is the study process organised using digital tools?*

The results of the questionnaire survey provided valuable insights for the formulation of the questions for the qualitative study, which aimed to find out about the participants' experiences and perceptions of innovation in education and the impact this has on their behaviour in applying innovation in the course of study. In the second phase, 12 lecturers took part and shared their experiences of using digital tools in their studies. Lecturers' personal experiences are crucial to understand how they perceive and experience innovation in the educational process. The survey asked the following questions: How is digitalisation (important for educational practice? How does the use of digital tools in the learning process shape the profile of an innovative teacher? What motivates and inspires you to use digital tools in your studies? What changes can be observed in the study process by applying digital tools?

Data analysis

The data were analyzed through a combination of statistical analysis of the survey results and content analysis of the reflective essays (Johnson, Grove & Clarke, 2019). The survey data were analyzed using the statistical software SPSS. The texts of the reflective essays were analyzed based on content analysis using an inductive approach (Liu, 2016). The analysis of the qualitative research data was carried out by consistently analysing the content of the text, dividing the research content into analytical units, i.e. categories and subcategories (Sabaliauskas, 2017). The results of both surveys were analyzed using a mixed-methods approach, with four stages in the pillar integration process: listing (i), matching (ii), checking (iii), and pillar development (iv) (Johnson, Grove & Clarke, 2019).

The validity of the study is reflected in the use of 'live' reflective extracts from the participants in the coding, abstraction and conceptualization of the data. Summative validity is based on the triangulation of researchers, combining qualitative and quantitative research (Maxwell, 2022).

Research ethics

Participants were provided with detailed information about the purpose and objective of the study. All respondents participated voluntarily. The principle of anonymity ensures that the data obtained in the course of the study will not be linked to a specific person. The texts of the respondents' reflections have been given individual pseudonyms. The principle of confidentiality guarantees that the data will be stored in special electronic files created for the study and that the information will be accessible only to the researchers (The European Code of Conduct for Research Integrity, 2017).

Theoretical assumptions of innovation in educational process

Innovation, the implementation of creative ideas, is a necessary process for organisations to compete globally (Kremer et al., 2018). Innovation in related operations can improve an organisation's efficiency, productivity and competitiveness (Manafi & Subramaniam, 2015). In the education system, the application of innovation is vital to improve learning outcomes, the quality of education services, equity and equality, and efficiency, in addition to reducing the cost of education and maximising revenue from education spending (OECD, 2016).

Innovation is a multidimensional concept that is recognised in two domains. The concept of innovation emphasises elements of process, competitive advantage and technological innovation. This is particularly relevant in the context of education, where higher education institutions rely on the continuous "modernisation of the operational process, the pursuit of competitive advantage, and the provision of exceptional services that are inseparable from technological innovation" (Išoraitė, 2010) in order to achieve outstanding service quality. Okamoto et. al. (2013) echoes this, stating that in education it is necessary to continuously "innovate in the educational process", which leads to a multifaceted educational quality. As Almonaitienė (2006) points out, an innovation is a creative idea that has been adapted and implemented. In the scientific literature, innovation refers to a new idea/project/object (Karnowski, 2011, Janiūnaitė, 2000). The term "innovation" itself derives from the Latin word "nova", which means "new" (Stripeikis & Ramanauskas, 2011). In French, "innovacyon" means "renewal" or "giving a new form to an existing thing" (Jakubavičius et al., 2008). Shalley et al. (2004) emphasise the creation, use and diffusion of innovation. In the context of education, innovation is defined as "anything that is new at the level of the organisation, at the level of the pedagogical system" (Janiūnaitė, 2000 cit. Hoppkins, Ainscow West (1998)), that which is adopted or rejected by potential users. Theoretical model of innovation in educational process based on theoretical analysis is shown in Figure 1.

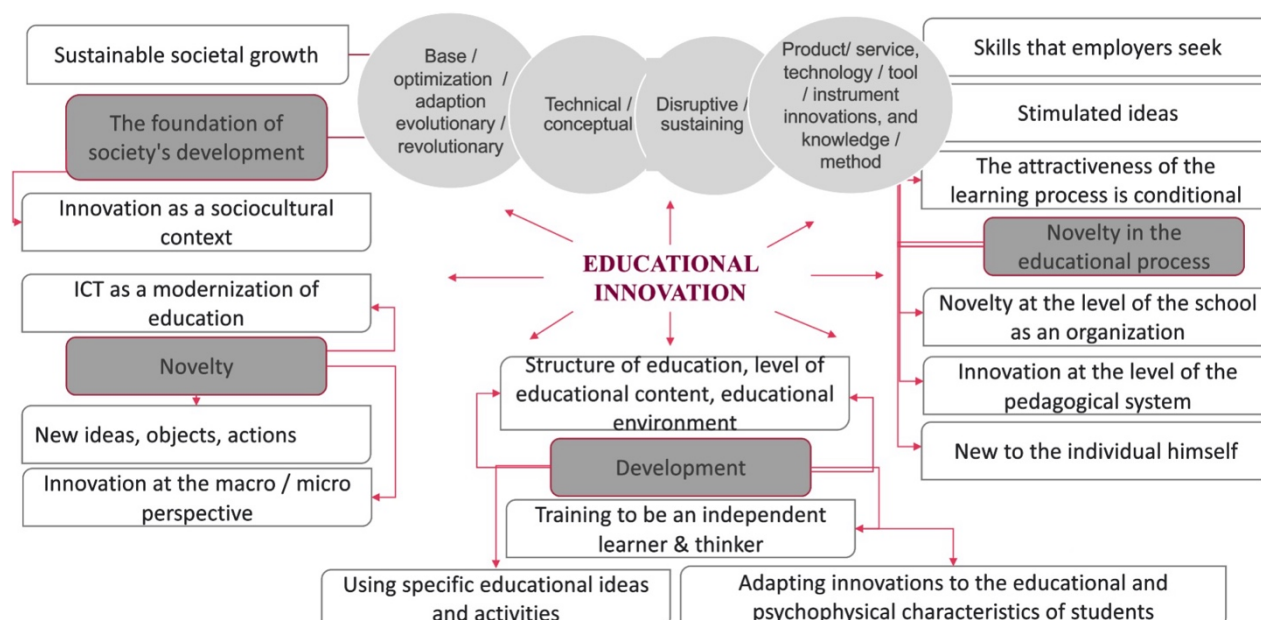


Figure 1: Theoretical model of innovation in educational process
(Designed by the authors, according to Vesshoff, 2010, Baumann et al., 2015, Dahiya, 2019, Popescu, Crenicean, 2012, Letelier & Sandoval, 2015, Neubauer, 2015, etc.)

Innovation is recognised through differences from existing forms of thought, behaviour or subject matter. It is a new practice or process for the individual implementing it (Janiūnaitė, 2000 cit. Hord et al [1989]). Vesshoff (2010), Albers (2005), Garcia & Calantone (2002) distinguish between the micro and macro levels of innovation, where at the macro level innovation is perceived as an innovation in the world, in the market, and at the micro level as an innovation for the consumer. However, it is noted that it is not only a new product/process, but also improvements that complement/enhance activities with new approaches, insights that increase the benefits for the user. According to Melnik & Strazd (2000) an innovation "is an idea, activity or some tangible object that is new to the firms, group or organisation that implements or uses it. Budreckienė & Janiūnaitė (2010) define innovative activity as the generation of new ideas, the creation of innovations, modifications, processes creating new services, methods, etc. Innovation is "the development and implementation of new processes, products, services and delivery methods that result in a significant improvement in the efficiency, effectiveness or quality of results" (ANAO, 2009). Thus, innovation can involve significant improvements or more transformative approaches. For example, the South Australian Department of Education and Child Development draws on OECD (2005) in defining innovation as 'the implementation of a new or significantly improved product (good or service) or a new organisational approach' (also DECD, 2010). Innovation is a process - the adaptation of a new or significantly changed creation (OECD, 2005) - that requires a long-term commitment, resources and an innovation climate within an organisation (Badran, 2007).

Innovation is understood as the introduction of a new educational idea, the transition and use of new ways of doing things (Janiūnaitė, 2000 cit. Hopkins [1990]), the successful introduction of a new subject or method" (Brewer & Tierney, 2012). In this practice, an idea, an object, a practice is introduced at the level of an individual, a group, an organisation, an education system. This view is echoed by Dahiya (2019), who states that innovation is seen as "the introduction of new methods/practices, new/improved products/services. Educational institutions can apply innovation in any activity related to learning, be it education, educational process or management of the institution, to improve the efficiency of the institution and overcome day-to-day problems and difficulties".

Innovation is seen as a prerequisite for change/renewal, where challenges are overcome, changes are implemented to improve performance, and educational content is modified. Innovation refers to changes in technology, process or operational methods (Pogosian & Dzemyda, 2012). Innovation should be seen as a means of necessary and positive change. As Serdyukov points out, any activity (e.g. industry, business or education) needs continuous innovation to remain sustainable. Innovation is created as a result of "the relationship between science and the knowledge base and technological development" (Levickaitė et al. 2011). Innovation is associated with progress focused on replacing the old with the new (Jakubavičius, 2003), a process that involves purposeful collaboration (Kirstukas et al., 2013). Blândul (2015) points out that innovation in educational institutions is one of the ways to meet the challenges of a changing world. In order to improve certain aspects of education, practices, individual behaviours and attitudes, and to realise systemic goals, planned changes are initiated and introduced into the educational environment by changing "the content of education through complementary change" (Janiūnaitė, 2000).

New information technologies are an integral part of the perception of innovation, where new information technologies are used for educational innovation, usually in order to modernise an educational institution and improve the quality of the educational process. Jong and

Hartong (2007) emphasise the ways in which activities are organised within an organisation through the use of the technological medium. As Popescu & Crenicean (2012) point out, new communication and information technologies stimulate innovation, thus changing the established educational system. Slahova et al. (2007) emphasize the creation, acquisition, education, and implementation of new technological processes.

Educational innovation requires the unified application of all the elements, as it is a complex process involving "the transformation of the values to be conveyed, the information to be taught, the methods to be used in educational activities" (Blândul, 2015), etc. Thus, in education, innovation must be implemented at all levels because, as Matsuda and Cohen, 2014, point out, "imbalances can undermine the idea of educational content and affect students' academic achievement". This leads to the need to develop all elements of the educational content - "didactic objectives, information content, teaching strategies, forms of organising the educational process, etc." (Matsuda & Cohen, 2014). This can be achieved by applying a unified teaching approach to the whole educational institution, holistically considering the whole innovation process as an "innovation" (Baumann et al., 2015).

Innovation is inextricably linked to the development of abilities/skills, where the emphasis is on the development of an independent personality and the need for new skills and competences. It is emphasised that innovation and creativity in education should promote students' analytical thinking, the ability to solve problems, to put their ideas and knowledge into practice (Matsuda & Cohen, 2014), and to become independent and responsible for their own educational process (Blândul, 2015). The development of these skills would meet the needs of employers, as research has shown that innovation and creativity in education are the skills most emphasised by employers and the process of building them (Popescu & Crenicean, 2012). Educational innovations related to the development of creativity and innovativeness of the individual are used to find access to the beneficiary, to create positive behaviours, and to foster creativity and innovativeness (Popescu & Crenicean, 2012).

The application of innovation in education is based on the importance of the characteristics of learners and the implementation at different levels of education. It is noted that new technologies are used as an integral part of innovation in order to improve the efficiency of education. However, the latter must be "adapted to the educational and psychophysical characteristics of the learners" (Matsuda & Cohen, 2014). An innovative approach must include relevant stakeholders (parents, businesses, students, education providers, communities, political organisations), the objects of innovation (mindset, organisation, products, processes, etc.) (Baumann et al., 2015) and the different levels of education (structure, organisation, content and environment) (Popescu & Crenicean, 2012). "In education, innovation is expressed as a new pedagogical theory, methodological approach, teaching technique, teaching tool, learning process or institutional structure that results in a significant change in teaching and learning, leading to improved student learning. Educational innovations thus aim to increase the productivity and efficiency of learning and/or to improve the quality of learning. Innovation can be directed towards advancing one, several or all aspects of the education system: theory and practice, curriculum, teaching and learning, policy, technology, institutions and administration, institutional culture and teacher training. It can be applied to any aspect of education that can have a positive impact on learning and learners. Similarly, educational innovation involves all stakeholders: learners, parents, teachers, administrators, researchers and policy makers, and requires their active participation and support" (Serdyukov). The success factors of an educational innovation are determined by the applicability of the innovation to the education sector, recognising the

conditions, characteristics, objects and stakeholders that exist within it (Baumann et al., 2015).

Analysis of research data

The results of survey revealed what lecturers consider to be innovations in the study process and what innovations they use (Fig.2). It also highlighted the opportunities for students to develop by experiencing the innovativeness of the study process.

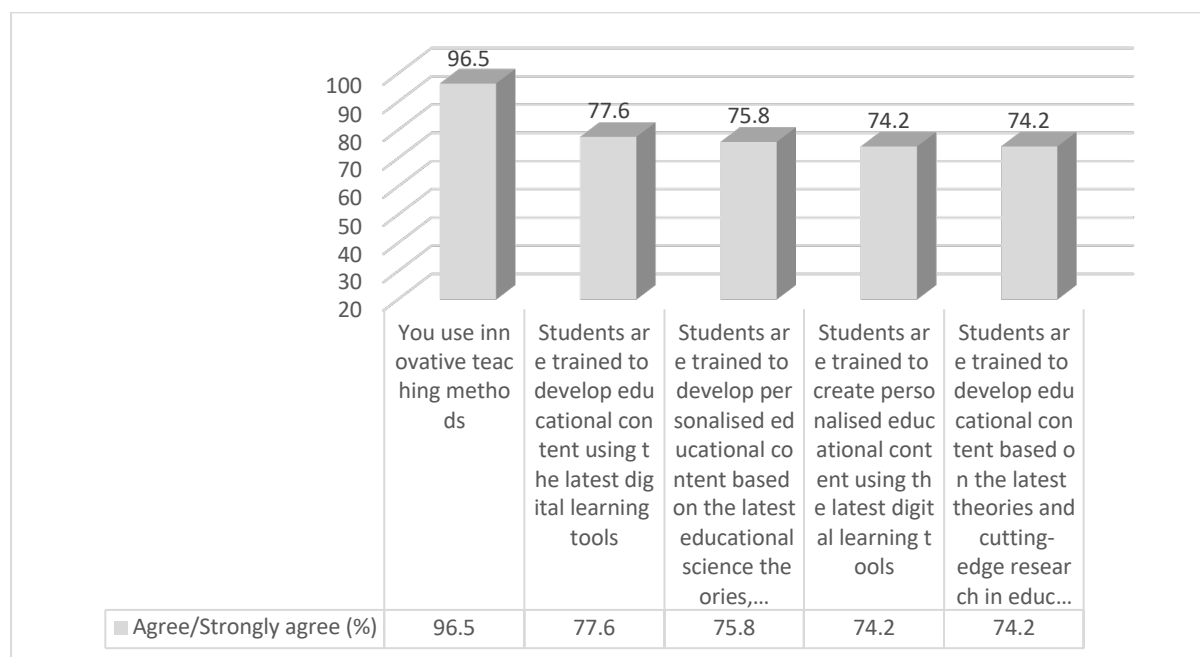


Figure 2: Lecturers' innovations in the study process (N=58)

The analysis of the survey data (Fig.3) revealed that lecturers apply innovative study methods (96.5%), which they also consider as essential innovations in the study process (62%). In parallel, the use of digital resources (56.9%) is also recognised as an important innovation in the study process.

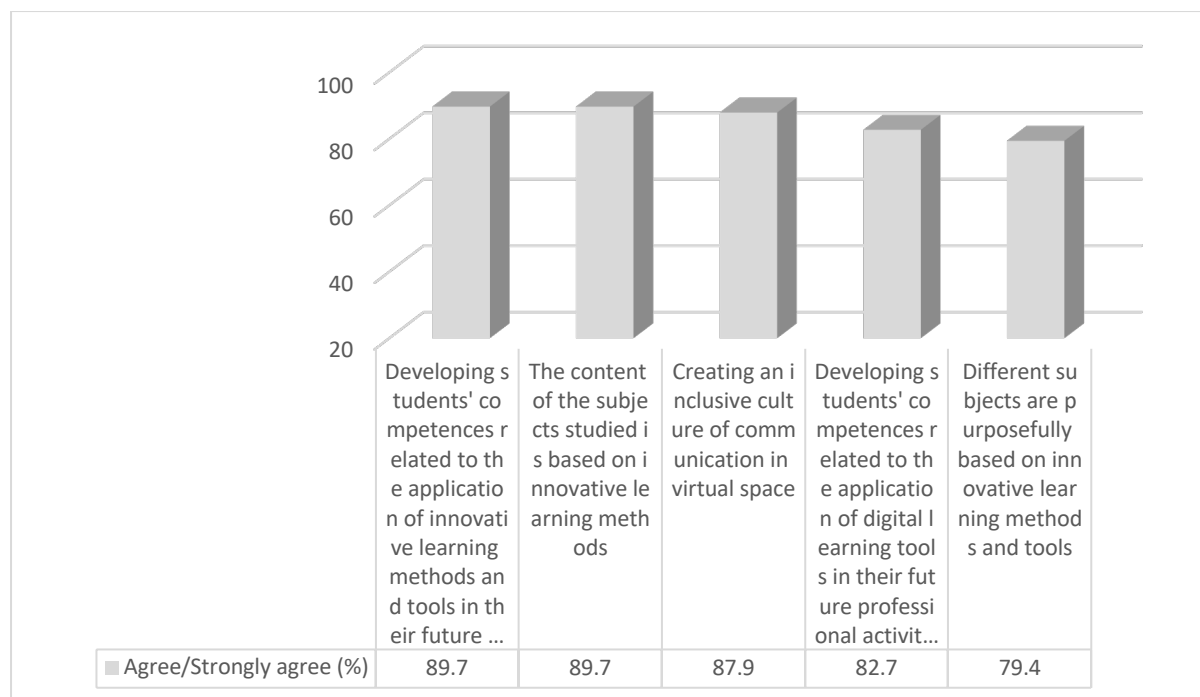


Figure 3: Student access to digital learning tools (N=58)

Studying in pedagogical studies creates an inclusive culture of communication in the virtual space (87.9%), and that students are enabled to develop competences related to the application of innovative learning methods and tools in their further professional activity (89.7%).

The qualitative research sought to identify the relevance of digitisation (the use of digital tools) for educational practice. On this basis, the theme "Changing the educational process" was identified, consisting of three sub-themes (Fig. 4).

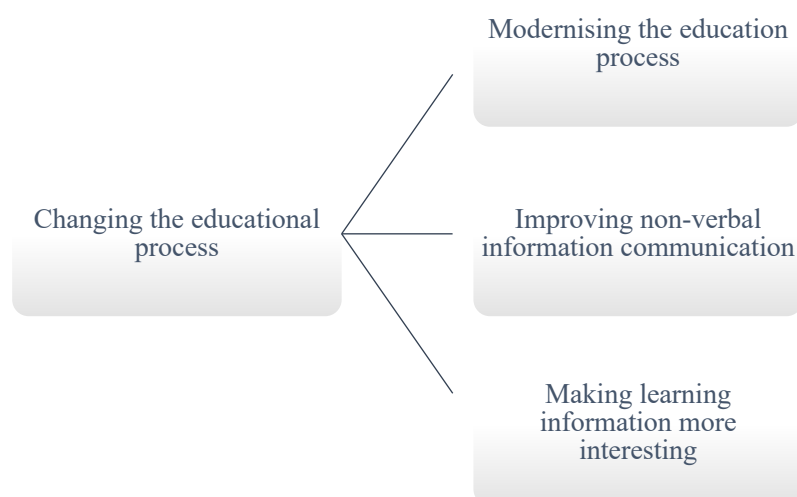


Figure 4: Insights from teacher educators on the role of digital tools in educational practice

As can be seen from the figure above, the first sub-theme "*Modernising the education process*" identifies that digital tools and their application allow for a modern educational process, when a participant of the study says: "*Nowadays, we can no longer use the traditional model of teaching, where the teacher/lecturer is the knower and the*

pupils/students are the hearers. Therefore, the educational content should be supplemented with a variety of digital teaching methods to engage and interest the new generation" (No.9). Another sub-theme *"Improving non-verbal information communication"* shows that digital tools in educational practice take the place of creating content that makes sense of non-verbal communication: *"This tool creates specialised illustrations for a particular biological context. It allows to improve the non-verbal communication of information and can also be used in assessment"* (No. 2). The third sub-theme *"Making learning information more interesting"* reveals that digitisation is a prerequisite for learners' interest and a motivational factor for learning.

It also explored what changes pedagogical lecturers have noticed when they have used or are using digital tools in their studies. The two themes *"Promoting students' self-regulated learning"* (Fig.5) and *"Supporting the lecturer in organising the educational process"* (Fig. 6) show that the use of digital tools is seen from two perspectives, i.e. the lecturer's and student's.

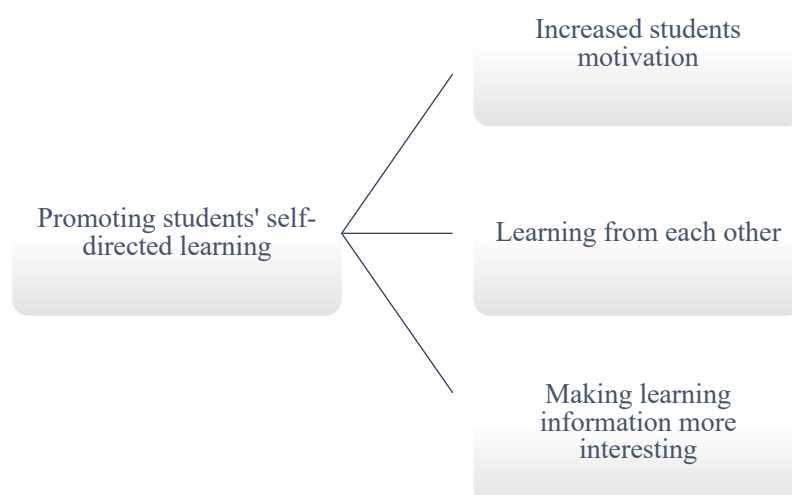


Figure 5: Changes in the study process when digital tools are used, as identified by teacher educators

The analysis of the data identified three sub-themes, the first of which *"Increased student motivation"* shows that digital tools are associated with increased student motivation. It can be assumed that digital tools should be used in the study process in order to foster students' motivation to learn. The second sub-theme *"Learning from each other"* shows that digitalisation promotes peer learning, where students can consult or choose stimulating tools to work together. The third sub-theme *"Making learning information more interesting"* highlights that digitisation of educational content activates interest in the learning material, which leads to deeper student engagement.

As can be seen in Figure 6, the theme *"Supporting the lecturer in organising the educational process"* has two sub-categories.

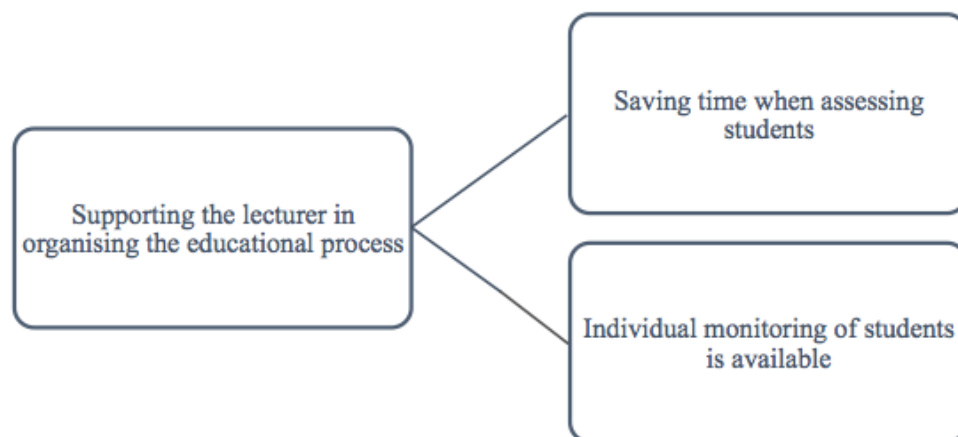


Figure 6: Changes in the study process when digital tools are used, as identified by teacher educators

The study found that the use of digital tools in the study process also saves lecturers' time, specifically in student assessment. This shows that lecturers tend to use and apply tools that also allow them to assess learners. Second sub-theme "*Individual monitoring of students is available*" reveals that digital tools help personalise the learning process and monitor individual student progress. This use of digital tools focuses on the modern educational process.

Conclusion

The use of innovative teaching methods using digital resources (e.g. virtual learning environments or digital teaching tools) is an essential feature of innovative pedagogical studies at the University. Lecturers perceive the use of digital tools in the study process as a significant innovation. By encouraging students to innovate, lecturers create environments in which students can experience the innovation of the learning process by developing educational content, learning to personalise educational content, linking the educational content they develop to advanced research.

Effective curriculum development relies on the development of educational content through the integration and synergies between the latest digital technologies and the latest research findings in educational sciences or other fields.

Digital technologies play a key role in personalising the learning process. Digital tools allow teachers and students to diversify and adapt educational content according to the learners' level of progress and facilitate the administration of academic processes.

The emergence of a future learning culture requires the creation and development of learning ecosystems that connect interacting people, technologies, content, and cultures, and that exist both inside and outside the organisation.

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Fostering the Entrepreneurial Mindset of Students Through Pioneering Teaching Pedagogies: An Empirical Study on a B-School

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Abstract

Recent studies have shown the importance of entrepreneurship on the economy of a country. Universities and Educational institutions play a vital role in nurturing students. The study focuses on the impact of innovative teaching pedagogies such as TAP (Teaching, Application and Practice) on the entrepreneurial mindset of students. The mindset of the students was measured using the “Theory of Planned Behavior” by Dr. Azjen and “Entrepreneurial Potential Theory” and extension of this model by Quixing Yang et. al (2021) in two stages via an experimental design method over a longitudinal period of two years. An instrument has been designed and administered on a sample of 570 respondents from university for pre and post testing in order to understand the entrepreneurial mindset using simple random sampling. An attempt has been made to understand the relationship among determinants of entrepreneurial intention using Structural equation modelling analysis. The result shows that the proposed model in the present study explains 54% of the variance, explaining the existence of entrepreneurial intention among students. The purpose of the research is to inspire additional research on measuring the entrepreneurial mindset of students utilizing other innovative training pedagogies, identifying a suitable pedagogy to foster the entrepreneurial mindset of students, and creating an appropriate eco-system to develop educational policies at the national level.

Keywords: TAP-R (Teaching, Application, Practice and Research), Entrepreneurial Intent, Entrepreneurship

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Introduction

Innovation is the phrase that will never go out of vogue. Modern learners are well-equipped with the information readily available to them via new media such as Facebook, Instagram reels, and infographic-based knowledge sharing programs such as YODA. The duty of an educator is growing, and with it comes a greater requirement for a higher degree of innovative teaching style to hold the attention of the student. In order to capture the students' interest, the pedagogy that is developed must have a certain element of novelty. The innovation in pedagogy should also emphasize unlearning the incorrect information that is available to the student and focusing instead on education-focused correct knowledge. When compared to the teaching pedagogy of the twentieth century, the pedagogical shift in the twenty-first century may be related to the phenomena of internationalization of society and the infusion of digitalization in learning. One of the major studies in this field discusses this significant transformation in the didactics and technique of education (Mynbayeva et al, 2017).

The recent pandemic resulted in the entire move of offline courses to online classrooms, and the previous adoption of blended learning facilitated a rapid transition to a wholly online model of learning for the COVID contingency classes as well. Both of these modifications are the outcome of the present epidemic.

Literature Review

It has come to light that the procedure of establishing a new company is fraught with a number of challenges due to the fact that commercial choices are made under conditions of uncertainty, in particular with respect to functional domains (Timmons et al., 2013). Therefore, those who want to start their own businesses need to demonstrate a significant amount of intellectual and practical capability.

They are required to triumph over the challenges that are inherently associated with entrepreneurial endeavors (Gibb, 2002). In light of this, research in the field of entrepreneurship education has placed an emphasis on the creation of new ideas in students so that they would be able to cope with ambiguity in the circumstances that they find themselves in (Kailer, 2009). The need of instructional methodologies that equip students to deal with the complexity of new company growth is predicated on the fact that this is the case (Biggs, 2003). Case study, individual presentation, group projects, formal lectures, seminars, guest speakers, web-based learning, group discussion, and guest speakers are just a few of the various instructional methods that have been identified in the content evaluations of entrepreneurship classes. Other instructional methods include: (Fayola et al., 2008; Lee, L et al., 2011).

The literatures on entrepreneurial education have not been able to reach a consensus regarding the particular criteria for selecting those teaching techniques that will be most effective for a given group of students in terms of transfer of entrepreneurial knowledge and motivation for future learning (Balan, 2012). This is the case despite the availability of such a wide variety of teaching techniques.

Therefore, the primary problem is to locate the most innovative tactics for regulating learning skills and to find the optimal match between teaching methods and the requirements of students (Lee et al., 2007). In this research study, we will investigate the significance of using

the model TAP(Theory , Application and Practice) and its extension as TAP R(Theory, Application, Practice and Research) as one of the innovative methods of teaching and learning that exist, with the goal of better facilitating the dissemination of entrepreneurial education and enhancing the overall learning process.

Proposed Framework for the Study

The proposed framework for the study has been adapted from the Ajzen Theory of planned behavior(Ajzen, 1991) and Dr. Krueger and Brazeal model of Entrepreneurial potential model. The conceptual model used for the study is presented below in figure 1.

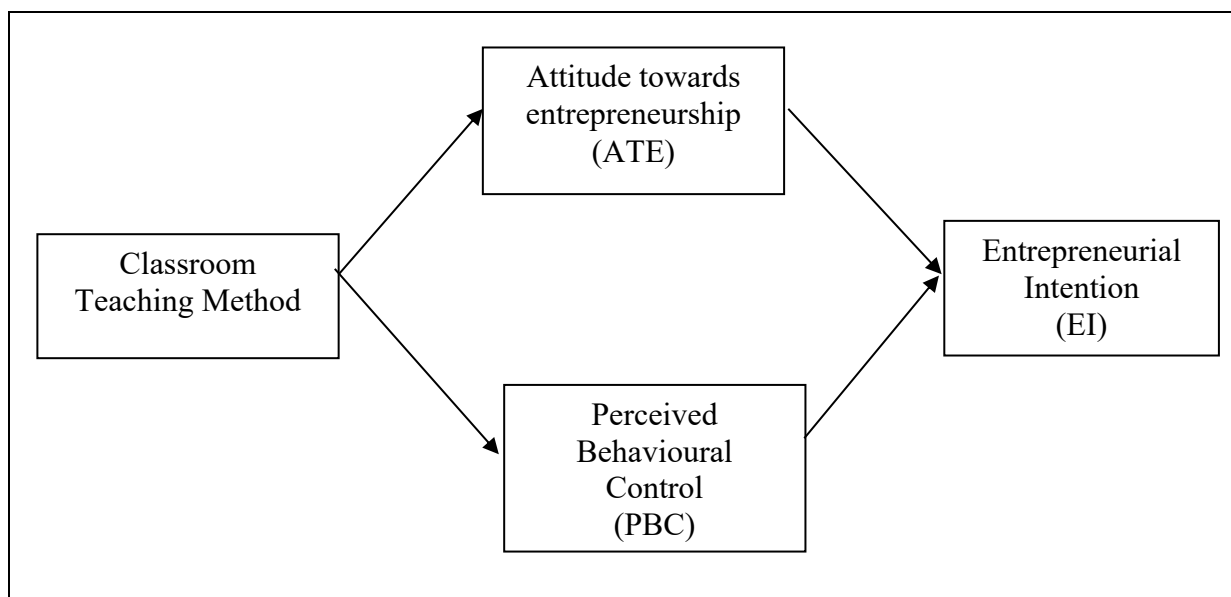


Fig 1: Proposed Framework for the Study

(Adopted from Ajzen Theory of Planned Behavior 1991 and study on “How to Develop Entrepreneurial Talent More Effectively? A Comparison of Different Entrepreneurship Educational Methods” by Qixing Yang et. al,2021)

The framework asserts that the classroom teaching methods and pedagogies forms the attitude toward entrepreneurship, and perceived behavioral control to shape an entrepreneurial intent among students. As stated in the suggested framework, the purpose of this research was to investigate the change in entrepreneurial attitude among students as a result of the usage of TAP R modular teaching for delivering a course. The hypothesis are formulated as per the proposed framework for the study and are presented as below:

H1: There is a significant relationship in the Pre test and Post test scores of Attitude towards entrepreneurship.

H2: There is a significant relationship in the Pre test and Post test scores of Perceived Behavioral control.

H3: There is a significant relationship in the Pre test and Post test scores of Entrepreneurial Intention

Data Analysis

This research employed an experimental design via ANOVA test to analyse data gathered over the course of a full two years of the MBA degree (Batch 2020–2022). Data was

collected twice, first at the beginning of the MBA programme in 2020 and again at the end of the MBA programme in 2022.

The study also involves testing the existence of significant relationships between the antecedents of entrepreneurial intention as per the proposed framework used for the study. The data has been collected using stratified random sampling based on the area of specialization chosen by students. Survey method has been used to collect the responses from students by administering the questionnaire in prior with the help of expert opinions i.e researcher, field experts and academicians working in the similar lines.

Experimental Design Analysis

The experimental design has been used to understand the pre and post behavior of students that has undergone a full time MBA programme(2020-2022) using TAP R modular teaching approach. The results obtained from pre and post experimental design through ANOVA test are presented in Table 1 and 2.

Table 1. Results obtained from ANOVA Testing (Paired Sample Statistics)

H1						H2					
PAIRED SAMPLES STATISTICS						PAIRED SAMPLES STATISTICS					
		Mean	N	Std. Deviation	Std. Error Mean			Mean	N	Std. Deviation	Std. Error Mean
Pair 1	PRE_ATE	4.0674	570	.70812	.05263	Pair 2	PRE_PBC	4.0374	570	.60812	.05263
	POS_ATE	5.0707	570	.80628	.05993		POS_PBC	5.1307	570	.88628	.05993
PAIRED SAMPLES CORRELATIONS						PAIRED SAMPLES CORRELATIONS					
		N	Correlation	Sig.				N	Correlation	Sig.	
Pair 1	PRE_ATE & POS_ATE	570	.857	.000	Pair 2	PRE_PBC & POS_PBC	570	.788	.000		

Table 2. Results obtained from ANOVA Testing (Pre and Post Results)

Pre Test(Control) Post Test(Treatment)	Difference Between the Means	F Statistic
CG_ATE	2.23	0.675
TR_ATE		
CG_PBC	0.14	0.754
TR_PBC		
CG_EI	1.17	0.741
TR_EI		
TR_IN		

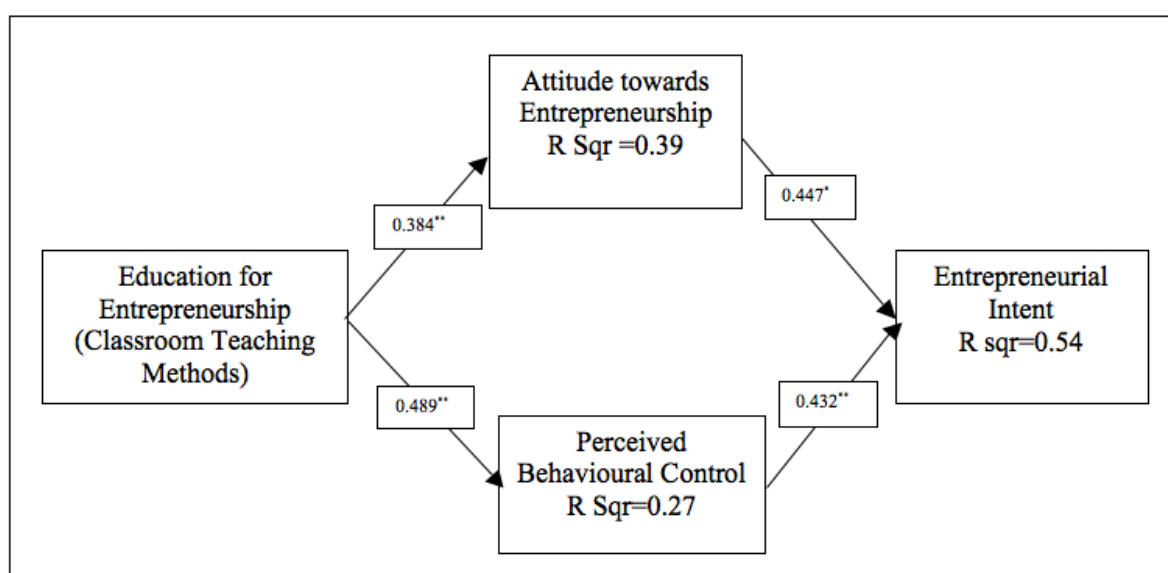
All the hypothesis are found to be in acceptable ranges indicating the F Statistic value >0.6 explaining the significance of existence of relationship between Pre and Post experiments.

Also, the results obtained have indicated that entrepreneurial intent is influenced by attitude towards entrepreneurship which in further influenced by classroom teaching method and perceived behavioral control among the students.

The research demonstrates a paradigm change in the students' mindset from the time they entered the MBA programme to the time they graduated. 15 percent of students are on the brink of obtaining seed funding and have produced a business plan throughout their MBA programme while the rest 50% of the students have started thinking in the lines of having their own business in near future. In addition, results obtained from paired tests explain the relevance of existing correlations between two samples.

Structure Equation Modeling (Overall Model for the Study)

The model explains the existence of substantial correlations between the different entrepreneurial intention categories. The resultant value was determined to be between 0.384 and 0.489 at the 0.01 and 0.05 significance level. The R-square value was calculated using SEM analysis on 570 completed surveys. The R square values for perceived attitude toward entrepreneurship and perceived behavioural control were found to be .39 and .27, respectively, which explains 34 and 27 percent of the total number of components. The result for the overall structural model is 0.54, meaning that the model explains 54% of the constructs. According to the overall structural model, attitude toward entrepreneurship and perceived behavioral control play a significant impact in entrepreneurial intention. Students with a greater attitude toward sustainable entrepreneurship via education (classroom teaching such as TAP R) and perceived behavioral control are more likely to choose entrepreneurship as a vocation, according to the findings of this research. The whole model is shown in figure 2 below:



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

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

Fig 2: Overall Model for the study (Correlations obtained from SEM analysis)

Conclusion and Recommendations

This study aimed to comprehend the paradigm change in the entrepreneurial attitude of MBA students from the time they enter the programme till they graduate. The research demonstrates that the TAP R is a proven innovative teaching pedagogy that has had a substantial impact on the entrepreneurial spirit of students. In addition to the modular teaching strategy, the research aspect via entrepreneurial projects, project-centric learning, and entrepreneurship-oriented courses with an emphasis on experiential learning plays a crucial role in shaping students' attitudes toward entrepreneurship. This study investigated the impact of education on entrepreneurial attitude and perceived behavioural control on entrepreneurial intent. To verify and establish the link between constructs, hypotheses were tested.

This research proposes that educational institutions should develop a curriculum matrix that includes both discipline-specific and entrepreneurial electives providing entrepreneurial classes and programmes. This will provide students with an awareness of the entrepreneurial environment and the core skills necessary for future business success and longevity. Moreover, the study also recommends that the government create research and development programmes to assist the diffusion of additional business expertise.

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Reflection of Sustainable Entrepreneurial Intent Among the Learners on Completion of Courses on Sustainability

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Abstract

The increased awareness of destruction created by human behavior is serving as fuel to stand together for a sustainable planet as a society. The irrational behavior towards society and the environment has moved us closer to global crises like global warming hunger & poverty. The studies in recent times prove the learned consumers are attracted to buy a product or avail a service which is sustainable. This study aims to understand the sustainable entrepreneurial intent among students after the completion of courses in sustainability. An instrument has been designed and administered on a sample of 380 respondents from university students in order to understand the sustainable entrepreneurial intention using simple random sampling. An attempt has been made to understand the relationship among determinants of entrepreneurial intention using Structural equation modelling analysis. The result shows that the proposed model in the present study explains 51% of the variance, explaining the existence of sustainable entrepreneurial intention among learners. This study proposes that educational institutions provide courses and programmes in sustainable entrepreneurship. This will equip students with an awareness of the entrepreneurial environment and the essential skills need to be successful, sustainable businesses in the future. In addition, the report recommends that the government construct research and development programmes to help in the distribution of further entrepreneurial expertise.

Keywords: Sustainability, Entrepreneurial Intent, Sustainable Entrepreneurship

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Introduction

The affection for planet earth is on an upfront increasing trend with 60% of Indian consumers are willing to loosen their pockets by paying a premium price for the sustainable planned friendly products ("60% in India", 2022). With the increased dialogue between the world economies the researchers reveal that the consumers from the strong global identity have large concern towards the environment. (Salnikova et.al, 2022). The United Nations has named the period between 2020 and 2030 as the "decade of action." Despite the fact that the pandemic has shaken the world, it is also the beginning of the age of resilience. The administration has taken an unprecedented choice to make a bold and revolutionary statement with the implementation of the New Education Policy (NEP, 2020).

Recent education policies in India have switched their emphasis from delivering subject knowledge-based curriculum courses to increasing awareness and cultivating an entrepreneurial mindset among students that would produce future sustainable managers, consultants, and entrepreneurs.

Literature Review

The research was conducted using a systematic literature review method, which resulted in the identification of three primary themes, which includes: (1) Sustainability, (2) Entrepreneurial Intent and (3) Academics Role in Sustainability

Sustainability

Sustainable Business Model incorporate a triple bottom line approach and are considerate to the interest of other stakeholders as well. the stakeholders can bring in sustainability practices into the process of business which can be a competitive advantage. Salnikova et.al (2022) expressed that the consumers who have a strong global identity are found to be more associated with the events organized on sustainability. For the growth and success of sustainable business model the organizations opt for an alliance for technical and innovation and to partner in any other areas of interest by the people concerned (Wahba et.al., 2019). The sustainable challenges have a wider scope with environmental, social and with other dimensions of the components used in the process of production of the product. The traceability of the non-sustainability behavior is difficult. Despite the support received by the consumers in terms of words their actions are opposing to protect the planet with their buying decisions (Sumner, M. P. 2015).

Entrepreneurship Intent

Social entrepreneurship intent has a direct relation with the formation of social entrepreneurship (Nsereko, I., 2020). There is a correlation between the conditional resources available geographically and the formation of social enterprise. A recent study proved that the preexisting psychological capital controls the attitude of the entrepreneurs' intentions developed post the academic qualification (Liao, K. et.al, 2022). The entrepreneurship intent as a result of academic learning is a blend of risk and resources. The risk is identified the no guarantee card for the success of a business and the other risk is in terms of taking the advantage of the opportunity and also in the journey of innovation as they are very well aware and existing method and technology cannot be adaptive ethically (Teece, D. J. 2007).

Academics Role in Sustainability

The educational institutions can adopt to the top-down and bottom-up approach to engage the students to bring in the awareness on the scarce resources. The academic curriculum can be of direction to bring in the change of the mindset of the students aiming towards the sustainable world (Young, S.,2013). The academic factor is higher contributor to the involvement of social entrepreneur in cases which involves the technical research knowledge (Newig, J.,2019). There has been a paradigm shift in the academic curriculum from designing the courses to delivering the courses. In addition, the New Education Policy 2020 in India has shifted its emphasis to place a greater emphasis on the teaching of sustainability in business school curriculum, as well as on the delivery of sustainability-related courses (NEP,2020).

Methodology

An in-depth examination of the literature on sustainable entrepreneurial intention sheds light on the antecedents of entrepreneurial activity. To ascertain entrepreneurial intent among the learners on completion of courses on sustainability among business school students, a survey approach has been conducted.

A simple random sample technique was used to develop and deliver an instrument to postgraduate students. The study employs an exploratory and descriptive research approach using experimental design method and makes extensive use of primary and secondary data. This study aims to understanding the sustainable entrepreneurial intent among students after the completion of courses in sustainability. The list of sustainability courses offered at post graduate level in Jain University is presented in Table 1.

Table 1. Sustainability Courses undertaken by MBA Students at Jain University

TRIPPLE BOTTOM ELEMENTS	COURSES UNDERTAKEN BY MBA STUDENTS
PROFIT	All Business Courses(100+),ENVC etc
PLANET	Corporate Social responsibility and Sustainability, Green Innovation and Entrepreneurship, Sustainable Entrepreneurship, Business Ethics, Managing Innovation and Technology, Business Law etc(30 Courses)
PEOPLE	Social entrepreneurship, Corporate Strategy, HR Core electives

To further understand the relationship between the variables, structural equation modeling (SEM) was used. The structural relationship between perceived desirability, perceived feasibility, propensity to act, and entrepreneurial intention is examined using SEM analysis.

Proposed Framework for the Study

The proposed framework for the study has been adapted from the Ajzen Theory of planned behavior(Ajzen, 1991) and conceptual model on sustainable entrepreneurial intent (Lina Marcela et al,2022) is presented below in figure 1.

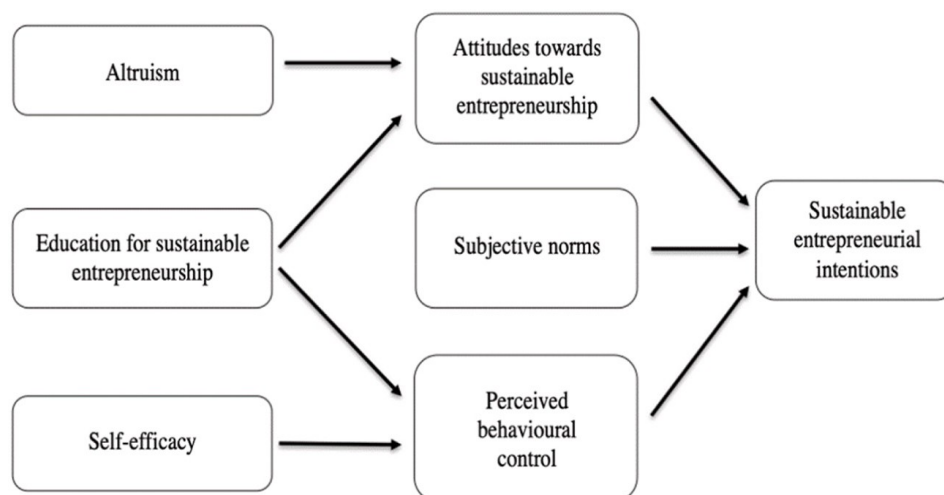


Fig 1: Proposed Framework for the study

The framework asserts that the attitude toward sustainable entrepreneurship, subjective norms, and perceived behavioral control plays a significant role in fostering sustainable entrepreneurial intent. As presented in proposed framework, education through curriculum designed aiming at sustainability also plays a significant role in entrepreneurial intent among the learners. The hypothesis are formulated as per the proposed framework for the study and are presented as below :

H1: There is a significant relationship in the Pretest and Post test scores of Altruism.

H2: There is a significant relationship in the Pretest and Post test scores of Education for SE.

H3: There is a significant relationship in the Pretest and Post test scores of Entrepreneurial Self efficacy.

H4: There is a significant relationship in the Pretest and Post test scores of Attitude towards entrepreneurship.

H5: There is a significant relationship in the Pretest and Post test scores of Perceived desirability.

H6: There is a significant relationship in the Pretest and Post test scores of Perceived Feasibility.

H7: There is a significant relationship in the Pretest and Post test scores of Entrepreneurial Intention

Data Analysis

The data analysis can be studied through experimental design testing followed by structure equation modeling to understand the relationship between the antecedents of sustainable entrepreneurial intent.

Experimental Design Analysis

The experimental design has been used to understand the pre and post behavior of students that has undergone through sustainability courses. The results obtained from pre and post experimental design through ANOVA test are presented in Table 2.

Table 2. Results obtained from ANOVA Testing

Pre Test(Control) Post Test(Treatment)	Difference Between the Means	F Statistic
CG_AL	2.48	0.757
TR_AL		
CG_SE	0.14	0.754
TR_SE		
CG_ESE	1.17	0.881
TR_ESE		
CG_AE	0.14	0.721
TR_AE		
CG_PBC	1.18	0.652
TR_PBC		
CG_PD	1.06	0.824
TR_PD		
CG_PF	1.23	0.687
TR_PF		
CG_IN	1.42	0.771
TR_IN		

All the hypothesis are found to be in acceptable ranges indicating the F Statistic value >0.6 explaining the significance of existence of relationship between Pre and Post experiments.

Also, the results obtained have indicated that sustainable entrepreneurial intent is influenced by Altruism, education for sustainable entrepreneurship and perceived behavioral control among the learners. The delivery of curriculum courses on sustainability has a significant influence on the learners' sustainable entrepreneurial intention.

Structure Equation Modeling(Overall Model for the Study)

The overall model explains the presence of significant relationships existing between the various constructs of Sustainable entrepreneurial intention. The obtained value was found to be in a range of .327 to .584 at significant level 0.01 and 0.05. The R square value has been computed using SEM analysis for 380 filled questionnaires. The R square value for perceived attitude towards sustainable entrepreneurship, Subjective norms and perceived behavioral control were found to be .34 and .45 and .22 explaining the 34,45 and 22 percentage of constructs. The value for the overall structural model is found to be 0.51 i.e. 51% of the constructs are explained by the model. The overall structural model states that for entrepreneurial intention to take place attitude towards sustainable entrepreneurship, subjective norms and perceived behavioral control plays an important role. Through analysis of this study it is stated that learners with more attitude towards sustainable entrepreneurship through education and subjective norms possess more willingness to choose entrepreneurship as a career. The overall model has been presented below:

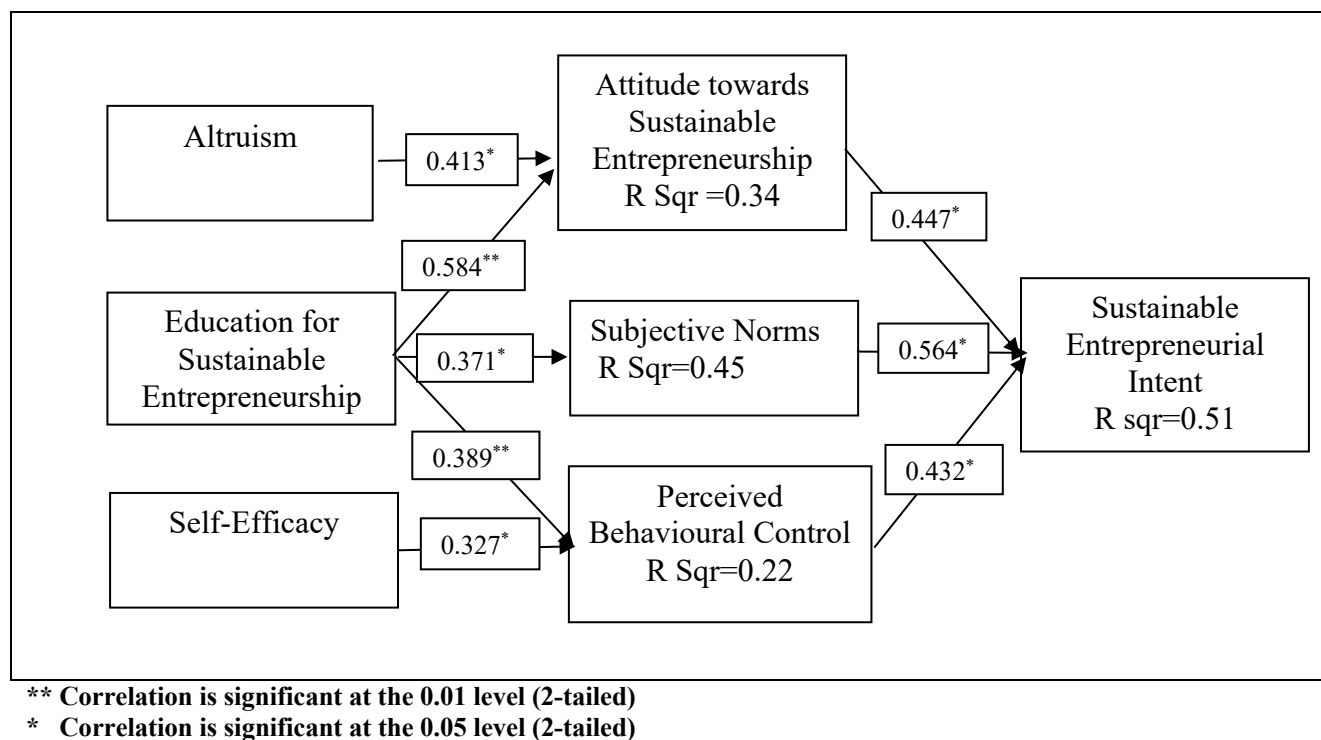


Fig 2: Overall Model for the study (Correlations obtained from SEM analysis)

Conclusion and Recommendations

The objective of this research was to determine students' sustainable entrepreneurship intentions after completing sustainability courses. The research explored the influence of education for sustainability and subjective criteria, self-efficacy, and attitude toward sustainable entrepreneurship in influencing the entrepreneurial purpose for sustainability. Testing hypotheses was used to validate and establish the relationship between constructs.

This study suggests that educational institutions provide sustainable entrepreneurial courses and programmes. This will give students with an understanding of the entrepreneurial environment and the fundamental skills required for future success and sustainability in company. In addition, the study suggests that the government establish research and development programmes to facilitate the dissemination of further entrepreneurial experience. Moreover, this study has used Ajzen theory of planned behavior to look at the learner's entrepreneurial intent on reading sustainable courses that influence entrepreneurial tendencies among university students in Bangalore.

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Use of Information and Communication Technology for Quality Education

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Abstract

Sustainable Development Goals (SDGs) aim to attain a better and viable future for everyone and the world. Quality education is one of the SD goals vital for nation-building and equalising with other countries. Technology plays a significant part in education as it enhances the quality of education when integrating Information and Communication Technologies in the education system, predominantly in the teaching and learning process synchronously or asynchronously. It helps to attain the teaching-learning goals, enriches access and availability of resources, builds capacities, and manages the educational system. It improves flexibility, where students and teachers can access teaching and learn anywhere without geographical barriers. It also expands access to education, raises academic quality, and helps teaching-learning engage. The present study aims to determine the role of ICT in improving the quality of education and how its usage can be enhanced in the education system. The study materials will be gathered through the interdisciplinary literature review method. However, to make it possible, there are roles to be exercised by the government, education management, teachers, and students.

Keywords: Sustainable Development Goals, Quality Education, Information and Communication Technology

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Introduction

The United Nations established a sustainable development goal (SDGs) in Brazil in 2012 at a conference on the topic of Sustainable Development which has 17 goals to attain a better and viable future for all people and the world. Among the goals, Quality Education is one of the most important goals that urgently need to focus on. All levels of education are equally essential to achieve the SD to eradicate poverty, attain gender equality, women's empowerment, and, most importantly, for human development (United Nations, 2012). It enables people to bring out or develop all their potential and skills to become beneficial to human beings and society. Education aims to make good human beings efficient in reasoning with action, acquiring a spirit of boldness or courage, loving and kindness towards fellow beings, creativity, and possessing moral values (NEP, 2020). For improving the quality of education, some factors are responsible. We need quality education to build a better nation and equal position with other countries. Creating a quality education requires cooperation between the government, society, and the private sector to support each other (Mou, 2016; Pramana et al., 2021). Furthermore, information and communication technologies play a significant role in this technological era, particularly in the field of education, to make the learners learn better, acquire higher-thinking levels, make it more enjoyable and effective, and produce quality human resources (Akilbekovna, 2021; Al-Rahmi et al., 2020). Therefore, the present study is to find how technologies (ICTs) are used in teaching-learning process particularly in India to enhance the quality of education.

Concept of Sustainable Development Goals

Sustainable Development examines the different needs towards the responsiveness of our environment, society, and economy of our planet. It is an effective approach as it focuses on recovering or progressing human-environment interaction by highlighting the management and preserving our world resources for the future (Willsher, 2022). Sustainable development is an approach to seeing the needs of the present generations without affecting or disturbing the needs of future generations (Global Environmental Health and Sustainable Development, 2022). Sustainable development has existed in indigenous values for years, although the term itself is relatively new (Agbedahin, 2019). Quality education is one of the sustainable development goals that call for all the education stakeholders to encourage and promote education by providing adequate facilities for all children irrespective of gender and health and providing safe and effective learning environments. ICT in education can improve and renovate the education system, thus making a nation reach a higher level (Yuchi & Zhujun, 2018). Moreover, the United Nations aims to realise quality education by enhancing teacher training, developing sustainability curricula, teacher training programmes that prepare students for careers in sustainability-related fields, and more effective use of information and communications technologies to enhance learning outcomes (United Nations, 2012).

Concept of Quality Education

In 2012, at Rio De Janeiro, a conference organised by United Nations on Sustainable Development, a document with seventeen sustainable development goals were adopted. By then, quality education was recognised as an essential element for sustainable development for the first time (United Nations, 2012). Moreover, in September 2015, the UN adopted 2030 Agenda for Sustainable Development with 17 goals. The world is putting education a priority to bring development and sustainable development. So, significant steps have been taken by the United Nations toward education by including in the SDGs to be achieved in 2030

(UNDP, 2015). Quality education is one of the 17 Sustainable development goals aimed at ensuring that all get equal education irrespective of caste, race, gender, or challenges providing opportunities for everyone (Rulandari, 2021). It is an essential weapon for achieving a sustainable future and aims to increase education access, particularly for girls and marginalised groups. Another aim of this goal is to achieve universal education. It also facilitates people to progress their skills and advance their potential as abled human beings that can contribute to and benefit society. Quality education provides the foundation for societal equity (Goldhaber, 2021). This quality education begins with improving the learning process that leads to independent learning for students and is no longer teacher-centred (Pramana et al., 2021).

Education is a foundation for peaceful societies and effective institutions. Building the knowledge to tackle critical challenges like climate change is essential. Attending school is never enough if children are not learning. Therefore, quality education is required for youth to get employment in a high-profile job, and it is necessary to be digitally literate, especially in this technological age where almost every work is done with the help of technology. Moreover, the educational system is the area that needs to focus on and how learning systems match with constantly changing demands (United Nations, 2019).

Concept of Information and Communication Technology

Information and communications technology cover all appliances and network mechanisms and applications, allowing people to be involved in communications, media, creating management systems, and audiovisual and network-based supervising. In a broader term, ICT refers to all technologies, such as computers, software, the internet, wireless networks, social media, cellphones, video-conferencing, and other facilities. It also includes resources, content, forums, and services that can be provided via digital forms. It can be utilised to realise teaching-learning goals, enhance access to learning and availability of resources, and manage the education system systematically (Agarwal et al., 2018; Mahashevta, 2017; *National Policy on Information and Communication Technology (ICT) In School Education Department of School Education and Literacy Ministry of Human Resource Development Government of India Contents*, 2012). Information and communication technology have done an extraordinary task for inclusion and overcoming the challenges to meet sustainable development. Technologies greatly help scientists, activists, technologists, educationists, and others with network collaboration, problem-solving, and discussions. The progress of sustainability can be realised through ICT, which assists the world's educational institutions, organisations, government and nongovernment, and all the people to become professionals and leaders to solve the problems of this generation (Sachs, 2012). Sustainable development goal number four- quality education aims to make a learner develop knowledge and skills which will back the sustainable development to protect our environment and make our world a better place now and for future generations (Wang et al., 2021).

Importance of Information and Communication Technology for Quality Education

Information and Communication Technology are commonly used in teaching-learning to strengthen students' learning experience, online learning, and evaluation, to increase the quality of knowledge delivery. It also promotes deeper understanding to develop personalised competencies and acquire knowledge and information (George et al., 2021). Moreover, the ICTs and the internet have an excellent advantage in enhancing traditional learning and act as a catalyst to change the teaching-learning approach. Appropriate ICT implementation

improves education quality and promotes educational equity in developing countries (OECD, 2016; Yuchi & Zhujun, 2018). Delivery through PowerPoint presentation, smart classroom develops interest and curiosity among students making the content easy to understand, and fulfill the needs of the learners. The use of ICT in the classroom makes the teachers easy to get the attention of students while delivering, making the teaching-learning process effective, productive and easy (S. Sharma, 2018). In addition, it encourages learning through participation, engagement, productive learning outcomes, and adopting the best teaching method. It also serves as a channel to build a social network for students and teachers to support and exchange knowledge within the institutions and share, learn, and support globally (Sobaih et al., 2022).

ICT employs for achieving educational goals and improving flexibility, where students and teachers can access teaching and learn anywhere without geographical barriers. It also expands access to education, raises academic quality, and helps teaching-learning engage (Bindu, 2017; U, Wilfred-bonse, Kate. E, Itodo. & A, 2020). Realising the weightage of technology use in the education system, the National Policy on Education 1992 emphasised the necessity to use technology in education to progress the quality of the Indian education system. Again, the National Curriculum Framework (2005) also suggested using ICT effectively in classrooms to develop critical thinking and the ability to solve problems amongst 21st-century learners. ICT empowers teaching and learning by incorporating different technique, methods and tools and also provide rich resources to enhance quality outcomes (National Curriculum Framework, 2005). The National Policy act as a blueprint for adopting and implementing educational technology in schools by emphasising the state's role in providing students and teachers with equitable and universal education and ICT-enabled resources (Maitra & Anurekha, 2021). Furthermore, the National Education Policy 2020 stresses digital literacy and ICT applications in teaching-learning to enable all children to get quality education and reach out even to the remotest places of the country. Such programmes are SWAYAM, SWAYAMPRAVA, e-pathshala, NROER, NDL, Digital India Campaign, and many others (Parida & Rout, 2021).

There are different ways of using ICT in teaching and learning. People learn from YouTube, and other social media as learning from ICTs or social media is more fun and convenient than sitting in the classroom and listening to lectures. Coursera, YouTube, WhatsApp, and Facebook are commonly used for asynchronous learning in India. While online platforms like Google Hangout, MS Teams, WebEx and Zooms are widely used for synchronous learning. Integration of ICT in education became popularised after the eruption of the Covid-19 pandemic when online learning and hybrid learning started to be adopted (Allen, 2019; Panigrahi & Dwivedi, 2021; Umare et al., 2022).

Moreover, WhatsApp is the easiest and most convenient way of linking and interchanging in a group through sharing and conversation. People feel more comfortable using English while interacting on social media, which helps them improve their skills in English (Rezaul Karim et al., 2022). Therefore, the use of the internet in language learning, mainly English language, is rapidly growing, opening up new and exciting opportunities for English Second Language classes. A weblog is another helpful appliance or tool for language learners to develop writing skills (Perumal & I, 2022). For young and adult learners, Gamification in Education is one of the most exciting, motivating, and fun approaches to learning using ICTs. It includes features such as discounts, badges and leaderboards to show the top performers, making teaching-learning more effective, enjoyable, competitive, and rewarding for academic students and professionals (Panigrahi & Dwivedi, 2021). In addition to that, Moreover, while

adopting an online or hybrid learning approach, Quizizz media is an effective method that motivates students to discover their abilities and understand what the teachers lecture or explain. It acts as a self-evaluation instrument that encourages the students to be attentive and work hard to get satisfactory learning outcomes on the test, making the learning process more exciting. It builds interest in learning (Henukh et al., 2022).

However, to be successful in using ICT for quality education, adequate infrastructure, human resources, and efficient leaders are highly required for effective and satisfactory classroom and online learning results (Wang et al., 2021). To reap the enormous advantages of ICT in education, there is a need to train teachers or lecturers on the basic skills of ICT to ensure their competency and possess educational institutions well equipped with ICT facilities (Imam & Andrew, 2016). Education becomes an agent for the community's social power to apply a method of fostering the people to adapt to the demands of the times. Globalisation is possible through ICT as it has brought unexpected changes regarding new values, perspectives, and the entire spectrum of human life. The role of technology, the community's professional and skilled human resources, and open, democratic, humanist, and progressive social order are the qualities that must possess to survive and face the unpredictable future (Rulandari, 2021).

In 2020, when Covid-19 hit the world, education was among the most critical factors greatly affected. The majority of the countries announced the temporary closure of schools, impacting the lives of students worldwide. The importance of technology became more intense or visible after the outbreak of the Coronavirus pandemic (Di Pietro et al., 2020). Therefore, the UNESCO 2021 rightly stated;

One silver lining of the COVID-19 pandemic is that it clearly showed that change in education is not always bad; classroom disruption can lead to classroom innovation. It is necessary to agree on the right route to ensure that all education is inclusive, equitable, and of high quality. (Fengchun & Wayne, 2021)

Discussion

Quality Education is included among the sustainable development goals as its importance has reached paramount in today's world. The main aim of quality education is to prepare students for life, life skill, and solve life's problems. The reviews clearly show that the use of information and communication technology in education enhances learning outcomes thereby, improves the quality of education. ICT is used in education as an interactive process integrating in the teaching-learning process simultaneously or it could be used asynchronously and synchronously. Access to education anywhere, breaking the barriers, and getting the opportunity to spread education to a large extent are made possible through the integration of ICT. It also helps teaching-learning interactive, engaging, exciting, and most importantly, it shifts from teacher-centred learning to student-centred learning. Additionally, the universalisation of education according to SDGs can be achieved through ICT as it breaks the geographical or time barriers to accessing education (NEP, 2020). The United Nations strongly believes that the quality of education can be improved through international cooperation, adequate infrastructure, and advanced investment to improve education for all developing countries. Furthermore, the UN support a sense of international cooperation like sharing and exchanging educational knowledge and partnerships, funding scholarships and fellowships to achieve education goals which are possible with the help of information and communication technologies (United Nations, 2012).

The NEP 2020 stands for ICT integration in education, where learning becomes more flexible and develops high order of thinking and problem-solving skills. Students develop skills such as presentation, teamwork and collaboration, and other academic relating things with the help of ICT. It also enhances the students to attain a higher order of thinking, evaluation, and develop creative thinking. It leads students not only in academic growth but also to know how to solve real-life daily today's problems (Vidanagama & Karunathilake, 2021). Furthermore, interactive technologies such as interactive whiteboards help learners easily acquire knowledge and understand the concepts better, and thus teaching-learning becomes effective and productive. Additionally, social media motivates and supports students and teachers to adopt the learning environment in the most effective approach and maintain better community relations (Akilbekovna, 2021; Papademetriou et al., 2022). However, teaching in the present schools requires knowledgeable and skilful teachers in using computers and other technology tools (Sunanda, 2015). To take full advantage of ICT in education, proper training of teachers and guidance programs are required. Moreover, it is the responsibility of the government to take the initiatives to fix the existing problem by providing regular in-service training programs and providing sufficient school infrastructure with robust connectivity (Fengchun & Wayne, 2021; Muthuprasad et al., 2021; Parida & Rout, 2021).

It made the students and teachers become problem-solvers, critical thinkers, and creative. However, ICT in education in India is concentrated only in metropolitan cities, so there is a need to access ICT both in rural and urban to achieve the educational goal. Therefore, the government, the policymakers, and the administration play a significant part while integrating ICT into education. Of course, there will be disadvantages when there are any innovations. However, the importance of ICT for quality education cannot be denied. Lack of proper ICT policy and inadequate funds for the development of ICT in education, non-availability of ICT infrastructures, lack of ICT training and professional development, lack of technical support, low internet speed, frequent power cuts, lack of ICT knowledge, skills, literacy of teachers and rigid attitude of teachers are the hinders for the successful application of ICT in education. Having the infrastructures or facilities alone cannot bring the best result, but it has to check what is best suited and effectively used. Additionally, regular in-service teacher training is required to update ICT knowledge and use it in teaching. Even though we are in the 21st century, known as the era of technology, the computer literacy rate of India is only 6%. The democratisation of education is possible only when the applications of ICT are ensured to their optimum level (Das, 2020). Therefore, the government should provide sufficient ICT facilities and resources in rural and urban areas. Moreover, ICT training is vital to know how to incorporate technology to meet the needs of the students (Mukti et al., 2020). So, it is necessary to have a good relationship and understanding between Principals, teachers and stakeholders for the fruitful integration of ICT in schools (Vidanagama & Karunathilake, 2021).

The outbreak of the Covid-19 pandemic obliged the world to use ICT predominantly in the teaching-learning process to a great extent to continue the learning process despite the closure of schools, colleges, and universities. The adoption of ICT in learning environment shifts the traditional to student-centred methods, where students play a central role while teachers act as a guide or facilitators. This method moved from lectures to group activities, discussion, and activities (Sobaih et al., 2022). For synchronous online and hybrid mode of learning uses platforms like google meet, MS Teams, Webex, zoom and so on became popular in India to continue the learning process despite the closure of educational institutions. The use of these platforms continues even today.

Conclusion

The need for an hour is to have a quality in education particular in India where 25% of the educated youth are unemployed (A. N. Sharma, 2022). Through quality education, an individual would be able to find a suitable job through their skills and competencies in certain field. Therefore, integrating information and communication technology in education is highly required to achieve the quality education goal and improve the quality of education. Teachers are the agents to bring changes in the teaching-learning environment only when there is an availability of infrastructures, skills and positive attitudes towards using ICT in teaching. Therefore, ICT training for teachers is highly required to adapt successfully to this technological world, particularly in education. However, the government, the policymakers, and the stakeholders play a vital role in the successful and effective integration of ICT in education to improve education quality.

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Study of the Attitudes and Manifestations of Non-Standardness of Primary Teachers in the Educational Environment

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Abstract

Non-standardness is a specific personality construct that manifests itself both in the intellectual-creative and behavioral sphere of personality. Non-standardity is regarded as human potential, which has different degrees of manifestation or even varies as a substance. Therefore, non-standardness does not develop, but can only be stimulated. The subject to development are the skills for non-standard expression, not the non-standardness itself. This development can be achieved by promoting, stimulating, unfolding of non-standardness. The main objective of the study is to establish the attitudes and manifestations of non-standardness of Bulgarian primary teachers in the real educational environment. For the purposes of the study, a complex methodology is applied. 100 primary teachers have been studied. In the first part of the study, the author's scale is used to determine the teacher's attitudes towards non-standard events in professional activity. The scale contains 30 statements and is of the 5-degree Licker scale, where 1 is "completely agree" and 5 - "completely disagree". The scale has a neutral response and contains reversible statements. In the second part of the study, a structured observation of lessons was carried out. A scale based on 5 criteria was used for observation purposes. Each criterion is estimated at 6 indicators. The results are analyzed in three stages: Evaluation of the Scales internal consistency; Factor Analyze and Correlation Analyses.

Keywords: Non-Standardness, Primary Teachers, Educational Environment, Attitudes, Constructivism

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Introduction

In the 1990s, constructivism entered as a global educational philosophy and sharply shifted the focus of educational interest from teaching to learning. The basic social constructivism thesis that knowledge is something that is actively constructed by learners based on their existing cognitive structures is seen as a model for transforming the educational environment in several aspects (Honebein, 1996; Tam, 2000; Jonassen, 1991):

- Knowledge is shared between teachers and students, and their construction takes place through experience (students determine how they will learn);
- Learning is based on multiple sources and resources, incl. video, audio, texts with different content and a different perspective on the problem;
- Learning is based on evaluating multiple perspectives and making alternative decisions);
- Learning takes place in real contexts through authentic tasks;
- Personal expression and the sharing of opinions are encouraged in the learning process;
- Learning is part of the social experience and must be realized collaboratively;
- Reflection and metacognition are encouraged, i.e. the awareness of the knowledge construction process;
- Teachers and students share the authority;
- The main roles of the teacher are facilitator or guide;
- Learning groups will consist of a small number of diverse students.

Although teaching is not a leading activity in the constructivist educational process, the personality of the teacher and the requirements for his personal qualities and professional skills is of considerable interest to modern educational sciences. Descriptors of constructivist teaching behaviors that describe Brooks and Brooks are especially popular (Brooks & Brooks, 1993):

1. Encourage and accept student autonomy and initiative.
2. Use raw data and primary sources, along with manipulative, interactive, and physical materials.
3. When framing tasks, use cognitive terminology such as “classify”, “analyze”, “predict”, and “create”.
4. Allow student responses to drive lessons, shift instructional strategies, and alter content.
5. Inquire about students’ understandings of the concepts before sharing [your] own understandings of those concepts.
6. Encourage students to engage in dialogue, both with the teacher and with one another.
7. Encourage student inquiry by asking thoughtful, open-ended questions and encouraging students to ask questions of each other.
8. Seek elaboration of students’ initial responses.
9. Engage students in experiences that might engender contradictions to their initial hypotheses and then encourage discussion.
10. Allow wait time after posing questions.
11. Provide time for students to construct relationships and create metaphors.
12. Nurture students’ natural curiosity through frequent use of the learning cycle model.

The described descriptors emphasize the high degree of creativity required of the modern teacher.

From a psychological point of view, creativity is a process of transformation of cognitive or social models into new forms, as a result of which a person builds a system of creative abilities, predisposition or inclination to creativity (Desev et. All, 2011; Simon & Kendrick, 1994).

For the teaching profession, the understanding of E. De Bono, who connects creativity with thinking in the concept of “creative thinking”, is more applicable. Creative thinking is not simply a system of creative abilities or a propensity for creativity, but is a „method“ of thinking „step by step, with developed practical techniques that can be used intentional“ that a person can master in the context of the professional sphere, in which develops (De Bono, 2009).

The development of this type of creativity is often determined by non-standardness, which represents a specific personal potential that is subject to stimulation, encouragement and deployment at any age and in various situations of professional and personal life with a view to developing creative (lateral) thinking (Zdravchev & Paspalanov, 1985; Levy, 1988; Todorina, 2001; Ilieva, 2002).

In the aspect of the current educational paradigm, non-standardness can be considered as a valuable professional resource, the potential of the teacher, the development and maintenance of which guarantees creative expression in the professional activity (Kaloyanova, 2022). Since non-standardness manifests itself simultaneously in the intellectual-creative and behavioral spheres of the personality (Sotirova, 2002), it refers both to the teacher's attitudes towards professional activity and to his behavior in the real educational environment. In the teacher's professional activity, non-standard manifestations can be specified according to the general criteria for non-standardness (see Kaloyanova, 2022) as follows:

- Non-standardness in the intellect: productivity, originality, alternative, non-routine in the association of objects
- Non-standard behavior: idiosyncratic behavioral repertoire, propensity for adventurism and openness to risk, flexibility and variability in the choice of behavior, dynamic adaptability

In the scientific literature, there are significant studies on the influence of beliefs on the specific behavior of the teachers in they professional activity. There is a range of empirical evidence that teachers' decisions about particular methodological approaches or teaching content are largely based on their personal believes (Levitt, 2001; Lumpe et all., 2000; Thomson & Gregory, 2013).

Similarly, there is research that establishes causal relationships between teachers' beliefs about learning, teaching, or teaching processes and their teaching practices (Cronin-Jones, 1991; Ertmer, 2005; Pajares, 1992; Tobin & Espinet, 1989; Yuan, 2017).

Bryan summarizes the results of research conducted over the past 30 years and derives 5 characteristics of teacher’s beliefs (Bryan, 2012):

- Teachers' beliefs have a much greater influence on analyzing classroom problems, making decisions about solutions, and overcoming problems than academic knowledge;
- Some teacher beliefs are stronger, and strong attitudes are more resistant to change
- Beliefs are not independent of each other, but are organized into a single internal structure;

- A teacher's beliefs may be organized into groups, and these groups of attitudes may conflict with each other on the same subject;
- When one belief changes, that change can affect other beliefs in the system.

Beliefs are the immanent part of the attitudes. Because attitudes are an unconscious form of stimulation of the psycho-behavioral activity of an individual, they are acquired in individual experience and are provoked by a certain type of situations (Minchev, 2006; p.101), they directly influence persons' behavior (Dzhonev, 1996; Minchev, 2006; Andreeva, 1983).

The derived characteristics of beliefs suggest that teachers' beliefs towards their professional activity can be much more effective than their academic knowledge and skills and become sustainable factors determining their behavior in the educational environment. The subject of this study are the teachers' attitudes because they reflect the professional experience of the teacher, contain its beliefs, and appears in specific situations in the educational environment. In addition, teachers' attitudes may be socially desirable or may not match their professional competencies. In this perspective, there could be a significant gap between the intentions and attitudes of teachers and their actual behavior in the educational environment. It can also be assumed that teachers' attitudes are grouped according to different signs in their value system, and these groups can conflict with each other, since their main component is beliefs.

The main purpose of this study is to establish the specific of relationship between the primary teachers' attitudes to non-standardness and their actual behavior in the educational environment. Within the study non-standardness is considered both in the context of the constructive demands on the teacher and in accordance with the criteria of non-standardness. In this way 5 research areas are identified, in which the teacher's attitude and behavior in the educational environment are simultaneously searched: Organization of educational environment, Teaching, Problem Solving, Reflection and Assessment, Pedagogical Communication.

Methodology

For the purposes of the study a complex methodology is applied. In the first part of the study 100 primary teachers have been studied with the author's scale. The scale is used to determine the teacher's attitudes towards non-standard events in professional activity according to 5 criteria, each with 6 indicators (statements). The scale contains total 30 statements and is rated on a 5-degree Likert scale, where 1 is "completely agree" and 5 – "completely disagree". The scale has a neutral response (3 – "I can't decide") and contains reversible statements.

In the second part of the study a structured observation of 100 lessons was carried out. A scale for observation contains relevant to the first scale statements and is based on the same 5 criteria and indicators. Each indicator is assessed on a 5-degree Likert scale, with 1 - observed to a very high degree, constantly; 2 - observed to a high degree, sustainable; 3 - observed, but hesitantly; 4 - observed to a low degree, sporadically; 5 - observed to a very low degree, missing. The empirical model of the study is presented on Table 1.

Table 1: Empirical model of study.

Criteria	Indicators for study of attitudes	Indicators for observation of behavior
Organization of educational environment	It is frivolous to turn the lesson into a theater [R]	The lesson is dynamic, all students are engaged and interested
	The beginning of the lesson should be impactful and provocative for the students	Uses effective means to motivate students at the beginning of the lesson
	It is important for the teacher to improvise, even if he/she has to abandon what was planned in the lesson	Break the “framework” of the lesson and improvise according to the situation
	The role of the teacher in the modern lesson is to support the student's independent learning	Stimulates students' independent learning
	I plan the lesson activities according to the individual progress of each student	Applied differentiated activities corresponding to the individual progress of each student
	In my lessons, group and individual work of students prevails	Group and individual work prevails in the lesson
Teaching	The teacher's explanation is an important part of the lesson [R]	It does not explain, but guides and facilitates student learning
	If the students are not paying attention, I discontinue the activity and quickly improvise	Included an unplanned activity/tasks in the lesson as appropriate
	I have found myself "inventing" an activity or assignment during lesson	Stopped a routine and uninteresting activity and replaced it with another
	I develop educational resources that express a different perspective on the topic being studied	Uses original educational resources that express a different perspective on the topic being studied
	Experimentation is an important part of my work	Experiments with different methods and forms in the lesson
	I use the current situation or occurred casus during the lesson	Uses the current situation or occurred casus during the lesson
Problem Solving	It is difficult for me to master discipline in class [R]	Uses tried and tested original methodological approaches to master the discipline in the lesson
	If a student is not paying attention in class, I immediately give him a warning [R]	Discreetly and adequately involve uninterested students in an activity
	Group work takes a lot of time and usually creates problems [R]	Quickly and efficiently deals with problems arising in group work
	I'm able to react immediately if there is an obstacle to the implementation of a given activity in the lesson	Responds quickly and continues with an alternative activity when a problem occurs
	Traditional punishments have no effect on modern students	Uses non-traditional person-centered strategies to manage unacceptable behavior of certain students
	Conflicts interfere with the achievement of learning objectives [R]	Uses conflicts that arise to achieve educational goals
Reflection and assessment	I develop and assign students practical and project tasks to assess student progress	Uses interactive tasks to check student progress
	It is not possible to assess students' key competencies within the lesson [R]	Assess both academic and key student competencies
	It is important for students to be able to assess their progress and the progress of the group	Apply a reflexive approach to checking assigned tasks (self-assessment, self-test
	A student's effort should be encouraged with good grades regardless of mistakes made	Reports and summarizes mistakes made, noting each student's progress

	When assessing and evaluating, I adhere to the established pedagogical methods [R]	Uses non-standard methods for checking and evaluating students
	In group work, it is important to assess the work of the team rather than individual students [R]	Evaluated action of each student in the group work
Pedagogical communication	Discussion is an important part of my lessons	Uses discussion in the lesson
	When a student expresses his opinion, I let him/her speak, even if he/she is wrong	It gave students a chance to express an opinion, even when they were clearly wrong
	I like to joke with the students	Jokes with the students
	I do not argue with the students because my intellectual and life experience is higher [R]	Argued with students and gave them the opportunity to argue
	My class has established groups for group work and I don't allow loud moments [R]	Used unconventional approaches to group formation and created a creative buzz
	The teacher is the primary source of information for the student [R]	Does't explain, but directs and orients the students in the information
Interpretation Box	Minimum	30
	Maximum	150
	Mean Value of Statements	High: 1 – 2,49 Moderate: 2,5 – 3,99 Low: 4 – 5
	Mean Value of Scales	High: 30 – 89 Moderate: 90 – 119 Low: 120 - 150

** For the scale of attitudes to non-standardness is calculated after transformation of reversive statements values*

The study covers 200 primary teachers. 100 primary teachers are studied with the attitude to non-standardness scale. 9% are between 25 and 35 years old, 16% - between 36 and 45, 45% - between 46 and 55, and 30% are over 55 years old. 81% work over 10 years as primary teachers, 49% - in schools in big towns, 40% - in schools in small towns and 11 – in village schools. Another 100 teachers are observed in real educational environment during the lessons. 13% of them are between 25 and 35 years old, 18% - between 36 and 45, 40% - between 46 and 55, and 29% are over 55 years old. 71% work over 10 years as primary teachers, 65% - in schools in big towns, 26% - in schools in small towns and 9 – in village schools.

The research results are presented with statistical, qualitative and quantitative quantities and determinated important aspects of the conducted research such as correlations between both scales, correlations between different scale items, and correlations between demographic factors and different research variables.

Results

The first stage of the analysis was to determine the statistical validity of the Attitude to non-standardness scale.

Internal consistency of items of the scale is evaluated by the Cronbach Alpha Consistency Assessment procedure. Alpha Cronbach's Values are shown below (Cronbach, 1988):

0,9 – 1,0	Excellent
0,8 – 0,9	Very good
0,7 – 0,8	Good
0,6 – 0,7	Modest
0,6 and down	Miserable

The scale has good internal consistency – Alpha Cronbach's Value is 0,706.

The scales have not sub-scales, therefore factor analysis was implemented with Kaiser-Meyer-Olkin Measure of Sampling Adequacy. The aim is to prove with even greater certainty the reliability of the scales used.

The Value of KMO is 0,711 and shows good sampling adequacy (Table 2).

Table 2: Kaiser-Meyer-Olkin Measure of Sampling Adequacy of the attitudes to non-standardness scale.

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,711
Bartlett's Test of Sphericity	Approx. Chi-Square	1411,669
	df	435
	Sig.	,000

The Figure 1 shows the distribution of the research sample according to the results of the study with the scale (Figure 1).

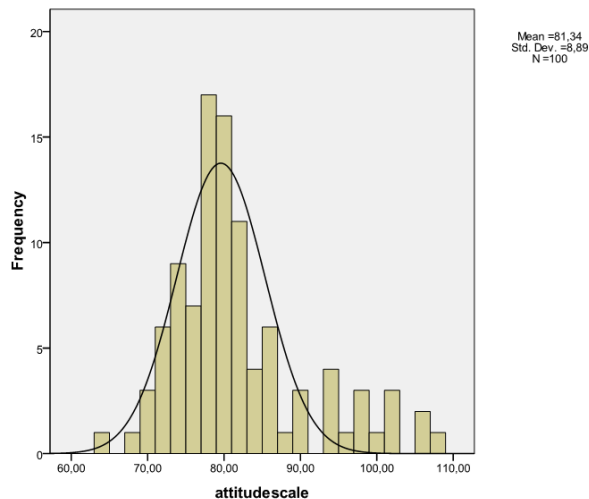


Figure 1: The distribution of the research sample.

The conclusion of the statistical analyses is that the attitude to non-standardness scale is characterized by good internal consistency, sampling adequacy and normal distribution of research simple which make it reliable instruments for measuring the attitudes to non-standardness of primary teachers. Table 3 presents statistical values of the result on both scales.

Table 3: Statistical results of both scales (attitudes and behaviour).

	attitudescale	observescale
N Valid	100	100
Missing	0	0
Mean	81,3400	115,1600
Median	79,0000	121,0000
Mode	79,00	127,00
Std. Deviation	8,89015	16,16126
Kurtosis	,851	,054
Std. Error of Kurtosis	,478	,478

According to the statistical values primary teachers have a high degree of attitudes to non-standardness and rather low degree of non-standard behavior (Table 3):

- Mean: 81,34 < 115,16
- Median: 79 < 121
- Mode: 78 < 127

The mean values of the individual statements confirm the tendency for a higher degree of attitudes than of actual non-standard behavior (Table 4). It is important to note that the values on both scales are close where the teachers consistently expressed their conservative attitude towards the requirements of modern education and with a significant difference in the cases where they indicated the statements socially desirable and not in accordance with their real professional behavior (Table 4).

Table 4: Mean Values of each statement of both scales.

Indicators for study of attitudes	M	Indicators for observation of behavior	M
It is frivolous to turn the lesson into a theater [R]	3,94	The lesson is dynamic, all students are engaged and interested	3,53
The beginning of the lesson should be impactful and provocative for the students	1,65	Uses effective means to motivate students at the beginning of the lesson	3,49
It is important for the teacher to improvise, even if he/she has to abandon what was planned in the lesson	1,69	Break the „framework” of the lesson and improvise according to the situation	3,59
The role of the teacher in the modern lesson is to support the student's independent learning	2,36	Stimulates students' independent learning	4,33
I plan the lesson activities according to the individual progress of each student	2,53	Applied differentiated activities corresponding to the individual progress of each student	4,43
In my lessons, group and individual work of students prevails	1,98	Group and individual work prevails in the lesson	3,89
The teacher's explanation is an important part of the lesson [R]	4,45	It does not explain, but guides and facilitates student learning	4,58
If the students are not paying attention, I discontinue the activity and quickly improvise	2,13	Included an unplanned activity/tasks in the lesson as appropriate	3,96
I have found myself „inventing“ an activity or assignment during lesson	2,25	Stoped a routine and uninteresting activity and replaced it with another	3,88
I develop educational resources that express a different perspective on the topic being studied	2,84	Uses original educational resources that express a different perspective on the topic being studied	4,52
Experimentation is an important part of my work	2,53	Experiments with different methods and forms in the lesson	3,44
I use the current situation or occurred casus during the lesson	2,40	Uses the current situation or occurred casus during the lesson	3,52

It is difficult for me to master discipline in class [R]	2,32	Uses tried and tested original methodological approaches to master the discipline in the lesson	3,41
If a student is not paying attention in class, I immediately give him a warning [R]	4,08	Discreetly and adequately involve uninterested students in an activity	3,65
Group work takes a lot of time and usually creates problems [R]	2,36	Quickly and efficiently deals with problems arising in group work	3,43
I'm able to react immediately if there is an obstacle to the implementation of a given activity in the lesson	2,08	Responds quickly and continues with an alternative activity when a problem occurs	3,29
Traditional punishments have no effect on modern students	1,79	Uses non-traditional person-centered strategies to manage unacceptable behavior of certain students	3,66
Conflicts interfere with the achievement of learning objectives [R]	3,60	Uses conflicts that arise to achieve educational goals	3,60
I develop and assign students practical and project tasks to assess student progress	2,07	Uses interactive tasks to check student progress	3,69
It is not possible to assess students' key competencies within the lesson [R]	3,88	Assess both academic and key student competencies	3,35
It is important for students to be able to assess their progress and the progress of the group	1,74	Apply a reflexive approach to checking assigned tasks (self-assessment, self-test)	3,39
A student's effort should be encouraged with good grades regardless of mistakes made	1,68	Reports and summarizes mistakes made, noting each student's progress	3,35
When assessing and evaluating, I adhere to the established pedagogical methods [R]	4,12	Uses non-standard methods for checking and evaluating students	4,21
In group work, it is important to assess the work of the team rather than individual students [R]	2,56	Evaluated action of each student in the group work	4,31
Discussion is an important part of my lessons	1,84	Uses discussion in the lesson	3,73
When a student expresses his opinion, I let him/her speak, even if he/she is wrong	2,68	It gave students a chance to express an opinion, even when they were clearly wrong	4,15
I like to joke with the students	2,21	Jokes with the students	3,73
I do not argue with the students because my intellectual and life experience is higher [R]	4,24	Argued with students and gave them the opportunity to argue	4,74
My class has established groups for group work and I don't allow loud moments [R]	3,63	Used unconventional approaches to group formation and created a creative buzz	4,31
The teacher is the primary source of information for the student [R]	3,71	Directs and orients the students in the information	4,00

One of the theoretical theses of this research is, that attitudes are both organized into a system and interconnected but can also belong to groups that contradict each other. The results, presented on Table 4 shows, that the system of attitudes of primary teachers is subordinate to the traditional leadership and control functions of the teacher, but within this system two independent groups of attitudes are distinguished. One group is attitudes towards organizing a dynamic environment, according to the profile of the contemporary students (see green boxes of Table 4). The other group of attitudes categorically holds the teacher's behavior to the traditional norm (see yellow boxes of the Table 4). This is the impossible reason in the primary teacher's behavior non-standardness to be suppressed.

According to the thesis that non-standardness is influenced by various personal and social factors it was important to check whether there is a correlation between the attitudes and manifestations of non-standardness of primary teachers and their demographic indicators. The research did not establish a significant correlation between some of the respondents' characteristics and the specifics of their attitudes and behaviors. It can be concluded that

primary teachers' attitudes and behaviors of non-standardness are not influenced by their age, pedagogical experience or the specific school they work in.

Conclusion

This research is part of an experimental program to stimulate the non-standardness of pedagogical subjects. According to the scientific premises of the experimental program, this research focuses on the following scientific questions:

- Is there a relationship between the attitude of teachers to non-standard manifestations in the educational activity and their actual behavior?
- Are there grounds to consider that some traditional attitudes are permanently integrated into the teacher's professional profile and prevent the unfolding of his non-standardness?
- Are there prerequisites for developing and changing the professional stereotype of teachers to improve the effectiveness of teaching?
- Can positive attitudes be used as a basis for the formation of adequate behavior in the educational environment?

The study referred to theoretical premises about the importance of attitudes in developing positive and effective teacher behavior patterns. The research proved that teachers are incline to non-standard behavior that reflects the philosophy of modern education. Their attitudes are well formed in terms of the need to create and maintain an interactive educational environment. However, this and other research shows that traditional professional stereotypes regarding management and control through traditional means are deeply embedded in teacher behavior regardless of their age, experience, or workplace.

Undoubtedly, the stimulation of non-standardness of primary teachers should use positive attitudes as a support and transform the attitudes, resp. behavior, in the direction of delegating more authority to students by using non-standard methods and forms of teaching.

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Prevalence of Anxiety in University Students During the COVID Pandemic -19

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Abstract

Coronavirus (COVID-19) is an infectious disease caused by the SARS-CoV-2 virus (WHO). University students are prone to experience anxiety during their years of study due to academic the student's experiences of insecurity, fear and anxiety. The purpose of this study was to assess the prevalence of anxiety among college students during the COVID-19 pandemic, to assess the risk for mental health problems, and to identify forms of coping and counseling for future anxiety. Quantitative method for data collection was used to conduct the study. Two inventories were used: DASS-21 and Coronavirus Anxiety Rate, in order to view data on stress and depression and specific experiences of the COVID -19 pandemic. The study included 364 students of Physiotherapy, Logopedia and professional master, of the Faculty of Medical Technical Sciences, University of Elbasan "Aleksandër Xhuvani", in January 2021. In the group of selected students, the prevalence of anxiety, depression, the stress and anxiety experienced by COVID -19 was 35.5% of students had high level of anxiety, 30% had moderate level and 30.5% had mild level. From the data 14% of the students included in the study had sought help from a doctor, psychologist or pharmacist for the experienced state of anxiety. The results showed a significant level of anxiety experience experienced by university students. There was also an increase in anxiety experiences when a family member was affected by COVID-19 or other illness. It is recommended to research in future studies other variables such as the impact of gender, the impact on academic performance and to provide various information on ways to relax and manage anxiety.

Keywords: Anxiety, Prevalence, Pandemic, COVID -19, Student

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Introduction

Coronavirus disease (COVID-19) is an infectious disease caused by the SARS-CoV-2 virus. Most individuals infected with the virus will have mild to moderate respiratory disease and will recover without the need for special treatment (WHO).

American Psychological Association APA defines anxiety as a characteristic emotion Strengthening the activity of the autonomous system, especially tension, increased heart rate, subjective feelings of tension, concern for physical change (Alan E. Kazdin, PhD, 2009).

University students are prone to experience anxiety during their years of study due to academic overload, results and graduation. The end of the pandemic and the shift from classrooms to online classes added to the uncertainty, fear of the unknown and anxiety of students.

This was a new interactive experience for students and professors alike. The perception and reception of information have become a challenge because of the problems and uncertainties involved. The transition to university is coincident with the peak period of onset of mental illness. The most common symptoms include anxiety and depression.

In this study, at a theoretical level, information is presented on anxiety, the COVID-19 pandemic, the experience of anxiety for university students, and research studies supporting the study.

Literature review

When the pandemic actually arrives, anxiety and fear become even greater. For example, in the early stages of the 2009 swine flu pandemic, 24% of respondents in a U.K. community reported significant anxiety about the pandemic outbreak (Rubin, Aml6t, Page, & Wessely, 2009). In a survey of U.S. college students in the early stages of the same pandemic, most (83%) reported at least some level of fear of contagion (Kanadiya & Sallar, 2011). Some people develop excessive fears of death and disability, while others fear being shunned by others if they become ill (Cheng, Wong, Tsang, & Wong, 2004). Some people may become so anxious that they experience clinically significant levels of distress, avoidance, and functional impairment, such that they require treatment for their emotional disorder (Wheaton et al., 2012).

Stress is the physiological or psychological response to internal or external stressors.

Coronavirus disease 2019 (COVID -19) is a respiratory infection caused by an emerging coronavirus, SARS-CoV-2, first detected in Wuhan, China, in December 2019. Genetic sequencing of the virus suggests that SARS-CoV-2 is a beta coronavirus closely related to the SARS virus.

Pandemic influenza is one of the greatest health threats currently facing the world (World Health Organization (WHO), 2019). Increasing antimicrobial resistance and the emergence of new, highly pathogenic viral strains have fueled fears of another global infectious disease outbreak (Nerlich & Halliday, 2007).

Host resistance to infection depends on several factors, including immunocompetence and psychological factors that influence how the host copes with or responds to a threat or actual infection. Environmental factors are numerous and multifaceted, including factors that promote or hinder host coping strategies.

The COVID -19 pandemic affected more than 90% of the world's students in the spring of 2020 and triggered an urgent shift to distance learning, which required transition and flexibility. Not knowing when protective measures would end required planning for a possible return to the classroom (Hollweck & Doucet, 2020). Similar measures to those taken during the 1918 Spanish flu pandemic were taken when college semesters were canceled, with schools internationally switching to an online modality in the spring of 2020 (Trilla et al., 2008). With the invention of the Internet and the increasing popularity of online courses, higher education could now continue in a modified form to sustain student learning.

For countries such as the United Kingdom, the United States of America, Germany, and Australia, this meant that they shifted to teaching and learning at a distance, while funding constraints, lack of technology, and limited connectivity meant that HE institutions in countries such as Egypt, Brazil, Albania, and India struggled to adapt (Crawford et al., 2020).

Prevalence of Anxiety in University Students during the COVID-19 Pandemic: A Systematic Review. This study evaluated the prevalence of anxiety and depression symptoms among students from China, France, UK , Saudi Arabia and Albania during the COVID-19 pandemic.

Study from the Chinese University. Subgroup analyses revealed that Chinese middle school students were at a heightened risk of anxiety, while university students were at a heightened risk of depression. Students who lived in higher-risk areas presented severe anxiety and depression, especially during the late period of the COVID-19 epidemic (Yaoyao Zhang, Xiuqin Bao, Jiaxin Yan, Hualing Miao, Cheng Guo.Zhang, Bao, Yan, Miao and Guo. 2021).

Study from the French University. A total of 69 054 students completed the survey. The results of this survey study suggest a high prevalence of mental health issues among students who experienced quarantine, underlining the need to reinforce prevention, surveillance, and access to care (Marielle Wathelet, Stéphane Duhem , Guillaume Vaiva , Thierry Baubet, Enguerrand Habran, Emilie Veerapa, Christophe Debien, Sylvie Molenda, Mathilde Horn, Pierre Grandgenèvre , Charles-Edouard Notredame, Fabien D'Hondt 2020).

Study from the US University. Among the 2031 participants. The proportion of respondents showing depression, anxiety, and/or suicidal thoughts is alarming. Respondents reported academic-, health-, and lifestyle-related concerns caused by the pandemic. Given the unexpected length and severity of the outbreak, these concerns need to be further understood and addressed (Xiaomei Wang, Sudeep Hegde, Changwon Son, Bruce Keller, Alec Smith, Farzan Sasangohar-2020).

Study from the Saudi Arabia University. The study included 936 university students. Symptoms of depression, anxiety, and stress were common among Saudi university students during the COVID-19 pandemic. Psychological counseling and support should be provided to university students in Saudi Arabia (Zeinab Mohammed, Ahmed Arafa, El-Sayed Atlam, Nader El-Qerafi, Momen El-Shazly, Omar Al-Hazazi, Ashraf Ewis.2020).

Methodology

The aim is to demonstrate the prevalence of anxiety, stress, and depression among students at the University of Technical Medicine.

Object

- This study aims to analyze anxiety, stress, and depression prevalence in men and women.
- This study compares the bachelor's degrees in speech therapy and physiotherapy.
- This study compares the professional master in speech therapy and physiotherapy.
- We are analyzing the data collected during bachelor's and professional master's degrees in speech therapy.
- Analysis of data collected during Bachelor's and Professional Master's studies in Physiotherapy.
- In order to determine the degree of stress, anxiety, and depression based on the opinions of mental health professionals.

Hypothesis: Anxiety, stress, and depression among university students have increased in response to the COVID -19 pandemic.

This study used a quantitative approach to data collection. After obtaining this quantitative information, two inventories were employed: DASS-21 and Coronavirus Anxiety Rate.

The DASS-21 is the short form of the DASS-42, a self-report scale designed to measure the negative emotional states of depression, anxiety, and stress. There are three DASS-21 rating scales, the third indicating the highest level of anxiety, stress and depression (Lovibond, S.H. & Lovibond, P.F. (1995).

In the first year of the COVID-19 pandemic, the global prevalence of anxiety and depression increased by a massive 25%, according to a scientific brief released by the World Health Organization (WHO 2022) today.

The manner, of collecting data depends on the statistical package SPSS version-21. These surveys were used to obtain general and accurate information on levels of stress and depression, as well as specific experiences during COVID-19.

This research allows us to measure the level of anxiety and stress experienced by our University's students.

We included N=364 students in Physiotherapy, Speech Pathology (Logopedy), undergraduate and professional master, from the Faculty of Technical Medical Sciences, Elbasan University "Aleksandër Xhuvani", in January 2021.

The following data are detailed and presented concretely in relation to the number of students taken as a study sample.

Conclusion

The selected sample was selected based on probability during this stage of the study. N=120 physiotherapy students participated in the study, consisting of N=39 women and N=81

Males, and N=100 speech pathology students, N=17 Males and N=83 Females. We also counted N=77 master's students in Professional Master at Physiotherapy in N=18 Females and N=59 Males and N=53 Females and N=17 Males in Professional Master at Speech pathology.

Physiotherapy Bachelor	120 (39 Females /81 Males)
Speech therapy (Logopedics) Bachelor	100 (83 Females /17 Males)
Physiotherapy Professional Master	77(18 Females /59 Males)
Speech therapy (Logopedics) Professional Master	70 (51 Females /19Males)
Total	364 (191 Females /173 Males)

Tab.1 Total Sampling Table

Among the selected group of N=364 students, the prevalence of depression, stress and anxiety related to COVID-19 was 35.5% among students with elevated levels of anxiety. 30% were moderate whereas 30.5% were mild.

		Anxiety, Stress and Depression		
		Anxiety	Stress	Depression
Bachelor	Logopedics	Overhead	Overhead	Overhead
	Physiotherapy	Overhead	Overhead	Overhead
Professional Master	Logopedics	Overhead	Moderate	Moderate
	Physiotherapy	Moderate	Moderate	Moderate

Tab. 2 The level of anxiety, stress, and depression among university students.

Disaggregated by gender, females have a higher prevalence of anxiety, stress, and depression than males. This report is broken down into percentages, where 72.4% of women had high levels of stress, anxiety, and depression. 48.2% moderately and only 12.9% low.

Under such conditions, the stress levels of men were low. There are only 40.1% of people with a high-stress level, 65.6% with a medium stress level, and only 9.3% with a low-stress level, according to statistics.

Based on the observed statistics, we can see that 14.0% of students sought specialist assistance.

Statistical data collected from Bachelor's and Professional Master's degree students show us this information. Students in Logopedics Bachelor's programs show a prevalence of 65.3%, while students in Logopedics Professional Master show a prevalence of 42.4%. The fact is clear that among Logopedics Bachelor students we have a higher percentage of stress, depression, and anxiety.

Another objective of ours is the comparison between Bachelor's and Professional Master's students of the physiotherapy department. The conclusions tell us that 58.7% of Bachelor's students have a high prevalence of anxiety, stress, and depression, although this follows by a lower percentage of 41.9% of professional master's students.

		Anxiety, Stress and Depression					
		Anxiety		Stress		Depression	
		Females	Males	Females	Males	Females	Males
Bachelor	Logopedics	Overhead	Overhead	Overhead	Overhead	Overhead	Overhead
	Physiotherapy	Overhead	Overhead	Overhead	Overhead	Overhead	Overhead
Professional Master	Logopedics	Overhead	Overhead	Overhead	Moderate	Overhead	Moderate
	Physiotherapy	Overhead	Moderate	Moderate	Moderate	Moderate	Moderate

Tab.3 Gender distribution of university students by branch.

The other information presented by us is the commission comparison between Bachelor's students in the department of Logopedics and Physiotherapy. Depending on whether the obtained statistics, these data are shown to us. Anxiety, stress, and depression are prevalent among 63.2% of Bachelor level Logopedics students, while these mental health issues are prevalent among 50.6% of Bachelor level Physiotherapy students. There is a low level of anxiety, depression, and stress in the Professional Master of Physiotherapy and Logopedics in comparison to the Bachelor. Logopedic students have a high prevalence of 45.3%, whereas students in Physiotherapy courses have a ratio of 38.7%.

The prevalence of condensation of the definition in our studies is completely climbing with the hypothesis we assume for this study. The prevalence assumed by us for the intention of our study is wholly consistent with the hypothesis we assume for this study.

According to the content obtained from the objective tests among the students of the University of Technical Medical Sciences in the department of Logopedics and Physiotherapy, where 30.5% of the students show a high level of and 30% of them a moderate level of mental health problems, such as anxiety, depression, and stress.

Discussion

In our study, there were a total of N=364 students purposefully surveyed. Principally in the department of Speech Language Pathology (Logopedics) and Physiotherapy Bachelor and professional master.

The global COVID-19 pandemic affects not only students, but also parents, teachers and educators in many different ways. What we learned from that study was that the scores or the difficulties in adapting to technology were not the most significant. Our main focus is on their social life, their mental health, and their emotional well-being. There are some drawbacks in these students, who have been touched by the same intensity that men and women have experienced.

Fragmented by gender, females have a higher prevalence of anxiety, stress, and depression than males. This report is severed down into percentages, where 72.4% of the females had strong levels of stress, anxiety, and depression. 48.2% reasonably and only 12.9% low.

Under such a situation, the stress levels of men were lower. There are only 40.1% of people with a high-stress level, 65.6% with a medium stress level, and only 9.3% with a low-stress level, according to statistics.

Gender is one of many factors that has a greater impact on the prevalence of anxiety and stress. women show a higher prevalence of stress and anxiety than men.

As determined by the ascertained statistics, we can see that 14.0% of students demanded specialization support.

Among the reasons for this low percentage are mentality, lack of information, and problems with social-cultural norms. Information deliberately gathered from these students, we found that 14% of those students in all asked for help from mental health specialists, such as psychologists, pharmacists, or psychiatrists. The remainder of the students interviewed confirmed that they use other solutions such as swimming, fitness, or reading to overcome this challenging mental state.

Higher stress prevalence has been observed among Bachelor students than among Professional Master students. The factors that affected this consequence were maturity, work experience, and the transformation in stage from high school to university.

Another visible change noted is the heightened prevalence of stress, anxiety, and depression among Speech-Language Pathology (Logopedics) students.

This enhanced percentage is registered in the Bachelor as well as in the Master Professional. This finding is evident to us because branches, like Physiotherapy, have a superior number of male students commensurate to women. However, the opposite is happening in the field of speech therapy, where the number of women is higher than that of men.

Even students have lost their own empathy, have shown problems with malnutrition, and inactivity, and dramatically change their daily routines.

As a result of data analysis based on relevant literature and a series of studies (Yaoyao Zhang, Xiuqin Bao, Jiaxin Yanao, etc. 2021) (Marielle Wathelet, Stéphane Duhem, Guillaume Vaiva, Thierry Barbet, etc. 2020) (Xiaomei Wang, Sudeep Hegde, Changwon Son 2020) and (Zeinab Mohammed, Ahmed Arafa, El-Sayed Atlam, etc. 2020), demonstration us that the notch, of anxiety, depression, and stress in University Students is comparatively very elevated. A similar set of results is presented in our study, which is in agreement with our hypothesis.

Recommendation

The results of this study demonstrate that: University students appear to have a high prevalence of anxiety, indicating an increase in the burden of mental health during this pandemic.

These results in our opinion were expected. Because factors such as age, the social-cultural conditions of our country, and the lack of detailed information about the situation we were in directly affected these results.

Taking into account the research conducted in different parts of the world. We can say that the COVID-19 situation affected all students in the same way, regardless of culture, religion, or cultural development.

It is recommended to research in future studies other variables such as the impact of gender, the impact on academic performance and to provide various information on ways to relax and manage anxiety.

At the end of the entire study, we concluded that college students are one of the age groups most affected by mental health problems such as anxiety, depression or other mental illnesses as a result of the COVID-19 pandemic.

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Financially Educating Generation Z Using Digital Media – A Competitive Field Test of eduStories® Versus Texts

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Abstract

A good general education on financial topics is required for wise financial decisions and thus also for one's own material financial security. However, according to consistent studies, financial literacy is particularly poor in Generation Z, which is now on the threshold of professional life. Against this background, the question arises as to how financial knowledge can be prepared and presented for Generation Z to arouse the target group's interest in financial topics on the one hand and to enable effective knowledge transfer on the other. This study investigates the potential of two different digital presentation formats for teaching financial education to secondary school students: The so-called eduStories® versus text. eduStories® are digital learning modules that, similar to the story format of Instagram, combine various digital elements such as photos, videos, text and quizzes to explain a financial topic. Both formats contain the same information on a given financial topic to ensure comparability. Two different sub-samples consisting of German 8th and 9th-grade school classes are used to test one of the two formats. The students evaluated their format based on attractiveness, seriousness and comprehensibility criteria. In addition, the respective increase in knowledge through the presented format is measured. The results show that the eduStories® are judged significantly better by the target group than the text: the stories are more entertaining and overall more appealing. However, knowledge creation was similar in both formats, i.e. stories can help arouse interest but have no advantages in actual knowledge transfer.

Keywords: Financial Education, Financial Literacy, Generation Z, eduStories®, Digital Formats

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1. Introduction

A few years ago, a then 17-year-old high school student tweeted: "I'm almost 18 and have no idea about taxes, rent or insurance. But I can write a poem analysis. In four languages." This statement was well-received online and triggered a major debate in Germany about the content of lessons and, in particular, the teaching of financial literacy in schools (Nestler, 2015). Country-level financial literacy ranges from 71% to 13%. With 65%, Germany is one of the countries with the highest financial literacy. Nevertheless, one-third of the population is financially illiterate (Klapper et al, 2015). Econometric models and experiments showed a significant causal impact of financial literacy on economic decision-making (Lusardi & Mitchell, 2014). People with a low level of financial literacy get into debt more quickly and generally have more problems making ends meet. That is why financial literacy is so critical. Financial literacy means solid financial decision-making and effective management of personal finances (Yakoboski, 2022).

Over-indebted younger consumers aged between 18 and 30 have decreased significantly in the long-term comparison 2004 / 2021 (Creditreform Economic Research, 2021). In 2021, 7% of this age group were over-indebted. Nevertheless, this development should be viewed with caution, as the Corona pandemic has brought down the over-indebtedness rate. Corona led to spending caution and an increase in the savings rate. In addition, irrational consumer behavior was limited (Creditreform Economic Research, 2021). Thus, the over-indebtedness rate could rise again in the future. In addition, school curricula still do not include financial education related to young people's daily lives (Breinich-Schilly, 2021). Therefore, it is not surprising that, besides external factors such as divorce, unemployment and illness, internal factors such as uneconomical household management or consumption behaviour are increasingly cited as a cause of financial over-indebtedness (Arndt et al., 2021). Changing payment practices and business practices are being driven by online retailing. Today, there are more and more "buy now, pay later" offers. As a result, the younger generation between 25 and 44 is increasingly turning up at advice centers (Eckert & Zschäpitz, 2021; Arndt et al., 2021). In addition, the German pension reform of 2000/2001 (BGBI, 2001) stipulates that especially young people must provide privately for their old age. Current demographic developments suggest that the German pension system, based on the pay-as-you-go principle, will not guarantee social security in old age in the medium term. Without the private provision, young people will be unable to maintain their living standard in retirement (Brey & Theek, 2022). Therefore, it becomes more crucial for young people to understand financial concepts such as the effects of compound interest or inflation and know what credit and savings options are open to them (Brey & Theek, 2022).

The way knowledge is communicated is more diverse today than ever before. Via the Internet, there are many different tried-and-tested and innovative ways to make content more suitable to various target audiences, given the opportunity to present information in a flexible, interactive and graphic way more easily (OECD, 2021). Since the proportion of young people in Germany who are online and own a smartphone is almost 100% (VuMa, 2020), the target group is easy to reach online. However, due to the overabundance of information on the Internet, it is even more important to attract the attention and interest of the young generation through a targeted approach. The greater the range, the more important the learning content selection, compilation and presentation (Linke, 2020).

This study, therefore, investigates the potential of two different presentation formats for conveying financial knowledge in a field test with 132 subjects. In addition, the acceptance of

the respective learning format is measured. The first presentation format is a classic text. In contrast, eduStories® (<https://www.eduStories.de/>) are tested as an innovative learning format aiming at the interactive transfer of financial knowledge.

1.1 Generation Z and Their Media Behavior

The year of birth as a criterion for belonging to Generation Z is defined differently in the literature. Generally, members born between 1996 and 2010 are classified as Generation Z (Scholz, 2018). While Generation Y (also known as Millennials) was the first digital natives, Generation Z is the first generation to have grown up entirely in a digital age (see Figure 1) (Marron, 2015).

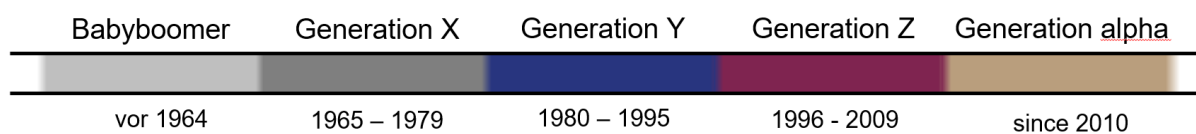


Figure 1: Overview of generations over time

Source: Kleinjohann Reinecke, 2020

The members of Generation Z are so-called social media natives. They were born into an already digitized world and have grown up with smartphones and social media (Kleinjohann & Reinecke, 2020). These social media, such as WhatsApp, Instagram, Snapchat, TikTok, Pinterest, Facebook or Twitch are an integral part of their everyday lives and form the basis of all social interactions (Feierabend et al., 2021; ARD ZDF Onlinestudie, 2021). They see social media as an access point for information of any kind (Newman et al. 2020: 13). In particular, they prefer reduced content due to visualization and the extensive avoidance of detailed texts (Vázquez-Herrero et al., 2019). Social media stories on Whatsapp, Instagram, Snapchat, and Facebook are inherently rich in visual components and text-reduced (Vázquez-Herrero et al., 2019).

On average, young people spend almost 8.5 hours a day consuming media (Breunig et al., 2020). If the parallel use of different media in the sense of second screens is taken into account, this even results in a daily gross usage time of 10.5 hours (Breunig et al., 2020). Only around 2.5 hours of this are spent with offline media such as TV, radio and print (Breunig et al., 2020). This high level of internet use sets the young generation apart from its predecessors (Kupferschmitt & Müller, 2020). Most young people say they use the Internet to maintain social contacts (96%), and in second place they use the Internet for entertainment purposes, such as video streaming, music or video games. However, it is notable that 71% say they use the Internet at least once a day to search for information of any kind (Shell, 2019).

The fear of poverty in old age (Wolfert & Schneekloth, 2019) prompts the vast majority of Generation Z (around 85% of all 17- to 27-year-olds) to build savings. They prefer safe forms of investment (e.g., savings accounts, call money accounts), which are losing value overall due to the ongoing zero interest rate phase and taking inflation into account, which is becoming more and more of a serious problem (Wolfert & Schneekloth, 2019). In general, young people still rely far too often on recommendations from their social environment instead of valid information (Hurrelmann et al., 2019). Thus, financial literacy is a relevant factor in minimizing irrational financial decisions.

1.2 Generation Z and Financial Literacy

By financial literacy, we mean the ability to process the information on economic and financial contexts and incorporate it into well-founded decisions; particularly concerning financial planning, asset accumulation, debt and retirement provision (Lusardi & Mitchell, 2014). The required knowledge and skills presuppose an understanding of basic economic concepts (Klapper et al., 2015).

Three questions have been developed in the literature, which are commonly used in surveys worldwide as a valid instrument to measure financial literacy. This is why we based our study on these questions. The so-called "Big Three" deal with knowledge of interest rates, inflation, and possibilities of risk diversification (Lusardi & Mitchell, 2011; Lusardi & Mitchell 2014). Other topics for mapping financial knowledge include the time value of money, money illusion (Van Rooij et al., 2011), and compound interest and debt (Schmidt & Panagiota, 2017).

Even in highly developed countries like Germany, financial literacy is at a considerable level. Only about two-thirds of Germans are financially literate (OECD, 2021; Klapper et al., 2015). Accordingly, more than half of Generation Z feel that their financial literacy is insufficient regarding investing, taxes or retirement planning (Schnitzer, 2019). For example, 25% of those under 25 cannot explain the term share. More or less 50% cannot explain call money, overdraft, liquidity, DAX, bond, yield and fund. A complete 87% cannot do anything with the term ETF (Comdirect, 2019). Therefore, both science and politics see an urgent need for action to increase financial literacy (Klapper et al., 2015). Thus, the industry-funded study by Comdirect found that almost 92% of people under 25 would like "financial literacy" to be a compulsory or at least an elective subject at school (Comdirect, 2019).

2. Learning theory

Numerous different learning theories describe under which conditions individuals learn best. Looking at common approaches, many of them (Mayer, 2005; Sweller, 2005) are based on the "less is more" principle (Dwyer, 1972). The background of this principle is that the working memory should not be overloaded (Butcher, 2006; Moreno & Mayer, 2004).

The Corona pandemic has forced multimedia learning further into the foreground (Grein, 2021b). Surveys make it clear that the future will be more digital (Rabe & Falkenberg, 2020; Jäckel, 2020). It has been shown that both the participants' learning success and motivation depend on the teaching process's implementation (Ersch, 2021; Grein, 2021a). It is assumed that learning success is more likely the more sensory channels are addressed in the learner. Multimedia presentation formats should motivate and enable learners with different learning styles to study according to their preferences. Essential components of multimedia learning are design, audio, images, a combination of pictures and text, and moving images such as animations, videos, and simulations (Niegemann et al., 2008). In addition, interaction with technology motivates the learner and promotes enjoyment, allowing tasks to be completed more efficiently and effectively (Wegener et al., 2011; Schrader & Niegemann, 2007).

When searching for information on financial topics, the young generation attaches particular importance to relevant content and a credible and user-friendly form of presentation that helps them gain a good overview of a particular topic (Heinemann et al., 2020). It should be noted that the receptivity of young people has been reduced. The information must be easily

digestible and, in the best case, offered in "small bites" within a good structure (Firnkes, 2012). Furthermore, Generation Z is living with a bombardment of information throughout their lives, so their attention span is only 6 seconds (Swanson & Davis, 2020).

2.1 Digital learning formats: eduStories®

EduStories® are digital learning modules with a playful character, aiming to support young people in acquiring financial skills and understanding economic contexts better. The focus is on the interactive transfer of competencies. Interactivity is to be achieved by using stories from social media such as Instagram or TikTok. This is because young people already heavily use social media to inform themselves (Newman et al., 2021; Hölig et al., 2021). Reduced and visualized content can make young people feel directly addressed, facilitate access to the content, and make it intuitively usable for them (Vásquez-Herrero et al., 2019).

The tasks and information within the eduStories® are structured as interactive questions with emojis and sliders. The goal is to arouse curiosity and motivate young people to learn. EduStories® can be worked on independently, and the processing time is 10 to 15 minutes, depending on the topic. After a short introduction to the topic, the provision of new knowledge follows. Transfer and reflection are part of the learning module. Within a learning module, there are different types of tasks (see Figure 2).

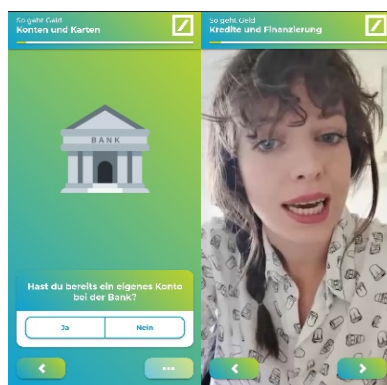


Figure 2: Screenshot eduStories®

Source: <https://www.eduStories.de/digitale-lernmodule>

2.2 Analog learning formats: Texts

According to the research objective, eduStories® will be contrasted with texts as a classic learning format. The Hamburger comprehensibility concept was developed to make texts easy to understand for learners, which describes four different characteristics (Langer et al., 2006).

1. **Simplicity:** Simplicity, as the most essential characteristic, refers to forming short sentences and using common words. Foreign words or technical terms should be explained. Complicated presentations would unnecessarily burden the working memory, so the “less is more” principle also applies to texts (Dwyer, 1972). In addition, the personalization principle can help increase learning performance (Robinson, 2004; Moreno & Mayer, 2004). This means addressing the learner personally with "you" instead of a formal address.
2. **Structure - order:** Texts should be structured as well as possible. Texts should have a comprehensible "red thread" and be presented by means of headings, preliminary remarks,

highlighting (bold print, underlining), numbering, marginal notes and a conclusion (Mautone & Mayer, 2007; Naumann et al., 2007).

3. **Brevity - conciseness:** Texts should not be concise and not limited to the essential, but should also not be too longwinded. For best learning results, a reasonable middle ground should be found (Langer et al., 2006):

4. **Stimulating additions:** Provided the text is well structured, extras can contribute to comprehension and promote motivation. However, additions such as interesting digressions, exclamations, and questions that are intended to stimulate thinking should be used sparingly (Langer et al., 2006). Other research, however, takes the view that interesting material that is not relevant for comprehension should not be used at all, as this facilitates the process of filtering out the essential information from the learning material (Mayer & Moreno, 2003).

Online texts should also consider that users do not read texts on the web; they often just skim the pages. Long pages tend to be scrolled, not read. Users prefer facts and reject a strongly promotional style. Therefore, the text should be concise, well-structured, and written objectively (Morkes & Nielsen, 1997).

3. Objective of this study

As already described, only about two-thirds of Germans are financially literate (Klapper et al., 2015), meaning there is a great need to impart knowledge on finance. In this research, we aim to find out how the manner in which complex content, i.e. financial topics, is prepared and presented favours recipients' learning motivation and success. The related research question is to what extent are text or videos better attracting the attention of the young target group and achieving learning success in terms of financial topics. To determine which learning format is perceived more positively and has a better learning effect, we present the results of an experimental design in different school classes of the same grade level (secondary school). In every class, one format (eduStory® or text) was assessed, both providing the same information about a financial topic.

4. Hypotheses

One of the biggest challenges faculty will face with Generation Z students is how to engage them (Fromm & Read, 2018; McNally & Stagliano, 2018; Mohr & Mohr, 2017; Twenge, 2017). Through the mix of different formats, i.e. audiovisual and interactive elements, eduStories® try to animate learning and transfer knowledge. Thus, a higher motivation of eduStories® compared to texts can be expected, leading to higher efficiency in knowledge transfer. This is based on the Cognitive Load Theory, which states that interaction in learning leads to a more successful learning process (Sweller, 2014). Furthermore, the theory advocates the "less is more" idea in the design of learning materials (Dwyer, 1972). Following this idea, a working memory, which is free from unnecessary burden, results in a higher learning performance (Butcher, 2006; Moreno & Mayer, 2004). eduStories® aim to follow this approach.

In contrast, in our study texts are the classic learning format, which still plays a central role in teaching and learning. We assume that both learning formats, eduStories® and texts, are suitable for successfully conveying financial knowledge. Learning processes occur when new information is actively processed (Richtberg & Girwidz, 2018). Our first two hypotheses follow from this:

H1a: Embedding content in a story with interactive and audiovisual elements as given in eduStories® lead to better test results in the final knowledge quiz than texts.

H1b: Embedding content in a story with interactive and audiovisual elements as given in eduStories® are better understandable for the user than pure texts.

It can also be concluded that members of Generation Z perceive eduStories® more positively as a learning format. For most of Generation Z, the possibility of interaction plays a major role in media consumption for information purposes (Hamari & Kolvisto, 2015). Young people of Generation Z also consume Stories on and also use social media to search for information (Newman et al., 2021). From this, we derive our second hypothesis:

H2a: The presentation form of eduStories® is perceived as more attractive to young people of Generation Z than pure texts.

H2b: The presentation form of eduStories® is perceived as more entertaining than pure texts to young people than pure texts.

5. Method

In order to compare the attractiveness and learning effect of the two forms of presentation among young people, a quantitative survey in the form of a standardized questionnaire was chosen. Four different sets of questionnaires were created (see Table 1).


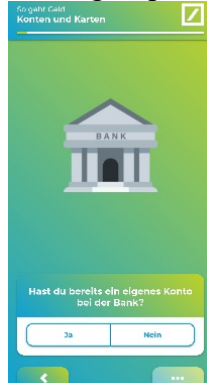


Topic	Texts n=68 ; 50.4%	eduStory® n=67 ; 49.6%
Accounts & Cards	<p>Test group A</p> 	<p>Test group B</p> 
Loans & Financing	<p>Test group C</p> 	<p>Test group D</p> 

Table 1: Research design

Source: own representation & <https://www.eduStories.de/digitale-lernmodule>

The test subjects were students from six different classes and three different schools in Baden-Württemberg. The paper & pencil survey took place from 15.10.2021 to 29.10.2021, in which a total of 135 students in the 8th or 9th grade were interviewed. There were a total of two different sections. The first block of topics, "Accounts & Cards," included sections on types of accounts, online banking: TAN procedures, advantages & disadvantages, cards and payment methods. The second block of topics, "Loans & Financing," covered sections on loans, creditworthiness and Schufa, types of loans, debt traps and overindebtedness.

In Step 1, a school class was assigned to a topic block. In Step 2, the students of this class were randomly assigned to a presentation form (text or eduStory®). Both forms of presentation, eduStory® and text, had the same content, which should only lead to increased knowledge via the different forms of expression. Consequently, it can be assumed that only the form of presentation influences attractiveness and effectiveness.

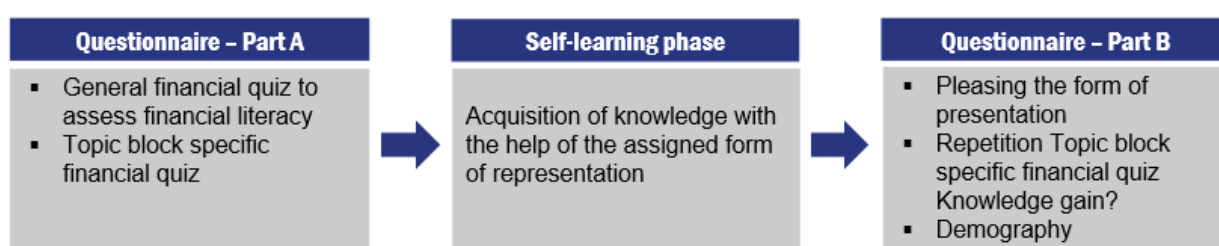


Figure 3: Structure of the questionnaire
Source: own representation

The structure of the questionnaire is shown in Figure 3. In part A of the questionnaire, financial literacy was surveyed to rule out the level of general financial knowledge as a cause for the degree of knowledge gain. Additionally, we wanted to determine which form of presentation works better for youth with/without prior knowledge. Furthermore, knowledge specific to the topic block (accounts & cards; loans & financing) was tested. In doing so, content that is taught in the learning format was tested in advance. This part forms the reference point for determining the increase in knowledge. In the self-study phase, students had time to learn about the topic block within their assigned presentation format (text or eduStory®). Part B of the questionnaire first asked which aspects of the learning format were perceived as good and which were bad. Comprehensibility, entertainment value, independence/neutrality of the learning format were also surveyed. For eduStories®, we expanded the set of questions to find out how they could be optimized. Therefore, the respondents also had to evaluate the use of audiovisual content and the use of different interactive elements (single choice, multiple choice, open questions with text input, etc.). Finally, the topic-specific financial quiz was repeated to determine what and how much the students had learned.

6. Results

6.1 Sample Structure

Of the 135 survey participants, 81.4% were attending 8th grade and 18.6% were attending 9th grade at the time of the survey. Thus, the participants were between 13 and 16 years old. The majority of respondents, 73.3%, were 13 years old. In terms of gender, 53.3% were male and 44.4% were female (2.2% abstained). 72.6% of the respondents aspire to graduate from high school, 27.1% intend to graduate from secondary school.

6.2 Financial Literacy & Financial quiz

At the beginning of the survey, respondents had to answer five financial questions to test their general financial knowledge. This revealed that only 17.8% of respondents were financially literate, meaning they could answer at least four of the five finance questions correctly. 80% of the respondents indicated that they turn to their parents for help with financial issues. Almost every fifth student would use Google for questions on financial topics.

The distribution in the four different groups was more or less equal (see table 2). 68 students were shown texts as a form of presentation (accounts and cards: 37; loans and financing: 31) 67 students were shown eduStories® as a form of presentation (accounts and cards: 36, loans and financing: 31).



Topic	Texts n=68 ; 50.4%	eduStory® n=67 ; 49.6%
Accounts & Cards n=73 ; 54.1%	<p>Bank- und Kreditkarte</p> <p>Hier mal ein Check-out, denn gehört dazu auch eine Bankkarte, die meistens EC-Karte. Die EC-Karte kann man auch mit der EC-Karte (EC: Electronic Cash) benutzen. Auch die EC-Karte kann man mit der EC-Karte (EC: Electronic Cash) benutzen. Auch die EC-Karte kann man mit der EC-Karte (EC: Electronic Cash) benutzen.</p> <p>Ein weiterer wichtiger Punkt ist die Kreditkarte. Die Kreditkarte ist eine Karte, die man mit der EC-Karte (EC: Electronic Cash) benutzen kann. Die Kreditkarte ist eine Karte, die man mit der EC-Karte (EC: Electronic Cash) benutzen kann. Die Kreditkarte ist eine Karte, die man mit der EC-Karte (EC: Electronic Cash) benutzen kann.</p> <p>Weitere bargeldlose Bezahlmethoden</p> <p>Neben Bank- und Kreditkarte gibt es noch die Überweisung und die Lastschrift, die ebenfalls zu den bargeldlosen Bezahlmethoden gehören.</p> <p>Die Überweisung gibt es in der Regel in zwei Varianten: Überweisung und Überweisung. Die Überweisung gibt es in der Regel in zwei Varianten: Überweisung und Überweisung.</p> <p>Die Lastschrift ist eine Karte, die man mit der EC-Karte (EC: Electronic Cash) benutzen kann. Die Lastschrift ist eine Karte, die man mit der EC-Karte (EC: Electronic Cash) benutzen kann. Die Lastschrift ist eine Karte, die man mit der EC-Karte (EC: Electronic Cash) benutzen kann.</p> <p>Bezahlverfahren</p> <p>Neben den verschiedenen Bezahlmethoden unterscheidet man bei Kartenzahlungen auch zwischen den Zahlungsmethoden. Neben den verschiedenen Bezahlmethoden unterscheidet man bei Kartenzahlungen auch zwischen den Zahlungsmethoden.</p> <p>• Elektronische Cash (EC) ist eine Karte, die man mit der EC-Karte (EC: Electronic Cash) benutzen kann. Die Elektronische Cash (EC) ist eine Karte, die man mit der EC-Karte (EC: Electronic Cash) benutzen kann.</p> <p>• Kreditkarte (CC) ist eine Karte, die man mit der EC-Karte (EC: Electronic Cash) benutzen kann. Die Kreditkarte (CC) ist eine Karte, die man mit der EC-Karte (EC: Electronic Cash) benutzen kann.</p> <p>• Elektronische Lastschriftverfahren (ELV) ist eine Karte, die man mit der EC-Karte (EC: Electronic Cash) benutzen kann. Die Elektronische Lastschriftverfahren (ELV) ist eine Karte, die man mit der EC-Karte (EC: Electronic Cash) benutzen kann.</p> <p>• Elektronische Lastschriftverfahren (ELV) ist eine Karte, die man mit der EC-Karte (EC: Electronic Cash) benutzen kann. Die Elektronische Lastschriftverfahren (ELV) ist eine Karte, die man mit der EC-Karte (EC: Electronic Cash) benutzen kann.</p>	 <p>n=36</p>
Loans & Financing n=62 ; 45.9%	<p>KREDITE & FINANZIERUNG</p> <p>Was ist ein Kredit?</p> <p>Ein Kredit ist eine Summe von Geld, die man von einer Bank oder einem anderen Kreditgeber bekommt. Man muss das Geld später mit Zinsen zurückzahlen.</p> <p>Zinsen</p> <p>Zinsen sind die Kosten, die man für das Darlehen zahlen muss. Sie werden als Prozentsatz des Kredits berechnet.</p> <p>Bauspar und Bauschuld</p> <p>Bauspar ist eine Form der Finanzierung, bei der man über einen längeren Zeitraum Geld aufspart, um es später für den Kauf eines Hauses zu verwenden. Bauschuld ist eine Form der Finanzierung, bei der man Geld von einer Bank oder einem anderen Kreditgeber bekommt, um es für den Kauf eines Hauses zu verwenden.</p>	 <p>n=31</p>

Table 2: Test group allocation

Source: own representation & <https://www.eduStories.de/digitale-lernmodule>

6.3 Knowledge creation

At the beginning of the survey, the students were asked a topic-specific financial quiz with seven questions. On average, the students answered 2.49 questions correctly (eduStories® group: Ø 2.52; text group: Ø 2.46).

After the learning phase, students in the eduStories® test group were able to answer an average of 4.43 questions correctly, while students in the text group were able to give an

average of 4.72 correct answers. Due to the small number of cases, the differences between the two groups are not significant ($p=0.279$). Also, the differences between the individual topics are rather small. On average, two more questions could be answered correctly (see table 3).

Presentation Form	Text		edustory®		Text	edustory®
	Before Learning Phase	After learning phase	Before Learning Phase	After learning phase	Knowledge creation	
Accounts & Cards	n=37 2.59	n=37 4.86	n=36 2.72	n=36 4.78	+ 2.27	+ 2.06
Loans & Financing	n=31 2.29	n=37 4.55	n=31 2.29	n=31 4.03	+ 2.26	+ 1.74
Total	n=68 2.46	n=68 4.72	n=67 2.52	n=67 4.43	+ 2.26	+ 1.91

Table 3: Knowledge gained after learning phase

Source: own representation

6.4 Performance of texts versus eduStories®

Overall, the students like eduStories® significantly and clearly better. EduStories® are perceived as significantly more entertaining, and despite the identical content to texts, the students see a higher relation to their everyday life. It is also surprising that the students perceive the eduStories® as significantly more neutral and independent. The content was equally comprehensible in both the texts and the eduStories®. The content also seemed relevant to the respondents, meaning that the questions they had on the respective topic were addressed. The fact that eduStories® are better received is also reflected in the probability of reuse and recommendation. Significantly more students would recommend eduStories® to a friend (see Table 4).

eduStories® vs text rating	Text Mean value	EduStory® Mean value
Favour Overall**	3.37	4.18
Understanding	3.65	3.77
Neutrality*	3.18	3.80
Entertainment***	2.62	3.62
Relevance of content	3.38	3.62
Relevance to everyday life**	2.41	3.06
Probability of reuse	3.21	3.51
Probability of recommendation***	2.54	3.22

Table 4: Performance of texts versus eduStories®

Source: own representation (agreement of mapped criteria; scale: 1 ("Do not agree at all") to 5 ("Fully agree")); $n(\text{eduStory}^\circledast) = 56$, $n(\text{text}) = 57$; Shown here: Mean values. $*p < 0.05$. $**p < 0.01$, $***p < 0.001$.)

The option of freely evaluating both forms of presentation also reflects that eduStories® left a more favourable impression on respondents. Slightly more than half of the respondents gave positive comments on the text, while two-thirds gave positive feedback on eduStories®. The text is perceived as particularly understandable, clear and detailed. EduStories® score with the interactive quiz elements and, similar to the text, with comprehensibility. Almost one in two people gave the text a negative rating, compared with only one in three for the eduStories®. The main criticism of the text was the level of detail and the lack of visuals to prevent people from getting bored while learning. Too much text and too few visualizations are the most significant criticism points in the eduStories®.

6.5 Detailed evaluation of eduStories®

Based on a rating scale (1 = "too little"; 3 = "just right"; 5 = "too much"), we examined some elements of the eduStories® more closely. Overall, the use of the queried elements of the eduStories® is perceived as just right. This includes the photos, graphics and animations shown, open-ended questions, length of audiovisual content and quizzes. The overall length of the two learning units was felt to be too long. On the other hand, the number of audiovisual elements should be increased somewhat (see Fig. 6).

eduStories® rating	Mean value (MV)	Standard deviation (SD)
The total length of the learning unit.	3.37	0.876
Duration/length of spoken texts, background music, sound effects.	2.92	1.005
Photos, graphics, animations	2.88	0.893
Open questions with text input	2.88	1.053
Quiz questions for ticking	2.72	0.761
Frequency of spoken texts, background music, sound effects	2.48	1.017

Table 5: Detailed evaluation of the eduStories®

Source: own representation (How do you rate the use of the following elements?"; scale: 1 ("Too little") to 5 ("Too much"); n = 65)

7. Discussion

7.1 Knowledge creation

As expected, the general financial knowledge of the students was at a low level. In line with our common assumption, both forms of presentation are suitable for conveying knowledge. The respondents were able to answer two more questions correctly after the learning unit. The number of "Don't know" uncertainties also decreased by almost 70% for both forms of presentation. However, we did not find a significant difference in knowledge creation between the two forms of presentation. Thus, we have to reject our first hypothesis (Embedding content in a story with interactive and audiovisual elements as given in eduStories® lead to better test results in the final knowledge quiz than texts.).

We also cannot confirm our second hypothesis (Embedding content in a story with interactive and audiovisual elements as given in eduStories® are better understandable for the user than

pure texts.). Indeed, the results for understanding (I was able to understand all the content well.) for eduStories® (MV=3.77; SD.=1.035) were on a slightly higher level than for texts (MV=3.65; SD=1.004). However, these differences were not significant due to the small number of cases.

7.2 Performance of eduStories® vs. texts

All in all, the students rated the eduStories® more positively than pure texts. Thus, our hypothesis (the presentation form of eduStories® appeals to young people of Generation Z better than pure texts) for the liking of eduStories® is true.

The entertainment value of the eduStories® is also at a significantly higher level than that of the texts, thus confirming our hypothesis (the presentation form of the eduStories® entertains young people of Generation Z better than pure texts).

7.3 Evaluation of the results

The eduStories® were not able to contribute to a higher level of knowledge formation, as assumed, but they were able to achieve roughly the same results as the texts. Although eduStories® have audiovisual and interactive elements, it became clear in the open responses that the students would have liked less text and more videos. For future surveys, stories that are intended to impart knowledge could be made even more interactive and contain even shorter information units to increase the favour even more.

The fact that the learning outcomes in our study were very similar can also be explained by the fact that the content of the given financial topics was possibly quite simple. This explains why both texts and eduStories® were perceived as comprehensible and why we did not find any significant differences. It is conceivable that in the case of more complex (financial) topics, the motivation for the respective learning format is the decisive factor for learning success. Due to the positive perception, eduStories® could lead to higher motivation and thus increase the will to learn for future learning units, because motivational processes play a significant role for learning success (Taylor et al., 1997). Future surveys could therefore slightly increase the complexity of the content.

8. Conclusion

Numerous studies have shown significant deficits in general financial education (Klapper et al., 2015). This also became clear in our survey. Especially for Generation Z in Germany, financial topics have a reputation of being boring and difficult to access. Therefore, it is important to get young people interested and present the topic that creates motivation for learning. In our survey, we examined two different forms of presentations intended to familiarize 8th and 9th grade students with specific financial topics. We chose texts as the classic presentation format, in contrast to which we placed eduStories® as an innovative presentation format. Both formats were used and evaluated separately. It has been shown that both formats contribute significantly to knowledge creation. While an average of 2.5 out of 7 questions were answered correctly before a learning unit, ~4.5 correct answers were given after the 15-minute self-learning phase.

Knowledge creation was similar for both formats, and we could not find any significant differences. However, we did find significant differences in the final evaluation of both

formats. EduStories® were rated better than texts across five dimensions (favour overall, neutrality, entertainment, relevance to everyday life, probability of recommendation). The recommendation probability was also significantly higher with the eduStories® than with the texts. We therefore assume that innovative forms of presentation, such as the eduStories®, have the potential to motivate young people and help them to deal with difficult or “boring” topics.

Based on our results, there are indications of how stories can be optimized to enable higher learning motivation and possibly also learning success. The texts within the eduStories® can be shortened and users demand more audiovisual elements. The users also wanted an increase in the number of quiz questions. The increase of interactive elements should not increase the length of a learning unit, in the best case even rather be kept somewhat shorter, since the human brain has only a limited amount of processing and a time-limited recording capacity (Sweller, 2009).

9. Limitations of the survey

One should remember that the learning phase took place in a school class during class time, i.e. in a familiar learning environment. Therefore, it can be assumed that the concentration on the learning unit and the corresponding form of presentation were higher than in free time because the students had to deal with the content and were not distracted by e.g. other media or more interesting contents. In other environments, the motivation to read and understand a text is presumably lower.

It is also interesting that eduStories® is perceived by the students as significantly more neutral or independent, even though the company's logo (Deutsche Bank) is clearly visible in the bar at the top right. Possible explanations for the perceived neutrality are that the students did not recognize the logo as such, since it was inserted into the eduStories® in color, or that the Deutsche Bank logo is not sufficiently well-known in the corresponding age group. Otherwise it is conceivable that it behaves exactly the other way around and Deutsche Bank as the sender is a well-known brand that conveys a high level of trust in the accuracy and neutrality of the content. Through the videos shown, the eduStories® got a face to the authorship, which could have additionally promoted the trust. Further research should also be ascertained whether the sender was noticed or known.

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Picture Books to Support the Teaching of Disciplinary Literacy in the Primary School Classroom

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Abstract

This study seeks to investigate the use of picture books in relation to the burgeoning area of disciplinary literacy in the Irish primary school context. At the centre of this research is the recognition that picture books play a central role in teaching and learning across the curriculum in primary schools; with this research deciphering whether picture books may aid disciplinary literacy learning as a child-friendly mode for exploring and teaching the language associated with the various disciplines. With the first mention of disciplinary literacy appearing in our recently published Primary Language Curriculum (2019) immediately followed by the interruption of the Covid-19 pandemic, teachers are yet to discover how this ideology may transpire into every day planning and practice. This case study-led piece of research uses a professional learning community model to engage practitioners in discourse in relation to disciplinary literacy, the use of picture books and teacher planning and preparation for teaching. The Irish curricula is currently in a period of drastic reform, with the Primary Curriculum Framework (2020) laying the foundations of what is yet to come, this research considers the most up-to-date expectations from our National Council for Curriculum Design and Assessment at the cusp of the dissemination and transfer into practice of a completely new curricula. Seeing the teacher as ‘the curriculum maker’, this research thoroughly explores the position of disciplinary literacy in a series of primary settings by working with teachers to identify the ways in which educators can plan for disciplinary literacy in a meaningful and purposeful way.

Keywords: Disciplinary Literacy, Picture Books, Teacher Planning, Professional Learning Communities

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Introduction

Disciplinary literacy involves the development of reading, writing, speaking and listening skills specific to a given subject. In a recent review of literature relating to disciplinary literacy, Burke and Welsh (2018) reported that the disciplinary literacy approach requires literacy teaching to fulfil the needs of a particular discipline, complementing and enhancing the modes of thinking and communicating that are characteristic within that discipline (Moje 2007, 2008; Shanahan and Shanahan 2008; Siebert et al. 2016). By using a literacy-based skillset, practitioners can, for example, assist pupils to add background knowledge to a scientific inquiry or provide authentic primary and secondary sources in an historical investigation. However, if disciplinary literacy is to take place within the primary classroom, it will need to be planned for carefully. The foundation for good teaching and learning is purposive teacher planning. This study seeks to investigate the development of teacher planning in relation the burgeoning area of disciplinary literacy. When the aims and objectives of current and new curricula are recognised and understood, the need for functional teacher planning documents will be an essential component for the effective delivery of a disciplinary approach. This is the gap which the researcher hopes to address.

Very few recent studies carried out in relation to disciplinary literacy recognise fully the role that picture books may play in teacher planning (Shanahan and Shanahan, 2014; Siebert et al, 2016, Spires et al, 2012). However, a study by Dawson et. al (2021) highlights the significant role that picture books can play in children's language. Some may argue that it may be more beneficial to invest in research that concentrates on the scope for using picture books within the primary language curriculum as it stands; however, having studied the curriculum document in-depth and in acknowledgment of the gap in curricular linkage, it seems well poised to locate this research within the current paradigm of overall curricular change. Furthermore, the researcher has a longstanding desire to explore the meaningful integration of literacy across the disciplines through the building blocks of good teaching and learning: planning. At the centre of this research will be an investigation into the development of teacher planning for disciplinary literacy using picture books, working with and alongside teachers in the process. To inform my own macro level understanding of the position, status and role of disciplinary literacy within the new and emerging primary framework, I will also connect with the Professional Development Services for Teachers (PDST) and the National Council for Curriculum Design and Assessment (NCCA). These educational bodies will comprise a primary level of data collection: questionnaires/on-line interviews if possible.

From initial research, it seems that the presence of The National Strategy to Improve Literacy and Numeracy among Children and Young People (2011- 2020) with its increase in the time allocation and centrality of these core subjects had led to a dilution of other curricular areas. With international best practice looking toward the emerging effect and implications that disciplinary literacy at primary level may offer, significant consideration must be given to the practical implementation of this endeavour. The knowledge and experiences of PDST facilitators and NCCA personnel will also be explored through questionnaire/interview which will be sent to all facilitators as well as a preliminary cover letter. The questionnaire will serve to provide a nuanced account of how the new curriculum is being presented to teachers as a pivot towards disciplinary learning emerges. While the literature on the effects of disciplinary literacy using picture books as central texts is limited, it is argued that in coming years, with the revision of other curricular areas and the full roll out of the primary language curriculum, the topic will be of popular consideration by schools and by researchers. However, is the quality of information provided by such groups translating into current

teacher planning and classroom practice? It seems that while our awareness of best practice in literacy has dramatically increased in recent years, our understanding of how to plan effectively for it has not developed simultaneously. Advisors for reformed primary language curriculum have advocated for the use of high quality picture books in schools in order to achieve a dialogic classroom (Courtney and Gleeson, 2009, Roche, 2014, Primary Language Curriculum Support Material for Teachers, 2018) This research study however will explore the reality of that rhetoric. It will consider the possibilities for placing high quality picture books at the centre of the move towards disciplinary literacy practices in Irish primary school settings.

Burke and Welsh (2016) note that teaching literacy from a disciplinary perspective would present a number of challenges for the Irish school context. If disciplinary literacy was to be a more prominent feature in the primary curriculum, the professional development needs of teachers would warrant careful consideration. Disciplinary literacy wields demands on practitioner pedagogical content knowledge (Carney and Indrisano 2013; Love 2009). Therefore, preparation for disciplinary literacy requires the establishment of deep and meaningful connections amongst the discipline and related literacy practices (Fang 2014). The use of narrative, fictional texts as reading material would also necessitate deliberation. Data from the 2014 National Assessment of English Reading and Mathematics (Kavanagh et al. 2015) reveal that teachers use informational texts considerably less frequently than narrative texts. This factor would require further consideration by the researcher through an in-depth picture book research review and interactions with professional curriculum and teacher bodies. The researcher recognises that a broad range of texts, in different formats and modalities, would be necessary for use across the curriculum.

Traditionally, cross curricular planning has a regular heading in teacher's planning documents. Teachers have always strived to connect curricular content whether it be thematically or loosely linked (Curriculum na Bunscoile, 1999, Planning documents). The transition towards disciplinary literacy across the curriculum would carry a number of potential advantages. Burke and Welsh (2013) note that disciplinary literacy, by its very nature requires intrinsic links between literacy and the different subject areas represented in the curriculum. Literacy, however must not become a mere 'add-on which can be universally applied to any content' (Piercy and Piercy 2011, 72). Planning and preparation for a disciplinary literacy approach to teaching should come first in order to ensure that the 'intrinsic links' are substantial, well-considered and worthwhile. A disciplinary approach with its focus on important critical thinking and literacy skills also fosters an inquiry-based classroom culture. It will interesting to see how this might be captured in planning documents and teacher discussions. Moje (2007) states that linking disciplinary knowledge and literacy empowers young people to read, write and think critically. Furthermore, the application of literacy in authentic contexts for authentic purposes has been shown to motivate learners. It could also be argued that an explicit focus on language in the disciplines would aid the growing number of English language learners in Irish schools (Fang et al. 2014).

Of course, the availability and provision of dedicated teacher planning time slots in schools is a factor in the creation and development of teacher planning. This will also be considered in this study. In the UK, teachers are provided weekly planning slots within their school day which is relieved by another member of staff. If such a system were employed here in Ireland, perhaps our disciplinary planning would be able to reach new heights. After all, the Looking at our School 2016: A Quality Framework for Primary Schools states that excellence in teaching is the most powerful influence on pupil achievement. It acknowledges career-long

professional development as central to the teacher's work and firmly situates reflection and collaboration at its heart. The framework holds that improving the quality of pupils' learning should be the main driver of teacher learning. These statements require, at their heart, explicit teacher planning.

A further consideration in this study will be the provision of funding for books in Irish Schools. Burke (2019) detailed a grim discovery when conducting research into Irish libraries and a decrease in funding for both schools and libraries since 2008. Following the establishment of the Robert Dunbar Memorial Libraries in 2017, a book-gifting programme, it was immediately flooded with 300 applications from schools across the country. With this in mind, and having seen first-hand the will of librarians to foster effective partnerships with school communities, the researcher hopes to bring to the fore the different ways in which libraries may facilitate the development of disciplinary literacy planning in schools.

This study will be conducted in the context of the Draft Primary Curriculum Framework (2020). In this Draft Framework there is evidence pointing toward a disciplinary literacy outlook with the merging and reclassification of subjects. This points towards the timely nature of this research study and the need for collaborative, open-ended research study with teachers.

Methodology

The proposed research will focus on the experiences, desires and beliefs of teachers in their practice and therefore must be qualitative in nature (Creswell, 2009; Denscombe, 2007; Punch, 2009). It will take the form of a case study. Bell (2014) denotes that case studies may be carried out to follow up and to put flesh on the bones of a survey. Case studies may also precede a survey, setting the scene and can be used as a means of identifying key issues which merit further investigation. However, most case studies are carried out as free-standing exercises.

Yin, Merriam, and Stake are three foundational methodologists in case study research. Cronin (2014) says that defining case study research remains problematic because a case study can constitute both a design and a research method. The terms 'case study', 'case study method' and 'case method' seem to be used interchangeably in the literature (Hamel et al 1993, Yin 2009). However, it is clear that case study research focuses on specific situations, outlining a picture of individual or multiple cases. In using this design, the researcher can explore 'everything' in that situation, be it individuals, groups, activities or a specific singularity.

Thorough planning and preparation are key to the presentation of case studies. Case study research seeks an in-depth understanding of an individual case (or series of cases) that is illustrative of an area/problem of interest. Rapley (2018) acknowledges that teacher practice can only be changed and enhanced if the underlying reasons for practices are enacted, and the influence of the place and people in a site, is understood. Only then can the advancement of teacher pedagogic practice take place. In relation to this study, it is hoped that through exploration and collaboration with practitioners and other educational personnel, teacher practice may indeed see some reform.

Sampling

This criterion is derived from the research question. This study's central research question asks; how can teacher planning be enhanced to work across the disciplines and is there a place for high quality picture books as a central basis for this planning. The sampling proposes will involve the researcher engaging with a set of practitioners through a series of teaching and planning meetings, discussing what does the translation of planning into practice look like?

Reflexivity

A crucial component of any qualitative research project is reflexivity. Maynard (2018) states that research is not about intervention, but rather it is about maintaining that ethical stance and taking care of people that you are researching with. In her SAGE research methods video excerpt, Maynard talks about the three R's; rapport, resilience and reflexivity. Rapport is about how you build a relationship in a research environment with people. Resilience is that pliability which comes from you as a researcher. Reflexivity questions, do you know how you are going to be able to respond and use those unique human stories that come to you in a way that really gives you some authentic learning? The three R's require careful consideration by the researcher and an allowance by the researcher to grow into that research role using a set of principles. This will form the backbone of the researcher's work.

Data Collection

The data will be collected in surroundings familiar to educators which should allow participants to act normally. Reflective diaries, observations, case studies, focus groups, questionnaires and interviews will comprise the data collection instruments used. These methodological tools reflect the values and characteristics of the study at hand. The researcher will ensure that the data is accessed, collected and managed in line with Mary Immaculate College's ethical guidelines and will have sought approval from the university's ethical committee prior to approaching any participants regarding their involvement in the proposed research.

Reflective diaries are an essential tool of the teacher researcher. The researcher has already begun using this reflective research tool in the formulation of this proposal. As a Reading Recovery teacher, the researcher holds a strong background in note taking, carefully observing the child at every turn of the lesson. This methodology has proven informative, functional and worthwhile and has shown to make a significant difference to both learner outcome and teacher practice. This tool will be employed throughout this research project. Furthermore, the researcher has some experience in educational research which may prove beneficial to this study. When the researcher conducted her M. Ed and research relating to Building Bridges of Understanding (2009) she conducted interviews and questionnaires as well as transcribing pupil responses using computer software. In this research, the researcher will observe and document the type, frequency and pattern of teacher responses to planning, the transfer of planning to practice and the identification of disciplinary links, supporting and guiding where necessary. Furthermore, Moje's (2015) heuristic for disciplinary literacy teaching may prove a helpful guide for considering what disciplinary literacy teaching must include and why (See Appendix 3).

Data Analysis

The approach to data analysis throughout this project will be iterative. Through repeated reading and consistent comparison methods of interpretive analysis, repeated phenomena will be identified (Burke, 2018). Qualitative research methods have been criticised for their apparent lack of validity and reliability in scientific terms (Strunk, 2020). However, the validity and reliability of qualitative studies do not rely solely on method and can only be confirmed if the experiences of participants are related accurately (Mertler, 2017). The validity and reliability of this research project will also be aided by the triangulation methods used throughout in relation to site and sample selection, data collection methods, and theoretical foundations.

It is envisaged that the proposed research project will span over a four-year period with year one being dedicated to research reading, skills development and project planning.

Conclusion

The quality of teaching and learning is central to confident teaching and in order to achieve this, effective and user friendly planning tools must be made available to practitioners. A disciplinary literacy approach requires that the literacy needs and methods of each subject be studied in unison. In this thesis, the researcher will examine the capacity for ‘tightening up’ the curriculum, in so far as this study will allow, in order to demonstrate that disciplinary literacy is the most effective way forward in terms of teacher planning. The Primary Curriculum Framework Document, which is due to be published in 2021, will serve to guide this research. We, as educators, must assist our colleagues to maintain high standards of teaching and learning in Irish classrooms. Through such example, educators play a vital role in the creation of a standard of teaching which continues to foster well-rounded pupils with a life-long love for learning. This research suggests a viable means of fusing current policy and practice in order to investigate the effectiveness of teacher planning documents that can be used for disciplinary planning. Such practical planning documents are essential for the effective delivery of high-quality teaching and learning. Research, upon which our future curricula is founded, has emphasised the need for teacher planning to be embedded across the disciplines. When disciplinary classroom environments are created and developed, learning experiences of all involved could be greatly enhanced. Disciplinary literacy is a relatively recent phenomenon. As a result, its application at the primary level is the focus of continuing research which the researcher hopes to contribute to.

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***Reformed STEM Education and Its Effects on Student Learning Outcomes
and Plagiarism Rates: A Look at a Higher Education Institution in the
Northeastern Democratic Republic of Congo***

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Abstract

Research on higher education in the Democratic Republic of Congo (DRC) is virtually absent (Zavale & Schneijderberg, 2020). Science, Technology, Engineering and Math (STEM) programs are being encouraged by the global community without assessments of the learning outcomes of the students enrolled (Blom, Lan & Adil, 2015). This project compared two STEM programs within the same university in the North Kivu province of the DRC. One program institutes non-semesterized, intensive courses with little resource availability and no homework assignments (pre-reformed program). In contrast, the reformed version of the same program follows a semesterized course calendar and uses inquiry-based pedagogy in line with current models of internationalized education. This study assessed differences in science literacy, science reasoning, rates of plagiarism and general numeracy between the two groups. It was found that students in the reformed program had improved numeracy scores after one year in the program while pre-reformed students' levels of numeracy were as low as incoming high school students. In addition, students in the reformed program had higher levels of science literacy than their peers in the pre-reformed program. Science reasoning was more in line with first-year students across other internationalized HEI's in the reformed program than it was in the less developed science reasoning test outcomes of the pre-reformed students. Lastly, it was discovered that plagiarism in the pre-reformed program was prolific while students in the pre-reformed program exhibited fewer examples of plagiarism. This research presents data that is currently absent within the field of higher education in the DRC.

Keywords: The Democratic Republic of the Congo, Higher Education, STEM, Student Learning Outcomes, Reformed Teaching, Inquiry-Based Learning

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Introduction

The Democratic Republic of Congo (DRC) is 12th on the list of least developed countries in the world (Human Development Report, 2020). Despite this fact, the nation has incredible wealth and provides more of the world's electronic-dependent element, cobalt, than any other nation (Scheele, De Haan & Kiezebrink, 2016). The juxtaposition of natural resource wealth with human poverty can be traced back to the horrific colonial rule of Belgium's King Leopold, who is held responsible - by some estimates - for the death of 10 million Congolese people from 1885 to 1908 while claiming ivory and rubber for personal gain (Moore, 2001). Today ivory and rubber have been replaced by mineral extraction, but the inequitable distribution of wealth remains a dire issue. The labour force extracting these minerals and gaining high salaries is largely foreign, with only the lowest paying and most dangerous jobs going to local people (Rubbers, 2020). Science, Technology, Engineering and Math (STEM) educated individuals may gain access to this booming industry, but education in the DRC is ineffective, both at an institutional and governmental level (De Herdt & Titeca, 2016). With a ministry of education that is nearly bankrupt, offering high-quality education is difficult for primary and secondary schools in the DRC in which teacher training programs are being supported by international development institutions (Lund, 2020). The quality of higher education in the DRC is virtually unknown and unresearched, aside from a few broad, cross-regional studies (Zavale & Schneijderberg, 2022).

Although STEM education remains an important means of getting locals into the lucrative economies of the region, STEM programs are also the most costly discipline for a higher education institution (HEI) to offer, averaging almost four times as much per student than a humanities major (Hemelt, Stange, Furquim, Simon & Sawyer, 2018). Furthermore, without knowledge of the quality of such programs in the DRC, it is impossible to know whether graduates are qualified enough to fill high-paying positions in their local economies.

This study took place at an HEI in the northeastern region of the DRC which is currently in the midst of reforming an established STEM program. This allowed for a comparison between a normative, pre-reformed STEM program and a reformed, inquiry-based program striving for a more internationalized level of education. This study assessed the achievement of learning outcomes and plagiarism rates by students in the new program with those in the original program. It aimed to determine if the curriculum's inquiry-based learning approach is successful through assessment tools and quantitative analysis.

Study site, programs of study, and participants

Université Chrétienne Bilingue du Congo (UCBC) is a small, private university located in the town of Beni in northeast DRC. It has a student body of approximately three hundred students living within the UCBC campus region. It was established in 2006 by a team of educators including Dr. David Kasali who spent a career as a postsecondary educator and as the president of Africa International University in Nairobi, Kenya. Dr. Kasali recruited a team of qualified administrators and professors to found UCBC, feeling the need for a high-quality HEI in his hometown of Beni, DRC. Tuition is approximately \$2,200USD/year; students are required to pay \$400 of this with the rest being matched through outside, international donors. The coordination of this comes from UCBC's non-profit governing body: Congo Initiative (CI). CI is a registered not-for-profit headquartered in Indiana, USA and hosts several other organizations within Beni.

After recruiting a qualified Ph.D. holder trained in physics in the U.S., the university planned to reform its current applied science program to a higher quality, internationalized program, beginning in 2020. The reformed applied science program requires that students sit for an entrance math exam - a new assessment not required by the pre-reformed applied science program and representing one of its most impactful changes. Requirements like entrance exams can be difficult for HEIs to make as the government must grant approval for entrance requirements (Majaliwa, 2020).

Assessing for numeracy

The UCBC entrance exams were an important addition to ensure student success in the rigorous, reformed STEM program, especially since delineated grades are not listed by subject on secondary school transcripts. Instead, grades are given as a blended average of all courses taken under the umbrella of broader categories like “math”, making it hard to assess a student’s strengths and weaknesses per subject (Talwanga, 2015). Although incoming students to UCBC’s newly reformed STEM program have mixed abilities in literacy and computer skills, they are expected to have a minimum level of numeracy to enter this newly reformed program.

Because this mathematical ability is being assessed by the institution, capturing its change over time in the reformed program was possible. It was also possible to administer the same test to students currently in the pre-reformed program to gauge the difference in student ability as a whole.

Assessing for Science literacy

Aside from foundational mathematical abilities, a more general cognitive function was assessed in students in both programs. Measuring the effectiveness of the new reformed program by looking at students’ “scientific thinking” or “science inquiry” skill development, was achieved through the medium of their written assignments. Research shows that the development of scientific knowledge (a collection of isolated facts) is separate from the skill of scientific thinking, which is defined as a combination of theoretical knowledge, curiosity, an understanding that theories must be falsifiable, respect and understanding of evidence, and an understanding that evidence is distinct from the theory (Kuhn, 2011). This developing science thinking can be observed in a student’s level of science literacy.

Gormally, Brickman and Lutz (2012) used large international and governmental education research bodies (AAAS, National Academy of Science, OECD) to construct a comprehensive list of science literacy skills, shown in Table 1. These skills are the foundation for a widely used science literacy assessment tool called the Test of Scientific Literacy Skills, filling important research needs that focus on being able to measure the learning outcomes of students in STEM programs and track their progress (ibid.).

Table 1. *A List of Scientific Literacy Skills. The 9 science literacy skills and examples of each are divided into two groups. (adapted from Gormally, Brickman & Lutz, 2012)*

Skills for Understanding Methods of Inquiry that Lead to Scientific Knowledge	Skills to Organize, Analyze, and Interpret Quantitative Data and Scientific Information
1. Identify a valid scientific argument	5. Create graphical representations of data
2. Evaluate the validity of sources	6. Read and interpret graphical representations of data
3. Evaluate the use and misuse of scientific information	7. Solve problems using quantitative skills, including probability and statistics
4. Understand elements of research design and how they impact scientific findings/conclusions	8. Understand and interpret basic statistics
	9. Justify inferences, predictions, and conclusions based on quantitative data

A rubric based on these nine traits was designed for this study to analyze student artifacts (see Table 2). For the pre-reformed students, final-year thesis documents were assessed and for the reformed program, physic lab reports were used.

Table 2. *Science Literacy Rubric. The rubric used to analyze scientific literacy skills in student documents. If the answer to questions is “yes”, then the student receives a point. There are 18 possible points. Half points are offered for partial inclusions of components. (ie. the data tables have some labels but not all)*

Introduction	Hypothesis listed anywhere?	Hypothesis in Intro?	Hypothesis match experiment?	Hypothesis explicit (insert text)	Hypothesis appropriately presented?	Does the student relate the experiment and question back to a "real life" event or need?
Methods and Procedures	Is there an exhaustive materials list?	Is there a written procedure?	Are there diagrams or photos of the procedures?			
Results	Are there data tables?	Are the data tables labelled properly (labels and units)?	Are there graphs?	Are the graphs appropriately labelled?	Is the data described in the text?	
Conclusion	Is there a conclusion based on gathered evidence?	Does the student differentiate between probability and proof?	Does the student accept or reject the hypothesis?	Is the report coherently ordered?		

Assessing for science reasoning

Science reasoning (one aspect of science literacy) has a correspondingly large body of research offering well-tested tools and assessment methods for STEM students. This cognitive function can be described as the ability to overcome embedded alternative conceptions about the natural world incompatible with current scientific theories (Lawson & Thompson, 1988). This journey a student makes from reasoning with alternate conceptions to reasoning with non-intuitive scientific theories after formalized education can be captured through various tools, including the Lawson Classroom Test of Scientific Reasoning (LCSTR) (Lawson & Thomson, 1988). The validity of this tool has been long established and it continues to be used as a means to gather evidence of learning outcomes achieved by students from middle school to early tertiary education in STEM programs (Bao et al. 2009; Hrouzkova & Richterek, 2021; Zhou et al. 2021).

An example of a typical distribution of first-year university STEM students' scores on the LCTSR can be viewed in Figure 1 (Hrouzkova & Richterek, 2021). In this study, 446 first-year science majors took the LCTSR, prior to beginning their first year of study. The score achieved on the test is connected with the stage of scientific reasoning that an individual falls into. They found that most students entering their first year of a science degree exhibited transitional reasoning (having some ability to engage with formal operational reasoning), with approximately a quarter falling into both the concrete operational and formal operational categories.

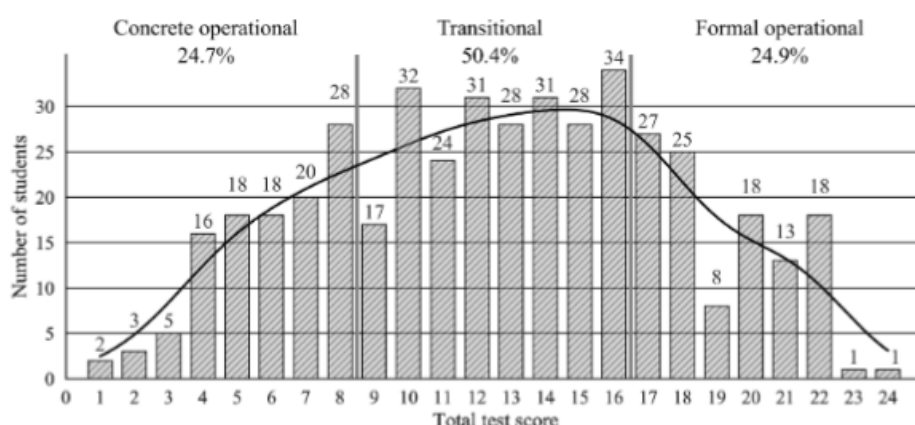


Figure 1. *Lawson's Classroom Test of Scientific Reasoning Distribution and Reasoning Categories. Of 446 first-year chemistry and physics students in the Czech Republic (published results) for comparison.*

Note: Reprinted from Hrouzkova, T. and Richterek, T. (2021)

Having a list of skills defining science literacy as outlined in Table 1 and tests like the LCTSR allow educators to map student outcomes and institutional patterns of success or failure. However, in order for these tools to be effective, student work needs to be original and mirror their thinking. This leads to the perennial problem of plagiarism.

Plagiarism in higher education as a barrier to assessment

Plagiarism is a universal problem, and there are many studies providing data on its prevalence in HEIs, even in well-resourced settings (Pupovac & Fanelli, 2015). Plagiarism takes different forms and has a plethora of definitions in the existing literature. For these

reasons, it is hard to quantify how problematic plagiarism is in any given institution. A few examples that highlight the spectrum of plagiarism are the extreme instances of “paper-mills” being used, in which students purchase entire essays. Additionally, “patchworking” occurs when students take chunks of another’s work and then change around words and structure or academic dishonesty can occur through citing work improperly, which can be either intentional or innocent. Each of these types of plagiarism can cloud the ability of instructors to assess student learning outcomes properly.

There is evidence that suggests a combination of these forms of plagiarism is more rampant in low-income countries (Ana, Koehlmoos, Smith & Yan, 2013), but a paucity of research does not allow for conclusive statements to be made on patterns, causes, or implications. McCabe (2005) points out a potential reason for this observed increase in plagiarism gleaned from his research in the US: institutions that do not have systems in place to quell plagiarism and, in any way allow it, find honest students frustrated that those who are dishonest may have an unfair advantage. This leads to an apparent increase in overall academic dishonesty so as to level the playing field. In other words, institutional complacency encourages academic dishonesty. McCabe (2005) points out that a lax institutional culture is more common in programs with large enrollment numbers and lower resources to check for plagiarism.

Although it is difficult to gain access to places like the DRC to determine student plagiarism rates, it is known that many of these institutions often have high enrollment and low resources (De Herdt & Titeca, 2016). Institutions in least-developed nations, like the DRC, often lack the capacity and resources to implement robust investigations, punishments, and prevention measures which are also known factors that suppress plagiarism rates (Ana, Koehlmoos, Smith & Yan, 2013).

Research design

This study used quantitative methods to measure the outcomes of the reformed program and the parallel pre-reformed STEM program. All data collection occurred in partnership with the applied science program staff and faculty at the chosen HEI in the DRC. This study was conducted in compliance with the Point Loma Nazarene University (USA) Institutional Review Board policies and procedures and informed consent was collected from each student involved. Participation in activities for this project took place during class time.

Table 3 outlines the differences between the reformed and pre-reformed programs. Currently, the degree is four years in length for both the reformed and pre-reformed applied science programs. The reformed program is systematically replacing the pre-reformed, and during the time of this study, the first and second-year students (L0 and L1 respectively) represent the reformed program. The third and fourth-year degree students represent those in the pre-reformed program (L2 and L3).

Table 3. *Differences in Student Groups. A breakdown of the differences between the student groups in the reformed and pre-reformed programs.*

Program Feature	Reformed program (L0 and L1 students)	Pre-reformed program (L2 and L3 students)
Professors	Consistent faculty	Visiting faculty
Class schedule	Courses spread over 7 weeks	Intensive courses 1-2 weeks long
Regular homework and feedback to students on their learning	Yes	No
Textbooks	Provided by faculty	No
Required reading and writing assignments	Yes	No
Course schedule	Planned prior to academic year	Planned week by week, based on professor availability

The length of the program has fluctuated in the recent past from three years to four (a remnant of Belgium's three-year degree system during colonial rule). The first year of the reformed program acts as a bridging year for making the program unofficially four years in length so as to act as a buffer against governmental requirements that may pressure the HEI to shorten the program to three years. It is also imperative to help incoming students reach a level of numeracy and academic competency to succeed in the more internationalized STEM program.

Results

Mathematical ability starting point and improvement

The combined mean scores of all prospective students who sat for the program entrance exam (including those who were not accepted into the program) from 2021 and 2022 ($M=55.48$, $SD=18.47$) were statistically significantly higher than the combined averages of all the pre-reformed students of L2 and L3 ($M=45.82$, $SD=15.9$, $t(144)=3.2$, $p<0.001$). The scores of the successful applicants invited into the program in 2021 were retested after one year in the program, and their average scores were compared through a paired t-test as shown in Figures 2 and 3. The scores are shown as box and whiskers plots displaying the variation and means of each group. The highest mean score achieved came from applicants in 2021 and the lowest mean score achieved was from a student in the L2 class. Only 6 of the 55 students in the pre-reformed program achieved a score high enough to be considered eligible for the reformed program.

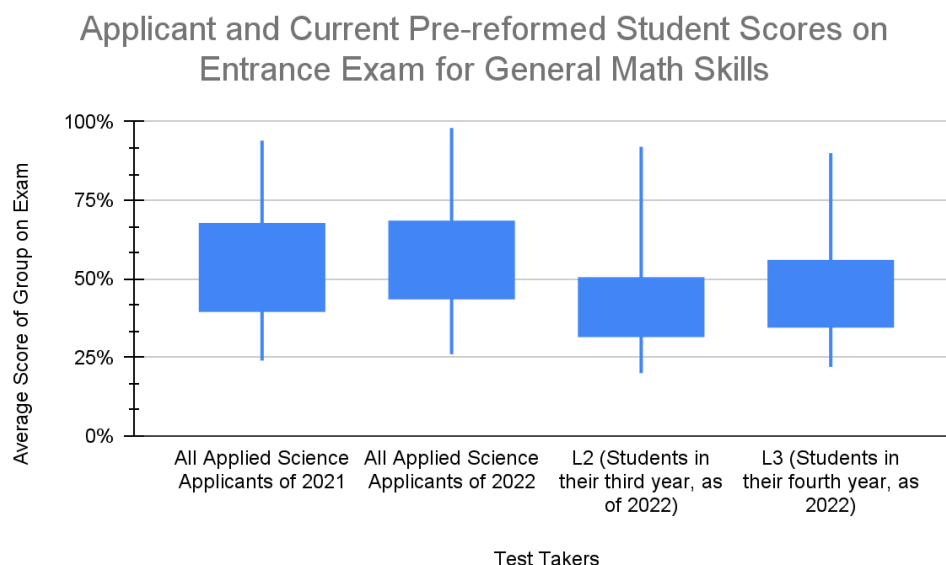


Figure 2. *Average Scores of Applicants and Pre-reformed Program Students on the Entrance Exam. Scores for the reformed program's mandatory entrance exam across four groups: all applicants for the new program from 2021 and 2022 as well as the third and fourth-year students in the pre-reformed program. For 2022 $n = 46$, for 2021 $n = 45$ for L2 $n = 37$ and for L3 $n = 18$.*

On average, students in L1 achieved a higher score on the entrance exam ($M = 85$, $SD = 9.6$) than they did the year prior, before beginning the program ($M = 78$, $SD = 11.9$) (see Figure 3). This mean difference of 7% was statistically significant ($t(18)=2.1$, $p = 0.004$).

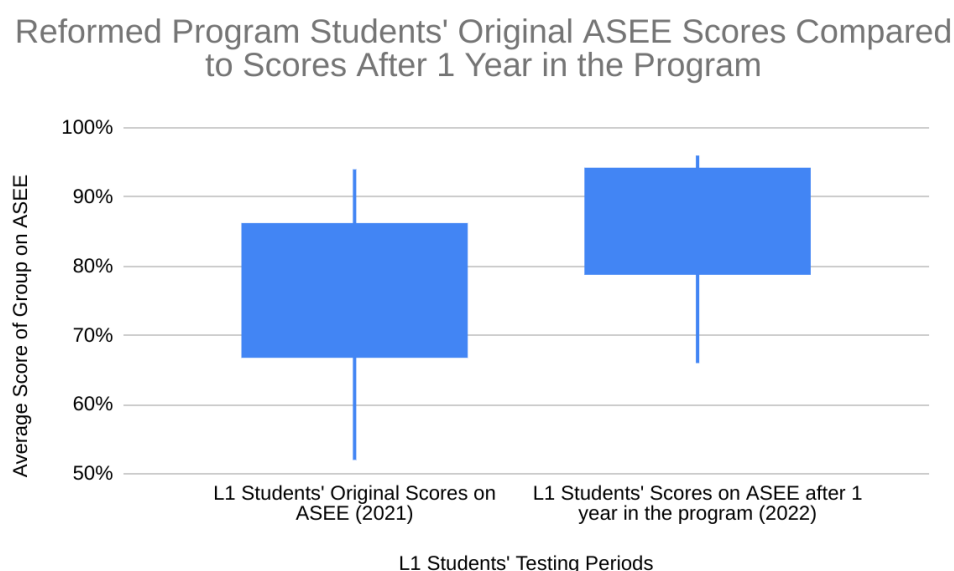


Figure 3. *Average Scores of L1 Students at Time of Application and After One Year on the Entrance Exam. This was a comparison over time, with the same individuals in each group ($n=19$). The 2022 entrance exam was built from questions of similar difficulty and style, but they were not the same.*

Lawson Classroom Test of Scientific Reasoning results

Similar to Hrouzkova and Richterek's (2021) findings shown in Figure 1, 58.2% of the UCBC reformed-program students scored within the "transitional" reasoning stage (Figure 4). Differing from their findings is the proportion of students in the present study classified in the "formal operational" range, in which only two achieved - both L0 students. L2 and L3 students (N = 41) fall mainly within the concrete operational stage (73.17%). Only 1 student scored higher than the transitional threshold (an L2 student).

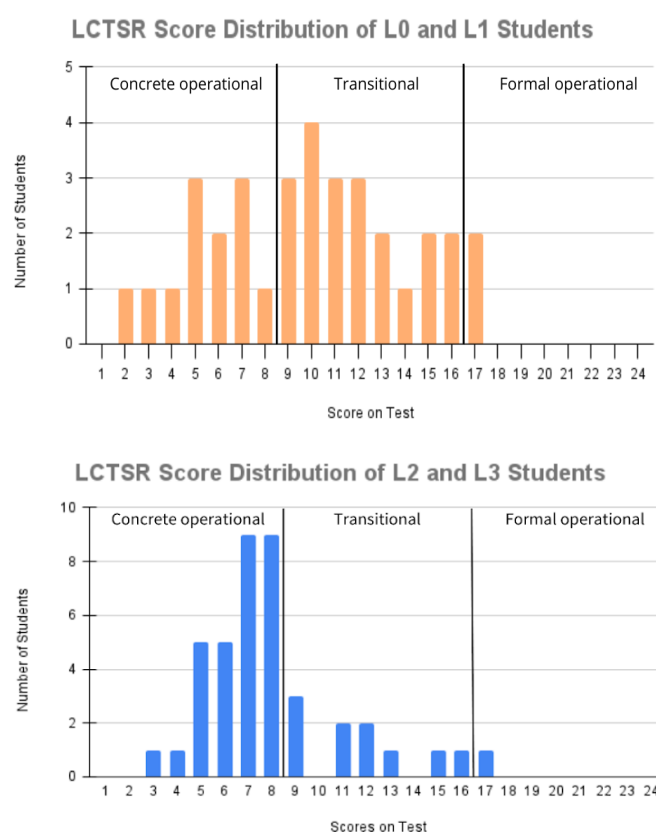


Figure 4. *The Distribution of Student Test Scores on the LCTSR. L0/L1 (top) and L2/L3 (bottom) in relation to the Piagetian stages of cognitive development.*

The makeup of the reformed program student scores is more closely related to that of typical first-year STEM students shown in other studies (Bao et al. 2009; Hrouzkova & Richterek, 2021; Zhou et al. 2021). The pre-reformed student distribution is heavily skewed into the concrete operational end of the curve where reasoning is based on naive reasoning.

Science literacy in written student work

Figure 5 shows the proportion of points awarded for the combined reformed and pre-reformed student artifacts for each section of the rubric. All student documents for the reformed program were found to have a hypothesis listed in their document. The lowest scoring components for the L1 student lab reports were for an appropriately presented hypothesis and for appropriately labelled graphs. The pre-reformed student documents had no examples of graphs and very few offered data sets or clear conclusions in regard to their hypotheses. Not correctly and coherently testing their hypotheses was the most obvious sign of low levels of science literacy within their documents.

Points Awarded Based on Science Literacy Rubric per Question

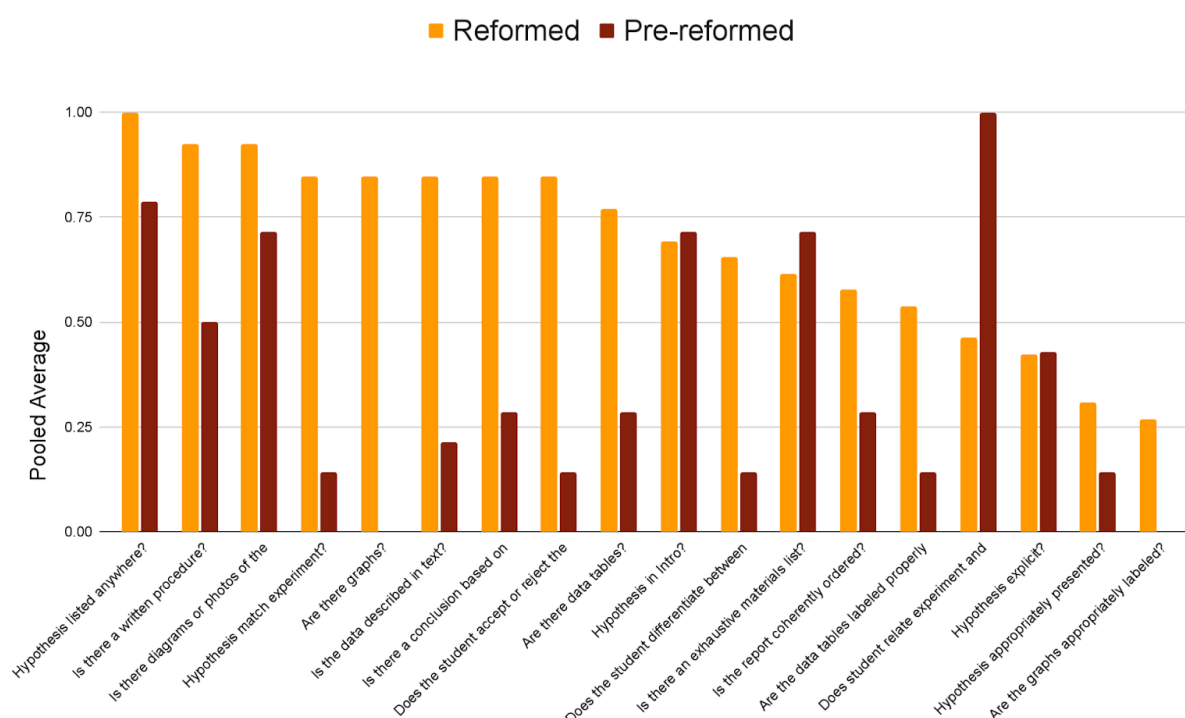


Figure 5. *A Breakdown of the Proportion of Points Achieved per Question on Science Literacy Rubric. The histogram is organized by highest to lowest combined scores/questions for the L1 student documents.*

Plagiarism in student written work

Table 4 shows the percentage of plagiarism present in student works assessed for the science literacy skill rubric. One student in the reformed program plagiarised more than 25% and another over 5% of the artifact. The rest of the reformed student participants had less than 5% plagiarism with over half of the students having no examples of plagiarism. Meanwhile, there are only two examples of students in the pre-reformed program with less than 5% of their documents (theses) plagiarised; both of these students were under the supervision of the founder of the reformed program and were confronted for handing in early drafts of plagiarised work. The plagiarism protocol for the students not under the supervision of the founder of the reformed program is unknown.

Table 4. *Rates of Plagiarism in Reformed and Pre-reformed artifacts.* Plagiarism rates for L1 students as assessed from lab reports (n = 36) and from thesis documents of graduated pre-reformed students (n=7).

	Number of Students with 0% plagiarism	Number of Students with >0% - 5% plagiarism	Number of Students with >5% - 10% plagiarism	Number of Students with >10% - 25% plagiarism	Number of Students with >25% plagiarism
L1	27 (75%)	6 (16.7%)	2 (5.7%)	0	1 (2.8%)
Graduated Pre-reformed student	0	2 (28.6%)*	0	2 (28.6%)	3 (42.9%)

*These students had the founder of the reformed program as their supervisor, who required students to re-do plagiarised work.

Conclusions

Students in the reformed program showed significant improvement in their mathematical abilities over the course of one year while the pre-reformed students scored below the average in mathematical ability compared to the applicants from the past two years. Their abilities in math remain lower than what is expected of a high school student.

Students in both the reformed and pre-reformed programs had fewer students fall into the formal operational category of reasoning than first-year university students from other studies (Hrouzkova & Richterek, 2021). All students in the UCBC program scored below the average of a sample of similarly aged students from Hrouzkova and Reichterek's (2021) study, but more students from the reformed science program sit within the transitional reasoning stage.

Students in the pre-reformed program exhibit more examples of science literacy, based on the nine key science literacy skills from Table 1 (Gormally, Brickman & Lutz, 2012) than students in the pre-reformed program. The selected written artifacts from the students in the pre-reformed program were completely lacking graphs and had very few examples of statistical analysis of their empirical research.

Students in the reformed program resort to plagiarism less frequently and less extensively than those in the pre-reformed program. Results show that 3 out of 7 (43%) of students in the pre-reformed program had examples of content that were more than 25% plagiarised, while most of the students in the reformed program either had no examples at all or minor incidents of plagiarism with the exception of two students.

This research project asked whether a newly reformed applied science program was different from a pre-reformed applied science program at the same small HEI in northeastern DRC. The study asked if the achievement of the learning outcomes by the students was different in three areas: mathematical ability, science literacy and reasoning, and rates of plagiarism. The findings from this study show that students in the reformed program have higher mathematical abilities than those in the pre-reformed program and that their abilities improved after a year in the reformed program. Furthermore, students in the reformed program have higher levels of science literacy evident in the written reports of their scientific method-structured assignments and corresponding results and achieved higher scores on the

Lawson's Classroom Test of Scientific Reasoning. Lastly, lower rates of plagiarism were found in the reformed students' written works.

In Beni, DRC, being a member of the national education community and the international education community are often mutually exclusive. The government demands that certain courses be offered in a degree program whether the institution can provide them effectively or not. To be considered a state-recognized institution these demands must be met and some years ago, this HEI's accreditation was revoked for choosing more evidence-based approaches to instructing and structuring certain programs. To function at an international standard with the resources at hand, substantial deviations from these national requirements had to be taken to create the reformed program, including the introduction of an entrance exam for incoming applied science students (forbidden by the government). By exempting itself from national rules to achieve greater international standards, the institution runs the risk of losing all legitimacy. A recent graduate informally interviewed during this research project was rejected for admission to an institution in the United Kingdom for not having an undergraduate diploma from a government-recognized university. As De Herdt and Titeca (2016) put it, although the government of the DRC itself lacks legitimacy, it is still required to lend legitimacy to educational institutions.

This leaves the question of which rules are more important for a university in the DRC to follow if the outcome means exclusion from the international academic community either way. If international standards are only achievable through the aid and intervention of staff and faculty trained in the ways of the international education community (such as the founder of the HEI, who spent his career at an internationalized university in Nairobi, Kenya) then the university will always be in a precarious state, since these members are apt to use their access to mobility to leave during times of instability. Indeed, since it was founded in 2008, the international staff has ebbed and flowed, and at the time of this research, only one full-time, on-the-ground, international instructor was present.

The reformed program is not widely accepted or welcomed by every member of the Applied Science staff and faculty at UCBC. Tabulawa (1997, 2003, 2013) points out in his expansive research on the matter, that instructors must be treated in the same manner that students are when expected to adopt new pedagogical methods: as thinking and belief-holding individuals that must construct knowledge before adhering to new models. Instructors of the pre-reformed program struggle to implement new methods of teaching, but the most adamant supporters of the new program are the teaching assistants (former pre-reformed students) who have observed the positive impact of the program and been allowed time to construct new ideas about teacher-student relationships and classroom management.

Although the reformed program was granted permission to institute an admissions test for mathematical abilities, a literacy test for English and French was not included. Since the literacy levels of students at UCBC in both the reformed and pre-reformed program, as well as all students in the DRC as a whole, are not assessed, it is likely that many students struggle with fundamental levels of literacy due to a lack of resources and trained teachers in primary and secondary schools. An added level of difficulty for students at UCBC with respect to the development of their fundamental literacy is that UCBC is a bilingual institution; students are expected to be fluent on an academic level in both French and English by the end of their degree. Ongoing debates continue among the faculty about whether this is causing more harm than good, especially as many of the English-speaking instructors have fled Beni due to the recent periods of unrest, as well as the ebola and Covid-19 crisis. Those remaining are non-

native English-speaking faculty, stretched thinly across the disciplines. As evidence suggests that general literacy is a key factor in science literacy, this should be considered when reviewing the data (Shaffer, Ferguson and Denaro, 2019). Namely, some of the student artifacts that were analyzed for this study were completed in English and some in French, but the literacy level of the students in either of these languages is unknown.

In conclusion, this study has found that students of the reformed program at this HEI are exhibiting improved achievement of learning outcomes. Although the sustainability of the program is not known, the unique history of this HEI and its willingness to explore empirically-driven pedagogical methods makes it an ideal subject for continued research.

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Evaluating Student Perspectives on Understanding of Complex Systems

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Abstract

Advances in technological detail and sophistication have resulted in more complex products, systems and services which can be more difficult for individuals to conceptualise and understand. This eventuality has potential to increase risks and assumptions in the use, operation, and management over time of such products and therefore presents a growing problem for those who have to plan and undertake such activities. It can thus be seen as important that people are informed as to the possible ramifications of increased complexity, and this presents a challenge to educators in terms of how the notion of ever-increasing complexity can be taught and inculcated. Previous work has considered how this might be achieved, evaluating learner preferences, mechanisms to describe greater complexity and its effects, and teaching strategies which can facilitate that learning and understanding. This paper builds upon the earlier work in the light of having since delivered complex systems course content at masters level. By viewing the situation through the prism of student learning experience and using informal discussion with learners and formal feedback on factors such as comprehension of topic, ability to analyse and evaluate holistically, and capability to apply understanding to real-life business scenarios, this paper assesses areas that students perceived as difficult or challenging to explicate and actualise. This is then placed in the overall context of the course cohort to analyse trends and whether different students experienced problems with the same issues before suggesting a revised andragogical strategy to address issues and improve the student learning experience.

Keywords: Andragogy, Supporting Students, Complex Systems

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Introduction

Complex Systems are by their very nature difficult to understand. This truism is underlined by various definitions of the term ‘complexity’: the International Standards Organisation state that complexity can be defined as “the degree to which a system's design or code is difficult to understand because of numerous components or relationships among components” (ISO/IEC, 2009), whilst the Oxford English Dictionary list ‘complexity’ as being “not easy to analyse or understand” (OED, 2010). Hitchins (2019) posited that “Many people have a view about complexity, but not so many can entirely justify their view”, which builds on the above definitions of complexity by suggesting that it is difficult to rationalize and communicate. Previous research has identified factors which increase complexity within a system, as described at table 1 below:

Characteristics	Exacerbating Factors
No. of nodes	What we understand
No. of connections	What we think we understand
Size	What we don't understand
Distribution	Human involvement
Location	Organisation
Level of Detail	Context and Environment

Table 1: Characteristics of Complexity (Barker, 2021a)

A key message from that work is that the extent to which we are able to understand, or not as the case may be, is a critical factor in both characterizing the extent of complexity, and the ability to assimilate and communicate its nature. Various authors have attempted to put forward methods to help explore complexity by unpacking the richness of a problem situation; Peter Checkland developed Soft Systems Methodology partly in response to the need to examine and understand the complexity inherent in organizational problem situations (Checkland, 1999a; 1999b), and this was further adapted and applied by Wilson (1990; 2001). Boulton et al (2015) and Jackson (2019) amongst others have put forward ideas on how to understand, conceptualise, and work with complex systems, whilst Bar-Yam (2005) considered how complex problems could be solved, and Axelrod et al. (2000) advocated the ‘harnessing’ of complexity in an ever-more multi-faceted organizational world.

At the heart of much of this literature is the accepted reality that complexity is in itself complex, and therefore difficult to rationalize and understand – and that without this, it is difficult to communicate its essence. This is all the more important as physical and organizational situations which we routinely encounter become more and more complex in their nature (Pak et al, 2017; NAO 2020a and 2020b; NAO 2021). As such, it is essential that we are able to educate people in the nature, ‘shape’ and effects of complexity within systems, and Barker (2021b) considered how this might be achieved and put forward an andragogical teaching to achieve it. This considered factors such as the nature of complexity, the learning styles and preferences of students, and the andragogical teaching methods and techniques available to implement such a strategy. This paper builds upon the earlier work described by Barker (2021b) in the light of subsequent delivery of a complex systems course at masters level which utilized the proposed teaching strategy. By reflecting on that experience and attempting to view the situation through the eyes of the students and their learning experience this paper assesses areas that students perceived as difficult or challenging to explicate and actualise. This analysis is then placed in the overall context of the course cohort to analyse

trends and whether different students experienced problems with the same issues before suggesting a revised andragogical strategy to address issues and improve the student learning experience.

Andragogical Teaching Strategy and Course Delivery

The proposed teaching strategy considered the nature of complexity (Boulton, 2015; Jackson 2019) and identified potential ‘blockers’ to teaching. These are listed below in table 2:

Detail: number of nodes or components, depth of organisational or system development ‘layers’	Stakeholders: number – and variety – of stakeholders, and their <ul style="list-style-type: none"> • views, • intentions, • Needs, and • Motivations
Interconnections: Number and variety of links between components	
Multi-faceted nature: Multiplicity of competing/conflicting factors needing consideration	
Variation and behaviour, especially across time	

Table 2: Challenges to teaching complex engineering concepts (Barker, 2021b)

Consideration was then given to student learning styles and preferences (Honey and Mumford, 1982) and how that might affect the ability of the student to understand the nature of complexity. Students have different learning styles (Barker, 2014), and evidence from literature suggested that different teaching mechanisms would achieve differing outcomes in facilitating learning (Ramsden, 2003). As such, some methods may work for certain students, but not for others (Biggs and Tang, 2007), and given the nature of complexity and complex systems, investigation was conducted into how different andragogical teaching methods may improve the ability of students to comprehend more challenging subject matter. Bligh (1998) contrasted various different teaching methods, whilst others, such as Lohse et al (1994) suggested that the use of more visual methods were a significant aid to better understanding. The work of Bradbury (2016) provoked consideration of the attention span of students, and how that might play into the use of techniques to maximise intake and cognition of information. The conclusion to this analysis was that multiple methods need to be employed interactively to give students the best chance of understanding the subject matter, and this view was supported by the work of Fry et al (2009) who suggested that the use of multiple complimentary teaching methods could enhance the likelihood of better learning. Barker (2021b) concluded in the light of this analysis that attention needed to be focused upon:

- What teaching methods are best suited to informing understanding of multi-faceted, orthogonal subjects involving multiple systems and stakeholders?
- How can these be structured into a coherent pedagogical/andragogical approach?
- How can such an approach be moulded to student expectations and their different learning styles?

Given the intricate nature of complex systems, it was deduced that an iterative approach which broke the subject material down into digestible segments as advocated by Ramsden (2003) would be most likely to succeed (Barker, 2021b), especially if coupled to a clear

structure and intent. To which end, Barker (2021b) suggested that the following ideas need to be addressed:

- The “essence” of complexity
- How to recognise complexity
- How to understand the ‘severity’ of the situation
 - What is the extent of the issue?
- How to describe complexity
 - The degree to which it can be modelled and formalised
- How to communicate the situation
 - How to ‘keep tracks’ on the spread of complexity

It was considered that the “essence” of complexity, or its intrinsic nature, would be difficult to convey due to factors such as detailed level of abstraction, number of system elements, variety of interconnections, and the propensity of complex systems to evolve and change over time, as identified in table 2 above. This was corroborated by Foster et al (2001) who suggested that complexity can evolve at a faster rate than the knowledge concerning it, which held the possibility of making the subject even more daunting to learners and making the magnitude of the andragogical task facing both teachers and students appear more extensive.

An approach to this was to add simplicity and increase meaning by use of pictorial methods to demonstrate the potential creation and subsequent spread of complexity within a system. If combined with the use of real world case studies to demonstrate how this occurred it was thought that learning could be enhanced (Whitman et al, 2002). This could then be reinforced by the use of case study material related to different organisational or industrial domains to place concepts of complexity directly within the contextual knowledge and experience of students, thus making it easier to grasp and relate to. It was believed that this would make complexity within systems easier for students to recognise and understand in terms of its potential effect, spread and severity.

The use of multi-methodological approaches (Mingers, 2003) could also assist in reducing the difficulty in understanding by exploring the multi-faceted nature of a complex problem situation and providing a more complete holistic understanding of complexity in situ. This view was informed by the work of authors such as Faules (1982) who investigated the use of multi-methods in organisational situations to provide greater understanding.

In addition to the use of pluralistic systems modelling techniques, Barker (2021b) proposed that the use of case studies throughout a module or course had the ability to provide continuity of understanding, offering learners a ‘handrail’ to guide and build their understanding by developing knowledge incrementally using the same relatable example and construct. By using a combination of these techniques, it was help possible to provide a comprehensive was of describing complexity and testing its extent in a more manageable, semi-formalised approach, which should also help in the communication of the concept. It was also noted that due to the level of course and qualification (UK Government, 2022) in question, the appropriate level of educational quality needed to be maintained. As the course was a level 7 masters degree, this meant in practice that while examples could be

demonstrated and discussed in class, there was also the need for students to apply and justify their learning independently, and so it was important that mechanisms be put in place to facilitate this.

In addition to the constraining and enabling factors considered above, it can be noted that there were a number of andragogical challenges to educating students at level 7 which centre around the mental model of the individual student (Barker 2021c). In the case of complexity and complex systems, these might be seen to centre around the individual student's mental model, in that their own experience and knowledge might bias them toward certain conclusions, whilst previous level of learning might facilitate or impede their ability to comprehend the subject matter. Learning preferences (Fry et al, 2009), as mentioned above, could also help or hinder students in their ability to learn, depending on how they reacted to the blend of andragogical techniques employed in the teaching process (Biggs and Tang, 2007).

Having considered these factors, Barker (2021b) proposed the teaching construct below for the level 7 Complex Systems course:

- Live sessions held as 'conversations' rather than formal lectures
- Short follow-on individual exercises to embed understanding
- Provision of worked solutions/model answers
- Q&A/Tutorial sessions to answer queries and repeat material if needed
- Self-paced research exercises to explore particular aspects of relevance
- Longer, group interactive workshops to simulate reality and foster peer-to-peer understanding and learning
- Seek regular feedback from students: session-by-session to ensure understanding and test different ideas
- Consistent 'storyline' through course

It was intended that by employing such a construct, involving the use of a variety of complementary approaches that a holistic, consistent learning experience would be provided that catered for individual learning preferences whilst also supporting the group dynamic within the cohort fostered a comprehensive learning culture. Moreover that this should facilitate sufficient learning and knowledge generation that students should be able to apply, rationalize and justify their understanding independently and therefore meet the level 7 learning criteria of the course.

Student Perceptions on the Learning Experience

Feedback was sought from the students both during and after the initial run of the course. The intention behind this was to gain 'in the moment' responses which would allow teaching staff to gauge the extent to which the andragogical teaching construct was working and to ensure that student learning was progressing as per course intended learning objectives whilst

meeting level 7 qualification levels. Immediacy of feedback also allowed to some extent the tailoring of teaching methods to maximise cohort-level learning and to support individual students through iteration of points or additional sessions to ensure comprehension of subject matter either individually or in sub-groups. After-course feedback was also sought to allow students to reflect on their learning experience, consider any elements that they might wish to have reiterated, and to suggest improvements in the light of whole course delivery. This latter method of feedback was intended to facilitate continuous development of the course teaching strategy, and to identify improvements that would better facilitate student learning.

Feedback during Course Delivery

During the delivery of the course, teaching staff frequently paused delivery of material to ask if students had any questions or required any clarifications. At the end of each teaching session, a Q&A was held to allow students to ask questions or request iteration of information, and informal tutor sessions were also offered to garner opinion on the learning process as it happened. The key responses from this means of seeking feedback are listed below:

- Students found the technical and mathematical areas of content to be very difficult to understand
- Complexity theory was difficult to grasp
- Structured approach was good for understanding fundamentals of complexity
- Multiple examples helped
- Group workshops increased understanding

Several of the students expressed the view that the more theoretical elements of subject matter such as complexity theory were more difficult to understand, and those unused to recent academic study were particularly strong in their views on this matter. Although some students were happy with detailed theory, the majority expressed a preference for a more practically structured learning experience in which models and techniques could be applied to defined case studies to build up their understanding of complexity and its affect upon systems. Most of the students provided positive feedback on the structure of the module, stating that an approach to incrementally increase understanding had helped build their familiarity with concepts, and the shorter exercises had helped considerably in this endeavour. All of the students found the interactive nature of the teaching strategy to be beneficial, especially the provision of multiple examples and worked solutions whilst the longer group workshop was found to provide contextual understanding whilst providing a collegiate multi-stakeholder ‘support network’ of shared ideas.

Feedback received subsequently to Course Delivery

At the end of the course, a wrap up session was held to allow the students to ask questions about the course material, clarify the intent and deliverables of the summative assessment, and to provide initial feedback whilst the learning experience was fresh in the memory. Experience from teaching on other modules and courses suggests that some students are uncomfortable when asked to provide feedback publicly, so students were given chance to

either/or complete an anonymous feedback online questionnaire at a later date, or to email feedback to the course leader. Feedback given during the course wrap up session reinforced the earlier view that the course structure and teaching construct had successfully facilitated learning but that the subject of complexity was difficult to understand, whilst the interactive nature of the teaching had helped understanding and given the students increased confidence in their knowledge and learning experience. The mix of individual exercises leading to group workshops also received praise for facilitating learning and fostering a good learning environment. The main points of feedback received via the anonymous questionnaire and/or via email were as follows:

- The nature of complexity was difficult to understand
- The subject matter was very challenging
- It was good following lectures, but hard once there was no direct guidance on context
- It was difficult to apply learning independently
- Following the text of books directly would help

Some of the feedback received from students subsequently to the module was similar to that received during its delivery. In particular, the students reflected that complexity as a subject matter was difficult to understand, and that while complexity could be understood locally within a system, it was much more difficult to understand holistically. Some students identified the subject as being challenging as concept, particularly due to the evolutionary nature of complexity and its emergent property of changing the nature, state and behaviour of the system under consideration. Other comments related to learning preferences, in that whilst students generally enjoyed the lectures, case studies and worked examples, some experienced difficulty in characterising complexity in a system without guidance and independently making sense of a situation and justifying their findings. Finally, a limited number of students expressed a preference for book-based learning that precisely followed the text of supporting course material. This might have been due to a lack of experience contextually, or a lack of previous academic study on more advanced subject matter.

Reflections and Response from Teaching Staff

Upon commencement of course delivery it very quickly became clear that there was a divergence of experience and academic ability amongst the cohort. Some students possessed academic qualifications at levels only slightly below that at which the course was being delivered, whilst others lacked in qualifications but had a vast amount of industrial domain experience. The effect was that whilst some students experienced difficulty in adapting to the academic style and level at which the course was pitched, others were less able to relate the subject matter to real world examples. It was found that broadly, the students fell into the following categorization:

- Those who were unable to deal with the intricacy and nuance of the subject matter
- Those who were able to follow the detail during lectures, but were then unable to conceptualise and apply it in context independently

- A relatively small number who were able to fully grasp the concept and evaluate associated issues independently

This caused some difficulty in that level 7 qualifications require students to be able to conceptualise arguments, rationalise ways forward and justify their reasoning; those able to do this more readily grasped the concept, but some students struggled to grasp the more detailed theoretical concepts and therefore had difficulty in reaching expected levels of attainment. Other students coped well whilst being provided with an iterative step-by-step approach along with worked examples and case studies but were less able to work independently where required to do so. This necessitated reiteration of some of the material, and inclusion of a more structured approach than was intended. This resulted in a focus on teaching essential concepts in a greater depth, which was in some ways more akin to training than education. Moreover, the emergent property of this was that some more advanced concepts could not be covered due to lack of time which required restructuring of the teaching construct in something approaching real time and meant that additional effort had to be spent to ensure that the integrity of the course as a level 7 qualification could be maintained. This was achieved through breaking down tasks into smaller independent work sessions, assessed formatively and backed by worked examples and extensive feedback to provide the students with confidence in their understanding, and then followed by a more open, reflective, piece of summative assessment than had originally been intended.

Other issues encountered were that because of the divergence in knowledge and qualifications amongst the cohort, some students need more tutoring than others, so effort had to be expended to ensure that the learning experience did not become disjointed at cohort-level. The preference of some students for step-by-step instruction led to some of the cohort progressing more quickly than others, such that in some cases normal and 'extended' tasks needed to be set to facilitate learning preferences, styles, and rates of progress. In addition, some students expressed a preference for learning structured against accompanying texts. It is questionable whether such an idea is compatible with level 7 qualifications, and again this necessitated additional work to facilitate the learning of some members of the cohort.

Revising and Evolving the Andragogical Teaching Construct

In considering the feedback from the students and the reflections of the teaching staff, it is considered that although the course construct was broadly successful, there is the potential to evolve it in a number of ways. Firstly, it is considered that the nature of complexity and complex systems understanding might lend itself to a multiple-tiered teaching approach that splits the topic into foundation- and practitioner-level courses, with the former providing learning on key concepts of complexity and demonstrating how it takes affect and propagates itself along with case studies and worked examples, whilst the latter is pitched as a level 7 qualification that allows students to debate and relate more advanced concepts to their domain experience and conduct independent evaluation as to how complexity can be managed and contained appropriately within a systemic context. In a similar way, if the subject matter is being delivered as a module of a long-form course, then it might be appropriate to move the module to the latter end of the course construct, which would allow students to build knowledge and experience before tackling a more advanced topic such as complex systems. In this way, pre-requisites in terms of experience or knowledge from earlier modules could be used to smooth and improve the learning experience. It is also noted that in a long-form course context, a complex systems module could be paired with an

alternative module to allow a student to avoid the study of complexity should they be too uncomfortable with such a prospect.

In addition to this, the delivery of the course construct could be adapted to 'sign-post' more potentially difficult material allowing students to have additional time to prepare for it and ask any questions that they deem relevant ahead of time. It is also possible to develop a wider range of cases studies to form a library from which material can be taken to apply to any industrial domain considered relevant, therefore increasing the chance of students being able to better relate the subject matter to their individual knowledge and experience.

Conclusions

In conclusion feedback from students reinforced the view that complexity is in itself inherently complex, especially due to its propensity to evolve, mutate, and therefore alter the behavioural and structural properties of the systemic entity in which it is present. The feedback received on both the course construct and andragogical teaching strategy employed to deliver it was broadly positive, suggesting that a mixture of interactive discussion-based lectures coupled to a developing case study used as the backbone to the learning experience, plentiful worked examples and a mixture of short individual learning tasks and longer group workshops provided a mechanism well-suited to facilitating the learning experience and fostering an engaging, collegiate, learning environment.

The feedback also showed that some students adapt to learning and embracing difficult topics more readily than others. Individual learning styles play an important part in this, but the experience of individual students also plays a significant part in their ability to understand and contextualise more challenging subject material, as does their academic preparedness and familiarity. Reflections from the teaching staff reveal that the cohort who attended the course contained a diverse range of academic qualifications and industrial domain experience, and this in cases led to the necessity of teaching at individual student- rather than at cohort level which proved disruptive and required changes to the original andragogical construct. As a cohort there was unanimity of views that the group workshop significantly helped group understanding, and the students did appear to work well as a unit. The outcome was that at a cohort level the course intended learning outcomes were met, albeit at the cost of the teaching staff investing additional effort to ensure that all students reached broadly the same level of understanding before the course could progress to the workshop activities. The additional time required to achieve this did result in changes to the original course construct, and a conclusion from the initial running of the course would be that cohorts with a wide range of abilities make advanced topics much more difficult to teach. In terms of future work, as a result of delivering an initial course on complex systems and reflecting on that experience in preparation for this paper, the author believes that the following should be undertaken:

- Continue practical and theoretical research into how to characterise and describe complexity, and how best it can be taught in order to refine and evolve the most suitable andragogical teaching strategy for the teaching of complexity and complex systems
- Experiment with different teaching styles and constructs to attempt to discern the most appropriate balance of teaching techniques and how they can be mapped to individual and potentially cohort learning styles and preferences

- Work with individual students to better understand learning preferences when faced with the task of understanding and making sense of challenging subject matter so as to facilitate the continuous development of the student learning experience whilst also informing the other aspects of future work stated above

A further conclusion upon reflection is that the course needs to be run on a number of occasions to accurately gauge the most appropriate teaching strategy, to understand more completely the level at which the delivery of challenging subject material can or should be pitched, and to test whether the feedback from this cohort is typical of all students or is due to the diverse nature of learners in this particular cohort.

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Interaction as Storytelling: A Framework for Structuring Stories From the Perspective of Quantum Theory

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Abstract

This research is based on teaching practices and proposes a framework for considering storytelling as a creative method for art students. Inspired by *trans-disciplinary* thinking, I compare some aspects of quantum theories as an analogy with my interpretation of interaction. In the practices of art and design, creativity is the most vital ingredient as its appearance is unpredictable, just like quantum leaps. Referring to the quantum theory, the eleven dimensions of space-time might show similar patterns with information exchanges. By designing interaction, it is intended to help analyze storytelling and offer interactive information for the further oriented design. How to inform, set up or maintain entanglement, the quantized storytelling might bring insights into the meanings of the art and why it matters. The coincidence between certain quantum rules and the interactive characteristics, might give a new perspective to philosophy, humanities & social sciences improvements.

Keywords: Interaction, Quantum Theory, Hyper-Dimension, Storytelling, Art Education, Creativity

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Introduction

From my own experience as a game designer in the professional industry and then a lecturer of animation in higher education, there are many students and practitioners facing the challenges of producing creativity. By identifying the problems, I am trying to develop a teaching tool and also a way of thinking by constructing storytelling to seek more possibilities for art and design. “The sudden appearance of idea has been explained as quantum leap” by Koyama and Niwase(2017, p.3) has enlightened me by posing creative ideas with quantum theory.

In this research, I try to apply *trans-disciplinary* thinking to creative industries starting with “interaction design”. It is of vital importance to realize the relationship between the artwork and the audience, the people and people, the physical feelings and mental cognition. In the practice of interactive art and design, I am drawn to the fascination of how to set up and maintain certain entanglement. In the early research, some concepts from quantum mechanics are referred into the interaction design. And the experimental framework of “Interaction Hyperspace” is used as a creative method for generating narratives and innovative ideas. In this article, I will introduce the background of my research, the theoretical framework, intended practical approaches and examples.

Beginning with “what is interaction”, my initial plan of interactive design has evolved into a sort of meta-design which takes into account all inter-relationships within art and design area and offers a potential solution. In stimulating creativity, the method I am trying to develop is based on the ability of storytelling, so that it might benefit the core of design and psychological and philosophical perspectives behind all art and design.

Problems (Motivations)

From the carving figures in the ancient caves to the graffiti on the modern streets, the images are something people keep trying to comprehend and seeking the stories behind them. In my opinion, it is the nature of humans, consciously or unconsciously, to be keen on unscrambling what they see and feel. Especially in art and design industries, the works are made to interact with the audience by specific storytelling methods.

My early career in professional creative industries requires young practitioners to provide effective and unique innovations. My past experience reminds me of the importance of creativity. In the teaching practices for university art students, especially for the major of animation, I am facing the challenges of helping students to generate their own creative ideas and storytelling skills. There is a common situation that college students often face the lack of originality and their storytelling skills are pale and unempathetic. One of the possible reasons might be that the students’ growing environment is simple and relatively isolated and their observation of life towards the various materials is replaced by the pressure of college entrance examination. Apart from their similar daily routines, their channels of acquiring information mainly rely on social networks. The current personalized push systems of the internet are based on big data and accurate delivery, which brings more pleasant customized service experiences as well as more narrow horizons of other possible information. It is the so-called interest that drives people to stay in their comfort zones and immerse in psychological alcohol. Sometimes, people are lucky enough to realize that their lives lack of creativity and fresh ideas. However, there are no better options to show them how to improve

this situation. Being one of them myself, I have been working on keeping the introspection and setting off some sparks from time to time.

The aims of my research are based on this phenomenon and trying to propose a creative method for people to design, think and maybe live.

Research Questions

The purpose of this practice-based research aims to build up a creative framework of storytelling to benefit the practices of art and design. Notably, this framework is based on “Interaction as Storytelling” combining some aspects of quantum theories. By outlining an eleven dimensional framework of *Interaction Hyperspace*, it might stimulate the creative process in producing innovations and analyzing the storytelling within artworks.

There are the Research questions:

1. What is *interaction* from the perspective of quantum theory?
2. How do the quantum theories relate to storytelling which builds the foundation of art and design?
3. How does the framework *Interaction Hyperspace* work for increasing creativity?

Literature Review

As John Polkinghorne (2002, p.26) once claimed, “Classical physics describes a world that is clear and determinate. Quantum physics describes a world that is cloudy and fitful”. When narratology meets with quantum physics, the multiple interpretations of narrativity could be seen as the possibilities within the multiverse by its readers’ or observers’ view.

Boje(2014, p.201) also proposed *Quantum Storytelling* “by outlining a three-part model of the storytelling process: Empiric Stories, Epistemic Narratives, and Ontological Living Stories, each as connected to one-another through the antenarrative process.” He looked at the processes of turning subjective experience into narrativized understanding and brought his 11D’s approach of ontology to the surface.

In Tang Li’s(2013,p.11) view, “the transdisciplinary quantum narrative brings fresh vigor to post-classical narratology and also offers a new method and cognitive pattern to the creation and explanation of literature”. The moment when the story's ending is spotted, is like the opening of the box containing *Schrodinger's Cat*. It is not the moment when the universe breaks apart, but the moment when the observer becomes aware of the universe in which the story is set.

Referring to some aspects of quantum theories, *Interaction as Storytelling*, as my working definition, might show similar patterns with information exchanges. Therefore, I compare the *quantum entanglement* to the information loop of interaction, like making phone calls, online chatting or eye contact, etc. Also, A photon, as an elementary particle, is a quantum of the electromagnetic field, is like the BIT from the theory of information which is the smallest unit consisting a story. In the practices of art and design, interaction is usually unpredictable just like *quantum leaps*. The latest research indicates that there is signals detected before *quantum leaps*. I would imagine it is like some sort of signals before certain interaction. For example, the ringing before we pick up the phone. Then, the intervention to reverse the

quantum leaps might be seen as cutting off the interaction or hanging up the phone. The comparison of terms is shown on below (Table 1).

Quantum terms	Interaction terms
Quantum entanglement	Information loop of interaction
Photon	BIT (information)
Quantum leaps	Interaction
Signals before quantum leaps	Signals before certain interaction
Reverse quantum leaps	Cut off interaction

Table 1: Comparison of Terms

The Framework

By designing the storytelling, it is vital to realize the relationship between the artwork and the audience, the people and people, the physical feelings and mental cognition. In the practice of interactive art and design, I am fascinated with setting up and maintaining certain entanglements.

Therefore, I am proposing a framework of storytelling: eleven is the maximum space-time dimension in which one can formulate a consistent supersymmetric theory, as was first recognized by Nahm (1999, p.7). Referring to the theory, this framework presents eleven dimensions of interaction and uses "Interaction Hyperspace" (Figure 1) as my early working title. The eleven dimensions (11Ds) are Location, Action, State, Time, Interaction, Entangled Results, Time of Interaction, Possibilities, Intensity, Result to the outside and Memory. Notably, there is also considered to contain a zero dimension, which is the nomination of a certain main object to conduct interaction.

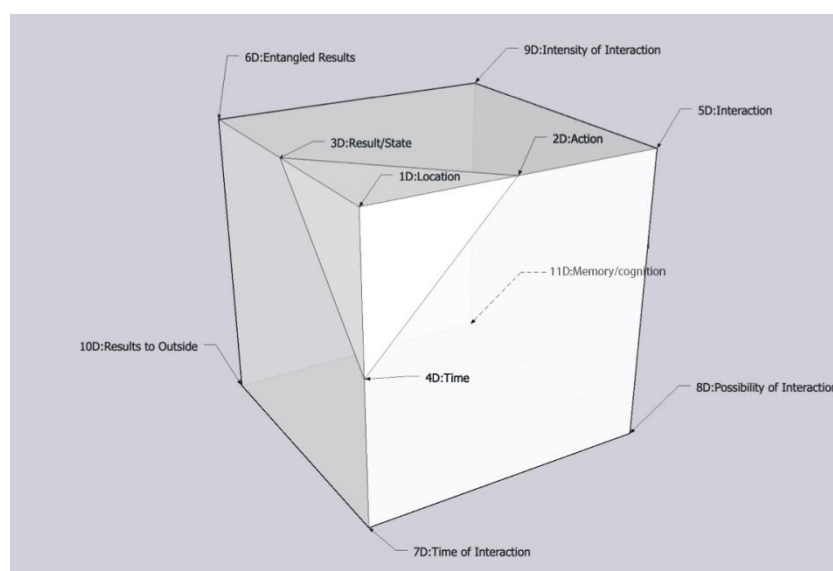


Figure 1: The Model of Interaction Hyperspace

As shown in this model, a tetrahedron is included in this model, which carries the most vital elements, the first four dimensions (4Ds). By changing the first 4Ds, the model would be

altered into different stories. It is set to be encouraging possibilities and risks than seeking the one and only answer.

As we know, "the Five W's" of Communication helps create information in the context of meeting an audience's needs (Hart,1996,p.139). There are Who, What, When, Where, and Why, which are often used to direct storytelling as the basic structure. Compared with this classic strategy of structuring stories, my proposed 11Ds model emphasizes the relationships and impacts between objects instead of the main characters. The model could be deconstructed every single binary relationship including people with people, people with things, things with things, people with environments or even people with their own minds.

In my current understanding and demarcation of interaction, the definition of interaction might be generalized, including more species and types. In that sense, I intend to release the limits of imagination in storytelling behind designs and encourage more people to challenge the rules and themselves. The research will be based on practical applications, including university teachings, industrial designs and even trans-disciplinary communications. As the method is a creative stimulation, it might show people from not classical creative areas with a brand new idea of out-of-the-box thinking.

Deconstruction and Construction

As Jim Jarmusch(2013) announced, "Nothing is original. Steal from anywhere that resonates with inspiration or fuels your imagination." "Always remember what Jean-Luc Godard said: "It's not where you take things from - it's where you take them to." I believe that corresponds to all methods involved with deconstruction and construction. In my working framework, it doesn't deviate from the track of the golden rules for creative combinations. The break-up and reestablishment process is based on the perspectives of interactions and focuses on the entanglement of relationships and results.

By identifying the 11Ds of interaction, it is intended to help people analyze a certain interrelation between the focused ones. To some extent, it aims to deconstruct a story, a product or an event to expose its potential problems with innovations.

The first 4Ds (tetrahedron) presenting Location, Action, State and Time will establish a new story for design or re-construct the original structure and bring new perspectives into the initial ones. By altering one or several parameters, the following dimensions of interaction will change into a new 11Ds system.

The deconstruction and construction process could be evolved over multiple iterations until the storytelling structure is creative and satisfying to the designers or artists. As a tool of creative minds, the being within the interaction could be replaced in different situations. For example, the design of table could be seen as an interaction between a table and people (consumer, producer or seller), the environment where it is placed, or even the material the table made from. All kinds of situations result in various interactions leading to different designs.

The Practices

My research focuses on the possibilities of the development of professional practice of art and design and creative solutions through action research. It's trying to conduct several

practices of teachers' or designers' action research. In one practice, I plan to develop a mobile application(Figure 2) to explain my framework and collect data from individual or group works.

In the university teaching practice, this creative method is intended to be a teaching tool conducted by the researcher or by other lecturers with the researcher doing observations as an outsider. It might be easier for the interaction between the lecturer and the students and the digital process of producing creativity enhances efficiency.

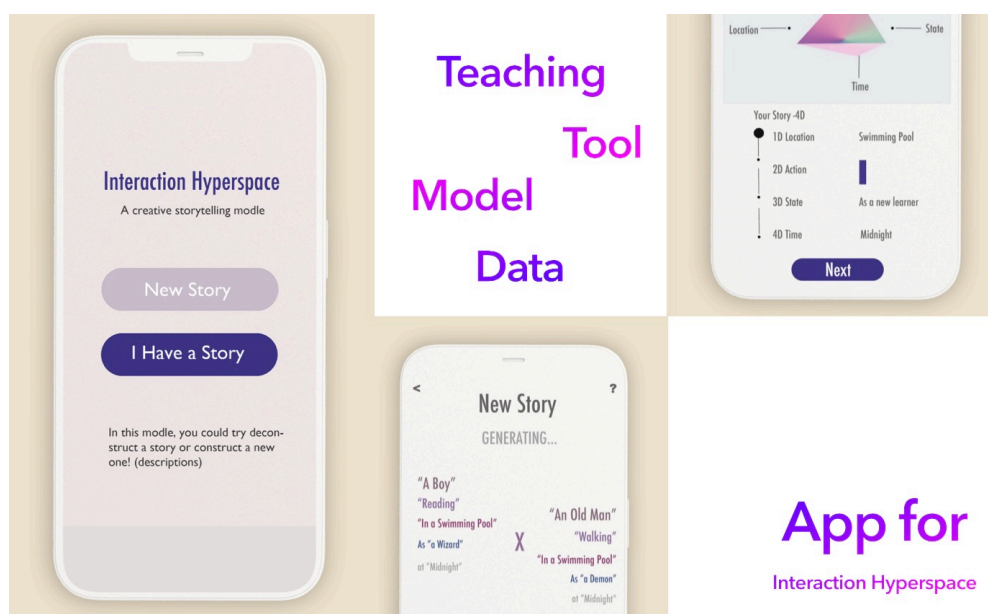


Figure 2: App Design for the Framework

Examples

When a story is described as “ To search for the true meaning of oneself, a kid set foot on the adventures and eventually has grown up as a new self”, this classic film theme suggests many possibilities and combinations of characters.

Firstly, to try to deconstruct a story from this theme, a successful example might be Harry Porter’s series by J.K.Rowling. It tells a story of a magic world from a boy wearing his glasses. The 11Ds could be derived from the main story in the following table (Table 2).

0D	Object	A gifted boy, Harry Potter	Lord Voldemort
1D	Location	Hogwarts, school of magic	Hogwarts and the magic world
2D	Action	Go to school to learn magic	Revenge and reborn
3D	Result(State)	A famous boy in the wizard world but grew up miserably as orphan in non-magic world	Coming back from “dead”
4D	Time	When Harry turned 11 years old	In 1981, after attempting to kill Harry Potter
5D	Interaction	Harry’s forehead left a scar by Voldemort instead of death, and he tried to protect himself and others from Voldemort.	
6D	Entangle Result (to selves)	Harry got his own life lesson’s to defeat the evil in the world and of himself.	
7D	Time of Interaction	18 years.	
8D	Possibilities of Interaction	Very surprising and unlikely (1/10)	
9D	Intensity of Interaction	Strong and highly influential (9/10)	
10D	Result to the outside	World-changing result: save the world from Voldemort.	
11D	Memory/Cognition	The whole experience affects many people’s life and souls.	

Table 2: Story Structure of *Harry Potter*

The first interaction between Harry Potter and Voldemort happened when Harry was one year and three months old. The notorious dark lord Voldemort encountered his first downfall and was ripped from his body. The boy became a legend in the wizarding world but was raised by his aunt’s family and was brutalized as a cursed orphan. They came across each other again when Harry went to Hogwarts and was entangled with friends, tutors, and enemies. The figure (Figure 3) below briefly indicates the track of interactions between Harry and Voldemort: the two individuals intersect from different start points and then develop tangled relations and finally are doomed in one’s extermination.

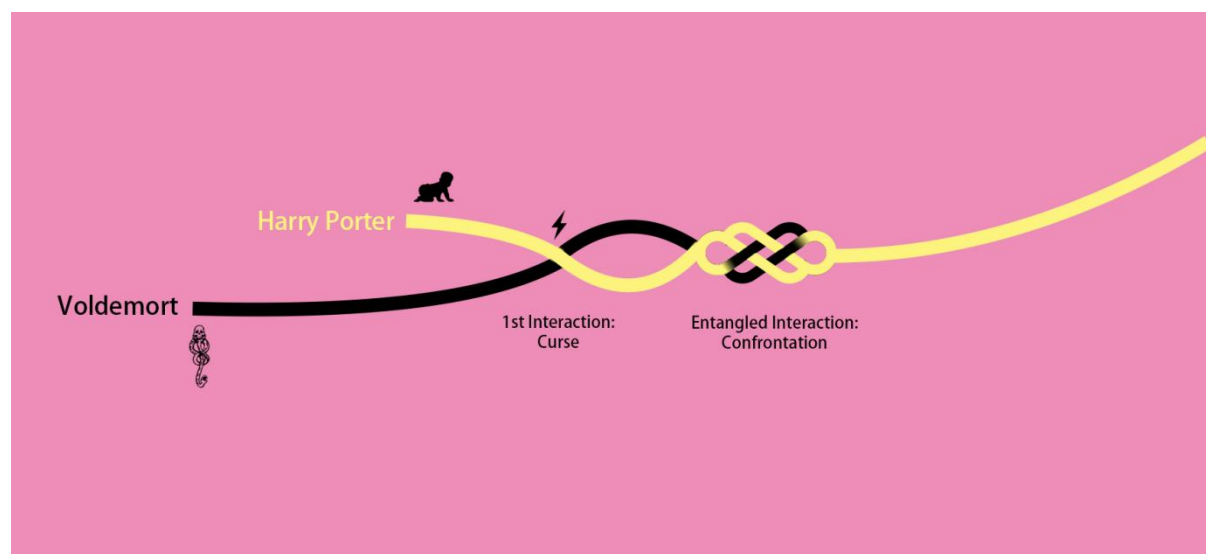


Figure 3: The Visual Narrative of Harry Potter

What made this story so-called successful and interesting, might lie in the character’s state. A boy carrying a special mission departs from other normal kids against the biggest antagonist.

The narrative design follows the key information in the 4Ds and eventually formulates memorable interactions.

What are the other possibilities for designing this theme? By altering the location, action, state and time, the model of interaction could be developed into a different new story (Table 3). Especially, when the location becomes a critical setting, the story's world might fulfill unexpected plots.

0D	Object	A girl- Chihiro Ogino	Rival- Yubaba
1D	Location	The spirit world	The spirit world
2D	Action	Was traveling to her new home	Runs a bathhouse
3D	Result(State)	A normal and effeminate kid	Strong witch
4D	Time	At 10 year's old	When she serves customers
5D	Interaction	Chihiro and her parents accidentally run into the spirit world, and she had to work for Yubaba for getting out.	
6D	Entangle Result (to selves)	Chihiro grew up and learn that what is important to her.	
7D	Time of Interaction	For several days	
8D	Possibilities of Interaction	Less likely- Chihiro was not supposed to enter the spirit's world(2/10).	
9D	Intensity of Interaction	Very strong- Chihiro fought for her own destiny and free her parents and Haku.	
10D	Result to the outside	Haku and many people around Chiriro affected by her and feel love and meaning of lives.	
11D	Memory/Cognition	"Once you do something, you never forget. Even if you can't remember."	

Table 3: Story Structure of *Spirited Away*

The uninvited human family of Chihiro went to the spirit world and the parents were cursed into pigs by their greed, while the 10-year-old Chihiro had to work in a bathhouse for witch Yubaba to save her family. Yubaba took Chihiro's name in exchange for her staying and put up innumerable obstacles deliberately. That interaction between themselves makes up the conflict and epitasis of the narrative leading to later plots' development.

These two examples are trying to present similar plots and theme that might end up as totally different storytelling in which the core idea is prominent for an unique innovation: a paradoxical behavior, an unexpected scenario, a surprising time perspective or state transforming. In creative writings, the interactions set the vision of the dramatic narratives while influencing the user interfaces and experience in general art and design. Hence, to deliver the appropriate information to the audience and to design the design of it are the current vital tasks in this research.

Conclusion

The framework for structuring stories, "Interaction Hyperspace", is still an early working structure and is proposed to be developed into a new method helping people from the creative industry to analyze their art and design and adjust it along with perspectives of sociology and psychology. At the present stage, I have used this framework in script writing and animation planning teaching practices. It has shown its advantages in encouraging students to produce more design concepts and providing diverse possibilities in design thinking. In the case study practices, my next stage of the research work might focus on the students responses based on various backgrounds and how the framework works in multi-culture classrooms.

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Learning Experiences of Online English Learning With Pedagogical Redesign for Complementing Formal Face-to-Face Learning

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Abstract

The use of online learning in education has increased rapidly during the pandemic. Both teachers and students are more familiarized with technologies in online teaching and learning. With the readiness of technology, some educational institutes started adopting more blended learning after the resumption of face-to-face learning. However, some institutes consider the online mode as a direct replacement of face-to-face mode. Without thoughtful redesign of pedagogy, the effectiveness of teaching and learning was affected. Educators believe teaching and learning would be impacted by thoughtful redesign of blended learning. This research took place in a school that provided online English learning with pedagogical redesign for the purpose of complementing the formal school's face-to-face learning. Individual interviews were conducted to collect learning experiences and thematic analysis was adopted for analysing the results. The results show learning experiences were enhanced via appropriate redesign of interaction, learning activities, and assessments. The students were highly motivated in the online learning environment and they enjoyed the learning content and learning activities. Learning experiences and effectiveness were both enhanced. This study result affirms positive impacts from the redesign of pedagogy in online English learning for complementing formal face-to-face learning.

Keywords: Online Learning, Pedagogical Design, Instructional Design, Complementing Face-to-Face, Golden Triangle of Learning Engagement, Learning Motivation, Learning Engagement, Learning Experiences, Protostar Education.

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1. Introduction

The unexpected suspension of classes in the schools during the pandemic changed the way the students learned. The emergency shift of learning from face-to-face mode to online mode led to problems in teaching and learning. With the sudden change, the instructors were prevented from undertaking the careful design process required for high-quality online learning (Branch & Dousay, 2015). Without the redesign of teaching and learning of the students from the classroom to the online environment, the students were found less motivated to learn (Masda Surti & Ramot, 2021).

When shifting classroom learning to online learning, the learning instruction and activities should be redesigned (Webster & Murphy, 2008). Chuah (2006) conducted a case study on a redesigned face-to-face course to build in the component of an online learning experience and showed the pedagogical approaches could help when moving teaching and learning online with the redesign of instructional materials, assessment, and presentation and support. With appropriate redesign of the course, both learning engagement and learning motivation could be improved (Theodosiou & Corbin, 2020 and (Masda Surti & Ramot, 2021).

In online learning, synchronous features are important as they enhance the flexibility and convenience of the courses (Mason & Rennie, 2006). In addition to the change during the synchronous online classes, Lam (2014) suggested that preparation before classes and reinforcement and assessment after classes are also crucial. As a result, when redesigning the course to complement face-to-face learning with online learning, a pedagogical perspective of online learning that includes instructional design, learner-centred learning, interactive learning content, and assessment, should be considered (Lam, 2014).

2. The Research

During the design and development of online English learning courses for youth and children, Protostar Education, based on the Common Core State Standards (CCSS) and local school standards, redesigned the curriculum and instruction to maximise teaching and learning effectiveness in online English learning. The school proposed and adopted a framework of “Effective Exposure Time” (EET), which is defined under the social learning theory as exposure time in formal and informal learning environments to learn English as a Foreign Language (EFL) from others who are more knowledgeable in the Zone of Proximal Development (ZPD)” (Chen, 2018). Under the EET framework, the school further designed the RITA model to include the learning activities of “Raise questions” (R), “Interaction” (I), “Task extension” (T), and Assessment (A) for effective teaching and learning. As of 2022, Protostar Education has provided more than 100,000 live classes to students in Asia and Pacific regions which include Shanghai, Hong Kong, Korea, Taiwan, Macao, Japan, Singapore, and Thailand. To understand the learning experiences of the students, Protostar Education has conducted research with the students in a secondary school in Hong Kong.

The aim of the research is to understand the learning experiences of the students taking the online course with pedagogical redesign for complementing formal face-to-face learning. Among all of the online English learning students, four students who had learnt in Protostar Education for more than one year were chosen to be studied. The students were from the same local school in Hong Kong. Consents for conducting the research were obtained from both the local school and the parents. The parents of the selected students, who decided to join the course and observed how the students learnt in the course, were interviewed

individually in a semi-structured way. Questions were asked based on an interview guide prepared with 16 questions in 5 categories. These categories included questions about the students' learning, students' engagement, teachers' engagement, difficulties in online learning, and expectations in online learning. After conducting the interviews in mid-2022, thematic analysis (Braun and Clarke, 2006) was used for data analysis of this research.

3. Analysis and Findings

In the thematic analysis, the initial thematic map, developed thematic map, and final thematic map were developed (Braun and Wilkinson, 2003). The final thematic map with 7 themes and 40 sub-themes were identified. The 7 themes and the major sub-themes will be discussed below. The students are represented in Student A, B, C and D. The frequencies of the sub-themes recorded are marked in the brackets after the sub-themes.

Theme 1: Students Engaged in Online Learning

All the students engaged in online learning as they are with sub-themes "happy (5), liked (3), enjoyed (3), actively (6), willing to speak (4), understood (1), helped (3) interaction (4), confident (3) and engaged (1)". All four students were engaged in the online learning, according to their parents' observation.

A: "He liked the online class. He entered the online classroom by himself on time and sat patiently to learn throughout the class. He actively did the exercises after the class."

B: "She is studying in a Chinese School and seldom talk in English. With more than one year's online learning with native English-speaking teacher, her oral improved a lot. She can speak in English with confident now and is willing to speak in the English class. She even actively talked to her sister in English at home. As her oral English improved, her teacher recommended her to join the English drama activity."

C: "She engaged in online English learning and enjoyed the classes. She interacted with the teacher happily with fun in the classes. Her confident in English speaking was increased and her fluency was improved."

D: "He liked and longed for attending the online class. When the class starts, he went to the online classroom actively."

Students in general enjoyed the classes and felt happy about them. It resulted in them being willing to speak and perform actively to interact and engage in the classes.

Theme 2: Students Learnt from the Online Class

All four of the students learnt from the online classes. This learning was most evident in the following areas: grammar (4), vocabulary (2), speaking/oral (7) and examination/assessment (4)". Below are some of the conversations which show what they learnt and what the results were.

A: "His English was improved after learning from the online class. The improvement was reflected in his Examination results."

A: "He had chances to speak English more in the online classes. As a result, he was no longer afraid of speaking in English now."

B: "Her improvement reflected from the result in examination. She got higher marks in English subject."

D: "Before studying in the course, he did not willing to talk in English as he afraid he spoke wrongly. After joining the course, he began to talk more in English as his confidence was developed with his improved fluency. The course helped him a lot!"

D: "After a year of online English learning, his academic result of English subject was highly increased. It reflected in his marks in English subject examination."

After attending the online class which complemented the formal face-to-face class, the students' speaking/oral and grammar were improved. This was reflected in their confidence in speaking English and the results on the examinations.

Theme 3: Students Learnt from Pre-Class and Post-Class Activities

It was found that the students learnt from pre-class and post-class activities via "reading books (3) and doing homework (4)". Below are the examples of how the students learnt from these activities.

A: "Homework reinforced his English learning. He did homework after class. He even searched the websites to obtain further knowledge for completing his homework."

B: "She read the online books before classes and she actively finished the homework after class."

D: "He actively did all the homework by himself. He never missed any as he liked learning in the course!"

The pre-class and post-class activities were the learning activities developed using pedagogical design. With the learning initiative driven by online classes, students demonstrated self-directed learning to acquire further knowledge from non-prescribed sources for continuous learning.

Theme 4: Online Learning and Face-to-Face Learning

For the questions on comparing and complementing online learning and formal face-to-face learning in the school's classroom, the sub-themes identified were "complement (4), spelling (1), examination (1) and native teacher (6)".

A: "He learnt grammar and speaking in online class. It complemented his face-to-face learning which he has less chance to speak and with more chance to learning the spelling of English words."

B: "In face-to-face learning environment, she felt nervous when facing the teacher in person. In online learning environment, she felt more relax and was willing to speak more. Learning in both environments helped her to learn indeed but in different ways."

D: “Online learning complemented face-to-face learning’s limitation. It is hard to have native speaking English teacher in the physical school for him to learn the native accent.”

The most important point in regards to online learning complementing face-to-face learning was that the parents found their children could really learn with the native teachers who were living and teaching in English-speaking countries at the same time. The increased interaction time with these native teachers helped the students to learn English.

Theme 5: Teachers’ Instructions and Interactions are Important

For questions regarding teachers, it was found that teachers’ instructions and their interactions with the students are important. The sub-themes include “fun (2), patient (1), encourage (4), feedback (3), interaction (6), explain (4), native (2) and attention (1)”. In one case, the student did not raise his questions but the teacher realised it and actively explained to the students:

A: “He understood the learning contents and the teacher explained to him appropriately most of the time. However, occasionally when he did not understand, the teachers sometimes did not realise and therefore did not explain to him.”

R: “Have the student or you raise this problem to the teacher?”

A: “No, we didn’t. Surprisingly, the teacher realised his problem and explained to him actively.”

From other cases, the teachers also had clear instructions and were able to encourage interactions with the students.

B: “When she felt puzzled in the class and not answered the teacher’s question, the teacher helped and explained to her.”

C: “In online learning, the teacher encouraged her to answer the question and gave sufficient time for her to think and join the conversation. She understood she had to answer the teacher’s question and therefore, she paid attention to the classes.”

It was found that students or parents might not ask for help when the students do not understand. From these cases, teachers acted actively to ask if the students understood or had any questions more frequently. The role of the teacher, especially in giving teaching instructions and encouraging interaction, is important in online learning.

Theme 6: Difficulties in Online Learning

Students found difficulties in online learning. For learning related difficulties, they “need time to adapt (1), found teachers did not explain clearly (1), felt nervous (1) and found class too long (1)”.

A: “He took about half year to adapt the online class. At the beginning, he rejected to attend the online class. Gradually, with familiarized with the learning environment and way of learning, he began to enjoy the classes... Now, he actively attended the class by himself and finish the after-class homework by himself.”

A: "He felt nervous when he did not know how to answer the questions from the teacher in English. This improved when he familiarized with the class. He used his cell phone to search for the meaning of some English words to help him answering the teacher's questions."

B: "The online classes were scheduled in dinner time. We understood there were limitations like matching teacher and other classmates' time. The course helped her English learning a lot and we would continue the class even the time could not be changed."

For technical issues, the sub-themes are "uploading files (1), using the system (1), no sound (1), solved by themselves (2) and connection problems (2)".

A: "In one class, there was no sound heard. The teacher fixed the problem later and the class was continued. No other technical issues were found."

A: "He accessed the system by himself for the classes. After he finished his homework, he could upload it to the system without difficulties."

B: "Once the system was unable but she could continue the class after several times of re-logged in. She could solve technical problem by herself."

C: "Sometimes, Internet connection was poor and the teacher could not hear what she said."

Unlike studies performed in the past decade, technical issues became less significant for the new generation of both students and teachers. They could use the systems effectively and could solve technical issues by themselves.

Theme 7: Uniqueness of Online Learning

The parents found that the uniqueness of online learning can help to complement the students' face-to-face learning. The sub-themes identified are "native (5), international (4) and online support (1)".

A: "He could learn from teachers living in US in the online learning environment."

A: "His classmates were living in other countries, for example, Korea. It made me feel he was learning in an international school. They interact and learn from each other."

B: "Besides receiving notices via WhatsApp before class, the Class Teacher will contact us via WhatsApp if we did not attend the class on-time so we would not miss the classes. It is helpful!"

D: "We have tried nearly all other online English learning's school. Most of their problems are without curriculum design and teachers were from non-native English-speaking countries. It is hard to find a school with quality education provision."

Besides the advantages of learning from the native teachers who are living and teaching in the English-speaking countries which was discussed in the prior section, the parents found they had classmates from other countries or regions in the online class. Even though the students are having formal learning in a local school, they can experience the learning environment like an international school.

4. Discussion

It is concluded from the results of the thematic analysis that the most important elements in performing the redesign of online learning for complementing formal face-to-face learning are: (1) learning activities; (2) interactions; and (3) assessments. Figure 1 shows the “Golden Triangle of Learning Engagement.”

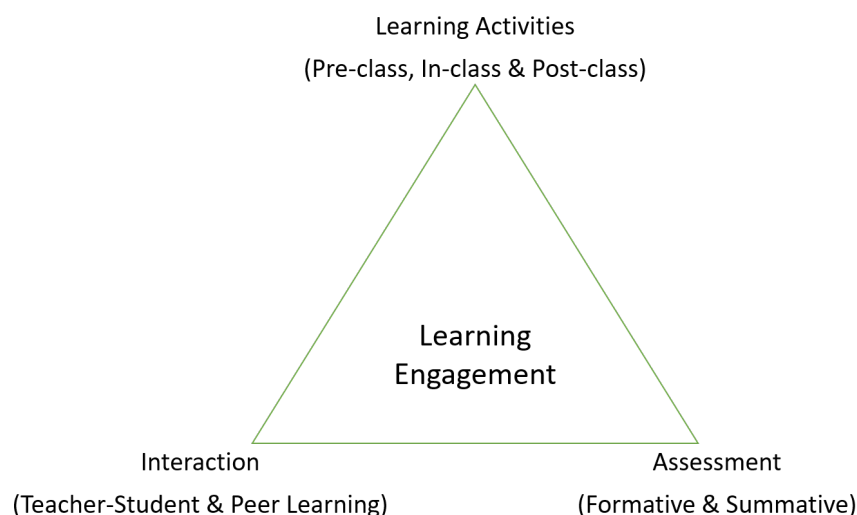


Figure 1. Golden Triangle of Learning Engagement in Online Learning

In the golden triangle of learning engagement in online learning, the design of learning activities includes pre-class, in-class and post-class activities. Pre-class activities provide the students with an initial idea on what is going to be taught in the classes. With prior knowledge of the class, the teacher can spend much more time interacting with the students in the class. For in-class activities, the design should be interactive and interesting enough to attract the students' attention. To reinforce in-class learning, post-class activities should be designed appropriately to align with the concepts the students learnt in the class.

Interaction in the online environment is crucial in enhancing the learning engagement of the students. In most situations, educators focus on the teacher-student interaction which can be achieved by training the teachers to encourage the students to answer the questions, to ask the questions, and to discuss and reflect. As in the effective online classes, the number of students is usually limited to a small number. In the case of Protostar Education, the maximum number of students is 4. It leads to an environment in which students can communicate and interact with other students more easily. With careful instructional design, the students can interact with other students and learn via peer learning.

Assessment helps to measure the learning of the students. Besides formative assessment, which was conducted in the format of a post-class activity after each of the classes, the school can conduct summative assessments to measure the learning of the students over a period. For example, in this case, Protostar Education uses Star Reading by Renaissance (SR Test) to administer summative assessments to the students. Since the students learnt with the design of the course based on CCSS and with classes taught by native teachers in overseas countries, they used the same assessment used for assessing the English abilities of native English-speaking students. In the school's provisional studies, the students' assessment results are promising. The assessment of using the SR test for Protostar Education students' online English learning will be further studied as an extension of this research.

5. Conclusions

The seven themes found in this research are: (1) students engaged in online learning; (2) students learnt from the online class; (3) students learnt from pre-class and post-class activities; (4) online learning and face-to-face learning; (5) teachers' instructions and interactions are important; (6) difficulties in online learning; and (7) uniqueness of online learning.

From consolidating the results of the themes and sub-themes, it was found that the most important elements in redesigning the online course to complement formal face-to-face courses in order to enhance learning engagement are (1) learning activities (pre-class, in-class, and post-class); (2) interactions (teacher-student and peer-learning); and (3) assessments (formative and summative). A golden triangle of learning engagement was developed with these important elements.

One of the biggest advantages of qualitative research with individual interviews is that in-depth data can be collected. However, the limitation is the small number of samples. After this study, the results can be used as the scope of conducting large scale quantitative research. In addition, further studies can be conducted in the area of summative assessment using the SR test to analyse the effectiveness of this thoughtfully redesigned online learning course.

The research results show learning experiences were enhanced via appropriate redesign of interaction, learning activities, and assessments. The students were highly motivated in the online learning environment, and they enjoyed the learning content and learning activities. Both learning experiences and learning effectiveness were enhanced. This study result affirms positive impacts from the redesign of pedagogy in online learning of English for complementing formal face-to-face learning.

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On Space, On Place: Emerging Tamaraw Identity – The Lived Experience Journey of Communication Students

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Abstract

The FEU Learning Journey provides a more formal structure that will capacitate students to navigate their academic lifecycle and prepare for career and life goals. It also integrates selected curricular and co-curricular activities as critical components of the students' holistic development. The Student Life Cycle Model (Lizzio & Wilson, 2010) framed the analysis, where purpose (goal after university; capability (curriculum, co-curriculum), culture (school pride and system), and connected (relationships) were examined. Using multiple methods of qualitative inquiry of concept maps and narrative analysis of the lived experiences of FEU students, this paper focused on identifying the Emerging Identity of the Tamaraw highlighting conceived space, spatial practices and experiences that provided sources of insights to be valued and examined closely. Findings of the study indicated that academic policies (conceived space), practices (spatial practices) and experiences (lived space) are realized as comprehensive components of space (Lefebvre, 1991). The Tamaraw identity – optimistic and confident with a strong sense of self, is techno-literate, a team player with a sense of civic duty resonates with the FEU core values of Fortitude, Excellence and Uprightness. This identity were reinforced in certain spaces where the sense of belongingness to the community is evidently felt. Interactions and communication exchanges in these spaces also contributed to the acculturation process. The narrative accounts and concept maps offered "unique sources of insight to be valued and examined" (Tillmann-Healy & Kiesinger, 2001, p. 82).

Keywords: Narratives on Lived Experiences, Student Life Cycle Model, Emerging Tamaraw Identity

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Introduction

Academic identity, defined by Clegg (2008), is “part of the lived complexity of a person’s project and their ways of being in those sites which are constituted as being part of the academic” (p. 329). McAlpine and Asghar (2010) suggest that the notion can be generally understood as the sense of being and becoming academic that one feels when one participates in collective academic practices. Pursuing the same line of reasoning, Mahlomaholo (2009) agrees that the term indicates values, attitudes, beliefs, behaviors, and other responsibilities required by the role of an academic who presumably works in higher education and carries out duties including research, teaching, and community service.

In higher education in general, and education in particular, space matters in the construction of academic identity (Madikizela-Madiya & Le Roux, 2017). Yet, while prior literature on the construction of academic identity among students tends to focus on the what and the how, and employs sociocultural, social network, socialization, or identities theories to investigate the issue, space, or the where, seems to be less problematized. In other words, not much prior literature has considered the significance of space and place, I would argue, in shaping local and international students’ identity, even though identities are formed and “continually reworked, contested and reproduced” in and through space (Shome, 2003, p. 43).

At the Far Eastern University, The Communication students’ Learning Journey provides a more formal structure that will capacitate students to navigate their academic lifecycle and prepare for career and life goals. It also integrates selected curricular and co-curricular activities as critical components of the students’ holistic development. The rationale for the FLJ is guided by the following:

1. Support the students’ constellation of evolving identities, needs and purposes.
2. Engage in learning opportunities , support services and intervention programs towards holistic development.
3. Provide inclusive, collaborative, capacitating and transformative school environment.

The Statement of the Problem

GENERAL: The study investigated how the Tamaraw Identity emerged on space and on place in the lived experiences of the Communication student Learning Journey.

SPECIFIC: Research Question # 1: What are the commonalities in conceived spaces (academic policies) in the categorized themes of students’ lived experiences within the inclusive period of AY 2020-2021 and 2021-2022?

Research Question # 2: How do they understand the meanings behind capability (curriculum and co-curriculum) in the lived experiences of students from AY 2020-2022?

Research Question # 3: What is the distinction in culture (school pride and system) evident in the meanings of the students’ lived experiences from 2011-2021?

Research Question # 4: How do they understand these distinctions in terms of connected (relationships)?

Significance of the Study

The study is significant to these stakeholders:

- The FEU Administrators: The study is relevant in understanding perspectives of the students in your learning journey that may provide inputs to improve efficiency and effectiveness of the learning processes.
- The Communication majors: The study is relevant in terms of developing their character aligned to the core values of Fortitude, Excellence and Uprightness to better equip them for gainful employment, not as followers but as leaders.
- The Communication scholars of Space and Place: The study situates its mixed qualitative analysis correlated with space and place and shall add to the scholarship in its examination of the study's variables.

Literature Review

Zucker (1959: 3), refers to space here is generally going to be used in relation to a 'three-dimensional expansion of any kind' and more specifically, as a scene for social life, formed by physical factors with their different dimensions, proportions and special features (monuments, fountains etc.). This is what Hillier (2008: 217) refers to as real space, meaning the shaped and interconnected spaces that people occupy in their everyday lives, as this is the level at which the relationship between the physical environment and social behavior and outcomes can be tested. Therefore, the container theory of space is adopted, according to which space is the scene on which the world proceeds, rather than relational one, that views space as a product of the relations between objects (Thrift 2009: 96).

What begins as an undifferentiated space becomes a place as we get to know it better and endow it with value.' (Tuan 1977: 6)

It is not an easy task to pinpoint the meaning of a word that is actually a definition in itself. However, understanding the concept of place, as well as how places are created or redefined in order to serve a specific social purpose, is crucial for city planning, management and even communication scholars.

Human geographers are generally in agreement that place exists in the context of space. While place is abstract, 'amorphous and intangible' (Relph 1980: 2), the concept of place is more concrete, charged with emotions and beliefs. The social practices of a particular society, the meaning that people assign to different objects and the way these objects are symbolized 'beyond their basic presence' (Madanipour et al. 2001: 158), is what gives places a certain meaning and turns them into 'centers of felt value' (Tuan 1977:4). Friedmann (2010: 154) argues for a more inside-out perspective on place, using the viewpoint of those who exploit and transform it. A place, according to him, is a 'small, three-dimensional space that is cherished by the people who inhabit it'. His definition also implies a distinguishment between space and place as between abstract and concrete, unemotional and emotional. Despite their opposing natures, it is clear that defining place would be impossible without using the concept of space.

The Role of place for everyday life and identity

Often when discussing place, the issue of everyday life comes up, as a place consists of ‘daily rhythms of being’ and is an important part of the process of interaction between people (Thrift 2009: 103). In the words of Relph (1976: 34), ‘people are their place and place is its people’, pointing out the mutual dependence between people and their environment, how they influence and create each other and the way in which places are deeply embedded in our everyday lives. As Sztompka (2008: 1) puts it, everyday life is a ‘seemingly trivial phenomenon’ and would have not been regarded as a scientific issue a couple of decades ago. However, today everyday life, together with the influence that places have on people and their identity, is of considerable interest to planners, architects, designers etc. Even though everyday life comprises both the private and the public domain, here it is discussed in the context of public spaces.

Despite the fact that we live in a highly mobile, technological and constantly changing world, Perkins and Thorns (2012: 2) argue that place and the local context continue to play an important role for designing everyday life. Places, according to them, cannot be regarded just as locations, but rather as ‘the center of everyday life’ (ibid: 14) that people gradually endow with value and form a close relationship with. This bond is described by Tuan (1976: 56) with the term ‘topophilia’, referring to the way everyday activities form a close connection with the physical environment. In more concrete terms, such activities include shopping and running different errands, having close access to work and school, as well as a well-functioning transport system, while at the same time feeling safe and having the opportunity to influence one’s closest environment (Boverkett 1999: 32). As argued by Lilja (2000: 2), apart from improving living conditions and facilitating everyday activities, the built environment can also worsen and hinder them. She expresses a concern that surrounds the notion of everyday life today, as it cannot successfully manage to assert its position in the planning process. What is needed, especially in the context of the suburbs, is filling the gap between planners’ intentions and actions on the one hand, and knowledge on everyday life.

As far as identity is concerned, following the example of Relph (1976: 45), a distinction should be made between ‘identity of’ and ‘identity with’. The identity of a place refers to the features that distinguish it from other places, but what is more important for the current discussion is the identity that a person or a group has with a place, to what degree they are attached to it and how they experience it (for example, as an outsider or an insider). Identity, according to Lilja (1995: 54), can exist in an ethical, space and time dimension; it is something that arises as a result of our search for meaning in everyday life and establishes a connection between past, present and future, as well as a relation between a person and the physical environment, both built and natural.

Identity, she continues, is shaped in connection to everyday events; our appropriation of places and the relations we establish with other people in the context of the physical environment results in a process of ‘meaning creation’. In their study on Hökarängen square, Borén and Koch (2009: 8,9) also touch upon the issue and point out that the degree to which people identify and connect themselves with places vary, but can be strengthened by improving the functions of the place and its usefulness.

Identity refers to “abiding qualities [that] individuate and allow us to recognize individuals, categories, [and] groups” (Wiley, 1994, p.130). It is constituted through an amalgamation of experiences, memories, perceptions, and actions (Marginson, 2014). While identities

encompass a “feeling of biographical continuity” (Giddens, 1991, p. 54), they are also malleable over time and negotiated across contexts (Stewart, 2008). Indeed, sociologists and psychologists have highlighted how identity negotiation is enacted in and through social interactions, as well as through processes of self-presentation (Lawler, 2013; Swann & Bosson, 2008).

The study investigates how the Tamaraw Identity emerged on space and on place in the lived experiences of the Communication students’ Learning Journey.

The Theoretical Framework

The Student Life Cycle Model (Lizzio & Wilson, 2010) describes the five aspects of student success. The lifecycle model suggests that successful transition into university is predicted by five core aspects: capability, purpose, resourcefulness, connectedness & culture.



Figure 1: The Five Senses of Successful Transition

Source: <https://www.csusm.edu.com>

This model has a strong evidence base and has been used to predict first year retention and academic performance (Lizzio & Wilson, 2010). The TiTo project used the model as a framework for understanding both the transition of first year students into the program and third year students as they transition out and prepare for further work or study. Focus was on the five senses as presented in the table below:

Five senses	First year mentees	Third year mentors
Connectedness	develop connection with colleagues through facilitated small group activities	develop connection with other third year colleagues, helping facilitate an alumni community
Capability	build capability (course knowledge) by guiding students through the first assessment task	build capability by enhancing not only academic skills, but the graduate attributes identified as important by employers, industry groups, and our professional body
Purpose	explore their sense of purpose, helping first year students work out why they are university and articulate their personal goals	explore their sense of purpose, helping third year students articulate their career goals and clarify their commitment to further study after graduation
Resourcefulness	develop resourcefulness by learning effective time management, interdependent learning and help seeking skills	develop resourcefulness, learning effective time management, interdependent learning and help seeking skills
Academic culture	learn about academic culture, including academic integrity, from a later year colleague who has successfully navigated the terrain	embed themselves in the academic culture by connecting more meaningfully with the staff and students of the discipline and develop a sense of professional identity

Figure 2 The TiTo Project
Source: <https://www.csusm.edu.com>

The Conceptual Framework

From the theoretical framework presented above, the following conceptual model was adopted to frame the analysis of the study.

The Student Life Cycle Model (Lizzio & Wilson, 2010) framed the analysis, where purpose (goal after university; capability (curriculum, co-curriculum), culture (school pride and system), and connected (relationships) were examined.

In this model, surveys and FGDs with student leaders, non-student leaders, scholars, students with failing grades, students from the LGBT group, and alumni were conducted. The results were merged with the Student Lifecycle Model focusing on these components:

- (1) Purpose (goal after the university),
- (2) Capability (curriculum, co-curriculum),
- (3) Resourcefulness (handling changes and challenges),
- (4) Connectedness (relationships in and outside the university), and
- (5) Culture (school pride and system).

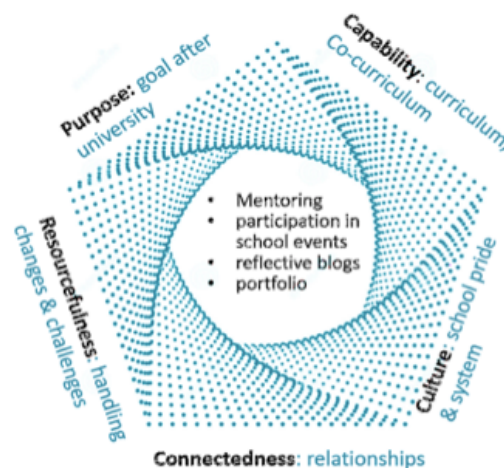


Figure 3. FEU Learning Journey Model based on Lizzio and Wilson, 2010

Design and Methodology

This study adopts a phenomenological perspective to understand the internal meaning of being a Tamaraw student. A phenomenological perspective gives participants a chance to present the shared meanings of their experiences (Creswell, 2002), by telling their stories freely and explaining their lived experiences deeply (Moustakas, 1994). The history of phenomenology started with Edmund Husserl, a German mathematician. In his extensive writings, Husserl emphasized many points of philosophical underpinnings of phenomenology. “Researchers search for the essential or central underlying meaning of the experience and emphasize the intentionality of consciousness where experiences contain both the outward appearance and inward consciousness based on memory, image, and meaning” (Lincoln & Guba, 1985). As the purpose of this study is to explore and understand the lived experiences of communication students in a university, a phenomenological design is the most appropriate method because it allows researcher to describe the lived experiences of participants in depth through the narrative analysis.

Participants

One Hundred participants were selected with a snowball sampling method. The students narratives were coordinated through the Office of the Assistant Vice-President for Students services, as they had repository of all FLJ learning journals. Participants in the study were mostly First Year students. Far eastern University, is one of the prominent universities in the University belt area and commonly known as Tamaraws.

Data Collection

Data were collected using a link sent by the Student Services Division of the University using semi-structured questions to be answered in narrative writing format which comprises data about academic policies, curriculum and co-curriculum and school pride and system.

Data Analysis

Data collection and analysis are interrelated processes (Corbin & Strauss, 1990), so it is critical to make coherent arrangements. An inductive narrative analysis approach, which moves from the specific to the general by emerging themes or categories from the data

(Patton, 2002). Technically, Six steps to analyze and interpret the data as Smith et al. (2009) . After the verification and confirmation of transcripts, data was shared into NVivo 8, (QSR International Inc., United States) to create initial codes and make patterns visible with free and tree modes. In Step 2, important parts of the text were highlighted and examined to find connections and patterns by assigning to the codes in the third step. By doing so, the package program allowed me to organize codes and themes by seeking connections across them in the fourth step. A colleague was invited to check codes and themes generated in the analysis. After member checking, The list of themes and formed categories, which were clustered around themes, corresponding to the literature review and the research purpose. Then, I chose quotations that demonstrated the themes based on participants' lived experiences to help readers understand the whole context. Finally, Identified key themes in the whole data and explored connections between emergent findings and existing literature.

Results

These themes were identified from the narratives of the participants' lived experiences through the process: (a) lived experiences relating to academic policies (b) meanings behind capability (curriculum and co-curriculum) in the lived experiences of students, (c) distinction in culture (school pride and system) evident in the meanings of the students' lived experiences and (d) how they understand these distinction in terms of connected relationships. These themes reflect what participants lived socially and academically through their first or second year of study at that city and university. Table 2 presents the main and subthemes of the data.

Table 1 Data Themes and Sub-themes

Main themes	Sub Themes
Lived experiences relating to academic policy	<ul style="list-style-type: none"> • A sense of familiarity
	<ul style="list-style-type: none"> • Holistic
Meanings behind capability (curriculum and co-curriculum)	<ul style="list-style-type: none"> • Opportunities for student engagement
	<ul style="list-style-type: none"> • Coherent
	<ul style="list-style-type: none"> • Perceived relevance to future career
School pride and system	<ul style="list-style-type: none"> • Empowering
	<ul style="list-style-type: none"> • Diversity
	<ul style="list-style-type: none"> • Leadership
Connected relationships	<ul style="list-style-type: none"> • Enriching
	<ul style="list-style-type: none"> • Complimentary

Lived Experiences relating to academic policy

Within the theme of lived experiences, most of the participants had positive experiences, while there were narratives that pointed to some negative ones. Indeed, the pandemic altered learning processes from face-to-face modality to virtual online classes. This too affected the student life' journey.

In terms of your academics, you should focus more on how you can study effectively. Knowing your own study pacing and schedule may be hard as there are many possibilities but after finding it out, I am telling you, your life will be put at ease. It will take a lot of trial and error, and attempts to find out during what time you are most productive but after finding it on your study habit will be more effective as you become efficient. Most especially that studying and working on your requirement is in different terms. I suggest that you do your task in the times that you are effectively working while for the free time on waiting for that time to pass/get to is to study. Weekly exams are inevitable in your course so having a schedule for it may help in following your lessons.

It's been one year and one semester has passed when I enter the school far eastern university. College life always has many challenges both physically and mentally. I hope to experience going to school in manila and be like other college students are doing but when the pandemic happened our life become messy. The normal way of studying and living has changed to cope with the pandemic. Many challenges arise and some solutions open up to continue our study.

(Respondent # 24)

Meaning behind Capability (curriculum and Co-curriculum)

Abstracting the meanings behind capability where capability here refers to the educational institutions' physical assets and manpower to offer quality education.

FEU offers lots of opportunities for students to join to, however, you must not forget that the university also promotes a healthy environment for us to work to. Moreover, if ever you needed help regarding your mental health, I am here to tell you that it's totally okay to seek help from FEU Guidance and Counseling, as they offer help enhance the students' holistic development by offering counselling services. Remember, it's okay to seek help. You are not alone. It's definitely much better for you to have someone to talk to, rather than using academics to distract you from feeling sad. It's okay not to be okay, and I hope that despite the hardships that you will go through, you will continue to find the joy of college life.

(Respondent # 85)

School Pride and System

This theme school pride and system in particular, refers to the culture in FEU where career pathing of its students become a priority.

College is where you will meet new faces that some of them you will only meet once and others are for forever. In here, you will experience a lot more advance that you had during your younger academic years but with hard work, I know you will get through it. Any coping advice would start with you being ready mentally and physically as freshmen year is where you build yourself and go beyond your zone with not only meeting other people but collaborating with them to, there's a saying from way back 17th century by poet John Donne, "no man is an island" that this quote is very relevant when you go start university as there would be a time that you really had to and would be thankful to be with someone or a group of people to share your

sentiments and rants with. Having strong support system helps as well for easily coping with new environment and incoming stress and work load as a freshman. Based on my experience so far, I have been in our university grounds for 2 years, physically when there was still face to face classes, since my Senior high school classrooms were located at the Accounting (IABF) and Nursing (NB). I can say that my SHS was a blast and I did not regret coming in FEU. Our university has a very welcoming vibe and what I like about it, since I was born and raised in the province, is that outside the school there are a lot of things like traffic, pollution and more but when you go inside the campus, you are welcomed with trees that gives you relaxing vibes.

(Respondent # 69)

Connected Relationships

As regard the theme connected relationships, this is both within and outside the academic institution.

There will be people both your classmates and professors who will bring you down and want you to give up please do not run away. I know that there have been a lot of events that have happened but I do want you to take your time before making a decision. Take some time to settle down and calm yourself first, then contemplate on your next step as this will be the future that you are planning. During these situations it is better to let all your frustration out– knowing you first take a day or 2 contemplating personally, not talking to anyone and is not in a mood to converse then after settling sharing how you are at your lowest and that of your experience. Sharing it with your friends actually helps in organizing and seeing from a perspective that you cannot see. Upon talking to your friends always seek advice on your decisions and opinion but the final decision is always yours.

(Respondent # 37)

Discussion

A ‘sense of familiarity’, refers to experiences recalled in recognition that we know something. Familiar things can make it easier to access and understand new knowledge, if things are completely unfamiliar the task of learning may become very difficult or potentially impossible. The students in this study revealed that familiar aspects of the first-year curriculum supported their experiences of learning. Features similar to students’ experiences of schooling enhanced familiarity as did smaller class sizes. The opportunity to focus on one subject and make friends was also recognized.

The inclusion of familiar people such as family and a welcome from the Colleges and other social activities were seen by the students to be integral to their learning journey. It helped them to ‘settle in’. The intentional involvement of mentor students was also welcome.

Mentors supported students to navigate the library, so they could become familiar with the physical environment of the university. Other students also purposefully assisted in the learning process.

When talking about their experiences of curriculum the students recognized the contribution that leadership played in their learning. This was evident in course coordination and the

knowledge required to structure a course. When asked to consider the extent to which the structure and management of their course supported experiences of learning, many responded with most likely.

This idea is reinforced by Kinchin (2011), who comments that revealing, ‘the “big picture” of the subject [course], as well as the details within it’ are important for student learning and the extent to which they can move, ‘between these perspectives is an indicator of depth of understanding and developing expertise’ (p. 186). With regard to coherence between subjects in a course, Schmidt et al. (2005) suggests that there is a structure to different disciplines that should be respected. Muller and Young (2019, p. 10) also comment that if the course does not, ‘signal these different conceptual logics clearly enough, incoherence will be the result...coherence is critical for understanding and learning’ and when grasped by learners they feel empowered. Deng (2015).

School pride and system is “culture” prevalent in the university. The Far Eastern University has been recognized World Universities with Real Impact (WURI) Ranking for 2020, placing 91st in the Global Top 100 Innovative Universities. Complementary activities, support staff and extra-curricular activities enabled the students to make the most of the opportunities for learning in their first year of study. Students in possession of a Scholarship indicated that while participation in extra-curricular activities was a requirement of their scholarship they too found the experience to be beneficial and positive.

Conclusion

The rationale of the FLJ learning journey is to support students’ constellation of evolving identities, needs and purposes. Hence, students have learning opportunities to engage in, support services and intervention programs towards holistic development The university provides inclusive, collaborative, capacitating and transformative school environment.

From this study, following the various themes and sub-themes arrived, one can surmise that the Tamaraw identity is marked by purpose, driven by capability and supported by resourcefulness in handling challenges. Connectedness or relationships develop as one navigates their 4 year stay in the university – their curricular, co-curricular, the academic support and services, career and counselling, all contributes to shaping the Tamaraw as brave, resilient, with fortitude and excellence.

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***Democratic Citizenship in the Formal Civic Education in Albania:
Assessment of Curriculum and Teaching of Democratic Citizenship in
Pre-University Education***

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Abstract

The education system in Albania has undergone a series of reforms intended to modernize the curriculum, develop the wider system capacities, expand access to compulsory education, and align its education policies and practice with European and international standards, in particular the European Union's Education Benchmarks for 2020 and UN SDG4-Education 2030. In this context Albania is experiencing a renewed engagement in democratic citizenship education and promoting democratic school governance. The situation of civic education in the pre-university education system has improved. However, there is still work to be done, in particular, in terms of increasing the importance and space devoted to EDC/HRE, improving the quality of textbooks, teacher training, and strengthening the role and cooperation of all actors. The transition to competence-based curricula marked a positive change, but in order to duly implement it, teachers must become creative and teach interactively to enable students to contextualize information, knowledge and values as individuals and as part of the community. In the process of implementing this curriculum in school, teachers generally rely on books, without trying to use materials that make the teaching process as attractive as possible. Also, the importance given to EDC/HRE by schools, teachers and parents, as well as the space that the relevant subjects have in the education program are not enough. Most of the conclusions of this analysis can be addressed through continuous teacher training, which brings rapid results in filling gaps in learning objectives.

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Introduction

The future of our society is very much related to the education provided to children and to what they learn at school on human rights and the rule of law, their rights and responsibilities, participation and affiliation, respect for diversity, etc. Therefore, the continuous improvement of the educational content and in particular of democratic citizenship-related subjects contributes to equipping pupils and learners with the knowledge, skills, attitudes and values of competent citizens.

This analysis attempts to identify how the set of practices and activities constituting education for democratic citizenship (EDC) have been reflected in the Albanian formal education system by reviewing the citizenship education-related curriculum and learning objectives of selected subjects dealing with citizenship education in grades 1 to 12 and their alignment with CoE standards and practices, including the Council of Europe Charter on Education for Democratic Citizenship and Human Rights Education (HRE), the Council of Europe Recommendation CM/Rec (2007) on gender mainstreaming in education and Reference Framework of Competences of Democratic Culture.

The alignment of democratic citizenship education in Albania with CoE standards contributes not only to the Albanian society as a whole but also to pursuing the goal of the CoE towards greater unity among its member through actions in the cultural and education field.

Methodology

The purpose of the research was to assess the level of democratic citizenship in formal civic education by reviewing the curriculum and learning objectives of subjects dealing with civic education in formal education in Albania.

The research methodology aimed to respond to the following research questions:

- Does the level of democratic citizenship education in Albania comply with CoE standards and practices?
Activities:
 - ✓ Review the curriculum, textbooks and learning objectives of the selected subjects dealing with citizenship education in grades 1 to 12. The curricula and learning objectives of the subjects of Citizenship, Philosophy and Sociology were assessed in terms of their alignment with CoE standards and practices.
 - ✓ Appraise textbooks' content, language and illustrations from a gender perspective due to the great importance of gender mainstreaming and non-stereotyped inclusive education.
- What are the gaps and how can they be addressed to ensure further alignment with CoE standards and practices? What are the opportunities and challenges?
Activities:
 - ✓ Identify the non-compliant aspects and the challenges in improving the situation.
 - ✓ Recommend the most feasible interventions to ensure further compliance with CoE standards and practices.

The research methodology used mixed methods involving desk-based research and interviews with key stakeholders. The desk research consisted of a review of previous studies, reference

documents and textbooks for the subjects of Citizenship taught in grades 1-10, Philosophy taught in the 11th grade and Sociology taught in the 12th grade. Studying the CoE documents served to draw the standards and practices towards which the curriculum review and learning objectives have been assessed. Content analysis methods were used for a deeper understanding of learning objectives, curricula structure, aims, content and epistemology.

The communication, consultation, and exchange with stakeholders involved different actors including officials at the Ministry of Education, Sports and Youth, the Agency for Quality Assurance for Pre-university Education, EDC-related subject teachers and authors of texts of “Citizenship” subjects as well as parents and pupils of primary and secondary education. 35 interviews were conducted with education experts, authors of textbooks and parents through mixed methods of communication. Parents were reached through questionnaires.

Results and discussion

Pursuant to the CoE Charter on EDC and HRE, the development of local policies, legislation but also their implementation to practice should be guided by the concepts and objectives provided in the Charter.

Overall, the situation of EDC/HRE has improved. However, there is a lot to be done especially as regards giving more importance and more space to EDC/HRE, improving the quality of textbooks of EDC/HRE-related subjects, training of teachers as well as increase of all involved stakeholders’ role and collaboration. The planned hours (35 hours per academic year) are not sufficient considering the load of the programme and learning objectives.

Switch to competence-based curriculum marked a positive change. However, this new curriculum requires creative teachers to organize the teaching and learning process in an interactive way and to integrate as many teaching topics of different subjects as possible, especially in primary education classes. Teachers should encourage more the teamwork or role play but also extracurricular activities to create opportunities for learners to contextualise the acquired information, knowledge, values and attitudes as individuals and as part of community.

The research finds that there are several issues concerning teachers’ performance and role in teaching EDC/HRE and conveying the right concepts to learners in an accurate way. In addition, the importance given to EDC/HRE by school, teachers and parents but also the space that related subjects have in the education programme are not sufficient. It is imperative for the education system and its actors to give more importance and space to EDC/HRE to ensure learners are better trained for life as well as better informed and competent adults.

The syllabuses and textbooks for the subject of “Citizenship” but also of subjects of “Albanian language”, “History” and “Sociology” aim to convey to learners the EDC/HRE concepts to equip them with the knowledge, skills, attitudes and values of competent citizens. Yet, a slightly indifferent attitude of teachers in relation to the program of these subjects is noticeable. In the development and implementation process of this curriculum in school, teachers mostly rely on the textbooks without asking for more, either by integrating the teaching topics of other subjects or by using different teaching materials to make the learning process as attractive as possible.

The vast majority of findings of this research can be addressed through continuous teachers training. Teachers' training brings rapid results on filling the gaps in the learning objectives and addresses simultaneously the majority of the identified problems.

A need and training assessment of the teachers of subjects of "Citizenship" is a matter of high priority to identify interventions that address the improvement of teaching and learning practices but also that bring quick positive results in the situation of education for democratic citizenship at schools. The six CoE "Living Democracy" manuals, which are tested by educators and are flexible enough to train teachers to introduce citizenship and human rights education into their classes in interactive, fun but also challenging way, may serve as a very good basis for the development of training curricula and training of trainers.

Conclusions

The research which involved a wide range of actors, helped to draw the following conclusions:

- ✓ The changes to the curriculum mark progress and are in line with policy of the CoE.
- ✓ There are some factors that hinder the adequate curriculum implementation.
- ✓ Teachers require a lot of training to adopt adequate teaching and learning techniques and improving effective assessment methods.
- ✓ Textbooks contain concepts that are difficult for age and do not promote problem-solving ability and critical thinking among children, let alone the interactive and inclusive learning away from prejudices and discriminatory approaches.

Recommendations

Teachers need to be better supported to implement the new competence-based curriculum. This support should be given in terms of training, infrastructure and institutional support. Textbook tasks and questions should be given as homework or class-work and engage learners in independent research activities, gathering of facts, draw of conclusions based on facts and making interpretations based on drawn conclusions. It encourages analytical and critical thinking once learners discover causal links of social phenomena or other interesting facts and situations. It is recommended that the text should remain the main source of the learning process as the quality of teachers is of different levels, which does not guarantee the same learning service for all learners. Therefore, the quality of the textbook remains paramount.

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