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A Conceptual Learning Design in Virtual Reality – The Cognitive VR Classroom for Education After the Pandemic Era

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ABSTRACT

The COVID-19 pandemic has created extraordinary global crises and unprecedented disruption to education. The current situation has become changeable and unpredictable, which may lead to chronic cognitive issues for students who have no access to education. At the same time, the use of virtual reality (VR) technology has emerged as a powerful instrument for re-thinking and enhancing the current educational patterns during the post-pandemic era. However, although ample reviews have summarized developments in VR and education, few studies have synthesized these findings into an integrated learning design. In response to this insufficiency, this study discusses potential solutions for current educational challenges and presents a novel design – the cognitive VR classroom. It is a conceptual design that could enable students to access rich learning resources within an immersive VR system. The design of the cognitive VR Classroom is based on the amalgamation of brain-based learning theory (BBL) and the cognitive-affective model of immersive learning (CAMIL). Further, six extended dimensions of classroom learning were developed to structure the cognitive VR classroom. To examine their validity, a correlation analysis was conducted to present the correlation coefficient and the strength of the association. The result shows that the cognitive VR classroom is a promising theoretical framework to facilitate educational diversity and a powerful model to develop smart classroom learning.

KEYWORDS: The Covid-19 Pandemic, Virtual Reality, Cognitive Education, Classroom Learning

1   INTRODUCTION

The Covid-19 pandemic has led to extraordinary global crises and unprecedented disruptions to international education. During the school closure, students were compelled to face relevant inconvenience, disruptions, and challenges. Also, students affected by the pandemic who might be at risk of long-term mental health impairments (Lee, 2020). For example, recent research has reported that 74 percent of students have been struggling to maintain a routine due to school closures (Active Minds, 2020). Twenty percent of students from higher education claim that their mental health has significantly worsened during this period of time (Active Minds, 2020). The main pressures reported by students were loneliness, isolation, concerns about school work, and deteriorating health condition as a result of lockdowns. What is more, many students have suffered from anxiety and depression, including self-harm, loss of motivation, and hopelessness (Young Minds, 2021). Increasing evidence has shown that characterized anxiety and depression have serious influences on students' cognitive development. With the educational landscape becoming changeable and unpredictable, the pandemic uncertainty may cause chronic educational and mental health issues for students (de Figueiredo et al., 2021; Majumdar et al., 2020). Meantime, many educational designs have exposed their rigidity, impracticality and unprogressive status in remote learning during the pandemic (Aeschliman, 2008; Davis, 2017; Popenici & Kerr, 2017; Tom, 1997). Therefore, preventing these crises from becoming generational catastrophes is urgent and critical. Schools and educators now more than ever need to harness leading technologies and new methods to develop innovative learning designs.

2   BACKGROUND

Previous studies have indicated that utilising appropriate technology to build distinct learning experiences can re-kindle students' motivation and curiosity (Abumalloh et al., 2021). The use of internet technology to improve educational practicability and diversity has been widely discussed. Moreover, Popenici and Kerr (2017) have convinced that advances in cutting-edge technology open new possibilities and challenges for innovative education. These factors can fundamentally change governance and the internal architecture of institutions within all levels of education. On the other hand, immersive virtual reality (VR) has become increasingly adopted for teaching and learning purposes. It is defined as a computer-generated environment that synthetizes multisensorial stimulation, immersive scenes, and simulated real-world contexts (Wedel et al., 2020). Research has validated that VR contributes to the understanding of technology-mediated collaborations and offers new solutions to educational purposes (Wang et al., 2021). Hence, this research employs immersive virtual reality (VR) as a representative technology, developing a VR-mediated education design as a solution to present challenges in education.

2.1   Defining VR Technology

VR is defined as a computer-generated environment that synthetizes multisensorial stimulation, immersive scenes, and simulated real-world contexts (Wedel et al., 2020). In a typical VR format, the user wears a headset with a stereoscopic screen, where animated images of a simulated setting can be experienced in real-time (Lowood, 2015). The application of VR is based on the unique method of modelling real environments with the ever-growing development of computer-generated graphic technology. The virtual setting has been used as a replacement or extension of the physical world, allowing users to experience

six degrees of freedom ((Wang et al., 2021), based on principles of environmental immersive interactivity (Freina & Ott, 2015). To date, the standard VR system utilizes both VR headset and multi-projected settings to generate verisimilar images, videos, sounds and other sensations which could simulate an immersive environment for users. By providing the optimal control for experimental conditions within a safe and observable setting (e.g., choice of avatars, environments, sounds, perspective), VR can improve the interactive experience (Bohil et al., 2011; Pan & Hamilton, 2018). As an emergent technology, VR simulates a variety of senses in an immersive setting with the potential to present realistic and dynamic social scenarios, which trigger individuals' responses with a real sense of being there (Riva et al., 2019).

3   METHODOLOGY

There has been an increasing number of reviews summarizing developments of VR and educational design, whereas few studies have synthesized these findings into an integrated learning design (Fig. 1). This research presents a conceptual design for students to access multi-dimensional education within an immersive learning setting – the cognitive VR classroom. This concept is inspired by brain-based learning theory (BBL) and the cognitive-affective model of immersive learning (CAMIL) and aims to provide a conceptual learning design as a solution for current educational plights and a theoretical exploration for future educational development.
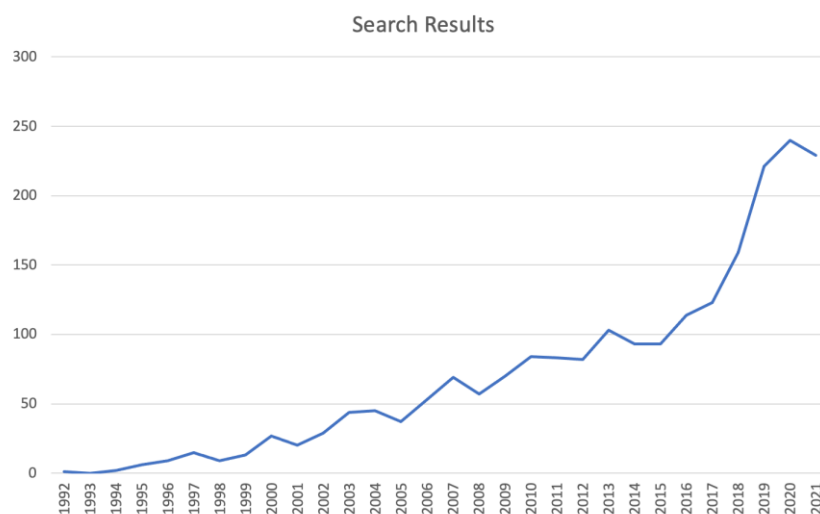
Figure 1: Number of studies on the Scopus database refer to VR and educational designs

Note: The following search string was applied: TITLE-ABS-KEY (virtual AND reality OR vr AND (educational AND design* OR learning AND design)) AND PUBYEAR < 2022. Retrieved December 12, 2021.

3.1   Perspectives of BBL

BBL theory states that educational environments and curriculum designs should follow the nature of how the brain learns (Craig, 2003). It explains brain-information processes and their connections with learning activities. For example, it suggests a learner-centred and teacher-facilitated approach which is accomplished by learners' cognitive

endowments (Olaoluwa & Ayantoye, 2016). This innate cognitive ability relates to the brain structure and brain function in different aspects. As noted by HINTON et al. (2008), the relative activity level at each synaptic connection regulates various neuron connections. Brain functions such as thinking, assimilating, memorialising, and concretizing are shaped by these neuron connections. BBL utilizes this bio-neurological mechanism to highlight meaningful learning, which suggests that information should be acquired intelligibly and effectively, as opposed to memorizing information. Jensen (2008) argues that meaningful learning can be achieved by re-ensuring environmental factors in the classroom, e.g., relaxed alertness, deep immersion, and timely processing. Previous research supported that the learning process becomes productive and substantial while the learning setting meets three conditions: (i) abstract concepts can be concretized to comprehensible knowledge, (ii) combing the theory with empirical studies and ecological settings, and (iii) learning and motivation can be rewarded during the process (Flagel et al., 2011; Phan & Ngu, 2018). Therefore, the core of BBL is to organize learning materials by focusing on brain mechanisms, so that it can be a feasible solution to learning problems (Uzezi & Jonah, 2017).

3.2   The Connection Between VR and the Learning Process

Previous studies have noted that VR shares the same basic mechanism for processing information from the environment as does the brain, a concept referred to as "embodiment" (Riva et al., 2019). Riva et al. (2018) has presented a hypothesis of predictive coding 94–96, which proposes that the brain creates embodied simulations from reality to command the body effectively. The embodied process has a connection with orbitofrontal cortex (OFC). It is located in the frontal region of the brain and plays an important role as a processing station for visual information (Chaumon et al., 2013). It links the sensory system (e.g., motion, vision, auditory, olfactory, and gustatory) to higher-order thinking processes of the outer cerebral cortex. Also, processing incoming visual information from social stimuli (Northoff, 2016). The OFC influences interactions between humans and the environment, e.g., VR embodied experience includes the highest level of opioid receptors in the cerebral cortex with stimulation reward (Nelson & Panksepp, 1998; Šimić et al., 2021).

In addition, when viewed through the lens of neurobiology, the learning process and associated neural changes are seen to be activated by attention. This neurobiological mechanism activates neurons to change and strengthen connections between and across the synapse (Sarter et al., 2001). Similarly, VR can reproduce the external features of the body connections by using vision and auditory (Riva et al., 2019). It is a non-invasive technological paradigm based on wearable acoustic and vibrotactile transducers, also, a possible approach to connect and augment the contents of the inner body. Current studies have provided strong evidence to support the mechanism of the brain embodiment in the VR experience (Perez-Marcos, 2018). Hence, we predict that such a powerful tool can play a leading role in teaching and learning in the future.

4   THE NATURE OF THE COGNITION VR CLASSROOM

In recent years, there have been increasing interests in technology-based learning designs for teaching and learning during the covid-19 pandemic. Intellectualised learning designs (e.g., interactive learning and artificial intelligence classes) have shown significant growth in the

educational market. Although the foundation of these designs is based on technology, technology is mainly used to promote educational diversity, rather than dominate educational practices by differentiating learning environments. More specific, technology can support classroom learning in various means, valuable learning primarily requires educators to meet the needs of different learners (Wang et al., 2019). Therefore, the nature of our conceptual design – the cognitive VR classroom, is a functional design that uses cognitive theories and VR technology as driving forces to overcome educational barriers and challenges under the Covid-19 pandemic. It also aims to match with various pedagogical aspects and create a smart, situated, and multi-sensory learning environment. In doing so, we harnessed BBL theory as a foundation and developed three extended pillars to establish a framework for the cognitive VR classroom. These include Pillar 1 – Embodiment of abstract concepts, Pillar 2 – Enhancement of cognitive competence, and Pillar 3 – Edutainment mechanism (Fig.2).
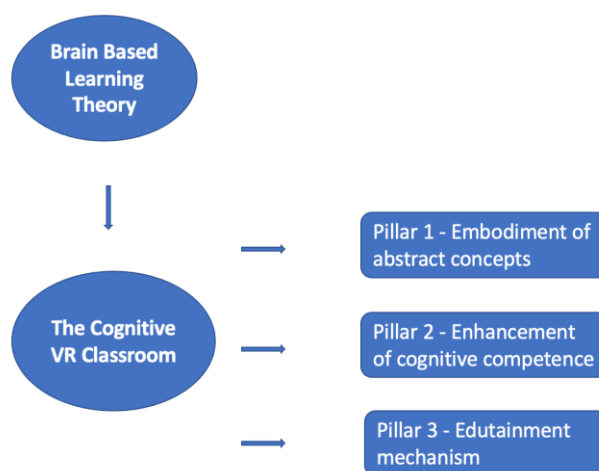
Figure 2: Three Extended Dimensions of The Cognitive VR Classroom Adapted From The BBL Theory

4.1   The embodiment of Abstract Concepts

Traditional classroom teaching and learning often require students to have complex and abstract cognitive capacities to imagine scenarios and settings which no longer exist. Such concepts represent one of the most sophisticated abilities of the human imagination. Teaching abstract concepts (e.g., metaphor and analogy) often involves complex factual and process-based knowledge which are ambiguous and difficult (Lodge et al., 2018). To support students to have a better understanding of abstract concepts, the cognitive VR classroom can embody abstract and obscure knowledge in a visualised way, enabling nonrepresentational to become vivid and concrete, which largely increases students' interests and motivation (Zhang & Bowman, 2021). Neuroscientific evidence has shown that visual inputs are easier to impress as synapses activation and cognitive development are co-occurring when the brain is learning (Kim et al., 2018). Visual function relates to the primary visual cortex and prestrite cortex that take part in the process of embodied learning, linking neuron networks that represent and store the information (Macedonia, 2019). In particular, neurons in visual and haptic areas are connected to represent the shape, colour and texture of the objective presences (Macedonia, 2019), next, the sensorimotor networks mirror all experiences of the physical body (Di Paolo & Thompson, 2014; O'Regan & Noë, 2001; Pulvermüller, 1999). These activities reveal how the brain accepts learning input and produces learning output (Duffy & Jonassen, 2013). Thus, immersive VR can visualize abstract concepts, presenting the image, animated materials, and videos in multiple-sensory dimensions. Applying this

technology in the classroom can enhance individuals' understanding and turn elusive concepts into deep learning (Zhang & Bowman, 2021).

4.2   Enhancement of Cognitive Competence

González-Forero and Gardner (2018) have addressed that the human brain expansion is driven largely by the ecological environment. It is largely determined by complex interactions with the social environment (Barsalou, 2010). The brainwork of human-environment interaction relates to memory encoding (Herweg & Kahana, 2018). Once the individual engages in the encoding process, the formation of social memory would be boosted. Neuro-ecological evidence has indicated that the active memory of social interaction is significant to striatal-memory networking during the hippocampus-amygdala projection. Thus, social memory is considered a powerful mechanism that intervenes the development of human cognition (Shamay-Tsoory & Mendelsohn, 2019).

In addition, cognitive development believes that early learners construct an understanding of the world through the surrounding environment, experiencing discrepancies between the existing structures (accommodation) and new information from the environment (assimilation). The final product of this notion is "equilibration" (Piaget, 1936). Nowadays, immersive VR can be valued as the new "equilibration" as it is an effective way to process information between the brain and the environment. It is also a useful instrument in social neurosciences for simulating social interaction and evaluating cognitive competence (Lopatina et al., 2020). A recent study has revealed that the use of VR has resulted in increasing connections of the hippocampus with other brain regions (Fajnerová et al., 2018). Research has proved that VR can enhance cognitive function for individuals through a series of practices (Dawkins & Young, 2020). VR contributes considerable information on sensorimotor integration, decision making, and spatial navigation generating various stimuli to preserve and increase emotional/social cognition (Dombeck & Reiser, 2012). Utilizing this concept for educational practice, Żuromski et al. (2018) believe that VR can improve the presentation of domain ontologies by deeper embodied scenes. The immersive function of VR allows students to discover and experience objects and phenomena in various means that they cannot reach in real life (Taxén & Naeve, 2002). Similarly, the cognitive VR classroom can provide rich resources to generate diversity in teaching and learning, as well as information acquisition. With its audio and video components, it can intrigue students to have reciprocal explorations via telepresence (Alicea, 2020).

4.3   Edutainment Mechanism

Edutainment is a concept combining education and entertainment. In Edutainment, the learning process jumps from the traditional class to interactive learning by embedding educational elements from technology (Rapeepisarn et al., 2006). VR in education is a reflection of Edutainment. For instance, VR stimulation can boost the reward circuitry in the brain and improve attention, memory and motivation (Renninger & Hidi, 2020). Evidence from brain studies has found that once the student is attracted to a particular object, they will be interested in seeking relevant information. This seeking behaviour may reactivate the reward circuitry system,   forming an effective circulation mechanism (Gottlieb et al., 2013). In this way, taking part in entertaining activities can increase the reactivity to visual cues that are associated with the particular exposure. Exposures in VR thereby substantially enhance students' episodic memory, semantic memory, and procedural memory (Bazzett et al., 2018).

On the other hand, VR's immersive endowment allows educators and students to process learning material with more visual support and less abstract imagination (Smutny et al., 2019). The various scenarios made by VR systems provide considerable information with less ambiguity and confusion. Many VR settings can be poised to replace real environments during the pandemic situation, motivating learners to gain knowledge from alternative simulated settings (Christou, 2010). This ability has been demonstrated by Xie et al. (2019) who conducted a study for students to learn Chinese as a foreign language through VR Cardboard. The purpose was to examine students' perceivable benefits and challenges when using VR tools for language and culture acquisition. Findings have reported that VR scenarios reproduce vivid virtual venues and cultural atmospheres which deeply sparked learners' interest in cultural exploration and language study. At the same time, this study has also highlighted the importance to have support from educators to help students stay engaged, actively exploring the hidden mechanism – the relationship between teaching and learning, as well as how the brain works. Meanwhile, teachers have been suggested to take advantage of smart technology and methods to interact with students in an effective way (Xie et al., 2019). Likewise, the cognitive VR classroom harnesses the edutainment mechanism to inspire innovative teaching and learning. This theoretical design firmly supports educational practice to raise engagement and improve diversity.

5   The Cognitive Affective Model of Immersive Learning (CAMIL)

Makransky and Petersen (2021) presented the cognitive-affective model of immersive learning (CAMIL), which integrated existing educational studies into an immersive VR setting. CAMIL posits that VR systems have a multi-sensory nature to support information coming from more than one source at a time, adding to the experience and making it more visual and engaging. There are six cognitive factors which influence immersive VR learning outcomes, including self-efficacy, interest, motivation, cognitive load, embodiment, and self-regulation. these dimensions reinforce learning from multiple sources. VR's immersive capability creates vivid scenarios in providing quality educational context which allows students to retain more knowledge (Olmos et al., 2018). In addition, due to the higher sense of presence in VR education, the CAMIL model substantiated that students' could have greater academic performance in a cognitive VR class compared to a simplex video input class (Olmos et al., 2018).   However, as a burgeoning learning model, it needs to be tested, extended, and improved by more studies (Makransky & Petersen, 2021). Thus, to echo this perspective, we further developed three core elements. These are Core 1- Multisensory stimulation, Core 2 - Situated learning, and Core 3 - Interdisciplinary study (Fig. 3). Synthesizing these Cores with the Pillars previously discussed. We structure the foundational framework of the cognitive VR classroom with guidance from BBL theory and CAMIL (Fig. 4).
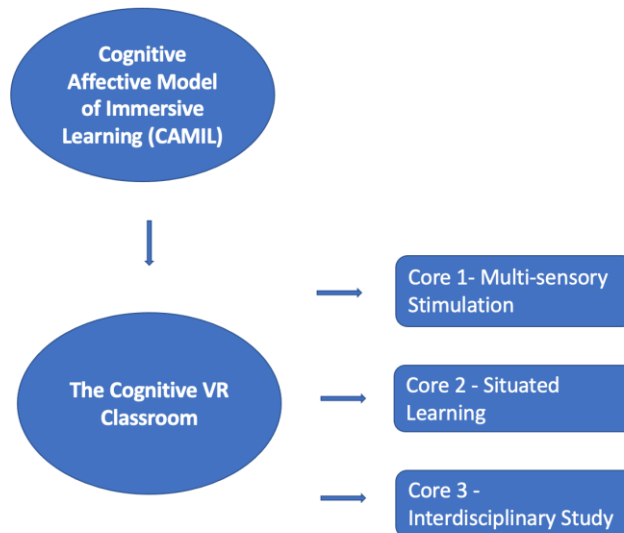
Fig. 3 Three extended dimensions from CAMIL
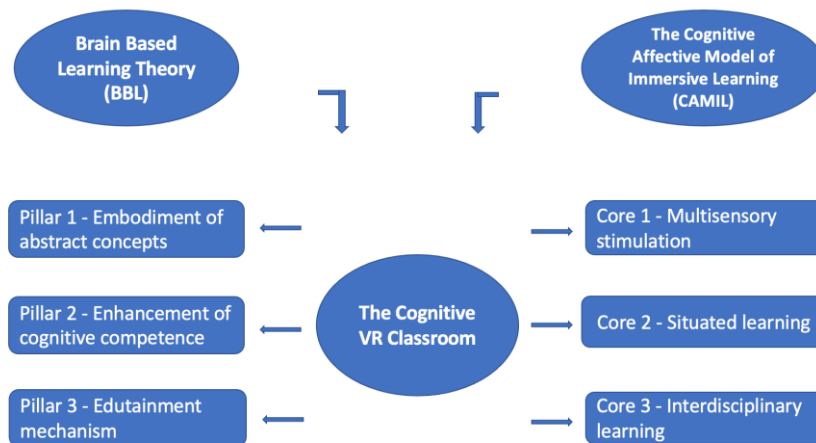
Figure 4: The Visualized Concept of The Cognitive VR Classroom

5.1   Learning with Multisensory Stimulation

The cognitive VR classroom yields multisensory education to teach, learn, and feel the educational materials through seeing, hearing, speaking, touching, moving, and perceiving. Teaching through multisensory stimulation supports students to apply new information to previous learning, and understand its hidden logic and connections (Katai & Toth, 2010). Research has revealed that the brain learns and functions optimally while information is intermixed with multiple sensory inputs (Shams & Seitz, 2008). In the process of information integrating, external object characteristics can be perceived and handled in different visual areas in the human brain. Moreover, multisensory neurons' characteristics only could be kindled when more than one sensory modality is activated, their response speed (supra-additivity) can be enhanced by the presentation of co-occurring events (Katai & Toth, 2010). VR is a powerful instrument when it is applied to specific learning tasks and objectives (Holopainen et al., 2020). It ideally supports kinesthetic learning – active learning which combines a hands-on approach and body movement. Based on this function, the cognitive VR classroom encourages students to actively get involved in the setting and to learn through

touch, space, and motion by physically doing (Craig, 2003). Hence, students' learning outcomes might be increased by the development of creativity and collaboration with VR (Wu & Tai, 2016). This simulated multi-sensory visualization can provide high-definition (HD) virtual reality 3D environment, which is an effective method for classroom learning (Tsaramirsis et al., 2016).

5.2   Situated Learning with Immersive VR

Constructive knowledge and learning skills can be acquired by situated activities and interactions with objects exploration. Utilizing VR to construct situated learning facilitates students to critically develop their thinking (Li et al., 2015). For example, students learn terms while seeing the exact applicability from the materials, instead of mechanically memorising abstract facts which are isolated from the context (Chiou, 2020). The situated learning approach occurs in the context of the experience. The cognitive VR classroom embeds knowledge and skills in the context of real life, reflecting how knowledge is obtained and applied in daily life. The cognitive VR classroom integrates immersive environments from authentic content into the immersive setting. It also emphasises relationships and interactions between teachers and students to build trust, understanding, and constructive interactions. As a consequence, effective learning happens by making connections to the teacher, previous knowledge, and real life practice (Kurt, 2021).

5.3   VR for Interdisciplinary Learning

Although academia has devoted considerable resources to interdisciplinary studies in recent decades, the dynamics of interdisciplinary collaborations remain rather poorly understood by people from non-academic backgrounds (Siedlok & Hibbert, 2014). Subject barriers still exist between distant disciplines, such as between natural and social sciences. Technology drives innovation in many aspects and has a tight correlation among various disciplines. Immersive VR has an ever-growing potential to be valued as a potent way to transform approaches in which we learn and stimulate interdisciplinary communication (Leung et al., 2018). For example, abstract concepts can be embodied by VR to reduce students' cognitive load and simplify the amount of complicated materials. Image-based VR generates situated learning and visualizes texts into pictures and videos. With the support from visual technology, students may be able to transform complicated information from different subjects, and synthesize allied knowledge from a range of disciplines (Gisbert & Bullen, 2015). Ultimately, it could be formatted as a new approach for classroom learning to deliver inter-disciplinary knowledge to younger students, breaking through barriers between disciplines and enabling knowledge to be shared by younger and larger groups.

6   Correlation Analysis and Results

The cognitive VR classroom is built on educational concepts of interaction, collaboration, personalization, interdisciplinary learning, and neuroscientific inspiration. This conceptual learning design is an innovative model which combined texts, images, videos, audio, motion, and multisensory system. To examine its validity and adaptivity as a powerful theoretical framework for the smart classroom, we conduct a rating assessment for its six elements based on the smart classroom inventory ((SCI)) (Li et al., 2015). The four principles of SCI are 1) It is a learning environment based on technology support with a combination of both physical and virtual systems. 2) It provides rich learning materials, including constructive learning tools for a variety of teaching and learning activities. Also having support for active learning

and interactive activities. 3) it should be able to collect and analyze massive data of students and optimize educational decisions. 4) It is an open learning environment to bring the students to can stimulate learning motivation, and creativity with authentic learning from real-life practices (Li et al., 2015). Following these principles, the research team use a 5-point Likert-type evaluation with anchors from totally not match (scored as 1) to totally match (scored as 5) (Table 1). Next, a correlation analysis is conducted by R studio to display relationships among the Pillars and the Cores (Fig. 5, and Fig. 6).

Table 1 Smart Classroom Inventory Assessment of the Cognitive VR Classroom

SCI	Pillar 1	Pillar 2	Pillar 3	Core 1	Core 2	Core 3
Principle 1	5	5	4	5	5	5
Principle 2	4	3	5	4	5	5
Principle 3	2	3	3	2	3	4
Principle 4	5	4	5	5	5	4

Note. SCI = Smart Classroom Inventory

Figure 5: Plot of Correlation Analysis in Numbers
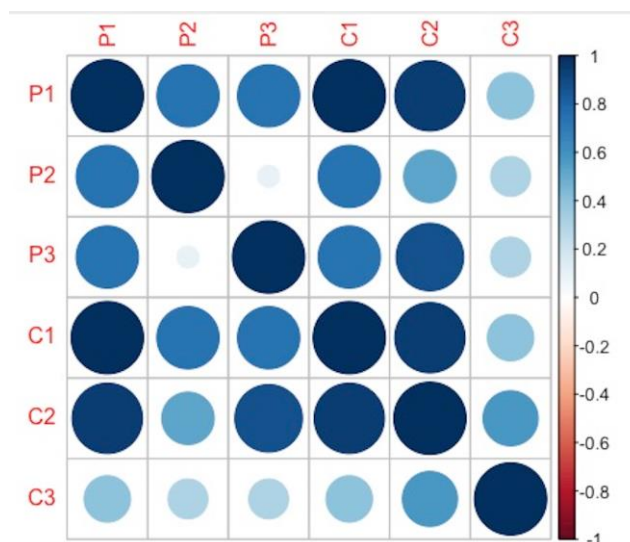
Figure 6 Visualization of Numerical Correlation Analysis

Note. P1= Pillar 1- Embodiment of abstract concepts, P2= Pillar 2 - Enhancement of cognitive competence, P3= Pillar 3 - Edutainment mechanism, C1= Core 1 - Multisensory stimulation, C2 =Core 2 - Situated learning, C3 = Core 3 - Interdisciplinary learning.

7   Conclusion

This study elaborates how VR can be used to facilitate education after the Covid-19 pandemic, suggesting that VR could be used as a powerful weapon to fit with a series of pedagogical concerns. In response to urgent educational adjustments and prospective challenges, we extended the BBL theory, the CAMIL model, and previous studies to generate an advanced learning design for future education – the cognitive VR classroom. It is a conceptual learning design for students to access a multi-sensory learning setting with interactive and entertaining devices and facilitate inter-disciplinary learning at the same time. This study intends to create an intelligent, integrated, and inter-disciplinary learning design to improve the present educational system. We utilize VR technology to create a novel theoretical model of the smart classroom and enable students to get into multi-functional learning and gain rich educational resources in a virtual learning environment. Also, we apply a Likert rating assessment of the six extended elements following the principles of SCI along with valid correlation analysis. As a consequence, results confirmed that there are co-effective associations among the Plillrs and Cores, which can strongly support the conceptual design. Therefore, we suggest that the cognitive VR classroom should be employed to develop prospective classroom learning after the pandemic era.

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A QUALITATIVE INQUIRY CONCERNING GAMIFICATION OF LANGUAGE LEARNING: A CASE STUDY ON THAI UNDERGRADUATE HOSPITALITY MANAGEMENT STUDENTS

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ABSTRACT

Gamification of learning in higher education has been used as an educational tool to motivate and engage students. Despite its positive impacts demonstrated in the existing body of knowledge, some adversaries are concerned with the decline of learners' intrinsic motivation and becoming independent of extrinsic rewards. This research aims to design a user-centered and meaningful gamification framework for students who are explicitly learning a second language to resolve these adversaries. The empirical data for this study was collected through a focus group discussion. It was conducted to obtain students' learning factors that would contribute to user-centered learning. Based on the focus group outcome, a gamification course using a learning management system with embedded gamification features will be best suited for these specific students. The affordances used in this study are rewards, levels, badges, and points. The practical implications of this study are to gain a more in-depth understanding of the students' motivations in language learning, which is crucial in creating a meaningful user-centered game design.

KEYWORDS: Language Learning, Gamification, Hospitality Education, Student Engagement

1   INTRODUCTION

Gamification is defined as applying game design principles in non-gaming contexts (Deterding et al., 2011; Manzano-León et al., 2021). It aims to stimulate human motivation and performance (Sailer et al., 2017) and the most common application of this concept is in formal education (Hamari et al., 2014; Almeida & Simoes, 2019). The learning outcomes of gamification are mostly positive in terms of increased motivation and engagement; this is according to the systematic literature review of empirical studies on gamification's efficacy (Hamari et al., 2014). However, despite the positive results, there are a few adverse outcomes relating to the gamification. A gamified product or service with a rewards feature may harm intrinsic motivation, not enhance it (Dahlstrøm, 2017). In addition, it can reduce the internal motivation the user has to take part in the activity, as it replaces internal motivation with external motivation (Nicholson, 2012). Gamification's success greatly relies on the context in which it is being implemented and its users (Hamari et al., 2014).

According to Chen et al. (2015), there are only a few qualitative gamification studies, indicating that current studies in gamification give more attention to data usage and interfering with user behavior, rather than paying enough attention to the actual players' experiences. Thus, qualitative data was collected through a focus group discussion to understand students' learning factors and perceptions in a gamified learning environment. This study aims to design a language learning course based on the students' learning factors to make it user-centric, then choose game elements that would intrinsically motivate students in learning a second language. Moreover, it is the objective of the study to design meaningful conceptual learning gamification to encourage students to learn a second language.

2   LITERATURE REVIEW

2.1   Gamification of Learning

Gamification is the application of game design principles in non-gaming contexts (Deterding et al., 2011; Manzano-León et al., 2021). It aims to foster human motivation and performance regarding a given activity (Sailer et al., 2017). According to Hamari et al. (2014), gamification provides positive effects. However, the results are much dependent on the implementation of gamification and the users using it.

Gamification of learning was the most common context for implementations (Hamari et al., 2014). It is not surprising that gamification is applied to education and learning since retaining engagement and motivation among students is a constant challenge. Based on Subhash and Cudney's (2018) selected articles related to gamification in education from a systematic search of databases, gamification's learning outcomes are mostly positive, for example, in terms of increased motivation and engagement in the learning tasks and enjoyment of them.

Despite the positive learning outcomes, their studies suggested that there are some pitfalls in gamification. Based on research conducted by Domínguez et al. (2013), despite the students' better scores in practical assignments and an overall score, the same sets of students performed poorly on written assignments and participated less in activities. The same study also suggested that the cognitive impact of gamification on students is not very significant. A gamified product

or service with a rewards feature may harm intrinsic motivation, not enhance it (Dahlstrøm, 2017). In addition, it can reduce the internal motivation the user has to take part in the activity, as it replaces internal motivation with external motivation (Nicholson, 2012).

2.2   Game Elements or Affordances Applied in Learning

Game elements or affordances are the game design principles that are applied in the non-gaming context. According to the systematic review on gamification of learning (Subhash & Cudney, 2018), points, badges, and leaderboards are the most frequently used gamification elements. These elements can be seen in a different form; for example, points can be in the form of a bonus, something earned, or experience points, while badges can be in the form of trophies and rewards. According to the same systematic review, the most significant benefits of gamification in higher education are improved student attitude, engagement, and performance. Engagement, motivation, and enjoyment among students are widely cited as benefits of gamification of learning. Table 1 shows an overview of game elements and benefits according to some recent studies on gamification.

Table 1. Game Elements and its Benefits

Affordances	Benefits
Points	Motivation and performance (Villagrasa et al., 2014)
	Motivation, interest, and knowledge (Markopoulos et al., 2015)
	Improved student performance (Strmečki et al., 2015)
	Engagement and retention (Kuo & Chuang, 2016)
	Engagement, more effort, and higher quality work (Hew et al., 2016)
	Improved attitude and learning outcomes (Yildirim, 2017)
	Motivate to participate and engage in learning (Poondej & Lerdpornkulrat, 2016)
	Increased competition (Sánchez-Martín et al., 2017)
	Improved student performance (De-Marcos et al., 2017)
	Motivation, engagement, enjoyment, and perceived learning (Stansbury & Earnest, 2016)
	Performance, engagement, and attendance (Dias, 2017)
	Engagement and enjoyment (Xu et al., 2017)
Badges	Motivation and performance (Villagrasa et al., 2014)
	Improved student performance (Strmečki et al., 2015)
	Engagement, more effort, and higher quality work (Hew et al., 2016)
	Improved attitude and learning outcomes (Yildirim, 2017)

Affordances	Benefits
	Motivate to participate and engage in learning (Poondej & Lerdpornkulrat, 2016)
	Improved student performance (De-Marcos et al., 2017)
	Psychological satisfaction (Sailer et al., 2017)
	Engagement, performance, confidence, motivation, and academic effort (Çakıroğlu et al., 2017)
	Performance, engagement, and attendance (Dias, 2017)
Leaderboard	Improved student performance (Strmečki et al., 2015)
	Enjoyment, motivation, engagement, and perceived learning (Leaning, 2015)
	Engagement and retention (Kuo & Chuang, 2016)
	Engagement, more effort, and higher quality work (Hew et al., 2016)
	Improved attitude and learning outcomes (Yildirim, 2017)
	Motivate to participate and engage in learning (Poondej & Lerdpornkulrat, 2016)
	Improved student performance (De-Marcos et al., 2017)
	Psychological satisfaction (Sailer et al., 2017)
	Engagement, performance, confidence, motivation, and academic effort (Çakıroğlu et al., 2017)
	Performance, engagement, and attendance (Dias, 2017)
Levels	Motivation, interest, and knowledge (Markopoulos et al., 2015)
	Improved student performance (Strmečki et al., 2015)
	Engagement and retention (Kuo & Chuang, 2016)
	Engagement (Giannetto et al., 2013)
Rewards	Engagement and retention (Kuo & Chuang, 2016)
	Improved learning outcomes (Buckley & Doyle, 2014)
	Engagement, performance, confidence, motivation, and academic effort (Çakıroğlu et al., 2017)
Feedback	Improved student performance (Strmečki et al., 2015)
	Motivation, confidence, engagement, and attention (Morillas Barrio et al., 2016)
	Improved learning outcomes (Buckley & Doyle, 2014)

Affordances	Benefits
	Motivation, engagement, enjoyment, and perceived learning (Stansbury & Earnest, 2016)
Competition	Improved learning outcomes (Buckley & Doyle, 2014)
Teamwork	Motivation, interest, and knowledge (Markopoulos et al., 2015)
	Psychological satisfaction (Sailer et al., 2017)
	Improved attitude and learning outcomes (Yildirim, 2017)
Role Play	Motivation, engagement, enjoyment, and perceived learning (Stansbury & Earnest, 2016)

According to Hamari et al. (2014), people interact with gamified systems differently for many different reasons, resulting in variation in the experiences created by these affordances. For example, a study conducted by Jia et al. (2016) claimed that individual personalities have different perceived preferences on motivational affordances: the results showed that extroverts tended to be motivated by points, levels, and leaderboards, while people with high levels of imagination/openness were less likely to be motivated by avatars. Research done by Xu et al. (2017) observed that bashful and distracted students were most likely to be engaged in the gamified class compared to the active students. In short, a similar outcome is not guaranteed for all students participating in a gamified learning environment.

Based on these studies, gamification of learning has positive outcomes such as increased motivation, engagement, and enjoyment (Hamari et al., 2014; Subhash & Cudney, 2018). However, some gamification elements can decrease intrinsic motivation (Deci et al., 2001; Nicholson, 2012; Dahlstrøm, 2017), which is the only consistent predictor of academic achievement across different school contexts and cultures (Taylor et al., 2014). With the lack of motivation and desire to reach their overall potential to learn a second language, learners show minimal effort in developing second language skills. These drawbacks favorably impact second language learning, wherein we want students to learn, practice, and retain second language skills individually.

According to a study conducted by Geelan et al., (2015), the learning style of individual students also plays a positive role in maintaining continued engagement. To apply gamification in language learning, we focus on the appropriate game elements and affordances according to our target players. We cannot simply use all these elements because previous studies claiming effective gamification have different player characteristics. The effectiveness of gamification varies depending on the players' characteristics (Jia et al., 2016; Xu et al., 2017).

2.3   Gamification in Learning Management Systems (Moodle)

Many institutions are using LMS to support the quality of education. It is not just a communication channel between teachers and students, but can also be a gamification tool.

Moodle, for example, is the top open-source tool for Learning Management Systems, according to Pappas (2020). Moodle has been used in a few research studies to implement game elements in the gamification of learning (Poondej & Lerdpornkulrat, 2019; Sitra et al., 2017). Game elements such as points, badges, and leaderboards were the most commonly used elements (Poondej & Lerdpornkulrat, 2019).

3   METHODOLOGY

This research is designed to identify and understand meaningful and effective gamification techniques. The first step is to understand students' learning factors to gain insight on what motivates them and to understand their intrinsic motivators. As suggested in the case study by Geelan et al. (2015), improving the understanding of learning preferences could maximize the educational benefits of learning experience through gamification. From a gaming perspective, this process is a way to understand the students or the players. The gamified language learning design, or the game, will depend on the players' learning factors. In this way, the game will be more meaningful to the players.

3.1   Sample and Setting

A focus group is a small, structured group with selected participants usually led by a moderator. It aims to gather multiple views and attitudes and often require complex negotiation of the on-going interaction process among participants (Litosseliti, 2003). In this study, the focus group will be able to understand students' learning factors and motivation in learning English as a second language. It is a way to gather first-hand information from the participants or potential players. The data was collected from 27 undergraduate students that were enrolled as full-time degree students at the time of sampling. The participants studied a business major at a large government-run university in southern Thailand. Moreover, the participating students were enrolled in a compulsory ESL course that is part of their degree curriculum.

3.2   Procedure and Data Collection

The empirical data for this study was collected through one focus group discussion. The discussion was conducted during the students' regular classroom time and lasted approximately 45 minutes. The focus group discussion was guided by open-ended semi-structured questions that aim to investigate the students' experiences in ESL learning. During the focus group, a moderator facilitated the discussion and encouraged involvement from all the participants. Furthermore, a research assistant was present to take notes and record audio. At the end of the discussion, a questionnaire was distributed to gather socio-demographic information about the participants.

3.3   Data Analysis

After the data collection, the recordings were transcribed before doing the analysis. The main ideas for each question were noted and reviewed. The main recurring ideas were critically analyzed to identify themes as presented in the following sections of this paper. The second step was to gather and understand the game design elements or affordances that can be implemented in designing gamification in language learning. This process aimed to classify

which affordances would be motivators for our players. In this process, the focus group's results were analyzed and some students' learning factors were matched to the affordances. This step was to eliminate unnecessary affordances and choose appropriate affordances that could motivate the students.

After gathering information on the players' learning factors and classifying the appropriate affordances, the game's formulation took place and all affordances listed as motivators were applied. For this research, a learning management system (LMS), specifically Moodle, created the gamified language learning activity suitable for the players. Moodle offers multiple features convenient to apply gamification in the learning experience. Frequently used affordances such as points, badges, and leaderboard (Subhash & Cudney, 2018) can be applied on Moodle.

4   RESULTS

4.1   Understanding Students' Learning Factors and Classifying Game Design Elements

4.1.1 Thai Students Motivation

Students from this faculty learn the English language mainly from the subject and course offerings from their secondary schools and the university. They mentioned a few hours of self-study and only a few enrolled in private language schools. Hollywood films, English TV shows, and TED talks were mentioned as their secondary sources of learning English. A few students said that some language learning mobile applications and websites were also used in learning English. Students have been studying the English language for 16-20 years.

When they were asked what motivated them to study English, 70% answered to graduate and please their parents. Students from this university are not eligible to graduate if their TOEIC score is below 630 points. 25% of students will settle on getting 630 points to graduate, while the rest aimed to get higher than that.

4.1.2 Learning Methods and Effectiveness

When it comes to language learning methods and techniques, the students mentioned that classroom composition and size could influence their motivation. Students prefer to be in a group with the same level of English skills as their own. A group with varied levels causes embarrassment to some students, either feeling that others look at them as superior or fearing making mistakes. Size also matters; students prefer a relatively smaller group, around 5-20 students per class, when it comes to language learning. They like to get more constructive and hands-on feedback from their teachers. Students mentioned that negative feedback is acceptable if it comes from someone with authority and expertise and is delivered in a non-embarrassing way.

Students had consensus answers regarding recognizing their English assessment accomplishments or group competition. While being recognized can boost motivation, they mentioned that announcing TOEIC accomplishments on social media, such as Facebook, is not encouraging but rather embarrassing. In addition, individual competition, such as getting a reward for getting the highest mark, is also not encouraging. 81% of the students say that they

do not want to compete with others and 96% say they would rather compete with their old self, aiming for self-improvement and checking their learning progress.

When it comes to the effectiveness of teaching methods and classroom tools, interactive media or whiteboards such as SMART Technologies are most effective, as well as real-life simulation or role-playing. 78% mentioned that interactive classrooms with supplementary mobile applications or software are effective means by which to study and, at the same time, help them engage with, attend, and participate in class. 93% say role-playing or real-life simulations let them practice their English skills. They believe that practical application is better than having academic tasks such as grammar lessons, seat works, and quizzes. Other means such as mobile learning apps, quizzes on LMS (56%), and video tutorials (70%) are also considered useful learning tools. 93% of students mentioned fun classroom games like Kahoot!, a game-based learning platform; they said that it is engaging and exciting while they are playing. Still, it does not have a long-term effect on learning.

4.2   Classifying Game Design Elements According to the Students' Learning Factors

The second step is to gather and understand the game design elements or affordances that can be implemented in designing gamification in learning and education. Game elements are used to increase the learner's motivation. Table 2 shows the summary of the affordances that can be a motivator or not a motivator for the players.

Table 2. Affordances that can be a motivator or not a motivator for the players

Affordances	Motivator	Not a Motivator
Earning Points	Points that can be converted to grades	Points that cannot be converted to anything
Badges/Medals	Something to show off to their parents	If it is announced in any form of social media
Levels	For self-improvement	Public announcement or leaderboard
Rewards	Money and grades (to graduate)	-
Competition	Competition with themselves	Competition against others

Referring to the information gathered from the focus group, the following game design elements will be used in this research: rewards, levels, badges, and points. Competition with oneself can be incorporated with the level and badge affordances. These game design elements were indirectly included in the focus group discussion and were concluded as motivators for our respondents, Thai undergraduate hospitality management students.

5   DISCUSSION

5.1   Designing a Gamified Language Learning

Before applying the affordances in a language learning activity in Moodle, adequate planning and development should be taken into consideration. The badge is the most common game element used in Moodle (Poondej & Lerdpornkulrat, 2019). To incorporate points and levels, a plugin is needed to showcase these affordances. The Level Up! plugin for Moodle can present students with their current levels based on points they earned, praise their progress once they move on to the next level and unlock content that requires a certain level to access it, and other customizations to make it more engaging and exciting ("Level up! Gamification for Moodle," n.d.).

5.2   Setting up Game Affordances on Moodle

The Level up! plugin will play a big part in designing a gamified Moodle course. One of its features is to automatically attribute points to students for their actions. It can also report the students' levels to the students and the teacher. As part of the planning and development, the teacher will set certain points for specific actions in the system and to achieve the next levels.

Activities set up in Moodle can be in the form of a lesson, forum, or quiz. Teachers can allocate points for participation in lessons, answering and contributing to forums, and achieving specific scores in quizzes. Points can also be rewarded for simple tasks such as reading in advance, asking questions, or referencing an external resource. This way, students can be more engaged in lessons and motivated to learn, knowing their simple actions can be rewarded. Using points as a game element can increase the engagement and motivation of students in comparison to traditional methods (Villagrasa et al., 2014; Markopoulos et al., 2015; Kuo & Chuang, 2016; Hew et al., 2016; Stansbury & Earnest, 2016; Dias, 2017; Xu et al., 2017; Poondej & Lerdpornkulrat, 2016).

For the levels, the teacher can set up the first few levels to be easily achieved; thus, students will be engaged and motivated upon seeing their levels improve. The points needed for leveling up should gradually increase to challenge students to perform better and encourage them to do more tasks to earn points. Previous studies on gamification and game-based learning mentioned that this game element could motivate students (Markopoulos et al., 2015), improve students' performance (Strmečki et al., 2015), and increase engagement (Kuo & Chuang, 2016; Giannetto et al., 2013).

Badges should be meaningful to players, something that is not earned too fast (TechnologyAdvice, 2014). To do so, badges should be designed to be awarded after the accomplishment of certain cumulative tasks, such as completing a lesson and getting a high score for the lesson's quiz, or it can be about perseverance by taking practice tests or lessons every day for 30 consecutive days or more. The awarding of badges can be set up automatically by the system by establishing certain criteria to be accomplished in a given time. It can also be granted by the teacher if necessary. Badges can also have an equivalent point to be earned at the same time as the badge is acquired, so that students can level up as well. Badges can motivate, engage, and improve students' attitudes and performances in learning (Poondej &

Lerdpornkulrat, 2016; Villagrasa et al., 2014; Strmečki et al., 2015; Hew et al., 2016; Yildirim, 2017; De-Marcos et al., 2017; Çakıroğlu et al., 2017; Dias, 2017)

Rewards can boost engagement (Kuo & Chuang, 2016), improve learning outcomes (Buckley & Doyle, 2014), and increase motivation, confidence, and academic effort (Çakıroğlu et al., 2017). When it comes to rewards, teachers can reward students with badges for particular excellence achieved throughout the course. This can be in the form of a badge or points. Other means of rewards can be in the form of virtual money, which can be used to unlock specific tasks or in exchange for skipping a day for review. The rewards given in this game design should not be too attractive for the students, as this can result in them depending on external rewards (Deci et al., 2001). However, all these are extrinsic rewards that may motivate students in a short period.

This gamified language learning course's overall design was based on the students' input from the focus group. The plan is to boost self-development and let students see their progress over time. It encourages students to compete with their old self and challenge oneself to perform better. Based on the previous gamification of learning research studies, each affordance and its implementation mentioned were all aiming towards a more meaningful learning gamification design for students to be more engaged and intrinsically motivated to learn a second language.

6   CONCLUSION

As Nicholson (2012) suggested, gamification approaches decrease intrinsic motivation. Thus, incorporating gamification elements without considering the players' needs and goals will lead to ineffective learning gamification. The combination of user-centered game design elements into a non-game context can lead to meaningful gamification. User-centered meaningful gamification will result in longer-term and deeper engagement between users, non-game activities, and supporting organizations (Nicholson, 2012).

This research has given much consideration to Nicholson's studies to reduce the inefficient gamification methods assumed to have positive results at most times. Understanding the students' motivations in language learning was crucial to creating a meaningful user-centered game design. It was a necessary step to assess the game elements to be used in gamified learning through the learner's experience, such as points, badges, and leaderboard activities. When it comes to designing gamified learning, the main objective in applying the game elements is to boost self-improvement and progression in learning a language, which is considered an intrinsic motivation for students.

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CONFLICT OF INTEREST

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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AN INVESTIGATION INTO THE EFFECTS OF MOTHER TONGUE ON VIETNAMESE FIRST-YEAR ENGLISH-MAJORED STUDENTS' WRITING SKILLS

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ABSTRACT

This research focused on finding the patterns of mother tongue interference in written English of first-year English-majored students at University of Languages and International Studies, Vietnam National University, Hanoi as well as discovering effective methods to mitigate them. It analyzed how much students are affected by Vietnamese, their mother tongue in terms of grammar, vocabulary and sentence conjunctions. The researcher examined 84 students' questionaire and interviewed 9 random students. From the data collected, it can be seen that most students' writings consisted of grammatical inaccuracies related to Vietnamese writing habits. Conversely, the frequency of lexical mistakes was quite low. In terms of sentence conjunctions, most students still forgot to use a comma before certain linking words. Based on the findings, it is advisable for students to ameliorate the Vietnamese influences by familiarizing themselves with native speakers' thinking system with several tools such as books, TV shows and forums.

Keywords: mother tongue, first language, interference, English-majored students

Abbreviations:

FANBOYS: For, and, nor, but, or, yet, so

FELTE: Faculty of English Language Teacher Education

ULIS: University of Languages and International Studies

PART I: INTRODUCTION

1. Statement of the problem and rationale for the study

Learning foreign languages is a must in this era of globalization. Among acknowledged languages, English is the largest one by the number of speakers with the estimation of over 1.5 billion individuals worldwide (World Economic Forum, 2015). In Vietnam, a developing nation in Southeast Asia, English is the most common foreign language.

In general education, particularly primary schools and secondary schools, though there is a considerable increase in the quantities and the qualities of English-learning students, it is undoubted that writing skills have yet to be put emphasis. The current format of the English exam required to enroll in a university does not include writing paragraphs/essays. Moreover, the limited amount of time for English-teaching at school is believed to prevent teachers from teaching their students how to write in English properly (Ur, 1999). Therefore, writing seems to be the weakest among four macro-skills to most Vietnamese students.

As a consequence, on becoming a freshman, plenty of students are still involved in a great number of errors. To illustrate, the instructors are believed to detect manifold inaccuracies varying from spelling to sentence structure in their writing assignments. Those mistakes seem to emerge from the influence of Vietnamese, their first language.

This project is expected to find out the level of effect Vietnamese writing habits have on first-year students from FELTE. Thus, measures to ameliorate the problems stand more chances of being feasible.

2. Research purposes

The objectives of this study are:

[1] To identify some influences of mother tongue on Writing English skills among English-major first-year students at ULIS.

[2] To propose solutions to tackle the disruptive influences of first language on Writing English skills based on the findings of this study.

3. Significance of the study

With this study, the researcher expected to gain insights into the patterns of Vietnamese influences on first-year students at FELTE, ULIS during academic writing, as perceived by the students themselves. Once completed, the research would serve as a source of reference for those who wish to have a more precise look at the effects of Vietnamese on English language writings of first-year students and to exploit it in more appropriate ways. More importantly, the findings are primary resource for subsequent researchers in designing programs or courses of treatment to improve the situation on a larger and more practical scale.

4. Scope of the study

The participants of our research were 84 first-year students chosen randomly from four classes of Faculty of English Language Teacher Education, University of Languages and International Studies, Vietnam National University, Hanoi.

These students all completed 1 semesters at FELTE, ULIS with compulsory language-practicing courses. They were expected to be at B1+/B2 level of English Proficiency at the time our research was conducted.

First-year students were chosen because they had more than a semester to reflect on their mother tongue interference errors and achieve self-improvements. In addition, during the 2nd semester, they were assigned to writing academic paragraphs and essays, which demands their skills of using academic language to be as efficient as possible. All things considered, this group of subjects is ideally suited with the research purposes, which are to examine some native language interference, their origins, their levels, and their negative effects as well as finding out some appropriate methods to alleviate the inaccuracies.

Our study was carried out from November 2021 to January 2022. It would have been ideal for stretching the scope of this study to cover more cases in Faculty of English Language Teacher Education at the University of Languages and International Studies. However, for the limitation of available resources and time, this study was only conducted among 84 first-year students randomly selected from Faculty of English Language Teacher Education in the University of Languages and International Studies. This study was also only conducted under the perspective of students.

5. Method of the study

To thoroughly support this study, the researchers decided to use mixed methods.

5.1. Quantitative method

There was a questionnaire (survey) with the participation of 84 random FELTE freshmen. The questions concentrated on the Vietnamese influences in terms of vocabulary, grammar, and sentence conjunctions with diverse answer methods (from short answer to multiple choice). After collecting all survey responses from selected students, the researchers grouped the answers to each question into five tables. The first three tables were based on types of Vietnamese influences: grammar, vocabulary, and sentence conjunctions. It was to take a detailed look at each type of interference to find out which one was dominant among the three. The two last tables, on the other hand, were based on the groups of respondents: with and without an English proficiency certificate. Although at semester 2, FELTE first-year students are all expected to be at B1+/B2 level, according to the researchers' daily observation, it seemed that there were some students had not yet reached it. Therefore, two last tables would provide more direct insights into the relation between levels of English proficiency and Vietnamese interference on English writing. Overall, the quantitative method, accompanied by the support of questionnaire reflects the quantity of the analysed objects. Since the time for conducting this research was quite limited, using questionnaire was a effective method.

5.2. Qualitative method

The researcher believed that the quantity cannot fully reflect the reality of the results. Some participants might be reluctant to respond carefully and honestly. Therefore, it would be ideal for the qualitative method to be the partner of the quantitative one. To comprehensively analyse the overview of the topic, the researchers approved the use of interview. It could be ensured that their answers are objective and trustworthy to themselves because of unexpected questions. All nine interviewees were selected entirely randomly. There were four major questions used by the interviewers:

[1] Do you often make the mistakes included in your response in writing exercises that you do at home, with enough time to prepare and review or in writing tests under time pressure?

[2] Could you recognize your inaccuracies yourself?

[3] Do your teachers and classmates point out those influences for you during peer-checking and marking activities?

[4] Do you follow any methods to alleviate the Vietnamese influences in English language writings?

Researcher intended to figure out whether time limitation was a factor affecting students' writing skills through the first question. Two following ones were to identify students' abilities to detect the Vietnamese influences with peers and teachers' assistance. The final question was to suggest effective ways to ameliorate mother tongue interference to perfect FELTE first-years' English writing skills.

PART II: LITERATURE REVIEW

1. Key constructs

Because of the vagueness of " mother tongue" term, some researchers believe that meanings of this term vary according to the intended usage of the word (Pokorn, 2005).

According to Skutnabb-Kangas and Phillipson (1989), *mother tongue* has the following meanings:

1. The language learned from the mother.

2. The first language (Ll) learned, irrespective of "from whom."

3. The stronger language at any time of life.

4. The mother tongue of the area or country (e.g., Byelorussian in Byelorussia).

5. The language most used by a person.

6. The language to which a person has the more positive attitude and affection.

Bloomfield (1994) defined a *first language*, *native language* or *mother/father/parent tongue* (also known as *arterial language* or *L1*) as a language that one has been exposed to from birth.

Davies (2003) stated that *native language/mother tongue* refers to the language of one's ethnic group rather than one's first language in some countries.

In our research, *mother tongue/first language/native language* is understood as the language a person uses in their daily life, therefore, is most familiar with. That is the combination of Skutnabb-Kangas and Phillipson's #5 definition and Bloomfield's claim. Instead of using previous definitions, the researchers made a decision to combine some of them. Because Vietnamese is offically the national language, as guaranteed in the Constitution of the Socialist Republic of Vietnam despite the co-existence of 54 ethnic

groups nationwide. Therefore, no matter which ethnic group one belongs to, he/she must use Vietnamese on a regular basis and be familiar with it.

2. Literature gaps

There are already detailed studies on interferences of mother tongue in the English writings of Vietnamese students, such as "Some influences of Vietnamese writing habits on English academic writing by students at Vietnam National University" (Phan, 2014). The students' inaccuracies she scrutinized include the habit of putting the subordinate clause before the dependent one and the adverbial phrase at the beginning of the sentence as well as using inappropriate vocabulary due to translating word by word. Those are the typical mistakes that we also intend to examine. However, some of her subjects were from University of Natural Sciences and University of Social Sciences and Humanities, which means their majors were not English Language.

Moreover, Do from College of Foreign Languages, Hue University also carried out extensive research in 2011. She presented her work in an article named "Some influences of Vietnamese writing habits on English academic writing by Vietnamese students at universities." She illustrated some errors in the students' styles, as a result of their dream to have their assignments or products appreciated by the instructors, or published on articles. The typical one is the high tendency of arranging the adverbial clauses prior to the main one, or at the beginning of the sentences. Despite being acceptable in informal writing, it is considered not highly academic on that excessive writing style. However, this research only put an emphasis on the seniors of College of Foreign Languages, Hue, and the writing section in an end-term examination. In an exam, there is insufficient time to preview the work, and the research was conducted 9 years ago, which is out of date currently.

In conclusion, both those two researchers focused mostly on grammar-related issues, and their studies are somehow out of date. Moreover, to the extent of our knowledge, none of the local researchers have carried out a study on a similar topic on English-majored first-year students at University of Languages and International Studies, Vietnam National University, Hanoi. My research is expected to fill this gap of time and subjects as well as examining some more influences regarding sentence link that were not included in their studies.

=> **Research questions:**

[1] How does Vietnamese affect subjects' English writing skills ?

[2] Is there any possible way for FELTE freshmen to mitigate mother tongue interference in their English language writing?

PART III: FINDINGS

1. Questionnaire analysis

1.1. Based on types of influences

Table 1: The percentage of respondents who were influenced by Vietnamese in terms of GRAMMAR

	Always	**Often**	**Sometimes**	**Rarely**	**Never**	**Not sure**
Question 1	5.95	45.24	40.48	7.14	1.19	0.00
Question 2	1.19	40.48	44.05	7.14	2.38	4.76
Question 3	7.14	51.20	35.71	5.95	0.00	0.00
Question 4	1.19	2.38	14.29	34.52	46.43	1.19

As can be seen from Table 1, second-year students are strongly affected by Vietnamese writing routines in terms of grammar. The rate of students whose responses were "Always" and "Often" when asked about how frequently they put the subordinate clause before the main one was more than 51%. Those of putting the adverbial clauses of time and condition before the main ones were 41.67% and 58.34%, respectively. Finally, only 3.57% of the survey respondents used the Vietnamese past form instead of the actual English phrases (Eg: "I did go" instead of "I went"). A large number of students occasionally put the subordinate, time, and conditional clauses prior to the main ones. However, 80.95% reported as rarely or never translated the Vietnamese past form of expression into English. A small number of students were not able to recognize their routines, which resulted in their "Not sure" answers.

Table 2: The percentage of respondents who were influenced by Vietnamese in terms of VOCABULARY

	Always	Often	Sometimes	Rarely	Never	Not sure
Question 1	1.19	5.95	51.20	36.90	2.38	2.38
Question 2	0.00	1.19	13.10	26.19	57.14	2.38

As can be seen from Table 2, very few first-year students got confused by the meaning of Vietnamese synonyms when expressing their ideas in English. For instance, only 7.14% struggled to find the difference between "nice play" and "fair play". However, 51.2% occasionally had difficulty in detecting the dissimilarity. When it came to mistake in terms of word order (Eg: "the red hat" and "the hat red"), the rate of "Always" and "Often" answers was only 1.19% in total. 83.33% of the respondents were able to avoid this mistake. Nevertheless, a small number of freshmen filling in the questionnaire did not pay much attention to their writings, as they selected the "Not sure" option.

Table 3: The percentage of respondents who were influenced by Vietnamese in terms of SENTENCE CONJUNCTIONS

	Always	Often	Sometimes	Rarely	Never	Not sure
Question 1	7.14	14.29	30.95	29.76	14.29	3.57
Question 2	1.19	4.76	4.76	25.00	64.29	0.00

As can be seen from Table 3, only a minority of first-year students from FELTE (21.43%) regularly forgot to use a comma before the conjunctions of the FANBOYS group. Regarding making a complex sentence with "However...but" or "Because...so", the rate of "Always" and "Often" responses was even only 5.95% in total. Specifically, 64.29% never made this mistake.

1.2. Based on groups of respondents

Table 4: The percentage of respondents with English proficiency certificates who were influenced by Vietnamese

	Always	Often	Sometimes	Rarely	Never	Not sure
Question 1	3.33	36.67	53,34	3.33	3.33	0.00
Question 2	0.00	33.33	53.34	10.00	0.00	3.33
Question 3	6.67	53.33	40.00	0.00	0.00	0.00
Question 4	0.00	6.67	10.00	43.33	40.00	0.00
Question 5	0.00	0.00	33.33	50.00	13.34	3.33
Question 6	0.00	3.33	0.00	30.00	63.34	3.33
Question 7	3.33	10.00	36.67	33.33	13.34	3.33
Question 8	3.33	6.67	3.33	23.33	63.33	0.00

From table 4, it is obvious that in general, first-year students who obtained a B2-level English proficiency certificate were less affected by Vietnamese writing habits. The strongest influences consisted of putting the subordinate, time, and conditional clauses before the main ones. Very few students found themselves always making these mistakes. On the other hand, a majority never or rarely were affected by three Vietnamese writing routines which are using the Vietnamese past form instead of the actual English phrase (Eg: "I did go" instead of "I went"), getting confused by Vietnamese synonyms in English ("nice play" and "fair play") and using both "Because...so" and "However...but" in one sentence.

Table 5: The percentage of respondents without English proficiency certificates who were influenced by Vietnamese

	Always	Often	Sometimes	Rarely	Never	Not sure
Question 1	7.40	50.00	33.33	9.27	0.00	0.00

Question 2	1.85	46.30	38.88	5.56	1.85	5.56
Question 3	7.41	50.00	33.33	9.26	0.00	0.00
Question 4	1.86	0.00	16.66	29.62	50.00	1.86
Question 5	1.86	9.26	38.88	29.62	18.52	1.86
Question 6	0.00	0.00	20.37	24.07	53.70	1.86
Question 7	9.26	16.67	27.78	27.78	14.81	3.70
Question 8	0.00	3.70	5.56	25.93	64.81	0.00

From table 5, it can be seen that students who had not obtained an English Proficiency Certificate had a high tendency to put the adverbial clauses of time and condition prior to the main ones. However, a majority of them rarely or even never applied the Vietnamese past form into English sentences, made mistakes in terms of word order (Eg:"the hat red" instead of "the red hat"), and used both "However...but" or "Because...so" in one sentence. In comparison, second-year students who had obtained an English Proficiency certificate were less affected by Vietnamese writing habits in terms of grammar, vocabulary, and sentence conjunctions. The analysis based on groups of respondents indicates that in students at B1+/B2 level of English proficiency, the influence of Vietnamese was less frequent.

2. Interview analysis

First of all, the majority of respondents agreed that their inaccuracies in writings often appeared in writing tests under time pressure due to the insufficient time to prepare and review. An interviewee, however, claimed that the first drafts of his writing assignments contained grammatical errors which were influenced by Vietnamese writing habits rather than in tests or exams due to his concentration on producing ideas. In addition, most students admitted that they were not aware of the Vietnamese influence errors. Only two students responded that they were able to detect a few of their own mistakes.

Answers to the third question proved the helpfulness of academic assistance in class. Most interviewees reported that their teachers often pointed out the influences for them. On the

other hand, peer-feedback was believed to be less effective than expected by all interviewees. It could be explained as most of the students did not have enough capabilities to detect the Vietnamese influences. The responses to the first three questions indicated that in general, the students were highly influenced by their mother tongue and lacked the abilities to find the inaccuracies in their and their classmates' writings.

However, several measures for FELTE freshmen to mitigate Vietnamese influence in English language writings were suggested by the interviewees. The students who were less affected by Vietnamese writing routines reported that they usually learned English via reliable websites such as "phrases.co.uk" and "thefreedictionary.com". They also formed a habit of constantly watching TV shows and reading books in English to get more familiar with native speakers' thinking process. Specifically, one student who obtained an IELTS Certificate with writing score of 7.0 in 2020 declared that he wrote paragraphs and essays about social topics and shared them via major websites on a regular basis.

PART IV: DISCUSSION

The findings helped the researchers to find out the answers to two intended research questions.

1. How Vietnamese writing habits affect subjects' English writing skills

Vietnamese writing habits affect first-year English-majored students in terms of grammar, vocabulary and sentence conjunctions. Specifically, grammar-related inaccuracies such as putting the subordinate clause prior to the main one was proven to be the most commonly made mistakes. The rates of students who found themselves making mistakes in terms of word choice, word order and sentence conjunctions were much lower. The data gathered from questionnaire responses and interviews indicated that at B1+/B2 level of English Proficiency, most of FELTE freshmen could avoid basic mistakes like making a sentence with "However...but" or "Because...so". It is also noteworthy that when in a examination room and experiencing time pressure, first-year English-majored students make mistakes caused by native language interference much more often.

2. Appropriate methods for FELTE first-year students to mitigate mother tongue interference in their English language writing

Every English learner, especially FELTE freshmen knows for sure that to alleviate the influences of Vietnamese writing habits, it is a must to think in English instead of their mother tongue. However, not everyone knows how to train themselves to think in English. Fortunately, the researchers are able to suggest several measures after interviewing some of the questionnaire respondents and discuss with them in-depth about their learning routines. The students who said they rarely or even never made the mistakes included in the questionnaire claimed that they built a habit of watching TV shows and reading books in English on a regular basis to familiarize themselves with native speakers' thinking process. Broadening self-knowledge of vocabulary and idioms with the help of reliable and helpful websites such as "phrases.co.uk" and "thefreedictionary.com" is another problem-solving approach. Last but not least, writing skills need to be cultivated in other environments outside school. Therefore, students should try to write in English as much as possible instead of only writing to complete their assignments. A daily habit of sharing thoughts and information via social networkingsites will boost students' abilities to use English in the written form.

PART V: IMPLICATIONS

Although all the researcher put all his efforts into conducting this study, the appearance of mistakes is inevitable. There are several reasons for that unwanted result:

[1] The amount of time for carrying out this research was quite limited.

[2] The researcher was only able to work with subjects from 4/20 classes from FELTE, ULIS.

Due to all reasons mentioned above, researchers who aim at examining the Vietnamese interference in English language writing in the future can fill the gap of my research by investigating on a larger and more practical scale, or into other influences that were not scrutinized in my investigation.

APPENDICES

APPENDIX A: THEQUESTIONNAIRE

I. Subject's information

1. Name:
2. Class:
3. Email address:

II. Please answer the following questions:

1. Were you:

A. A student who majored in English at a specialized school ? (Eg: Foreign Language Specialized School, HNUE High School, provincial gifted high schools, etc.)

B. A student whose major was not English at a specialized school ?

C. Going to a non-specialized school ?

D. Others

2. What are your English proficiency certificate and your **WRITING** score ? When did you obtain your certificate ? (Eg: IELTS Certificate 7.5 - 2018). If you haven't got one, write N/A. (Note: DO NOT answer the OVERALL score)

III. Choose the options that are most suitable for yourself

Section A: Grammar

1. How often do you put the subordinate clause before the main clause when WRITING ? (Eg: <u>When we study in primary schools</u>, we can have wonderful memories with friends.)

A. Never   B. Rarely   C. Sometimes

D. Often   E. Always   F. Unsure

2. How often do you put the adverbial clause of TIME before the main clause when WRITING ? (Eg: <u>At the same time</u>, the teacher should be a facilitator in the learning process of students.)

A. Never   B. Rarely   C. Sometimes

| D. Often | E. Always | F. Unsure |

3. How often do you put the conditional clause before the main clause when WRITING ?

(Eg: If we do not concern about the environment protection, human's life can be endangered.)

| A. Never | B. Rarely | C. Sometimes |
| D. Often | E. Always | F. Unsure |

4. How often do you apply the Vietnamese past form into English sentences ? (Eg: "*I did go*" instead of "*I went*")

| A. Never | B. Rarely | C. Sometimes |
| D. Often | E. Always | F. Unsure |

Section B: Vocabulary

1. How often do you make mistakes in terms of word choice ? (Eg*: "nice play"* instead of *"fair play"*)

| A. Never | B. Rarely | C. Sometimes |
| D. Often | E. Always | F. Unsure |

2. How often do you make mistakes in terms of word order ? (*Eg:"the hat red"* instead of *"the red hat"*)

| A. Never | B. Rarely | C. Sometimes |
| D. Often | E. Always | F. Unsure |

Section C: Sentence conjunctions

1. How often do you forget to use a comma before FANBOYS ?

(*Eg: He felt tired **SO** he went to bed.*)

| A. Never | B. Rarely | C. Sometimes |
| D. Often | E. Always | F. Unsure |

2. How often do you make a complex sentence with **However...but** or **Because...so** ?

(*Eg: **Because** he felt tired, **so** he went to bed.*)

| A. Never | B. Rarely | C. Sometimes |
| D. Often | E. Always | F. Unsure |

APPENDIX B: INTERVIEW SAMPLE

Interviewer: Shall we begin ?

Subject X: Sure.

Interviewer: Your response to our questionnaire says that you weren't going to a specialized school, and you got an IELTS Certificate with the writing score of 7.0 in 2020. Is that true ?

Subject X: Yeah, it's true.

Interviewer: It also indicates that you find yourself highly influenced by Vietnamese writing habits in terms of grammar such as putting the subordinate clause before the main clause. I want to know if you often make these mistakes in writing exercises that you do at home, with enough time to prepare and review or in writing tests under time pressure.

Subject X: Those influences are usually found in the first drafts of my writing assignments. That's because at that time, I tend to focus more on the ideas than on the grammar. I take a look at my writing assignments before writing the second drafts and correct my mistakes, so usually things go quite well at this stage. That's how I do writing exercises at home. When it comes to tests and exams, I try my best to make things right at the first time.

Interviewer: So that means you usually recognize your own mistakes and correct them when writing draft 2.

Subject X: Yeah, you got it.

Interviewer: Have your classmates and teachers ever pointed out those inaccuracies for you during peer-check or marking ?

Subject X: They usually don't. My teachers often give comments when I make mistakes in terms of tenses or word choices. Probably because those influences of Vietnamese writing habits don't appear in the final versions I submit.

Interviewer: Have you ever found the interference we mention in our questionnaire in your peers' writings ?

Subject X: According to my memory, my friends don't make mistakes in terms of word choice and word order. However, sometimes they forget to use a comma before FANBOYS.

Interviewer: Well, have you ever detected any other influence in yourself and your classmates ?

Subject X: My peers have a tendency to directly translate idioms into English instead of using the ones native speakers use. Rather than that I see no interference.

Interviewer: Could you please give me an example ?

Subject X: Many of my friends use the phrase "polish one's name" when they mean "đánh bóng tên tuổi", which is a direct translation.

Interviewer: You told me that you usually try to self-correct before writing draft 2. Do you have any other way to mitigate the Vietnamese influences ?

Subject X: I spend a lot of time on "phrases.co.uk" and "thefreedictionary.com" to broaden my own knowledge. When I'm stuck I try to express my ideas in other ways, sometimes longer than the actual English idiom. For instance, I use the phrase "bolster one's reputation" when I mean "đánh bóng tên tuổi".

Interviewer: Do you often watch English TV shows ? I'm asking because some researchers claim that watching English TV shows helps you to think more like the natives.

Subject X: News program is the only TV show I watch that isn't in English.

Interviewer: Are those programs related to your personal interests such as sports, music, economics and politics or do you watch them to cultivate your listening skills ?

Subject X: They're the programs of my interests.

Interviewer: Do you read books on a regular basis ? If so, what's your favorite type ?

Subject X: I read quite a lot, about one book per month. Most of them are non-fiction. My go-to books are those about history and politics.

Interviewer: Is there another environment for you to use English in the written form besides classes such as a part-time job ?

Subject X: Yes, there is. I usually write stuff on Reddit. I haven't got a part-time job, but when I do, I'm pretty sure writing will be involved.

Interviewer: That was the last question. Thank you so much for your time and contribution to our survey.

Subject X: You're welcome.

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Collaborative learning with CCC members in Learning 21st century skills and worldviews during the COVID-19

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Abstract

This study examines the effects of dialogue with CCC (Campus Crusade for Christ) members (1 CCC vs. 3 students) on Japanese English learners' attitudes toward speaking English. The authors focus on how students feel about speaking English and explore the effects of presentations and frequent interactions with CCC members by analyzing their statements in questionnaires and pre-post Speaking Tests. To help prepare for the digitized society, the participants (n=17 Japanese university students) studied English and presentation skills from April 2021 to January 2022 on topics derived from epistemology and ontology. The pedagogical training focused on helping students find solutions to humanity's many crucial issues in the 21st century. Throughout the 30-week online program, training in higher-order thinking skills and integrating ICT and human dialogue with young overseas people was emphasized.   The learning procedures were as follows: 1) Flipped and TBL lessons were conducted throughout 30 weeks, actively engaged in presentations with slides and discussions with MP4 videos uploaded on Facebook after the presentation. 2) All students (n=17) had their English lessons using real-time virtual interaction with Zoom. In addition, students interacted with the CCC members every three weeks during the first term and every other week during the second term. This interaction aimed to improve cross-cultural communication skills with some feedback about their presentations. Furthermore, in May 2021, the students took an Oral Proficiency Interview-computer speaking pre-test and post-test in January 2022. The students' mean score level improved from CEFR B1.1 to B1.2. Finally, pre-questionnaires and post-questionnaires are compared to examine their progress of oral proficiency and cross-cultural sensitiveness. By observing the lessons over two semesters, it was found that the activities impacted the students' perspectives on studying cross-cultural communication skills and different worldviews. In addition, they provided contextualization and socialization to the learning through the interactive and meaningful context of the training.

Keywords: ontology, epistemology, worldviews, TBL, flipped learning, integration of human interaction, ICT/AI

CYBERCULTURE IN TEACHER EDUCATION: A SOUTHERN BRAZILIAN EXPERIENCE IN INTEGRATING DIGITAL CULTURE ACROSS AND BEYOND CURRICULUM

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Abstract

Complexity inherent to educational innovation must be aligned with structural changes on information and communication technologies (ICT) to accommodate intellectual and critical thinking development. Based on that scenario, the authors understand that not only ICT must be part of the educational sphere, but also the digital culture itself should be included in pedagogical concepts and practices. The teacher's role and the ability to respond to unpredictable situations in everyday educational situations depend on ICT integration. This study proposes a two-pronged experience report to articulate how digital culture, or cyberculture, has been introduced and implemented throughout teacher education courses at a Brazilian university, as well as how education itself might be influenced by ICT in post-pandemic scenarios in Brazil. Two-decades of experiences reported from Letters and History undergraduate courses within UNIJUI, a southern-Brazilian university, evidence the importance of involving digital technologies in teaching and learning processes not only within one discipline but also across and beyond curriculum. The current work on Traças Digitais (Digital Bookworms) and App Go allows the authors access to updated information on Brazilian teaching teachers' education context. Results suggest that teacher education requires knowledge built over time, new methodologies raised, and countless activities developed. Teacher education also requires a blend of human and technological education to comprehend the contemporary challenges. Curricular Hybricity, ICT uses, and multimodal learning are set ups for further studies and research.

Keywords: cyberculture, teacher education, Brazil education, curriculum

Examining Gender and Urban/Rural School Differences in Empirically-derived Achievement Profiles

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ABSTRACT

The present study used a person-oriented approach to examine gender differences at the level of achievement profiles and examine such differences in the context of urban and rural schools. The achievement test scores in English, math, and science of 2,408 tenth-grade students were used to derive achievement profiles through agglomerative-hierarchical and k-means clustering techniques. Four profiles were derived: 1) Low Achievers, 2) True Average Achievers, 3) High Achievers with weak math and science skills, and 4) High Achievers with strong math and science skills. Significant gender and urban/rural school differences among the profiles were found after performing cross-tabulation analyses with chi-square testing. The so-called "female advantage" in education was more evident among Low Achievers, but not among the High Achievers. When the urban/rural school context was considered, the female advantage tends to disappear and the urban school advantage becomes more definite. Finally, the High Achievers with weak math and science skills were mostly females in urban schools. The findings suggest that it is important to situate gender differences in a certain context. Implications for practice are provided, as well as recommendations for future research.

KEYWORDS: Gender differences, urban and rural schools, achievement profiles, cluster analysis, Filipino students

1   INTRODUCTION

Many educational institutions all over the world are seeing a reversal of gender disparity in educational attainment. Girls and women are being documented as having higher general achievement than boys and men (Bacharach et al., 2003; Clark et al., 2008; Demie, 2001; Hubbard, 2005), and are over-represented in academic completion and success (Becker, 2014; Cohn et al., 2004; Quenzel & Hurrelmann, 2013; Saunders et al., 2004; see reviews, Buchmann et al., 2008; Hadjar et al., 2014). Most scholars (e.g., Adamuti-Trache et al., 2013; Etim et al., 2016; Legewie & DiPrete, 2012; Lörz et al., 2011) consider this as a significant change from the past that saw the male advantage and, at the same time, a different version of disparity in the access to education. Such is still a problem that invites further research, since this gap will eventually have large-scale impact in various social, political, and economic structures (Berggren, 2011; Klasen & Lamanna, 2009; Seguino, 2000).

Basically, understanding gender disparity in educational attainment and success is done by looking into performance differentials of students in achievement tests. Reviewing this research area, however, depicts a somewhat messy picture. First, studies that focused on domain-specific achievements (e.g., specific math achievement, specific reading achievement) largely point that gender achievement differences are only minimal and negligible (Dimitrov, 1999; Rosén, 1995; Stumpf, 1995; see review, Hyde et al., 1990). Second, investigations using a nested-factor model of achievement, which specifically examined achievement in one subject area while controlling for the influence of general academic achievement (the g in education), provides evidence for large gender differences favoring males in terms of math and females in terms of reading (Brunner, 2008; Brunner et al., 2008, 2013). Lastly, research works that focused on achievement differences by gender alone were strongly criticized as being context-free. Consideration of other factors, such as race, SES, and culture, along with gender has been advocated to provide a better picture of gender achievement disparity (Brunner et al., 2013; Chapin, 2006; Dimitrov, 1999; McDaniel et al., 2011; Scott, 1987; see reviews, Buchmann et al., 2008; Legewie & DiPrete, 2012).

Taken together, much of what we understand is that gender achievement disparity creates different scenarios depending on how academic achievement is conceptually and psychometrically framed. In addition, gender difference research may potentially reveal other important information when context is considered. This present study aimed to contribute in this line of research by considering academic achievement as person-oriented; by conceptualizing it as a student profile. This conceptualization is unique as it captures students' academic achievement as a configuration of achievements in different subject areas. Moreover, a commonly neglected school contextual variable, the school location (urban/rural schools), was considered in this study to better situate gender achievement differences.

2   THE IMPORTANCE FOR ACHIEVEMENT PROFILES

The person-oriented approach (Bergman & Wångby, 2014) provides for a theoretical basis for determination of students' academic achievement profiles. The basic proposition of this theory is that an individual is an organized whole with elements operating to achieve a unified functioning system (Bergman & Wångby, 2014; Sterba & Bauer, 2010). This means that there is structure and coherence in the way individuals function. In terms of academic achievement, this means that patterns of achievement in different subject areas can be discerned, thus the term achievement profile.

Surprisingly, extant literature has little to say about achievement profiles. There were works that examined students' achievement profiles but they separately examined achievements in different subject areas. That is, they did not document academic achievement holistically (e.g., Dimitrov, 1999). There were works also that may be described as close to a person-oriented conceptualization, such as the study on math-science expertise of mathematically precocious youth (Lubinski & Benbow, 2006), and the work on secondary school students' achievement profile shapes (Brunner et al., 2013). The latter was particularly interesting as it gave empirical evidence for the idea that students may have a profile of strong in reading but weak in math, and others a profile of strong in math but weak in reading. However, such work was predominantly variable-centered as gender disparity was examined only at the level of specific achievement and not at the profile level.

Several scholars argue that the use of the person-oriented approach allows researchers to make inferences about specific individuals, and not about the variables under study (e.g., Konold & Pianta, 2005; Yukselturk & Top, 2013). As non-overlapping, homogenous groups are inevitably created in doing a person-centered study, interventions and other practical considerations can be addressed directly to specific groups.

In this present study, achievement profiles were derived using tenth-grade students' achievement scores in three subject areas: science, math, and English. The focus on tenth-graders would enable to explore profile-level gender achievement disparity in the junior high school level, which may be tested in the future whether any trend could be replicated in senior high school and higher educational levels. Moreover, the emphasis on the three subject areas was justified since they are considered as the core courses. It is important to note that, with the person-oriented conceptualization of achievement, the profiles would be data-driven, hence the term empirically-derived. No specific hypothesis, or premeditated number of achievement profiles, guided the analysis. However, it was reasonable to expect that the achievement patterns that have been explored in the literature would be replicated: the math-science expertise and/or the high-in-reading-and-low-in-math pattern.

3   GENDER DIFFERENCES IN ACHIEVEMENT AND THE URBAN/RURAL SCHOOLS

Ceci, Williams, and Barnett (2009) proposed a general causal model why there are gender differences in cognitive performance and educational success. This model reinforces the person-oriented approach and solidifies the key theoretical proposition held in this study that there might be urban/rural school differences, aside from gender differences, in achievement profiles.

Accordingly, the interplay of individual and sociocultural factors affects individuals' cognitive performance and success. Ceci and colleagues (2009) mainly proposed that there are broad contextual influences (e.g., cultural beliefs, school location) that shape individual characteristics (motivations, beliefs, and activities), which in turn influence brain development and consequent abilities. These abilities are then manifested in assessed performances, such as achievement test scores. Biological sex enters the picture by directly affecting brain development through hormones or shaping broad contextual/cultural expectations, and by indirectly influencing brain development and abilities. Support to this model has been generally positive (Ackerman et al., 2013; Brunner, 2008; Brunner et al., 2008, 2013; Entwisle et al., 1994; Francis, 2000; Grabner et al., 2003; Johnson et al., 2009; Lubinski & Benbow, 2006).

In explicating the role of context, Brunner and his colleagues (2013) argued that the role of environment, including cultural differences in how education is valued and cross-national differences in educational systems, contributes to gender disparity in achievement. Buchman and his colleagues (2008) also noted that patterns of gender inequalities in education are, in fact, different for developing and highly industrialized societies.

In this study, the concept of urban/rural school was used as a social-contextual factor of gender achievement disparity. In a review article, Bæck (2016) argues that students in rural and urban schools vary in terms of the compositional and contextual effects of their communities. Specifically, for rural school students, compositional effects (e.g., ethnicity, SES and educational background of people in the locality) interact with contextual effects (e.g., local or regional labor markets, rural school management) of their community that impact their psychological attributes related to schooling, such as motivation, choices, preferences, and interests. More specifically, for boys and girls in rural schools, the patriarchal and masculine cultural features of rural societies, including gendered work and social patterns, contribute to gender differences in academic achievement.

Taken together, gender achievement disparity can be complex when we consider contextual factors, such as urban/rural location of schools. In this present study, however, no specific hypothesis was formulated on gender and urban/rural school differences in achievement profiles since the latter would only be empirically-derived. However, based on the review of literature, it was plausible to generally expect female advantage and urban-school advantage in achievement profiles.

4   THIS STUDY

This study aimed to contribute in the research on gender differences in academic achievement by (a) using a person-oriented approach and (b) considering the context of rural and urban schools. Specifically, two questions guided this study:
1. What achievement profiles can be derived from the achievement scores in science, English, and math of tenth graders?
2. Are there significant differences in empirically-derived achievement profiles when compared according to a) males and females, b) rural and urban schools, and c) males and females in rural and urban schools?

5   METHOD

5.1   Research Design

The appropriate design to use was descriptive, cross-sectional, non-experimental research (Johnson, 2001). Descriptive because this study aimed to describe achievement profiles of tenth-grade students; cross-sectional because comparisons will be made between males and females in rural and urban schools.

5.2   Sample and Data Source

The data used in this study were obtained from the Center of Educational Measurement (CEM), which is an institution that provides testing services for public and private schools all over the Philippines. A total of 2,408 tenth-grade students was randomly selected from their

database. These students were from the three major regions of the country: Luzon (23% urban; 20% rural), Visayas (10% urban; 26% rural), and Mindanao (17% urban; 5% rural). The achievement tests, covering English, math, and science, were K-12 curriculum-based tests assessing knowledge and skills for Grade 10 and were administered in the last quarter of school year 2016-2017. Only the total raw scores were used for this study.

5.3   Data Analytic Procedures

Preliminary data analysis was done to perform data cleaning. This mainly involved identification of multivariate outliers using Mahalanobis distance and examination of descriptive statistics for normality.

Cluster analysis was used an exploratory classification technique to answer the first research question. It was performed in two phases: the first was to determine the acceptable range of cluster solutions using agglomerative-hierarchical clustering and the second was to identify the best cluster solution within the identified range using k-means clustering. This technique was used in similar studies (e.g., Collie et al., 2017; Yukselturk & Top, 2013).

For ease of interpretation, the z-scores (M=0; SD=1) of the total raw scores for English, math, and science were used for the analysis. The agglomerative-hierarchical clustering used the Ward's method as the clustering algorithm and the squared Euclidean distance as the proximity measure to extract non-overlapping and homogeneous clusters. Benchmarking on the work of Collie and others (2017), the determination of the acceptable range of cluster solutions was based on the percentage change in agglomeration coefficients of cluster groupings, which should not be lower than 10%. In k-means clustering, the judgment of the best cluster solution was made on the bases of plausibility and relatively-balanced cluster sizes.

The best cluster solution was considered as the set of achievement profiles. Then, cross-tabulations with chi-square testing were done to answer the second research question. Specifically, one-way cross-tabulations were done to examine differences between (1) males and females and (2) urban and rural schools. Two-way cross-tabulation was also done to examine differences among males and females in urban and rural schools.

All analyses were performed using the IBM SPSS Statistics version 23.

6   RESULTS

The final dataset that was analyzed had 2,398 cases after ten outliers were deleted. There was approximately equal representation of rural females (25.10%), rural males (24.85%), urban females (25.06%), and urban males (24.98%). Table 1 displays the descriptive statistics, which generally indicate normality.

Table 1 Descriptive statistics

	M	SD	Skewness		Kurtosis	
			Statistic	Std. Error	Statistic	Std. Error
English	28.633	9.6006	.017	.050	-.956	.100
Math	21.826	8.5343	.672	.050	-.081	.100
Science	22.663	7.8977	.275	.050	-.641	.100

Note: Descriptive statistics were calculated on unstandardized variables.

6.1   Phase 1: Agglomerative Hierarchical Clustering

The identification of achievement profiles using scores in English, math, and science began with performing agglomerative hierarchical clustering with the data. The percent changes in agglomeration coefficients for two to ten clusters were computed, and it was revealed that moving from one to two clusters explained 44.74% variance in cluster groupings. Moreover, moving from two to five clusters explained 39.95%, 17.66%, and 10.72% additional variances, respectively. After this, moving from five to ten clusters explained less than 10% additional variances in cluster groupings. Hence, based on this information, the range of cluster solutions that should be explored further is two to five.

6.2   Phase 2: *k*-means Clustering

The *k*-means clustering was performed to generate two-, three-, four-, and five-cluster solutions with the data. The two- and thee-cluster solutions were first examined. In terms of the sizes of clusters in both solutions, a relatively proportionate representation of the sample is evident. However, in terms of the level of detail, the two-cluster solution reveals a high-in-all cluster and a low-in-all cluster as potential achievement profiles, while the three-cluster solution has a middle ground. Hence, the three-cluster solution was considered more desirable than the two-cluster solution.

Next, the three- and the four-cluster solutions were compared. It was revealed that the low-in-all cluster and the middle-ground cluster in the three-cluster solution are retained in the four-cluster solution. The high-in-all cluster, however, can be seen as being split into two clusters with marked difference in math and science scores. This pattern echoes the previous works of Lubinski and colleagues (2006) on high-achieving students' math-science expertise. That is, one cluster could be the high-achieving math-science expert profile and the other is the high-achieving math-science inexpert profile. Examining the cluster sizes of the four-cluster solution reveals relatively balanced sample representation. Thus, the four-cluster solution was considered more plausible than the three-cluster solution.

Finally, the four- and the five-cluster solutions were examined. In the five-cluster solution, one cluster is clearly the same as the low-in-all cluster seen in previous solutions. However, two clusters are somewhat duplicates of the other two, hence difficult to interpret. In terms of cluster sizes, there is somewhat imbalanced sample representation (e.g., one cluster has 14% and another 29%). The final, deemed most plausible, cluster solution was the four-cluster solution.

In Figure 1, the empirically-derived achievement profiles are shown based on the four-cluster solution. The profiles are labeled Low Achievers, True Average Achievers, High Achievers with Weak Math-Science Skills, and High Achievers with Strong Math-Science Skills, with sample representation of 31%, 30%, 21% and 18% respectively.
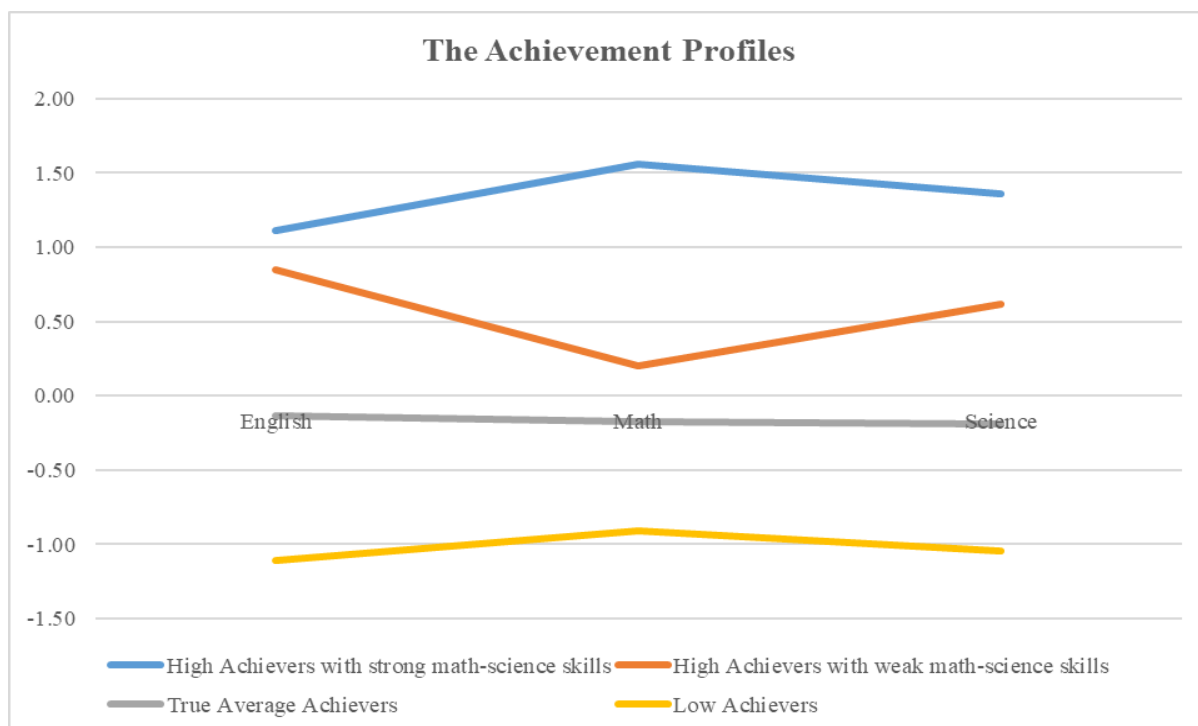
Figure 1: The empirically-derived achievement profiles

6.3   Cross-tabulations and Chi-square Analyses

Figures 2 displays the bar charts of 1) one-way cross-tabulation of gender and achievement profiles, 2) one-way cross-tabulation of urban/rural schools and achievement profiles, and 3) two-way cross-tabulation of gender, urban/rural schools, and achievement profiles. Chi-square tests revealed there are significant differences in achievement profiles when compared according to gender (Pearson's X^2 (3, 2398) = 43.84, p > .001, Cramer's V = .135) and urban/rural schools (Pearson's X^2 (3, 2398) = 437.79, p > .001, Cramer's V = .427). Also, there were differences in achievement profiles when females and males in urban and rural schools are compared (Pearson's X^2 (3, 2398) = 467.60, p > .001, Cramer's V = .263).

7   DISCUSSION

The present study aimed to examine gender and urban/rural school differences at the level of achievement profiles. Using cluster analytic techniques, four achievement profiles were derived from the data: Low Achievers, True Average Achievers, High Achievers with weak math and science skills and High Achievers with strong math and science skills. These profiles are non-overlapping; it can be said that a tenth-grader assumes an achievement profile that is one of the four profiles. While the two profiles are straightforward (the Low Achievers and the True Average Achievers), the other two (the High Achievers who are different in terms of math and science skills) are noteworthy. The studies of Lubinski and colleagues (2008) on the math-science expertise among gifted students were replicated with such finding. Specifically, it can be said that the high-achieving students can differ in terms of whether they are weak or strong in math and science subjects, and this difference cannot be observed among low-achieving and average-achieving students. Further research needs to be done to examine the background information of these students, including their cognitive and motivational characteristics.

Figure 2: Bar charts of cross-tabulations of gender, urban/rural schools, and achievement profiles
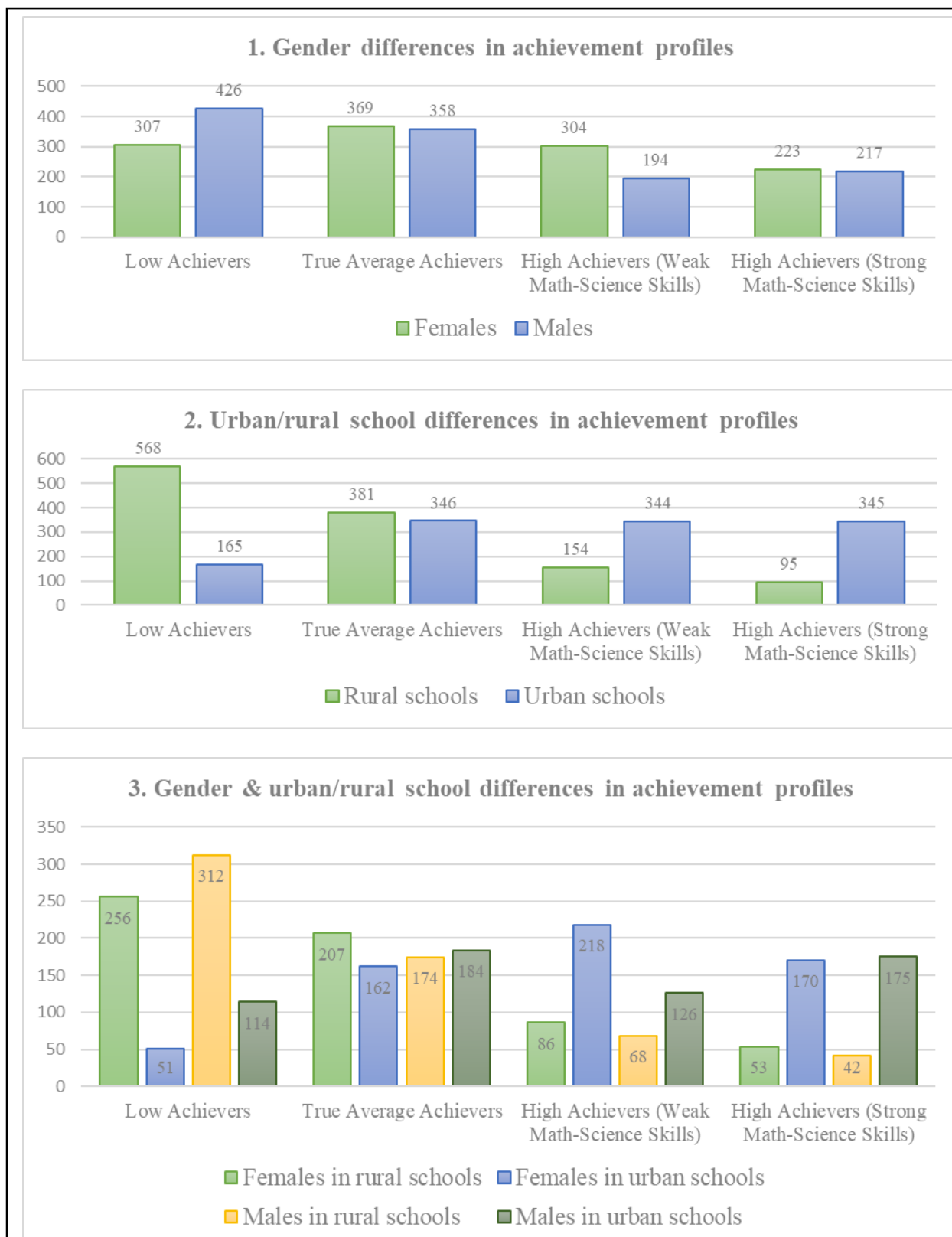
As displayed in the first bar chart in Figure 2, the gender differences in achievement profiles suggest that the female advantage is strong among Low Achievers, but not among High Achievers with strong math and science skills. This unique finding suggests that among the high achievers, there is not much of gender disparity. Further research needs to verify this finding. On the other hand, it is interesting to point that most High Achievers with weak math and science skills are mostly females. This finding might explain why, in senior high school and higher education levels, there is underrepresentation of females in STEM courses (Ceci et al., 2009).

In examining the urban/rural schools and the achievement profiles displayed in the second bar chart, the urban school advantage is outstanding and strong. Among Low Achievers, most are from rural schools. Among the High Achievers with strong and weak math and science skills, most are from urban schools. This finding supports the literature that certain compositional effects (e.g., low SES, ethnic minority background, low parental educational background) and contextual effects (e.g., rural school management) of rural schools are detrimental to students' academic achievement (Bæck, 2016). Generally, this finding invites more research to pin down the specific aspects of rural schools that do not facilitate high academic achievement among students. Similarly, more research also needs to be done to identify the specific positive effects of urban schools on students' achievement.

Finally, as displayed in the third bar chart, the differences among females and males in rural and urban schools reveal interesting findings. First, when school location is considered, the female advantage somewhat becomes more of an urban school advantage among Low Achievers and High Achievers with strong math and science skills. That is, the obvious difference is no longer between males and females but between urban and rural schools. This finding is very important as this suggests that gender differences blur when they are put in the context of urban/rural schools. In other words, there are pronounced differences in achievement when we examine between urban and rural schools, and not between males and females. More research needs to be done to verify this finding. Second, there is consistently more females than males who are High Achievers but weak in math and science skills across school locations, and most of these females are indeed from urban schools. This finding is unique, which invites more research to dig into the urban/rural school dichotomy and trace why there are more females with weak math and science in urban schools than in rural schools. Also, it is worth examining what interventions can be designed to target these high-achieving girls with weak math and science to allow them cope with high-achieving peers with strong math and science. Finally, the female advantage totally disappears if we compare high achievers from different school locations. For example, there are more male high achievers in urban schools than there are female high achievers in rural schools. Similarly, there are more female high achievers in urban schools than there are male high achievers in rural schools This finding supports other results that there is likely no gender disparity at all but only disparity between urban and rural schools. More research needs to be conducted to confirm this idea.

In general, it has been fruitful examining at once gender and urban/rural school differences in achievement. At its core, this study sends a message to achievement disparity scholars to focus on the urban/rural school dichotomy instead of males versus females. In addition, deriving achievement profiles has been informative in clarifying how students really differ among one another. The profiles indicate that the traditional classification of students into Low, Average, and High may not be feasible anymore. as differences among High Achievers

in terms of math and science expertise can potentially answer who chooses to major STEM courses in senior high school and higher education levels.

8   LIMITATIONS

This study has at least two limitations. First, the sample cannot be readily considered as nationally representative of Filipino students. It may be noted that the data were from students of client-schools of the Center of Educational Measurement (CEM), and most of these schools were, in fact, private institutions. Future researchers who might want to replicate the present findings may consider a nationally representative sample, a sample of students from a post-secondary school level, and/or a sample of students from different countries. Second, the clusters derived empirically need to be validated using an external variable (Pastor & Erbacher, 2019). In the case of the present study, no validation was done. Future researchers who might consider replicating the achievement profiles may do a validation by performing further statistical tests wherein the achievement profiles are the independent variable and theoretically-relevant constructs, such as college admission test performance and career interests, are the dependent variables.

9   IMPLICATIONS FOR PRACTICE

The findings of the present study have at least three implications for practice. First, there is a need to focus on low performers in both rural and urban schools. School administrators and heads may consider looking into their difficulties and formulate appropriate bridging programs to help them cope up with their high-achieving peers. Based on the findings, the focus on the low achievers is as important as remedying gender achievement disparity, since male and female high achievers (with strong math and science) tend to not differ with each other.

Second, there is a need to eliminate the urban/rural school differences as it is the factor that strongly creates achievement disparity among students. The male/female dichotomy may still be ignored, but not the urban/rural school dichotomy. Interventions may be planned to counter the effects of "rurality" of schools. To do this, more researches certainly need to be done, including dissemination of this information to policy makers who decide on resource allocation for urban and rural schools.

Finally, school administrators and teachers may need to identify who among the female high achievers in urban and rural schools are weak in math and science. They need to gather them as they are probably the cause whey there is currently underrepresentation of women in STEM courses. Intervention programs may be designed to remediate their weakness.

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Inclusive Education – A Prescript to Engagement by all Stakeholders

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Abstract

Inclusive education forms a crucial part of social cohesion that underpins fairness in any society, which means equal opportunities for all. Many countries have embraced this concept as the general view is that society will undergo a positive paradigm shift if education is all encompassing since education is a microcosm of society. However, the main question that should be addressed is to what extent is education inclusive? Does it cater for diverse student population, for example, the disabled (physically and mentally), students with mild, moderate and serious learning disabilities, different genders, ethnic groups, religious affiliations, classes, etc. A mixed research methodology can determine the core roles of the different stakeholders that underpin fundamental concepts of full inclusivity. Inclusive education can be realised if different stakeholders who are directly affected are taken on board. These would be students as the focal point, as well as teachers, schools, institutions where teachers are trained, curriculum developers and the government. Students' academic needs as well as their personal growth and development must be the prescript that informs the curriculum, and this must be embedded in all education policies and practices. Students' engagement and motivation form the bedrock of inclusive education as the support of the other stakeholders culminates in this. Lack of a strong academic background and the student's home language are some of the strategies used to deny enrolment to certain students. In essence, revising current practices with a view to updating policies and the curriculum to align them with students' educational needs will increase students' engagement and will therefore lead to full integration and success.

Key words:

Inclusive education, education policies, curriculum, learning disabilities, education reform

Introduction

It is the responsibility of all stakeholders to eliminate a system that prevents students from being taught in the same school and in the same class by applying inclusive education. Ainscow (1995) views inclusive education as a way of curbing discrimination in that schools have to enrol all interested students. In essence, this means that students with barriers to learning must be offered support to cope with the set curriculum and not be sent to a different institution or be given a 'special curriculum' which would prevent them from being included in mainstream education. To find out whether students and teachers understand what inclusive education entails, Rodrigues-Falcon et al. (2010) consulted more than 900 students and staff, and their results underscored an array of perceptions which need clarification. The findings of this consultation state that inclusive education is at times only inclusive to a certain point, as some practices include some groups and exclude others. In essence, inclusive education is a global concern because different nations are trying to carve a path to social cohesion by making equal education accessible to all. According to Hockings et al. (2012), the emphasis on inclusive education in England covers a wide spectrum with a view to strengthening the social fabric by having a diverse student demography in higher education. The emphasis is therefore on uplifting minority groups. Hockings (2010) also states that the 2010 Equality Act in England also supports inclusivity; this has compelled institutions of higher learning to review their pedagogical practices.

Although a study conducted in South Africa by Magare et al. (2010: 52) focuses on inclusive education, their definition is only based on barriers to learning, therefore they define inclusive education as 'the inclusion of learners who experience barriers to learning in a regular environment regardless of their diverse personal and interpersonal needs.' Magaba (2019: 6) focuses on structural, interpersonal and institutional miscommunication which leads to barriers manifested in 'social-markers like class, religion, education, gender, values and norms.' This is clarified by highlighting that in education, social-markers can have dire consequences as they tend to alienate certain groups which will lead to the education of young people being negatively affected. Although definitions of inclusive education differ slightly, the emphasis is on a system that is all-encompassing. The same principles must be enforced in higher education where lessons must be inclusive. However, studies indicate that academics have reservations about competencies in this regard, as 'professional skills and values associated with teaching diverse students are not well understood in the sector' (Hockings, 2012: 238). Lecturing is pinpointed as ineffective in inclusive education as academics deal with large numbers of students in lecture halls where lessons are streamlined to cover the outlined objectives within a given timeslot. In such cases, struggling students will be disadvantaged as there is no one-on-one interaction to check individual student's understanding of the topic; therefore, there is very little individual support during lectures.

To determine whether schools experience the same challenges, a study was conducted in an underprivileged area of the Western Cape. A positive outcome was obtained; while teachers admitted to not knowing how to implement inclusive education, the researcher nonetheless picked up good practices during class observations where teachers tried by all means to engage all learners by displaying a positive attitude towards the learners (Hall, 2002). In such cases, inclusivity in lessons is done unconsciously. In other cases, teachers are aware that they lack competence in delivering inclusive education, but they are eager to learn so that they can incorporate it in their lessons (Rapmund & Moore, 2002: in Magare et al. 2010). This is true for many teachers in South Africa, since students/learners who experience barriers to learning used to be enrolled in special schools, but the system is now open to all students. In essence, this means that most teachers in mainstream schools did not get training in including this group of students in their lessons as there were few of them in mainstream classrooms, if any. In those years, students who encountered

challenges in learning were referred to remedial teachers who were the ones responsible for these students. Although such students were enrolled in mainstream schools, they were segregated because they had their own class and teacher/s. However, the status quo has generally changed; all students attend lessons in the same class and teachers have to employ methods that include everyone.

Classrooms are a microcosm of society where diversity is common; if education does not cater for some students, it means that part of society is not catered for. With the necessary support, all students are capable of reaching their full potential. This is one of the reasons that has prompted many countries to include students who were originally only allowed to enrol in special schools, in mainstream schools. South Africa is one of the countries that are promoting inclusivity in schools, as its stance is that education must not be used as a tool to marginalise, polarise and segregate. Classrooms are made up of individual students who cannot perform at the same level, but are capable of performing in their own way and at their own pace. Students also express their best in different ways, therefore, inclusive education must be a way of assimilating all the students. No good can come of giving only a certain group of students support, since such actions will only benefit one group at the expense of another. If groups of students are stereotyped as 'different' and pushed to the periphery, these side-lined groups will end up being unfairly marginalised by not being included in the mainstream group. Such practices do nothing but polarise classes/communities, which will have a negative impact as they often result in social disharmony. Equal education must be open to all as it is the key to enlightenment and better prospects for all.

Education methodology and its impact: The role of teachers

The synergy between the teacher's role and students' academic needs is pivotal as it underpins strategies that must be employed by teachers so that students can attain success. According to Coates et al. (2008 in Zepke & Leach, 2010), when teachers utilise different methods of assessments where they ask students to analyse, evaluate, differentiate, and the like, they are testing the students' higher-order cognitive skills, which will compel them to engage more actively with the task in a more engaged manner. This is important as when such tasks are set, the focus is likely to shift from just attaining marks, to actually learning and applying that knowledge in different forms. Similar pedagogical practices may transform lessons into hives of activity as they integrate different abilities with the students exploring concepts from an array of angles. The fundamental role of teachers is to address students' needs by tapping into their strengths and building on them, whist also identifying areas for development in order to ensure a balanced outcome that addresses students' varying needs. Bryson and Hand (2007) emphasise the positive impact of encouraging participation which results in improved student engagement and attainment.

It is crucial for teachers to create a positive learning environment as it can restore normality by drawing in disengaged students. Most students would greatly benefit from teachers' application of varied, but higher-order assessments; this is likely to stretch the thinking capacity of all students. If teachers prepare lessons and utilise resources that cater for diverse abilities, then this will widen the margin for success as all students will be engaged in lessons. Teachers must demonstrate an array of strategies that will pique interest in learning for all ability groups by sourcing teaching materials that will challenge disengaged students.

Zepke and Leach (2010) explored the research literature and summed up their extensive review in ten proposals which integrate various aspects of a holistic approach. This approach addresses students' educational needs, subsequently tabling findings that will contribute to students' success. All ten proposals have teachers as the bedrock of students' attainment, as the students' individual success hinges on the positive contribution of facilitators. Schuetz (2008) views student motivation as a driving force for success, while other studies attribute students' success to the pivotal role

played by teachers (Kuh, 2001 in Zepke & Leach, 2010). This is an indication that even though other components play an important role in meeting students' needs, teachers bring inherent qualities that assimilate salient features which help students to reach their potential.

In order to restore inclusivity, some questions which resonate with teachers' roles in an inclusive classroom include, among others:

- Do teachers encourage group work made up of students with different abilities to encourage inclusivity and peer learning?
- Is the classroom layout conducive to inclusive learning?
- Do teachers identify students' strengths and weaknesses?
- Do lesson plans cater for students with different attention spans?
- Is there room for flexibility when conducting lessons if there is a need to monitor the engagement of certain students?
- Are teachers approachable and accessible to all students?
- Are tasks differentiated to include students with different abilities?
- Is there preparation to avert unnecessary disruptions in lessons?
- Is the time allocated before students are assessed on a topic fair?
- Are different strategies employed in assessing students?

By virtue of being the facilitators of inclusive education, teachers can transcend theory into practice through good pedagogical strategies. If they shirk responsibility for inclusivity in their lessons, then inclusive education will be an ideology that will not gain traction.

Students' level of engagement in lessons

Student engagement is at the core of students' success because without this, all the measures taken will be in vain. It is imperative that students are motivated to be actively involved in their education, but self-motivation must not be ignored as it can pique students' interest in their studies, which when coupled with good teaching, can help them attain success beyond their expected level. Students' level of engagement or lack thereof can stem from a number of things. Some questions that need to be addressed are:

- Are there disengaged students in class?
- If so, why are they disengaged?
- What measures are taken to engage them in lessons?
- What can be done to make them reach their full potential?
- If there are no disengaged students in a class, are the students learning at different paces and what measures are utilised to make all the students benefit equally from each lesson?
- Are there any teaching methods that benefit most if not all students in a class?
- Which assessment methods best suit all the students' learning methods?
- What can be done to make students reach their full potential?
- Are the school's intervention methods for struggling students applying the right tools to support a wide variety of students who need support?
- Does the number of students in a class play a role in how students engage in lessons?
- Are lessons teacher-centred or student-centred?
- Are all students encouraged to be actively engaged in lessons?

If it is not mandatory in a school for teachers to ensure that all students are included in inclusive education lessons, then the practice would be a façade as it will lack any basis for alienating some members of the core group.

School support systems

To students, the school is supposed to be home away from home as that is where they spend most of the days during term time, and that is why teachers act in loco parentis (in the place of parents). However, the school is sometimes not as warm and welcoming as it is supposed to be, particularly when it alienates some students. In order to make any school a place where students go for both educational and personal growth and development, some pertinent questions need to be answered. Some of these questions underscore certain areas that need to be analysed.

- Does the school offer support to students with disabilities (mental and physical), and does it cater for cultural, religious, linguistic diversity and other differences?
- Are systems in place to help integrate students who come from diverse backgrounds?
- Does the school cater for students with varied learning paces (fast, moderate and slow learners)?
- Are all teachers at the school equipped to teach inclusive classes to at least a satisfactory level?
- Is it fair to subject students to an entrance test in an inclusive school and use the results to decide who will be allowed to enrol?
- How are students with barriers to learning accommodated in classes?
- Are students' learning challenges rated for specialised support?
- How is a needs analysis done of all students?
- If there is need for support, what is the timeframe allocated for the affected students to get the required support?
- Does the school policy cater for inclusive education?
- Does the school timetable accommodate students with a short attention span as well as for fast learners (this is based on the different time schedules for lessons which range from 30 minutes to 55 minutes per lesson)?

The school is at the heart of formal education; therefore, it is important that it operates in an inclusive manner that resonates with students' needs. If the school falls short of addressing pertinent questions in inclusive education, then measures must be put in place to address any shortcomings.

The role of curriculum developers and teacher training institutions

Education policies and the setting and adoption of the curriculum are the bedrock of what students are going to learn and these can make or break students and teachers as they navigate their paths. A few questions to ponder which might underpin challenges which will have a ripple effect on curriculum developers and teacher training institutions to schools, teachers and students highlight the following:

- Does the curriculum cater for diversity?
- Are teacher training institutions preparing teachers to be competent in inclusive education?
- As all teachers are now expected to teach classes that are diverse, are all teachers trained in inclusive education to a competent level?
- What is being done to retrain teachers who are lacking in inclusive education?
- Are there resources to help schools and teachers to engage actively with inclusive education?

The curriculum underpins what students are going to learn, so if it lacks clarity, the system will yield negative results. It will also negatively affect students' academic prospects.

Practical implications of inclusive education delivery

Inclusive education is based on the premise that if the doors of learning are open for all, then all the stakeholders will work seamlessly together for the greater good of education values and practices. However, the implementation of inclusive education has exposed gaps in competencies on a scale that is unprecedented. This has raised concerns across the spectrum in countries that have adopted and implemented inclusivity in classrooms (Nel et al. 2016, Magare et al. 2010, Savolainen et al. 2012, Hockings, et al. 2012). The different studies highlight the important role that teachers play in implementing inclusive education, but if they lack competence in delivery due to lack of training, then the implementation success rate will be capped at a low rate.

In order to emphasise the pivotal role of inclusivity in education, an official document positing measures that will intercede in underpinning the synergy between education and equality was introduced in the form of 'Education White Paper 6' – Special Needs Education: Building an Inclusive Education and Training System (Department of Education, 2001). Its aim was to transcend the education system, hence one of the most important changes was to endorse open enrolment in mainstream schools where students who were labelled 'special needs' would be taught the same curriculum and in the same classes as all the other students. However, challenges in implementation have been a serious concern, thus more than 20 years after the adoption of 'Education White Paper 6,' studies are still being conducted to try and uncover the trends that hinder progress in inclusivity in the classroom. To gauge teachers' perceptions on how confident they are in dealing successfully with inclusivity, the SACIE scale (SACIE - Sentiments, Attitudes and Concerns about Inclusive Education) has been used to understand the underlying issues that affect implementation (Loreman et al. 2007, in Savolainen et al. 2012). The SACIE scale is ideal for collecting large data, as participants can answer questions posed in terms of one of the four tabulated responses, 'strongly agree, agree, disagree, strongly disagree.' Analysis of responses from the scale can quickly indicate whether certain pedagogical practices resonate with teachers' perceptions of actual inclusive education implementation in the classroom or not.

A classroom that is inclusive covers diversity in terms of culture, beliefs, background, learning speed and disabilities (deaf students, students with vision problems, ADHD students, autistic students, students with physical disabilities, etc.). In essence, teachers are likely to have a class that will be diverse in one way or another, and will require time and support to maximise the potential of every student. This resonates with Nel et al. (2016) when they define inclusive education as an 'evolutionary process.' Giving support to teachers is pivotal as it is the bedrock that will ensure a positive outcome for students. Interestingly, Nel et al. (2016) highlight the lack of support, as do Walton et al. (2014) when stating that policies are available, for example, 'Education White Paper 6' (Department of Education, 2001), but there is no clarity on implementation. This can alienate some students, especially considering that teachers in mainstream schools were thrust into, diverse classrooms without prior training to ensure good practice.

For many years during apartheid, South Africa was segregated along racial lines, and the element of separation was evident in the education system where race and language were used to separate students. This was termed 'Separate but equal' (Department of Education, 1967). This bad precedent, which was signed into policy many years ago, was replicated from a different angle when disability was used to segregate students for many years, hence there is now pressure to correct 'separate education.' Prejudice and segregation will adversely affect education, therefore it is imperative for different cultures to be integrated in the education spectrum to ensure that future generations are spared the social inequality and divide (Magaba, 2019). In view of practicality of

implementation, Engelbrecht et al. (2012) posit that about 65% of teachers have not had any training to conduct inclusive education in mainstream schools, therefore, students with disabilities are still marginalised. Teachers often try to reach all students in a lesson, but timetabling constrains them as CAPS (Curriculum Assessment Policy Statement) clearly stipulates the time-frames that should be spent on activities (Department of Education - 2011). For many subject teachers, this is a particular challenge as they have to leave the class at the end of the lesson, regardless of whether they managed to reach all students or not.

Another angle of the implementation challenges is the retention policy which emphasises the age cohort, meaning that students will be progressed to the next grade if they have already been retained in the phase once. This compounds the delivery of inclusive education as such students might be too far behind in knowledge for their grade. As mentioned earlier, in the greater scheme of things, classes are diverse because the students in any class are different from each other in one way or another, so inclusivity has always been a part of teaching. The premise from this is that teachers should have had training and experience in including all the students in lesson planning and delivery. In essence, what has been tabled by the Education White Paper 6 (Department of Education, 2001) merely extended the margin to include students who were originally excluded from mainstream education. Walton and Rusznyak (2016) are of the view that teacher training institutions do offer pre-service teachers skills in inclusive education, but it is often perceived as a course on its own as it is not included in the general education course. Such a perception is not a positive attribute as it alludes to the 'otherness' of inclusive education (Bernstein, 2010: 10, in Walton & Rusznyak, 2016). Inclusivity in education will benefit from a clear delivery processes that will have a structured curriculum that assimilates theoretical concepts and practice. Hockings et al. (2008b) forewarns of leaning too much on supporting struggling students at the expense of the more academically able students by not stretching their knowledge through activities that will engage them and pique their interest. If teachers fail in this, it will alienate the more academically gifted students and will in turn put inclusivity in jeopardy through oversight. As stated by Hall (2002), prior knowledge must be recognised so that all students feel welcome and supported in an educational setting.

Integration of the different stakeholders

The upper echelons of education must know what inclusive education entails in principle, and not just know what the curriculum states, as failure to understand implementation can result in poor support. Provincial support teams have the role of coordinating the implementation of teaching and learning in the province in accordance with the policy framework, thereby ensuring that support and guidance go through to the District Based Support Teams (DBST) and reach schools. Failure to oversee this is likely to result in the fragmentation of the policy framework and the uncoordinated implementation of inclusive education. At the upper echelon of the structure is the national department of education where the team oversees the management of the national policy. If there is lack of clarity from top management, the ripple effect of this will trickle down to institutions and will negatively affect students.

The principals are at the helm of institutions where they are supported by the school management teams/institutional level support Teams (ILSTs) and the school governing body for governance related matters. The role of the SMT/ILSTs is to support teachers to ensure effective teaching that includes all students in different lessons. The teacher is the bedrock of inclusive education as he/she is the one responsible for the implementation process, while the students as the receivers of education are the ones who will benefit from or be disadvantaged by the planning and delivery of lessons. It is imperative that implementation of inclusive education runs seamlessly at the institutional level because the results are far-reaching.

Interestingly, there is currently a great deal of exclusion in education; there are schools for girls/boys, schools for particular churches where membership of the church plays a role, for example. If inclusive education is not just a concept, but is practised in principle, then why are there institutions that are obviously exclusive? Education White Paper 6 was introduced to address all levels of exclusion in education, but it is viewed as unclear on certain issues, hence teachers struggle in its implementation (Bornman, 2014: 1 in Nel et al. 2016). The level of oversight on covering the entire spectrum indicates that the concept is good, but is not matched by reality. The problem is compounded by the scarcity of relevant resources to support effective implementation of inclusion. Systemic support from top-down structures should be tailored in such a way that those who manage the implementation of inclusive education should have in-depth knowledge of the processes that will boost effective learning and teaching in a diverse classroom. The positive synergy between the different structures will drive the process to attain effective pedagogical practices which will result in students' engagement in lessons and their ultimate success. Outside help from the health system, social services, psychologists, and the like will add complementary skills and expertise to support teachers in conducting inclusive lessons (Department of Education, 2005). The integration of all stakeholders is pivotal as cooperation among the different structures will ensure that no group of students will be alienated, disadvantaged, stereotyped or marginalised.

Research methods and design

Both qualitative and quantitative methods were used to gauge the level of participation of teachers/academics and students in inclusive education. Methods employed to obtain data varied, including, structured and unstructured interviews, observations, focus group discussions and questionnaires. Data was collected from three schools and from two higher education institutions to get a bigger picture showing whether the concept was applied more on one side of the spectrum than on the other. Different groups of students and facilitators were all asked the same questions.

Participants

The study focused primarily on two main groups, namely, teachers and students. Education officials and academics who lecture students training to be teachers were engaged so that the study would cover various angles. Questions for the two primary groups dealt with whether schools fully support teachers in applying inclusive education and to what extent they offer support in cases where there were challenges in the implementation of this process. Students were interviewed to determine whether they understood what inclusive education is and to gauge whether they felt that all students are supported in a diverse class.

Research questions

Questions posed to facilitators (this means teachers in a school and lecturers at a university):

  ➢ What is your definition of inclusive education?
  ➢ Do you feel that you are adequately equipped to teach an inclusive class?
  ➢ What are the reasons behind your answer?
  ➢ What do you think can be done to improve facilitators' competencies in inclusive education?
  ➢ What methods have you applied in supporting students who have barriers to learning?
  ➢ How successful have these been?
  ➢ What do you think can be done to get more facilitators to actively conduct lessons which are in line with inclusive education?

Questions posed to students:

  ➢ What is your definition of inclusive education?

➢ Do you feel inclusive education is applied in your lessons?
➢ What is/are the reason/s behind your answer?
➢ What do you think facilitators can do to include all students?
➢ What methods do you think can be applied to support students who are struggling in a diverse class?

Focus group recorded discussions (9 teachers – 5 females 4 males; referred to as teacher x1 to teacher x9)

Teacher x6: *I'm frustrated. I used to think that I'm a good teacher, but I'm not so sure anymore.*

Teacher x4: *Me too. I teach big classes, some of them uh, they struggle to understand the work. Eish!*

Teacher x6: *Exactly!*

Teacher x9: *It used to be easier when we had remedial teachers to send struggling learners to, now we have to teach all of them ourselves. You have those learners who struggle to read and if they can't read, how can they write because they can't understand what's written.*

Teacher x1: *Some learners just cannot cope, but hey, if they don't pass at the end of the year, it's the teachers fault.*

Teacher x5: *You're right. You have to make a plan for them to pass with intervention assessment. Sometimes uhm, uhm, they fail the reassessment and you have uhm, to reassess the reassessment.*

Teacher x9: *Don't forget the parents who have to sign to agree that their child should repeat. They often refuse saying the child has to go to the next grade because their friends will be in the next grade.*

Teacher x2, x5, x1, x8, x3, x6, x7: *Yes, that's true (murmurs of agreement).*

Teacher x3: *Teachers in the next grade will experience the same problems and the learners will go on to another grade. It's a cycle, it is a bad cycle.*

Teacher x4: *When they get to grade 12, everybody will blame the primary school teachers. Iyoo! They are forgetting that the system doesn't allow learners to repeat a phase more than once.*

Teacher x5: *We are not trained to teach some of the learners in our classes. I once had a learner with a medical condition and he had to eat at certain times which clashed with the timetable, so he often missed out on parts of his lessons and he had learning problems.*

Teacher x9: *If I had my way, slow learners would have their own class so that you simplify activities for them which you can't do in an inclusive class because most will finish quickly and disturb the class when you're trying to help others. I understand that we can't do that because it won't be an inclusive class, but this inclusive education is giving us problems.*

Teacher x7: *I feel better because now I know that I'm not the only one struggling with this. Most of the workshops don't really help. They, they just read what you must do in class. When you come back and try to do it, it doesn't work. I wish those people could come and do those things in my class so that I can see if they can manage inclusive education with my class. Did the workshop help you guys?*

Teacher x3: *Iyoo, I read the notes and took them to class, but I was still struggling. A lot of learners understand and do well, it's those with learning problems that are failing.*

Teacher x8: *I'm thinking of going to ....'s class to see how she does it.*

Teacher x3: *Maybe I should come too. I really need help with those learners.*

Teacher x1: *What do you guys think of subject advisors in this matter?*

Teacher x2: *I don't think they understand how eh, some of us are struggling. They just want to check the books and want to see good lesson plans and good marks.*

Teacher x5: *I don't feel supported by anyone. I'm a qualified teacher, but hey, I don't see that helping me.*

Teacher x4: *There's never time to reach all students in a lesson. Sometimes I find out about their struggles when I mark their work.*

Teacher x6: *The issue of ehh support from subject advisors is discouraging. It seems like they just come in for monitoring the work. There is no support.*

Teacher x7: How about if we support each other by sharing tips that work with certain learners?

Teacher x8: *That's the reason I want to go observe in there.*

Teacher x2: *I'll join you guys. Can't we ask management to organise something from the school?*

Teacher x3: *That's a good idea. We have to do something because we're stuck with our classes.*

Teacher x9: *Who is going to raise the suggestion with management?*

Teacher x8: *I nominate you (points at another teacher). We can't sit and do nothing.*

Teacher x1: *Seconded.*

Teacher x6: *At least we've come up with a support plan. Cheers everyone.*

Data analysis

To ensure validity, the researcher took notes and most of the information was recorded verbatim, a voice recorder was used after getting all the participants consent. After each interaction, all the data collected were collated and analysed concurrently. The findings were informed by data obtained from an analysis of all participants' responses which covered different education sectors and the prescripts underpinning different stakeholders.

Findings

Many teachers have not been trained to teach inclusive classrooms, and even though teachers try their best to engage all students, not all students are catered for in lessons. High enrolment in classes makes inclusive education challenging as teachers/facilitators cannot always identify students who need intervention. In some high schools, struggling students in Grade 11 are held back so that the schools can focus on the group that has the potential to help the school obtain a high pass rate for Grade 12. A similar finding has been alluded to by Metcalf (2019). Such schools do not practise inclusive education as they alienate students whom they deem to be below average, and concentrate on the students who show potential to get good grades. Although special schools have generally been reduced drastically for students who need remedial education, there is still segregation within schools where they use this as a basis. In some schools, there are classes for fast learners (at times these classes are referred to as top sets) and separate classes for slow learners (bottom sets). Language is also used to segregate students. This has caused an uproar nationally when such cases come to the fore. A typical example which drew attention happened at Laerskool Schweizer-Reneke in the North West province and at King Edward School in Matatiele in the Eastern Cape (Govender & Hosken, 2019) where the lack of proficiency in the medium of

instruction was cited as the reason for separating primary school children. Timeframes allocated for covering the curriculum constrained pedagogical practices as it did not always allow fair engagement between teacher and students. These findings attest to the disparities that are still common in education, which infers that there is no synergy between needs analysis and practical application.

Discussion

Teachers who shared their views indicated that they do their utmost to include all students in lessons, but timetable constraints force them to move at the required pace so that they are able to cover the syllabus within the allocated timeframe. This consequently disadvantages students who are not fast learners. Students feel that inclusive education is a brilliant concept that fails in rudimentary practice. Inclusive education could yield positive results if synergy between the concept, the resources and the practical work could be realised. School authorities have no voice in how the curriculum is structured since after the curriculum is passed to them, their role is that of monitoring its implementation and evaluating teachers' performance in this. According to academics who work with students who are training to be teachers, the recent batch of graduates have been trained in inclusive education, but when some of them go into schools to do their teaching practice, they are thrust into an environment that groups students according to ability. In essence, this means that in the realm of inclusivity, such schools are alienating some students based on academic ability. This defeats the purpose of cohesion in schools when education which is deemed the 'social fabric,' leads to disharmony. These contentious issues need to be addressed so that the validity of inclusive education can be brought to the fore.

Conclusion

The fundamental concept of inclusive education is to harness pedagogical strategies so that disparity can be addressed. There is a dire need for further training of teachers so that they can be equipped to impart quality education to all the students in their classes. There are gaps in the competencies of different stakeholders in the implementation process of inclusive education. The way in which the curriculum is structured marginalises some students who might learn at a different pace and also those who might benefit from other forms of assessment that are not centred primarily on good writing skills. Monitoring and evaluation without support for teachers tend to make teachers despondent as they need guidance and support to acquire the skills that will help them navigate the path to the successful delivery of inclusive education.

Recommendations

Workshops that are tailored to equip teachers with the relevant teaching skills encompassing inclusive education must be arranged. Facilitators of workshops must make follow-up visits to gauge whether the workshops are yielding the required results and to check if they need to be tweaked to be more accommodating. Collaborative teaching should be encouraged in schools as this is a form of support where teachers can learn from each other so that they may experience personal growth and professional development. Classroom approaches must be based on respect on the part of the teacher towards the students; respect on the part of the students towards the teacher and towards each other. This is a simple but crucial approach that can foster inclusion. Encouraging diversity in group work (diversity in terms of culture, learning pace, background, etc.) will ultimately assimilate different groups where the different strengths are merged, which will in turn lead to students engaging with the lesson. Interschool training in inclusive education should be encouraged to make this accessible to everyone. Teachers should also attend district and provincial developmental workshops which would help them to better understand the students' underlying learning processes that can help or hinder them from engaging with learning. School development

plans must clearly stipulate timeframes for supporting teachers and measures that will be taken to ensure the implementation of core strategies. Schools can also form networks to share good practices.

There is a dire need for intervention programmes outside the scope of education, thus, liaising with other professionals like social workers and psychologists to support students who need outside intervention can produce positive results. If such assistance is not incorporated in inclusive education, then chances are, there will be no end in sight for the challenges encountered by students and teachers in diverse classrooms. The national curriculum must be reviewed to ensure that it meets the needs of all students as the ramifications of the shortfalls are far-reaching. Further research needs to be conducted with education officials (MEC's, directors, deputy directors, etc.) to unpack the government strategies for dealing with recurring problems in inclusive education.

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Recent Trends in Quality Assurance in Asian Higher Education: Comparing the Cases of Japan, China, Vietnam and Indonesia, 2000-2020

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Abstract

As Asian higher education systems distinguish themselves by various international metrics –be it in overall student numbers, budget sizes or their presence on ranking tables—the pressure to formalize and enhance mechanisms of educational quality has only become more urgent. Indeed, over the last twenty years, all major Asian university systems have undertaken significant reforms to enhance the performance of their academic activities and organizational operations. This fits in with larger global trends, such as in the United States and the United Kingdom, that have been seeking to make higher education more accountable through an increased focus on student learning outcomes. Focusing on four of the largest and most prominent higher education systems on the continent --Japan, China, Indonesia and Vietnam-- this study will examine how recent policy initiatives and educational practices have advanced this global goal within specific national contexts. Drawing upon the latest work of scholars of different national systems, as well as conducting a detailed analysis of specific quality policies and practices themselves, this interpretative work will explore the ongoing balancing act that these Asian systems have engaged in as they seek to enforce basic standards of quality for *all* higher education provisions, while also allowing *individual* institutions a latitude of action to ensure learning innovation. Although, the presentation will focus primarily on the era of higher education "liberalization" (2000-2019), it will conclude by exploring the possible ways that global pandemic has both undercut and enhanced earlier trends.

Keywords: higher education, quality assurance, Asia, education trends

Social and Academic Impacts of CoViD19 - related Emergency Remote Teaching on Japanese University Students

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ABSTRACT

This study will detail how a university in Western Japan has implemented its English for Academic Purposes (EAP) program during the onset of CoViD-19. In the spring semester of 2020, after a 2 week delay, all courses within the school's EAP program were offered in an online asynchronous format. The course coordinators were tasked with consolidating the materials originally designed for face-to-face,14 week courses, for a 12 week asynchronous online semester, and with uploading the modified course materials to the university's Learning Management System (LMS). Twenty one students participated in semi-open interviews to determine the social and academic impacts of this CoViD-19 Emergency Remote Teaching (ERT) approach. The lessons learned from this experience will be discussed in terms of future curriculum design and implementation in a post-CoViD world. There are a wide variety of lessons that were salient. The role of the classroom as a social institution was very prominent; however, awareness of cognitive burdens and strategies to mitigate them may be more valuable for teachers. The lessons learned during this period of ERT can help teachers moving forward.

Keywords— asynchronous online learning, emergency remote teaching (ERT), online curriculum design, CoViD19

Introduction

The Covid-19 pandemic that started in Wuhan, China in 2019 took the world by surprise. The Japanese academic school year starts in April, and most Japanese universities were not prepared in April 2020 for the increasingly alarming news and government broadcasts that dominated the media at that time. Some universities made the switch to online lessons immediately, while other schools chose to delay the start of the academic year to assess their online teaching capabilities and wait for guidance from the Ministry of Education, Sports, Culture and Technology. Most Japanese universities have invested into some form of Learning Management Systems (LMS) like Blackboard, Manabe, or Moodle, etc., but very few have used them to deliver their programs entirely online (Murakami, 2016; Vallance, 2008). While this type of e-learning has been shown to facilitate the learning process during a lockdown (Zwain, 2019), many Japanese students are averse to using this type of technology in their studies (Murakami, 2016). According to research in the field of e-learning, it is important for higher education institutions to seriously consider what criteria will affect the students' acceptance of technology (Ma & Yuen, 2011), because failure to achieve this aim will result in diminished returns on the huge investments made into the LMS and other platforms used for online lessons (Zwain, 2019). The degree of students' technological acceptance varies depending on geographical regions: while university students in Western countries seem to be tech savvy and willing to learn online (Decman, 2015), the rate of technological acceptance for Middle Eastern students was found to be relatively low (Matar et al., 2011). Raza et.al have used the Unified Theory of Acceptance and Use of Technology (UTAUT) model to analyze Pakistani university students' adaptation and performance with Emergency Remote Teaching (ERT) during the Covid-19 pandemic. The UTAUT model considers factors such as performance expectancy, effort expectancy, social influence, social isolation, as well as attitudes towards and usage of LMS. The researchers also introduced "Corona fears" as a variable in their analysis. Their findings showed that the main factors mitigating students' acceptance of the online learning were how the LMS was introduced to them by their instructors, the perceptions towards technology of their social peers and family, and their perception of the user-friendliness of the system (Raza et.al, 2021). The researchers caution that these findings reflect the general attitude of Pakistani university students, and that future studies need to be carried out in other countries, since attitudes might also be influenced by culture and nationality (Raza et.al, 2021).

A lot of the studies on the use of LMSs in Japan have focused on the perspective of the teacher, not that of the students (Bateson, 2008; Bateson, 2009; Nozawa, 2011; Hirschel, 2012). Although learners' characteristics play a crucial role in the effective use of Information and Communication Technology (ICT) for the purpose of learning English as a foreign language, these characteristics have not been fully researched for the Japanese context (Ozawa, 2019).

This study will attempt to paint a picture, from the perspective of a group of Japanese university students, of the social and academic impacts of their first ever asynchronous, on-demand online semester of study. The students who participated in the study are all undergraduates in their first or second year of study at a private university in Western Japan.

The English Communication Program Background

The English Communication (EC) program described here is a 2 year program embedded into a School of Policy Studies at a Japanese university. The students are not English majors: they are majors in fields related to Policy Studies. However, the EC Program itself is quite rigorous: it's a 2 year course within a four year degree that is very challenging and focused on English for academic purposes. It was originally designed to develop students' ability to join English as a Medium of Instruction work in their third and fourth year. The EC program is highly coordinated, so that there is vertical integration within the 2 year courses. For example, each writing class is not seen as a separate, individual course, but as four parts of a single writing class within a two year period. There is also horizontal integration, which means that the skills learned within a presentation class are also used in the seminar, which is a speaking or discussion class. This results in a highly effective level of coordination which requires a great deal of management from full-time teachers. There are 11 full-time instructors managing 45 part-time workers. The full-time teachers also develop all the in-house materials, so that the relevance and the level of efficacy needed from this course can be maintained.

Spring 2020 Semester

In Japan, the school year begins in April. In the spring of 2020, this put the EC program staff in a peculiar situation because the semester was beginning just as the first wave of the pandemic struck. The start of the academic year had to be delayed by two weeks, during which time the 11 full-time teachers had to develop asynchronous course work for the classes that everyone was going to be teaching. One of the benefits of having in-house materials was that there was no need to seek permission from publishers to post online. Since the department was not aware of the students' access to WiFi or devices, it was decided that lessons will be delivered on demand asynchronously. In other words, teachers could not use Zoom or other platforms to provide live lessons. The materials were uploaded to LUNA, the university's learning management system, which is a version of Blackboard. Students could access their course materials on LUNA, submit homework assignments and take tests on the same platform. Communication with students was to be carried out through emails and the discussion boards on LUNA. Teachers were available to their students during office hours, which were not mandatory and were scheduled to take place on Zoom. This was the only opportunity the students had to meet their teachers live. Other platforms used were Turnitin.com (a site where students can submit their writing drafts), XReading.com (a digital library for implementing extensive reading), and OneDrive (a file hosting service operated by Microsoft).

Methodology

This research was focused on understanding the student experience in involvement in ERT during the beginning of the COVID-19 Pandemic by answering two research questions.

Research Question 1: How do students socially interact and develop social support networks during ERT?

Research Question 2: How do students perceive the impact of ERT on their academic experience and performance?

Participants

In the summer of 2020, 21 (14 female, 7 male) first and second year undergraduate students, who had just finished their first ever online asynchronous on demand semester of study, volunteered to be interviewed about their experience. Students were recruited through email from the entire English Communication program. Students who volunteered were provided a minor compensation for their time. The semi open-ended interviews were conducted on Zoom, in both English and Japanese. The transcripts of the interviews were typed with the participants' identifying information omitted, to be subsequently read and analyzed for emerging themes by the authors.

For phenomenological research, it is suggested to have a sample size between five and 25 subjects (Polkinghorne, 1989). Through in depth interviews which provide contextualization, this sample size provides a broad range of experiences and allows for salient similarities to appear.

Instruments

The authors decided to utilize a semi-open interview using an instrument similar to the one developed by De Soire et al. (2012). Validity was examined by first examining the instrument and personally answering the questions. Next the authors discussed the items to address any possible issues. The item was re-examined after the first few interviews to identify any issues in lieu of a pilot study. These procedures are based on the procedures outlined by Maxwell (2013).

Subjects were provided with an informed consent form prior to the interview, which was reviewed prior to the interview. Students were informed specifically about the purpose of the interview, how data would be handled, and the right to refuse questions or leave the interview at any time.

Questions were divided into five sets. The first was to provide general background information. The second was to provide an understanding of their overall experience with the phenomena. The third was to provide information on academic experiences. The fourth was to provide information regarding social experiences. The fifth and final set provided understanding into work-life-study balance and opened the door for any further information that subjects wished to include.

Results

First the data collected by each researcher was read (Maxwell, 2013). Each author proposed conceptual frameworks to aid in the initial coding. The use of a conceptual framework aids in identifying appropriate coding (Miles & Huberman, 1994). The data was examined for themes that could help answer the research questions. Other emergent themes were also noted, in particular economic issues. Once each author coded the data they compared their results to improve reliability.

Analysis

Upon carefully reviewing the interview transcripts, some common themes began to emerge: socially stagnant social networks, a desire for the social aspect of the classroom, significant economic issues, work-life-study balance problems, a vague dissatisfaction with pedagogy, and a lack of useful feedback.

Emerging Theme	Number of participants mentioning item
• Work-Life-Study Balance	18
• Socially Stagnant Networks	14
• Economic Issues	9
• Dissatisfaction with Pedagogy	19

I.   Work-Life-Study Balance

The balance between the social, academic, and economic aspects of their lives was sometimes difficult. Students seemed to think that acclimation would be easy to achieve, but many of them lacked the discipline and time management skills needed to stay on track in an on-demand asynchronous program, and they reported having a difficult adjustment period.

"I didn't really work during the semester: I only started working during summer vacation, so life-study-work balance was not so bad. But having to manage my own time and discipline myself was really hard." (1st Year Student)

"Life-study-work balance at first seemed easy. I mean, I lived at home, my parents cooked for me, so I could eat, even if I had to study during that time. But it was hard to schedule my own time for studying every day. I am a freshman, so I am not used to this on-demand online style. If you can get used to it, it's great. After I got used to it, it was okay: I could decide my own time to study, to work part-time, to relax, but it took a while." (1st Year Student)

"I enjoyed the fact that I didn't have to wake up early to join classes, but the issues was timing myself without a proper schedule." (2nd Year Student)

"Work-life-study balance was pretty hard to achieve. Freshman year, it took me 5 hours to go to school and come home and right now, it's true that I had 5 hours free to study. However, I ended up working those 5 hours and more at my part-time job, so I was even busier than I would usually be." (2nd Year Student)

"I had difficulty of studying, this was the first time for me of remote studying. The most difficult point for is we have to motivate ourselves to study. It's different when we are on campus, we can talk to our teachers and classmates. I think this is the most important: motivation. We don't know how to motivate ourselves alone." (2nd Year Student)

Another issue was that even though in this program teachers tried to decrease the overall workload, students felt like they had to do more work. Activities that they would do with a partner or a small group, had become homework, meaning it felt like more work, even though it was in fact the same amount of work.

"There was a lot of homework, so I didn't have a lot of free time. That part was hard." (1st Year Student)

"It was hard for me. The EC classes were too hard. Including Monday to Sunday I worked 10 hours on the computer every day. It was too hard." (2nd Year Student)

"Now, even now I don't know college life, so I feel nervous. I don't know college studying and college class and teachers, and friends. I don't have friends. I feel anxiety. Always anxiety. I check Luna and [the school] homepage and updated homework. This semester I had so many tasks. I have anxious." (1st Year Student)

Balancing work, social interaction, and school is difficult for many students. Students who had not planned to enter into an asynchronous program were given an additional hurdle. While many of the students asserted an acclimation by the end of the semester, it is important to note that the amount of perceived work increases when the workload shifts from in-class group activities to individual "homework" activities. This perceived increase in workload adds to the overall stress of students and makes it more difficult for them to feel comfortable with their work-life-study balance.

II.   Social

Socially stagnant networks: Although all students interviewed complained of limited opportunities to interact with peers, it seems that first year students were more severely affected. This is because while second year students could take advantage of pre-existing social networks they were able to form in their previous year at university, incoming freshmen did not have this resource to draw on. This seems to have affected not only the social life of new students, but also their ability to perform well in school, as reflected in the quotes following:

"I didn't really have many friends, so I couldn't really get much advice about tests and homework in my classes." (1st Year Student)

"The most stressful thing for me was that I am so shy, and I didn't know anyone at this school, so when I couldn't understand what to do for my classes, I was really anxious and frustrated." (1st Year Student)

For some, using applications like Line, a social media application popular in Japan, and Zoom, allowed them to connect with classmates and even make friends:

"I could make friends on Line through help groups set up for students from our department. We mostly talked about class work, but we could also talk about other things and hang out (online)." (1st Year Student)

"Of course, Line, Instagram, and WhatsApp is how I contacted my friends. Of course, I felt isolated, but one of the student is my neighbor, so I did a lot of tasks and assignments with him, so I didn't feel that isolated like other students." (2nd Year Student)

However, this social media interaction was mostly limited to exchanges about schoolwork, and was not as timely and enjoyable as regular face to face exchanges:

> *"[My] writing [class] is using one appli, Turnitin. I talked to my Line group how to use Turnitin. We only talk about class thing and Luna. I have not met friends of first year."* (1st Year Student)

> *"We contacted each other to talk about discussion boards or upcoming tests, but we only talked about class related stuff."* (1st Year Student)

> *"Line and Instagram were good to keep in touch with my friends. Those applis are good for that. I found it really kind of isolated. In school, whenever I had a problem I could ask my friends, but at home, I had to wait until they read my messages. And it took time to write to them. So I felt kind of isolated and didn't really talk about other than the homework things. At school we talk about life things, too."* (2nd Year Student)

One upperclassman suggested that the university needs to set up networking opportunities, so that incoming students can meet seniors and they can help each other adapt. However, the school administration needs to take an active role in doing this.

> *"The school should make connections between seniors and juniors, because seniors can speak with them in Japanese, and understand them better if they have some problem, and then we can help each other. But school needs to make this connection for us."* (2nd Year Student)

The disparate affect between those without developed social networks (primarily first year students) and those with established social networks was apparent. While the feeling of isolation may be more salient for students lacking a pre-existing network, even for those who have a network, there was a sense of stagnation. Interpersonal relationships seemed to stand still, awaiting a return to normalcy.

Desire for a social aspect of the classroom: Most of the students interviewed indicated that they would like to interact with each other in synchronous lessons.

> *"I was really looking forward to communicating face to face with native English speakers, so when we went online with on demand courses, I was really disappointed. I had one Zoom class (not in EC) and it was better. I think Zoom is better because we can talk to our classmates and teachers. At least the speaking classed should be on Zoom."* (1st Year Student)

> *"I think online on-demand classes are fine, but for Listening and Seminar classes we should have some Zoom lessons so we can actually communicate with each other."* (1st Year Student)

> *"Even if we only do 30 minutes, we should have Zoom for online classes. Everyone should have at least a phone, so it should be fine. I want to take EC class at KGU with my friends. I want to improve my English more and more, so I can't do that this semester. This EC stand for English Communication, but this semester we had only E, just English. No communication."* (2nd Year Student)

Despite this, very few students attended the Zoom office hours, which was their only chance this semester to interact in a synchronous manner with their instructors and fellow classmates.

For some, they did not do so because their academic performance did not warrant it, and they found enough support through their social networks:

> *"I didn't really go to office hours because I was able to do everything else by myself."* (1st Year Student)

> *"I didn't need to contact the teacher, my score was good, so I didn't go to office hours. But my friends who were not doing well told me they don't want to go to office hours because it is easier to ask friends in Line group."* (2nd Year Student)

For others, schedule conflicts did not permit them to join:

> *"I wish I could speak and listen to my teachers speaking to me, even if it was online. That was the thing that I missed this semester. However, I didn't really go to office hours. Sometimes there were other (non-EC) classes that were on Zoom during my EC office hours, so I couldn't really attend."* (1st Year Student)

Teachers were encouraged to hold office hours during their regularly scheduled lessons to avoid this type of conflicts, but anecdotal evidence suggests that some students chose to sign up for more hours at their part-time jobs, since they were not required to attend classes at that time and office hours were not mandatory.

> *"I worked a lot. Thanks to Corona virus, if I work more than 80 hours a month, I get a subsidy. Of course, I worked weekdays."* (2nd Year Student)

> *"Sometimes my part-time job schedule conflicted with my classes, but I couldn't give up my part-time job."* (2nd Year Student)

Time management became difficult without a set schedule of synchronous classes that demand attendance, and many students simply lacked the discipline and motivation to attend first period morning office hours:

> *"In my opinion, because of Corona, everyone stay late at night and wake up really late, so if your Zoom office hour is early, they don't come."* (2nd Year Student)

> *"When we are at home our priority is gaming and talking to friends. I am also addicted to YouTube. We understand we have to go office hours, but we didn't motivated enough."* (2nd Year Student)

Other students indicated that they felt too shy to join an office hour and speak to an instructor many of them had never met before. Additionally, some seemed to lack confidence in their ability to communicate with their teachers, many of whom are native English speakers and might not be able to speak Japanese. It is also a policy of the school that instructors must always communicate with their students in English.

> *"I didn't go to office hours because I am shy to talk to people I have never met before."* (1st Year Student)

> *"My friends especially say they don't want to go to office hours because they have to speak to the teacher in English."* (1st Year Student)

> *"Us Japanese are very shy, though, and really worried about pronunciation. Many of my friends are too worried someone will laugh or look down them if they come to Zoom office hours and can't say correctly. We also worried about grammar, so we're afraid to write email to teachers because it won't be perfect. Also, writing on the discussion boards is really high level, so we didn't do anything."* (2nd Year Student)

> *"I didn't write questions for my teacher on the discussion boards because everyone could see my questions and that's embarrassing. I didn't know there were office hours, but I wouldn't go to them anyway. I wouldn't want to speak in English on Zoom."* (2nd Year Student)

Some students felt this mental block so strongly, that they did not join office hours even when they realized that they needed to communicate with their teacher:

> *"Writing was hard. We had to read the materials by ourselves and we had to understand the comments and feedback on Turnitin by ourselves, so this was really too much. We need more explanation from teachers. I was afraid to go to the office hours to ask for help. I didn't have the confidence to go there."* (2nd Year Student)

> *"I didn't go to office hours, even though my teacher told us to come. I thought it's better not to go. I don't really like Zoom because I don't want people to see my face. I hope we won't have Zoom lessons next semester."* (2nd Year Student)

While this asynchronous coursework context is likely the worst-case-scenario for social interaction in the classroom, this finding may also be important for synchronous video classrooms or even lecture hall courses. The classroom is a social environment; however, this aspect may be overlooked in curriculum development. For online coursework, there may be an increased need for discrete social planning within the academic curriculum.

Economic issues: Some students were directly impacted by economic hardships caused by the pandemic. Some parents lost their jobs and were unemployed for long periods of time, so several students felt that they were forced to take on more responsibilities to help out in their homes by working part-time. Because the lessons were on-demand and asynchronous, many students opted to work during the time that they would normally attend classes and study.

> *"My mother lost her job because of Corona, but she was able to find a new job. For about a month she was unemployed, though. We were able to make ends meet, though."* (2nd Year Student)

> *"It's just me and my mom, so I work more than other students here. This year I had to work even more."* (2nd Year Student)

> *"I know a lot of friends who went to part-time job during classes. They know they have homework, but they need to make money."* (2nd Year Student)

Socio-economic status has long been considered an important factor in the educational performance. During this pandemic, however, socio-economic flux became more salient than usual.

III.   Academic Issues

Pedagogy: In terms of pedagogy, there were some aspects of the ERT experience that students appreciated. One of them was the use of videos by teachers, which allowed the students to better access the materials. Students could not only rewatch videos but slow the speed and add captions to increase accessibility.

> *"I wish my teachers made more mini-video lectures. It would have been helpful. I wish we had live, Zoom classes. However, I think the videos would be better because if I cannot understand, I can always go back and listen again or look at the captions."* (1st Year Student)

> *"I think using Zoom really depends on the class. For my media information class, the teacher uploaded videos, so there was no need."* (2nd Year Student)

On the other hand, there were experiences, especially for the seminar class, where the lack of the live aspect of the class limited their experience: they were not getting the experience of a live discussion in an asynchronous course. The course designers tried to mitigate this through the use of discussion boards and student-made recordings on the LMS. However, this was not sufficient, and many of the students felt that in those areas the pedagogy fell short. On the other hand, that same pedagogy, as this complex quote points out, was positive for the presentation class, because the self-recording method for the presentation class allowed students to put their best foot forward. In other words, whether the approach worked well or not was context specific.

> *"In Seminar class usually we can discuss something, but this time I had to record myself, so I don't know if my English ability is [good] or not. I want to [do] Zoom class in seminar. But Presentation class is good: it is good for me to record and I can prepare for long time, so it is useful for me compared to face to face."* (2nd Year Student)

> *"I don't want to use Zoom. I liked that my professor sent me PowerPoint for my architecture classes, so I can read again and again. Technical terms or very specific subject is easy to learn on my own, not in lecture. I can read in Luna, check hard words, then listen to teachers' recording. I was able to many times come up with ideas and rearrange content very carefully. For writing classes, it was the best for me."* (1st Year Student)

> *"I liked my Special Topics class because it had video and I could understand what to do. Seminar was the hardest. It took longest time. Every day I have to record and think about the plot."* (2nd Year Student)

The pedagogical differences between ERT and face-to-face coursework are significant. The "emergency" nature of ERT is important to note as teachers are not necessarily trained in or experienced with online education. Some of the solutions to make the coursework more accessible were appreciated. Other aspects helped educators learn from mistakes to improve online education moving forward as the emergency continues.

Feedback: The area with the most negative feedback was feedback itself. In regular, face to face classes the teachers provide feedback which can be expounded upon, and students can ask questions during the next class. However, in the context of an asynchronous course, the

feedback was not sufficient for many of the students. This could be in part because the teachers were stressed, since they were also in the midst of the pandemic and many of the teachers were in higher risk groups than the students they were teaching. However, when the only interaction between student and teacher is the feedback they receive on assignments, it is much more important that the feedback be not only good, but also actionable.

> *"I just wish my teachers would give me more concrete comments that are easy to understand so I can know how to improve my reports."* (1st Year Student)

> *"Writing was rather difficult for me. I had to read the materials by myself, understand them by myself, write the essay, but when I got the comments back in English, it was really hard for me to understand. It is hard to know how to revise just with English language feedback."* (1st Year Student)

> *"Some of my teachers replied me soon, some of my teachers was not. Communication really depend on the teachers. My writing teacher only gave me one comment: 'Too long, too long.' How can I work with that?"* (2nd Year Student)

> *"It was really difficult for me to improve. My teacher gave me less detailed advice, so I didn't know what was wrong with my homework, or what was point of improvement of my works. This is the same as my writing. My writing teacher gave me less advice so I didn't know what to do."* (2nd Year Student)

The way that different teachers chose to contact their students compounded the problem: some made use of the *Announcement* function in the LMS, which would post and email a notice to all students about their upcoming weekly tasks. Others chose to email these announcements. The difference was that by using the LMS function meant that the announcement was forever cemented on LUNA, making it easier to access, while an email might get lost in the sea of correspondence that seemed to have drastically increased for both students and teachers during the online semester.

> *"The biggest problem was some teachers were sending homework announcements in Oshirase,*[the LUNA function], *but some teachers were emailing the homework, so I was between fine and not."* (2nd Year Student)

The amount of feedback provided through passing interactions with students became more salient in its absence. Comments that students found sufficient were no longer sufficient when that passing interaction was removed. The facilitation of communication from teachers in a manner that is meaningful, actionable, specific, and timely is essential.

Implications

While course designers cannot address all the issues discussed in the previous section, it is possible to make curriculum and program-wide adjustments in terms of computer literacy, pedagogy, and feedback.

I.   Computer Literacy & Pedagogy

From a department-wide survey it was learned that access to WiFi and devices was a not a problem for students. However, depending on the type of devices used (Mac or Windows, laptops or tablets), they would have different issues accessing and viewing content on the many platforms that the program uses. For example, certain devices would not open articles

or attachments to tests on LUNA the same way or at all, so now course designers know how to anticipate and prepare for these issues. The program uses many different platforms like XReading.com for extensive reading, Turnitin.com for writing, and many others, so there was quite a steep learning curve for new students as they had to learn to navigate all these platforms on their own, with screenshots or video tutorials from their teachers. Fortunately, the students adapted surprisingly well.

> *"I've mainly used my smartphone for Xreading, I used my PC for everything else. Turnitin and LUNA were easy to use. My teacher's comments were easy to understand."* (1st Year Student)

> *"I didn't really have major problems with technology. I have my own PC and I don't share with anyone. LUNA was not easy to use at first, but I got used to it eventually, the more I had to use it."* (1st Year Student)

> *"I had no major tech issues. I checked Luna every day without problems. I could easily contact my teachers and coordinators by email. I used email for personal questions and the discussion boards for general questions related to the class."* (2nd Year Student)

> *"I had no problems with any of the online platforms, as I am a second year student and I have used them before. LUNA was a bit hard to use when I had to find out page numbers, but it worked out okay."* (2nd Year Student)

One thing that the course coordinators need to keep in mind, however, is to make full use of the *Due Date* function in the LMS. Students generally have as many as 14 to 18 courses in a semester, so even in a regular semester, they have quite a few deadlines to keep track of. The due date function in LUNA automatically sets up a calendar for the students with these deadlines, so they can easily be reminded of upcoming assignments. Unfortunately, many teachers were new to the LMS, so not all coordinators made use of this feature and many students were confused and missed deadlines. Also, the way that teachers send weekly announcements about upcoming lessons and assignments needs to be standardized across all courses, so that students know exactly where to find this information, instead of having to search for it through emails or on the LMS boards. Another issue was the introduction of Zoom for office hours: in the future, if these Zoom office hours will be carried over, they need to include incentives for attendance to improve efficacy.

When the program will eventually go back to regular face to face classes, a bring your own device (BYOD) policy will be implemented because this ERT experience has taught designers that materials can be made a lot more user-friendly, accessible, and attractive to students in a digital format as compared to the usual black and white printouts the department has been providing. This switch will also be better for the environment and for the school's bottom-line, as less money will be spent on printing costs. The materials will also need to be designed from a student's perspective: coordinators will need to conceptualize how the students will use these digital materials on their devices and anticipate any issues that

students might come across. Digital materials should also include a video archive providing lectures in video format for students to access.

Additionally, it was decided that the fewer programs are used, the better students and part-time teachers will be able to adapt. As this is a highly coordinated program, the aim should be to standardize and provide the same experience across all sections of the course, even though the lectures are delivered by different instructors. Therefore, the number of new applications and programs everyone needs to learn must be minimized to ensure a smooth delivery of the courses.

In terms of pedagogy, multimodality, or different ways to access the materials, is very important. This is a common theme in Computer Assisted Language Learning (CALL), and with ERT this became even more important than with a normal CALL lesson. For communication coursework, discussion boards were not sufficient to develop the communication skills the students needed. Moreover, optional materials were often either overlooked or ignored by students, because it meant that there was an additional amount of work that the students would have to do. Because course designers only had two weeks to organize the materials for an online format, the materials and the due dates were often at odds with each other, which caused some confusion. It is important that the lesson materials and the LMS have the same due dates.

Moving forward, designers also need to consider the function of online quizzes. It is good to divide between pedagogical quizzes, which allow multiple attempts and serve the purpose of learning and student feedback, and assessment-based quizzes, which are single timed attempts and evaluate students' progress.

II.   Feedback

Feedback to students needs to be timely, specific, meaningful, and actionable. Because the majority of teachers in this program are part-timers, they have had to adapt not only to teaching online at this university, but at four or even seven other schools, each with their own system and standards. Unfortunately, this meant that there was a significant delay in communicating with students not only through email, but also in terms of scoring their assignments in a timely manner. As a result, students did not have a clear idea of how they were progressing until quite late in the semester. Many students complained that the feedback was not clear and they did not know how to use it to improve or make revisions. In a regular, face-to-face class, that student could have had the opportunity to interact with their teacher and ask questions, but not in an on-demand asynchronous environment where no one came to office hours. Therefore, more training with specific examples and instructions should be provided to teachers on how to give feedback.

The feedback from students to teachers was also problematic. Especially for 1st year students, many of whom had never written an email in English to their teacher, communication in this type of environment proved to be a huge obstacle. Some did not know where to begin, while others who did write would not provide enough information to help the teacher know how to locate them in the system. One teacher can have as many as 200 students in a week and many sections of the same course, so just signing off with a name and "I am in your Listening class" meant a lot of extra back and forth before the student could be located on LUNA and their issue addressed. Therefore, it would be a good idea to provide templates to students on how to write different kinds of emails to teachers with their orientation materials at the beginning of the academic year, as well as introduce a code of manners for communication, to avoid situations where the student contacts their teacher five minutes before a midnight deadline.

Limitations

Out of the 250 students enrolled in the Spring 2020 semester, 21 volunteered to participate in these interviews. As the interviewees theorized, it is possible that this sample is not representative of the entire student population:

> *"I think there are those of us who are really interested in learning and doing well in these classes, but there are also a lot of other people who are not interested as well. Like those of us who came to these interviews, we really want to learn."* (1st Year Student)

> *"Student who came to this Zoom interview, they want to improve their English skills, that's why they joined, because they care and want to give you your opinion. But the people who didn't come to this Zoom, they don't care about EC. They just want to pass through quickly and don't like to study."* (2nd Year Student)

According to surveys of the entire student population, the idea of switching to synchronous Zoom lessons for the second online semester was highly unpopular: roughly 71% of students surveyed indicated that they preferred the on-demand asynchronous style. This stands in sharp contrast with the students interviewed: just two out of twenty-one said they enjoyed and would like to continue with asynchronous on-demand lessons.

Conclusion

Making full use of the university's LMS allowed students to continue their studies safely during the CoViD-19 pandemic. However, a fully online on-demand asynchronous format might not be the most suitable and efficient method for delivering the courses for this EC program. Courses like Seminar and Presentation do not lend themselves well to this type of format since discussion skills are crucial and live student interactions are necessary. The comments from the students interviewed as well as the overall student performance in the Spring semester of 2020 (in which a record number of students failed compared to previous years) seemed to indicate that students can benefit from a synchronous component. The lack of motivation and time management skills that students mentioned in the interviews can be counter-balanced by regularly scheduled, synchronous lessons where the materials can be explained by teachers and the actual classroom atmosphere can be somewhat recreated. In the subsequent semesters, the program has continued to be taught online: in the Fall of 2020 it followed a hybrid of on-demand asynchronous lessons and live, synchronous lessons delivered on Zoom, while in the Spring of 2021 there was a mix of face-to-face lessons combined with synchronous Zoom lessons. Overall student scores seemed to improve and there was less chance of failure when the synchronous format was introduced. However, this may also have been the result of students adjusting to the online system.

The introduction of online lessons has taught the course developers valuable lessons about curriculum design centered around an LMS. There are many aspects of the online experience that will be adopted even after the end of the pandemic to make the EAP program more efficient and interactive, as well as less costly and harmful to the environment. The department will adopt a BYOD policy for all students so that materials can be digitized and many of the assessments and homework assignments will be completed fully online. The

students' scores will now be available to students on the LMS, along with a calendar of assignment deadlines, so that students can manage their learning experience online and be aware of their progress throughout the semester. Japan has unfortunately fallen behind in the technological divide and even younger generations seem to be averse to using technology. Perhaps the most valuable lesson learned from this experience is that it is possible to bridge this divide and to introduce Japanese learners to technology in the classroom in a manner that harnesses technology to support their study of English as a foreign language.

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Social Mobile Learning For Education For Sustainability (EfS)

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ABSTRACT

The purpose of this paper is to evaluate the potential use of videos for peer-to-peer learning for education for sustainability (EfS). Despite the need for more cognitive learning to solve complex sustainability issues, understanding of using social learning through modern communication methods such as social networks for knowledge co-creation in EfS is unclear. This pilot study conducted in a Thailand university used mobile videos to pitch sustainability solutions and facilitate peer engagement. Conducted on a private social network, Soqqle, students were encouraged to watch videos from each other and add comments. Post-course focus groups indicated a sense of collective efficacy as participants' sense of self-efficacy contributes to group effects that impact participations. Several observations were noted based on these focus groups which provided hints on what encouraged students to watch the content of their peers in a productive manner. Characteristics such as self-efficacy, or the lack of it, did cause students to disregard content and comments from others. Participants also discussed and explored potential opportunities to enhance the video activity to better scaffold the learning to build self-efficacy. Overall, results show the potential of incorporating a community of inquiry environment to encourage peer review and feedback. This study is significant due to its timeliness to leverage digital solutions to increase collective efficacy. Educators planning to introduce social learning in sustainability topics can incorporate findings from this study to facilitate effective learning outcomes for EfS.

KEYWORDS: social learning, peer to peer learning, education for sustainability, business pitching, community of inquiry

1   INTRODUCTION

According to OECD (2019), educational systems are shifting towards topics such as civic literacy, global awareness, cultural diversity, and environment awareness in light of the sustainable development goals (SDGs). Studies in education for sustainability (EfS) have called for authentic learning to bring in real-life experiences (Hermann & Bossle, 2020), and connected learning (Salovaara et al., 2021) to bring students closer to problems. According to Luna-Nemecio et al. (2020), solving age-old sustainability issues requires complex thinking and community-level solutions. Despite the recommendations, there is little understanding of how sustainability education can help contribute to the implementation of solutions that involve collective problem-solving or efficacy. Furthermore, to effect peer-to-peer engagement, students have demanded more use of modern technology methods like mobile videos in social networks (de Lima et al., 2019). This extant gap in knowledge has therefore motivated this study in which students in Thailand formed teams to create a sustainability-related product pitch using mobile videos on a private social network, Soqqle. Once the mobile videos were uploaded, students could watch the content of their peers to co-create solutions. The goal of this study was to investigate the use of social learning using mobile videos in a social network. The perceptions of students were examined, as well as their ability to extract affective and cognitive learning. In addition, potential cultural influences were also examined as part of the study.

2   LITERATURE REVIEW

Problems related to sustainability have been described as "wicked" with no clear solutions (Chen & Liu, 2020; Lotz-Sistka et al., 2015). As a result, simply depending on knowledge gained in lectures is not sufficient for students to develop the necessary skills to solve these problems (Fischer et al., 2012; Olsson, Gericke, Sass, & Boeve-de Pauw, 2020; Sass et al., 2020; Schrader & Lawless, 2004; Shephard et al., 2015a). According to OECD (2018), learning methods need to transform and adopt more cognitive and metacognitive skills. To do this, Salovaara et al. (2021) recommender that students learn through an interconnected approach of local, nature, social, individual, culture and global mindsets. The authors also provided empirical evidence that students who adopted this holistic style of learning had a broader sustainability study experience. In another study, Hermann & Bossle (2020) recommended active learning methods such as problem-solving using activities commonly seen in entrepreneurial education. The authors highlighted that students need more hands-on experience by being involved in real-world problems.

Having real world perspectives is a key part of authentic learning, and it has been recommended that authentic learning be embedded in teaching and learning to enhance higher order thinking in sustainable development (Istenic Starcic et al., 2018). The study of authentic learning often refers to providing students the opportunity to practice their classroom learned concepts to real-life scenarios (OECD, 2019). However, according to Farrell (2020), authentic learning can be assessed through factors such as creating varying experiences, collaborations, and opportunities to create a product or performance. Knowledge and evidence of the applications of these factors in learning methods are lesser known. In one example, Bendickson et al., (2020) found that students who took part in innovation pitches reported increased collaboration and problem solving as they looked at real life problems and came up with ideas for solutions. Despite these encouraging studies, cognitive and metacognitive learning often requires a form of authentic peer to peer learning (Sharma & Potey, 2018), for which the application in EfS is lesser known. The use of social learning theory may help as studies have indicated that experiential learning and social learning can

increase cognitive and affective skills (Gweon, 2021). The use of social learning is also timely with the popularity of social networks as students also prefer such tools in the classroom (de Lima et., 2019). However, low participant in social networks used in education contexts (Callaghan & Bower, 2012; Cavus, Sani, Haruna & Lawan, 2021) due to low purpose or utility has been reported, and its applicability in EfS requires further investigation. Thus, this study aims to examine student perception of a novel learning method that incorporates social learning into EfS to boost authentic cognitive and affective learning.

The use of inquiry-based learning has been shown to be effective in creating sustainability awareness in the classroom (Kalsoom & Khanam, 2017). Garrison & Akyol (2015) recommended the use of communities of inquiry (CoI) to influence metacognitive and co-regulation through social, cognitive and teaching factors. Within the communities of inquiry framework, students collaborate with one another using self-perceived and self-defined responsibilities. In this context, students and peers learn from both individual as well as group perspectives. To extend the literature, this study will incorporate the following CoI elements into a EfS context: i) social presence for participant engagement ii) cognitive presence for content engagement iii) teaching presence for goals engagement. According to Glassman et al. (2021), the implications of CoI extend to collective efficacy for which engagement and problem solving can occur. Thus, potential effects of collective efficacy will also be studied. This will be supported by game design elements by Mochizuki et al. (2021), authentic learning assessments (Farrell, 2020), as well as cognitive and emotional development (Plass & Kaplan, 2016; Ninaus et al., 2019). These elements are described further below.

2.1   Teaching presence for goals engagement

According to Kwee (2021), it is difficult to create student interest in sustainability topics due to sustainability being perceived as 'irrelevant' to the curriculum, as well as students feeling that they are unable to create an impact. The author further said that students are better motivated by incorporating real-life scenarios and encouraging discourse with peers. This is in line with recommendations by other research (Hermann & Bossle, 2020; Farrell, 2020) that designing problem-solving experiences for students in real world scenarios can make learning more authentic. In this context, the role of play, or gamification, has been suggested as an important element toward developing critical thinking, collective creativity, and problem solving (Tang et al., 2020). Games have also been described as a suitable way for students to better personalize their learning goals and pace (Toh & Kirschner, 2020), thereby creating a way for them to self-direct their learning process. Furthermore, the relationship between self-directed learning and problem solving has been studied (Loyens et al., 2008) and proven to be effective for sustainability education (Noordegraaf-Eelens et al., 2019).

One type of gamification of increasing interest (Hallinger & Wang, 2020) is the use of simulations, which can deliver real world and authentic experiences (Qian & Clark, 2016; Farashahi & Tajeddin, 2018), as well as asynchronous off-classroom engagements (Featherstone & Habgood, 2019; Robertson et al., 2021). Despite the benefits, a majority of simulations are usually done in vivid immersive environments that require high setup, user training, limited customization, and require significant planning to stimulate student participation (Delahunty, 2018). As students prefer more familiar methods like social networks to engage (Lima et al., 2019) and view content from peers, this study aims to create a simulation method on a social network to encourage self-directed learning for sustainability education.

2.2   Social Presence for Participant Engagement

One other challenge noted by Pennington (2016) is the successful integration of knowledge in interdisciplinary teams, and a key focus needs to be on creating connections between the knowledge held by people of different disciplines. The author also said that knowledge sharing must enable comprehension of complicated concepts and encourage reflection in addition to connection building (Pennington, 2016). Cincera et al. (2018) noted the importance of group dynamics, and social learning processes had to create supportive and trustful atmospheres among the participants. One recent sustainability-focused simulation used role-playing to allow participants to engage with peers with different goals to be able to learn diverse perspectives (Mochizuki et al., 2021). The authors reported evidence of complex thinking, collaboration, and that the participants were able to reflect on real world implications (Mochizuki et al., 2021).

These findings were quite similar to studies on team learning and shared mental models. Van den Bossche and colleagues (2018) defined shared mental models as shared representations of tasks, working relationships, and situations. According to previous research, all these types of knowledge need to be shared in effective teams for them to perform at a high level (Matheiu et al., 2005; Matheiu et al., 2000; Van Den Bossche et al., 2018). Empirical studies found a positive link between the sharedness of mental models and team performance (Mathieu et al., 2005). Similar to the findings of interdisciplinary team research (Cincera et al., 2018; Pennington, 2016), Van Den Bossche et al. (2018) stated that differences of opinion within a team need to be discussed constructively and viewed as opportunities as opposed to threats. The authors also stressed the importance of a shared mental model within a team, and teams with a shared mental model performed better, though the perceptions of the teamwork by the different members did not always match with the level of the shared mental model (Van Den Bossche et al., 2018).

A shared mental model can further be developed into collective efficacy which defines the groups' shared belief in its ability to achieve its goals (Bandura, 1963; Bandura, 2000). Glassman et al. (2021) postulated that the social influence, engagements and collaboration influence collective efficacy to create engaged, productive online communities, particularly in mass media such as social networks (Bandura, 2001). In the context of education, while collective efficacy has been previously shown to increase participation and motivation (Wang & Hwang, 2012; Remesal & Colomina, 2013; Goggins & Xing, 2016), investigations that use modern social network features like user-generated content and comments in relation to collective efficacy are lacking. Finally, while effects of collective efficacy have been proven to increase cohesion (Pabayo et al., 2020) and creativity (Zhang et al., 2011) in sustainable development concepts (Chen, 2015; Brunstein & King, 2018), its use in modern social networks requires more investigation.

Furthermore, opportunities to create a product as well as to collaborate with others are essential elements of authentic learning (Farrell, 2020). This is in line with a sustainability focused innovation contest (Greco et al., 2021) for which participants that took part in a design-thinking bootcamp that involved reported deep problem-solving and increased collaboration. This is also in line with entrepreneurship related recommendations (Hermann & Bossle, 2020) as students have direct exposure to their selected problem domains. With these aims in mind, one of the goals of this study was to examine the impact of introducing innovative product pitches in a collaborative and social learning supported learning environment.

2.5   Cognitive presence for content engagement

It has been argued that emotions affect all aspects of cognition, particularly in the case of memory attention and learning (Ninaus et al., 2019). There is increasing evidence that learners who do not feel emotionally engaged begin to disengage on the cognitive and behavioral level (Finch, Peacock, Lazdowski, & Hwang, 2015). Theories of learning with multimedia have increasingly considered emotions to be more crucial and emphasized that learning through multimedia should focus solely on cognitive aspects. Mobile videos, a common feature in social networks, have shown to provide realistic, cognitive-driven experiences and are able to affect emotions (Alemdag & Cagiltay, 2018; Sander & Nummenmaa, 2021), thus it might be a suitable method for allowing students to enhance their learning performance.

Plass & Kaplan (2016) argued there is an inseparable association between cognitive and emotional processes during learning. Despite the importance of emotional learning, a study by Cebrián & Junyent (2015) on student teacher perceptions on sustainability education indicated that students in their study disregard emotions, like a sense of belonging with the environment. The study suggested that student teachers did not focus on promoting reflection or awareness of emotional aspects. In fact, most of the teachers prioritized knowledge and practical skills for sustainability, to the detriment of other types of learning, such as management of emotions (Cebrián & Junyent, 2015).

On a related note, Plass & Kaplan (2016) noted that a number of different design elements can impact situational interest experienced by the learner. Ninaus et al. (2019) said however that the underlying mechanism by which games or game elements engage learners and promote learning is still unclear. They recommended that research focus on defining the zone of optimal emotional engagement to foster learning outcomes and emphasized that learners should not be distracted by too many emotional reactions or overload. Further research on role-play learning has also highlighted the importance of optimal emotional engagement, as several authors have noted that too much stress and anxiety can detract from the learning experience for students in role-play games (Sogunro, 2004; Taylor, 2018).

With the above discussions, the following research questions were investigated:
1. How did students perceive the social learning involved when watching pitch simulation mobile videos in a collective online social setting?
2. Which part of the learning activity (creating the videos, watching the videos, commenting on the videos) was most useful for the student learning?
3. What differences (if any) were there in the perceived learning outcomes between different intercultural learners?

3   METHODOLOGY

For this research, the focus was on a product pitch part of the course using a purpose built private social mobile application and how social learning conducted on the application contributed to enhance student learning outcomes.

3.1   Participants

The participants were from a class of 80 students who took part in a course on creativity and communication. The participants in the focus groups were both Thai and international students enrolled in the creativity and communication course taught in English. Most of the students were Thai, but there were several students from Myanmar, Cambodia, and China. Students represented two different faculties at the university. The study took place

in late October 2021, a few months after the students had completed the course and video activity.

Since there were both international and local students, focus group participants were split into two groups based on their nationality. Group 1 was composed of international students while Group 2 were Thai students. This was to ensure that students were comfortable to participate in the discussions and that any similarities or differences in their perspectives between the groups could be highlighted for further investigation.

3.2   Materials

Students recorded videos on their mobile devices and used their respective authoring tools (such as Tiktok or IG) to edit the videos. The videos were then transferred to their mobile devices and uploaded to the private social media application, Soqqle (https://soqqle.com), used in multiple institutions in Asia, where users can "post" images or videos as well as add personal comments on these submissions. Prior to the simulation game, a code-name was created on the Soqqle mobile application and given to the students through email. Students subsequently downloaded the Soqqle mobile application on the Android playstore or IOS app store and entered the code-name into the application to join the game. The code-based protection of the platform provides a private and safe environment where students can share their ideas and engage with others anonymously.

Throughout the game, students were expected to collaborate in their preferred applications such as LINE (https://line.me/en/), while actively commenting on the other product pitches that were posted by the other student groups on the Soqqle platform. It was assumed that students would learn from reading comments to their videos from their peers, as well as the comments provided by the instructors, and this was investigated further as part of the focus group discussions.

3.3   Design & Methodology

The course that was selected for this study focused on teaching students about creativity and applying creative solutions to significant problems in the world, many of which relate to socioeconomic issues. In the course, students worked in groups of 6-8 to research a problem that was significant to their group, and then produce a video on the problem based on their research. Afterward the group created and tested a prototype that addressed the problem they depicted in their initial video, before doing a final product pitch of their prototype to communicate how it would help address the problem. Due to the size/scope of this work, the students were encouraged by the instructors to divide the work into different roles in order to help the teams work more cohesively together.

To collect data, the study organized the focus groups at the end of the semester. The focus groups were transcribed and coded based on Colaizzi's Strategy, which has been used in subjects (Park et al., 2018) with phenomenal nature such as communication and social behavior. Colaizzi's Strategy is based on an inductive and interpretative approach to identify significant meaning, cluster common themes, and create a fundamental structure. In the context of this study, the use of authentic assessment framework and experiential learning was adopted to help with theme identification. These are described below.

To validate if students experienced authentic learning, the study adapted an authentic learning simulations framework by Farrell (2020). Participants were evaluated based on the i) level of challenge ii) ability to create performance iii) experience of collaboration iv) sense of realism v) observation of varying experiences vi) obtained knowledge that can be transferred vii) opportunities for reflection. A more thorough description is provided in appendix A.

It is worth noting that at the start of each focus group, where the session was recorded, the students were informed of the purpose of the study, and that their responses would be selected and cited anonymously. Verbal permission was gained from the participants before proceeding with the focus groups.

3.4 Procedure

Students worked in groups to produce 3 projects related to socioeconomic issues and sustainability. As the course was about creativity and communication, the students were expected to focus on developing not only their creative thinking, but also their communication skills through video projects and presentations. A major element of this course was self-directed learning and reflection. The instructors for the course acted as facilitators, and half of each class was dedicated to allowing students to do self-directed learning within their own groups. Several group tutorials were also arranged throughout the course so that students could get feedback on their work and ask the instructors questions.

At the end of the course, the two focus groups were conducted with 2-3 students in each group. One group was conducted with Thai students (Group 1) while another group was done with international students (Group 1). The focus groups lasted about 45 minutes each and were done over the video-conferencing application, Microsoft Teams.

An independent coder then transcribed the responses from the focus groups, and proceeded to identify significant sentences, exclude sentences with similar meaning, and normalized representative phrases per participant. Categories were identified based on common underlying concepts to formulate common themes. For phrases that were related to cognitive or affective outcomes based on the observation of peers, they were further scored (1-3 on Likert scale) on their depth of higher order thinking.

4 Results

The following section will outline the results of the two focus groups. Overall, the two focus groups generally agreed on the value of social learning, but did express some potential future improvements to the learning method that differed depending on their perceptions of the whole learning experience. This will be discussed more below. The section discusses overall authentic assessments first, followed by reflection responses from the students which were further coded into cognitive and affective types following the experiential learning model. Finally, additional coding on the reflection phrases was. Based on the focus group codings, three key themes of self-efficacy, group effects and challenges were identified.

4.1 Videos creation

8 videos were created as part of the tasks and uploaded on the Soqqle app (Figure 1). Some of the issues depicted were fast-fashion, infrastructure issues, and cyber-bullying. When the videos are posted on Soqqle, the application sends a push notification to all other participants on their mobile phones. When the push notification is tapped, Soqqle opens and allows the participant to view the video.
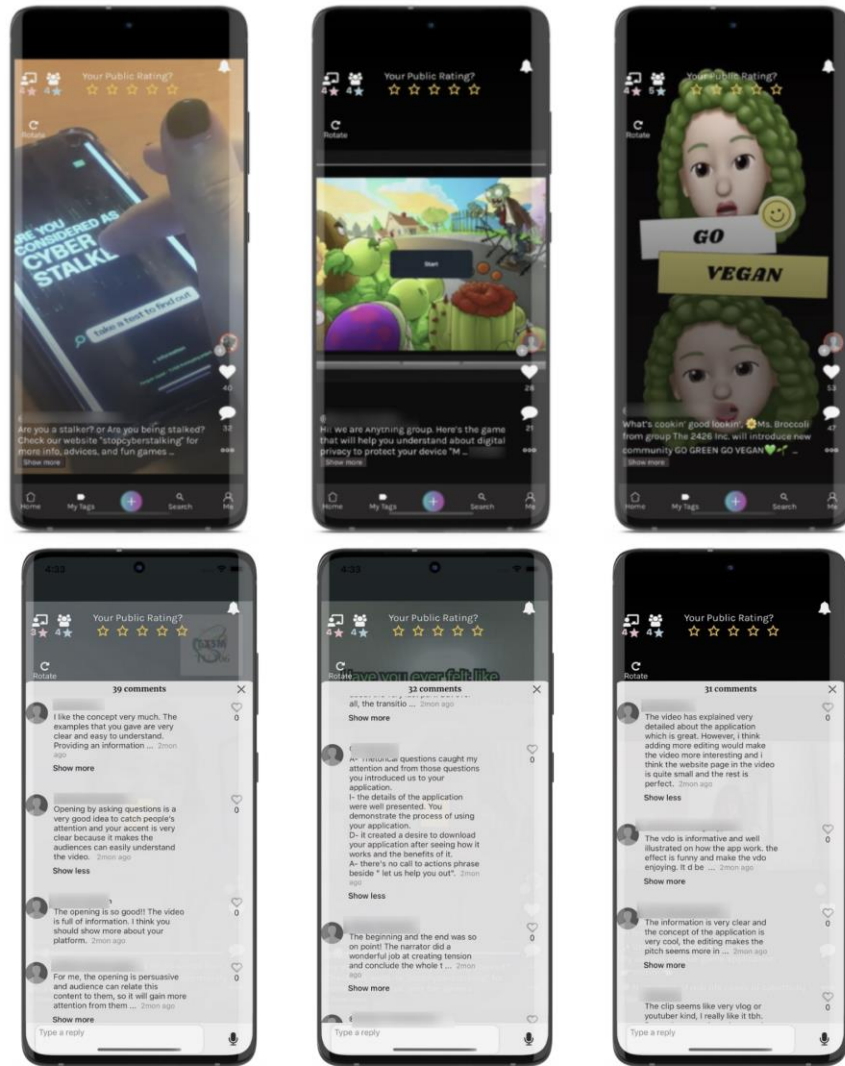
Figure 1: Screenshots of mobile videos and comments from Soqqle app

4.2   Performance

Participants stated that being a part of the group to complete the video-based task allowed them to experience and observe the different skills required to complete the task. However, it was also pointed out that due to the lack of hands-on experiences in each part of the video activity, participants were unable to have a deeper experience on the different tasks which were performed by the other group members. One participant recommended repeating the video-based tasks and rotate assigned roles to allow for more opportunities to get hands-on activity.

I think that doing it as a group would be better, because everyone everyone in the group has, you know, different skills that they're good at, some know editing, some are creative - But right now admittedly, I cannot remember all of that process at the steps of the pitch because I only took part in some of the work processes." Speaker 1, International

But what about making two projects with that video editing (the video pitch)? . . . So if it is a pitch project, then maybe we can do the different arrangements of the team. So for this group, maybe I will take part in video editing or something like that. But in another part of the project, I might get another responsibility (not video editing). Speaker 2, International

Another participant highlighted that the initial expectation was to use popular social media applications like Facebook, Instagram or Youtube. However, after learning about the private and safe environment of Soqqle, the participant concurred that Soqqle was ideal for experimentation and creative expression.

On when you first assigned the team about the Soqqle... I think many of my friends were asking me, what is Soqqle? Of course. And the point that you just stated, that you want to be a safe place for students to post their video on Soqqle, and there are no public kinds of things. So before I heard your statement, I thought we would just go on an online platform like Facebook, Instagram or YouTube, but after I know your reason, I think it's very useful for the students. So my answer is, yeah, I think we should go with Soqqle because there is some difficulty, but it's not that hard to adapt to the Soqqle platform. I think Soqqle is quite a safe place for us to do our experimenting and express our creative ideas. - Speaker 3, Thai

Participants reported that the video-based activity was interesting, memorable and unique. Notably, it was also mentioned that the ability to review content after the assessment concluded was helpful. Participants indicated that usually in their curriculum they just present their work and having peer to peer engagement for assessments was refreshing.

I think the Soqqle video is memorable because, you know, rather than doing presentations where we listen to each other talk. Watching videos was definitely much more interesting and memorable, and, you know, we could always go back to Soqqle and look at our videos over and over again." - Speaker 1, International

It's a bit unique because we don't have other projects like Soqqle in our curriculum. We mostly just present our work, and yeah, as Speaker 2 mentioned, we would forget such projects, but here with Soqqle, we can review it again. - Speaker 2, International

4.3   Collaboration

Participants perceived that the group work allowed them to assign activities and maximize their productivity. It was also noted that some team members did not actively participate which posed a challenge for collaboration and group work.

Some may not be really comfortable doing the research, but some can be really, really comfortable and creative when it comes to making videos and, yeah, Instagram and TikTok, for example. So I think I learned that I should put the right man in the right job because like, if I force everyone to like, OK, he has to do research and then you all have to do the research. I mean, it would be draining for everyone and not really productive for the group. - Speaker 1, Thai

There were some present in the meeting who didn't contribute that much. Sometimes they do not even attend the meeting. So this creates some negativity for me and friends, of course. - Speaker 3, Thai

4.4   Reflection

Some participants reported feelings of competition while completing the video-based assignments as they watched the videos of their peers. As participants watched the content of their peers, they would compare the performance of others against their own. In this context, a form of passive observational learning would take place. Not everyone felt this competitive element and it did seem to depend on the level of individual motivation. Furthermore, the format of videos was described as entertaining rather than competitive by one of the participants.

It's kind of like competitive somehow, because like everyone posts their pitch on the Soqqle and then we see it, and then we compare it to our own group and comparing another group to like the risk, - Speaker 2, Thai

I am not a super competitive person but on the other hand, I feel like it's very entertaining because watching my friends doing stuff like this, it's very interesting. - Speaker 3, Thai

4.5   Feedback

Participants provided responses that indicated they had trouble providing effective peer feedback. It was also noted that besides comments, other alternative forms of feedback could be used.

I feel like commenting is kind of a bit of a struggle, not as much the structure, but I feel like my natural action is to be a bit aggressive in commenting, and I didn't want to comment like that for the activity ... But sometimes I just feel like, yeah, there's some certain groups that didn't really perform well on it. But I felt like I couldn't say that, of course, because it seemed like it would be too obnoxiously aggressive. I didn't feel like I could articulate my feedback in a non-aggressive way. -Speaker 1, Thai

Commenting on anything is quite reasonable to me but being forced to comment only on certain content or things (like AIDA). I feel like we could have done that in alternative ways, like anonymous polling and giving points/ratings of each of the group videos or something. - Speaker 2, Thai

Participants provide opinions that they were not comfortable with posting feedback on public and personal social networks like Facebook. This is despite features on the applications that allows content to be private. Soqqle was described as 'clean', whereby only students could review and participate in the activity.

Facebook and YouTube would be kind of public data and I mean, I would not really be comfortable posting our videos there. I don't like to put my work and my comments on a live/public social media because I personally am not really active or comfortable in terms of commenting on social media at all. - Speaker 2, Thai

I think if it's a closed environment, then I feel like it's more formal. And yeah, it's more valuable. If we did it on YouTube or Facebook, some people might get confused with our purpose. -Speaker 2, International

I think Soqqle is like a very clean environment, like it's only us, the students. So, if it was posted on YouTube or another platform, then we would receive more comments from other people that see a possibility that would happen, and those people might not be as nice as our classmates. - Speaker 1, International

4.5   Realism

The use of videos was described as useful as the format is popular in modern social media platforms like Tiktok. However, as the activity was group based, not everyone had the chance to create the videos.

I think it was helpful because now a lot of businesses, they start to enter social media platforms like Tiktok and stuff, and the videos we did are similar to something we could put on Tiktok, as it's a short video business, so it will be helpful. But because I was not in the pitch video team, it was just not as memorable, but I bet that this experience for people who have been doing the video, it is definitely beneficial for the future. - Speaker 1, International

Although comments were described by some as not useful for learning outcomes, one participant highlighted how reading and handling feedback was relevant in a real life situation.

For me, I think it's really helpful like... Even if the scope was only in the context of TU106, we got a lot of comments. So in reality, we might get more comments and it's a kind of like a real life situation where we need to accept those comments and feedback. So in reality it would help us to experience that need to accept comments or feedback. -Speaker 1, International

4.5   Varying Experiences

As the video-based activity involved participants completing tasks with one provided framework, participants highlighted the opportunity to have more self-directed learning to search other frameworks. However, there was no conclusive result on whether a deep study into one framework or having opportunities to explore different frameworks was better. This was especially true with regards to the use of the evaluation framework AIDA (Attention-Interest-Desire-Action) as the main framework for creating their pitch videos.

The business pitch can be many things, right? But if we were to discuss more about making these videos, I think maybe use a different framework? I mean, I am not saying to get rid of the AIDA framework, but I mean, like on the framework, it might be better to let students pick their framework, and figure out which one would actually work best for their own project because like, there's a lot of different theories out there. - Speaker 1, Thai

I still have a mixed feeling about this because, sticking to a one framework could allow you to like to add more on the content. Like you could teach more deeply into

the concept. You can teach them how it is, what it is, and this would allow it to stick more, but you could also give them a variety of framework choices. But I think you don't have time to teach them all the stuff right? - Speaker 2, Thai

I think you can give us another five theories (in addition to AIDA) with the same level of detail, then I think it would be OK. Some students, especially in the first year, might be able to comprehend the theories quite well, so a few of them can really process the information about the theory and put it to good use. But I mean, for others it could drain them out quite a bit. - Speaker 1, Thai

4.6   Perceived self-competence affected reflection of content from peers and ability to provide constructive feedback to other groups

The students differed in terms of their perceived self-competence in reflecting on the comments of their peers. Both students agreed that commenting had to be required, otherwise, none of the students would have provided any constructive feedback to their peers. However, both the international and Thai student focus groups expressed their reservations about the effectiveness of the peer commenting part of the video assignment, with the international students feeling a bit more comfortable than the Thai students in commenting on the videos. Some of the most illustrative quotes of this issue can be found below:

I think we should focus on who is commenting because, for example, like I don't have direct knowledge like you. So let's say for example, we are in journalism or communication class. You are a teacher. I am a student. You know, I'm not that good at journalism or communication, I can teach my friends sometimes about some topics, but I cannot be like you. I cannot give direct insights like you. So it's kind of hard for us to come into something and like, give the specific feedback. I'll give something very useful for our friends to improve their work. So I think we do base our attention on the comments a bit to who is commenting. - Speaker 3, Thai

I think in another way, so our product is supposed to solve our customers' pain points, and our customers are not going to be some rocket science mathematics people. So I think it's OK to comment on someone else's video. Otherwise, how are we supposed to know where to improve and how we can suit our customers better if we don't even want to hear these "not expertise" comments? - Speaker 1, International

In terms of how to improve the perceived self-competence of students to reflect and comment constructively on the other pitch videos, opinions were divided as to what were the best solutions. Although the Thai respondents said making commenting anonymous, or teacher interventions in the commenting process, such as teachers "upvoting" or liking good comments to provide a model for commenting, could be effective ways to elicit more reflective and constructive feedback, the international students were not so keen on these ideas.

So I will say that teachers are commenting on student comments and telling us, like what we did good and what we could improve. So it could be the model for the student to like.... I don't really want to use the word copy, but yeah, some maybe do it, but I think it would be the model for a student to like, OK, this is how you should comment on your peers' videos. I think it would be good if they had a model to follow. - Speaker 1, Thai

I think if teachers like, you know, 'like' the comments or 'upvote' them. I mean, and I don't think it would be that helpful, because for me, it's like when we are in elementary school and then the teacher fills in as an example and then everyone follows and does the same thing. So I don't really think that is helpful for me. I think it would lead to a lot of copy/pasting. But what we mentioned about the comments being anonymous, I think, would be helpful in some way, but that's not like the ideal end solution. I think as long as we are classmates, this is a never-ending issue. Maybe if we had someone that is not in our faculty or doesn't know us at all comment, this would be more straight forward instead of just your video looks nice. - Speaker 1, International

I think if we define how to comment or something like that. Like, it may have the effect of nurturing the wrong mindset towards commenting, and they, like the student, might get that mindset like "this comment is right, but this comment is not right" or something like that. So it's a kind of restriction on their thinking. - Speaker 2, International

Another issue that impacted their ability to reflect on the content and provide constructive feedback was the strong feelings of camaraderie they had with their classmates, and this made them even more reluctant to provide constructive feedback. Several of them mentioned they did not want to cause some distress for the other groups.

When we had to comment on the video, it was more difficult because we thought, if it was produced by our own team. It would be very difficult for us to tell our teammates that the video is not as great as we expected it to be, and it would be very annoying for them to have to fix it over and over again. So I think it was for this reason why we, you know, we were not as direct with our comments to the other group videos. - Speaker 1, International

Overall, while the students believed there was definitely value to the peer reflection and peer commenting, there were still several issues that prevented the comments from being constructive and helpful for the improvements of the groups. Most notably, the students mentioned being uncomfortable with their perceived lack of expertise in business pitching, and potentially harming the morale of the other groups by being too constructive in their feedback. However, the international students did mention that allowing the students to do the video pitch twice as opposed to just once, could be a way to encourage students to pay more attention to the comments:

I think it would be helpful [to do this video activity twice] because we would be absorbing the feedback and could actually look at the feedback and make improvements. So I think doing it twice would be better because during TU106, we only did it for once and we kind of just finished the video and we didn't really go back to it. - Speaker 1, International

4.7   Group effects were seen in overall participant's learning experience

Participants collaborated and considered the skillsets of the group. For the most part, all the respondents agreed that they were able to divide the work evenly amongst themselves, and there was effective collaboration displayed by most of their team members. Although there were a few students who did not contribute much, the students said that these students did not

impact the overall experience of working in their groups. These were evidenced by the quotes below:

I would say that our group work was effective, although there were some people who didn't work, we were able to learn some things about effective teamwork and collaboration. - Speaker 1, Thai

I think, if I had to do this assignment individually, I wouldn't have been able to do it because I cannot video edit, so working as a group was beneficial for me. - Speaker 2, International

The group work aspect was a bit of a hassle because we had one member who never showed up or helped us, so it does make me think that if we were to do this assignment in groups, we should do it with a group of people we know well, as opposed to people we don't know. While yes, we do learn how to work as a team and communicate, it was just a struggle sometimes to schedule meetings together with some of our members. - Speaker 3, Thai

5   Discussion

Overall, although both focus groups noted having a positive experience with the social learning activity, they did have differing opinions on the nature of their learning and what they gained from the experience. In terms of the similarities between the two focus groups, both focus groups mentioned there was some challenge to doing the activity, and none of the respondents indicated that the task was not challenging enough.

The findings of this study suggest personal and interpersonal factors that influence the ability for students to practice higher order thinking. It was observed that some students appeared to be more dismissive of peer feedback, while some students felt a sense of worry if their work was able to meet learning goals. It should also be noted that while participants appeared to focus on video editing, it is possible that adjusting the explanations and graded assessments may redirect them to other competencies such as content development.

One objective of this study was to cultivate a sense of entrepreneurship and problem solving through product pitching. The ability to communicate problems was also important in the activities. However, a few points were observed around the learning outcomes. As many of the students reported not having much background in product pitching the students with first year students in the degree program, most many of the focus groups respondents perceived that they did not have the knowledge to effectively participate actively in a peer to peer and collaborative manner to solve problems. Some mentioned about the lack of self-confidence (and efficacy) in providing peer feedback or being perceived as "aggressive" to their classmates. Unfamiliarity was also mentioned as a factor in participation. Although being able to collaborate with others we do not know well is also often a realistic situation in a work environment, the classmates knew each other quite well and seemed to be reluctant to criticize each other's work. Secondly, participants were unlikely to perceive themselves as being experts in the topics selected for their product. This impacted their sense of usefulness when they engaged in peer-to-peer feedback. A potential solution is to include a phase of problem identification and investigation early in the program. Participants can explore problems closest to them and discuss them with peers, thus increasing the perceived usefulness of engaging peer to peer. Nonetheless, although peer feedback was described as shallow in our study, participants highlighted increased motivation due to encouragement

from friends. Also, by incorporating feedback, participants were more likely to watch the videos of others, thus increasing the benefits of getting new ideas from others.

It was observed that some students reflected on content based on whether their teams were able to make improvements on their work, not just with their own work but also when commenting on the work of their peers. However, if a student did not feel confident in making accurate judgements of good and poor quality, the student would similarly not express motivation to learn from others. Thus, it should be also noted that despite students obtaining vicarious experiences (Bandura, 1982), the ability to benefit from them does depend on the students' perception of the skills of the team as well as the students' perception of their own assessment abilities. This suggests that a certain amount of scaffolding is necessary to build students' self-perception of evaluating peer content for social learning. It was clear, particularly for the Thai student respondents, that they were not as comfortable providing comments to individuals they viewed as equals, while the international students indicated that they believed that even comments from "non-experts" such as themselves could be valuable for learning. However, both groups indicated that peer comments were not useful for improvement of their own work.

Some participants also compared the content of peers against the abilities of their own groups. For example, a participant in a group with strong technical skills may not feel the benefits of watching content from others with lower perceived technical skills. As this was a video project, many of the respondents focused more on video editing skills as opposed to the business pitch skills. These signal effects of collective efficacy (Bandura, 2000) where a student's self-efficacy can lead to a group benefit. For example, a student's skill on video editing results in a group member's confidence in the performance of the team. This is supported by Glassman et al. (2021) where collective efficacy is suggested to be a reciprocal causation relationship between possible actions, and feedback, to individual and group cognitive filters. The authors further suggest that collective efficacy can be measured on the participant's influence on social, engagement and co-creation capabilities.

It is important to note that while some groups appeared to display higher collective efficacy in accomplishing tasks, some participants indicated unclear learning goals and objectives. For example, many respondents focused more on developing skills in video-editing, while some students recognized clear communication as a learning objective. It was evident that the program was viewed as a video editing assignment. Thus, students may have overlooked other important self-directed learning objectives like communication and problem solving. This was further affected by a lack of self-efficacy described earlier due to lower appreciation or understanding of the topics. As learning skills like communication require scaffolding and careful execution (Teo, 2019), it is critical for practitioners to plan multiple learning outcomes and challenge levels to keep students motivated. Participants suggested in the focus groups to be given opportunities to search for different tools (e.g. communication frameworks) instead of being directed to use only one.

Overall, we purport that the key themes on perception of self-competency, the group effects and interpersonal interactions are the factors that influence a students' willingness to learn from peers through mobile videos in a social network. (Answer to RQ3) Cultures with high constructivist behavior such as Thai are influenced more by effects contributed by collective efficacy compared to others.

5.2   Theoretical Implications

The findings of this study help to extend understanding of the use of social learning for collective efficacy in education for sustainability. As studies that use social media for education for sustainability are sparse, this study can provide insights to educators looking for

new ways to encourage peer to peer engagement and collaboration. Through this study, factors that influence students' perception of peer content on social media can be considered for future research.

5.3   Limitations

For the focus group results, there were a few key limitations. Firstly, because none of the students were native speakers of English in the international student group, it is possible that some of them were not as comfortable discussing their views openly due to a lack of proficiency in English. The focus groups were also conducted in October 2021, a few months after the video activity had concluded, making it difficult for some of them to remember what exactly happened. However, because the focus groups were more geared towards assessing what the students remembered as opposed to having them describe what they did or how they felt, this study was still somewhat useful for understanding how deep the learning from the video activity was for the respondents. As the study utilized only focus groups, the results cannot be generalizable to a population. On a related note, as the focus groups featured a non-randomly selected group of students, so the respondents do not represent all of the possible viewpoints of the students who participated in social learning activity. It is also possible that a lack of explanation of social learning led students to overlook key aspects of the activity (e.g. the comments from their peers) and focus exclusively on more traditional feedback structures (e.g. teacher-student). Despite these limitations, the study has provided a few interesting findings into social learning in an Asian context. Future studies can explore how the group dynamics, the setup of learning assessments, and expected learning objectives might affect the benefits of peer-to-peer learning.

5.4   Recommendations

The study could benefit from incorporating a few improvements to its educational design. Firstly, to improve the individual proficiency and guidance, the technological system could benefit from automated metacognitive instructions. A study by Zheng et al. (2019) using automated group metacognitive instructions to deliver hints, prompts, and questions. Based on the factors identified in this study, it is possible to incorporate such features into the system to encourage a more personalized learning that can build self-efficacy.

In summary, according to the authentic assessment framework (Appendix A), the students found the Soqqle video activity to be challenging not just in terms of video editing, but also in terms of teamwork and collaboration. The students were also able to create a unique product geared towards addressing a sustainability problem as part of the product pitching. While there were some issues with collaboration of many teams as expressed by the focus group respondents, collaboration for the most part worked well for all the teams. The respondents also felt that the Soqqle activity was sufficiently realistic and indicated that receiving comments from their peers helped the whole activity feel more realistic in a sense. The students were also able to have diverse experiences with the pitch video creation process, though some indicated that their experiences could have been made more diverse by being allowed to do the video pitch twice and switching roles/responsibilities. The students all indicated they felt like they gained useful knowledge from the activity, and it was a good "warm-up" to understanding what a product pitch was and more importantly, how it should be done.

One clear area for improvement on this activity was the opportunities for reflection. While the peer commenting part of the assignment was supposed to elicit reflection and discussion among the students about the quality of the product pitch videos, it seemed to only

generate positive comments that reinforced their work quality was adequate, but did not necessarily make the students reflect more on how to improve their own work. The observations of the focus group respondents indicate that this was not necessarily a problem with the activity itself, but more an issue of students not having enough practice with reflecting and giving constructive feedback. It appears that doing the video activity just once would not generate sufficient reflection, and the activity has to be done multiple times for students to see the opportunity to discuss and reflect on their work in a more substantive manner.

6   Conclusion

In conclusion, although this study is limited in scope and qualitative in nature, the results yielded several interesting findings that warrant further investigation, as well as recommendations on how to implement social-learning activities in a multicultural learning environment. It should be noted that while the class was briefed on the social learning assignment, the students were not fully briefed on the concepts of social learning or authentic assessments, so it is possible that the students overlooked certain aspects such as social learning as part of the learning experience. Educators who hope to implement social learning activities should focus on not simply briefing students on new learning activities and tools, but also discuss the type of learning that should result from these activities.

The research also highlighted possible cultural differences between Thai students and other Asian students in terms of their perceptions of social learning. Although both sets of students were receptive to authentic assessments and viewed the activity as practical and applicable to real-life contexts, there were very different views on the social learning aspect. The Thai students were especially critical of the lack of guidance provided by the instructors, and how they were still not quite clear on how to persuasively pitch a product. Future studies might benefit from doing pre/post-tests with students to ascertain what they already know about a topic such as product pitching, and more reflection assignments to help students identify not just what they learned, but also what they still do not understand.

Reflection is another area that warrants further study. Although this was not specifically discussed in the focus groups, previous research has emphasized the importance of reflection with experiential learning activities. Although some students mentioned reflecting on comments from their peers as a key part of their learning within the activity, many others focused more on the activities, and suggested that having more activities would have made the learning much more effective. Future research should scrutinize the understanding of reflection within experiential learning, especially within Asian countries, as reflection is not always a part of the process that is explicitly mentioned.

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Appendices

A. Authentic assessment categories and description

Authentic Assessment Category	Description
Level of challenge	Experienced challenge that is of an appropriate level. Level of challenges may result in motivation or demotivation. Challenges may vary as the task progresses.
Creation of performance	The opportunity for a student to create a product. This can signal a sense of achievement for the student and encourage the student to participate more and put in more effort.
Experience of Collaboration	Opportunity to collaborate with others. Collaborative learning has been shown develop higher-level thinking, confidence and self-esteem as well.
Sense of realism	Task conducted can be applicable to a real life scenario. Can also represent completing the task in a situation or environment close to a real life scenario.
Observation of varying experiences	Exposure to diverse experiences that can increase learning outcomes based on different scenarios, situations. Able to handle various aspects in a complex scenario
Obtained knowledge that can be transferred	Opportunity to transfer knowledge from one context to another. Often requires scaffolding and reflection.
Opportunities for reflection	Ability to improve understanding of issues, develop insights, and identify issues. Requires a sense of metacognition ability to improve understanding.

Teacher Education and Professional Development on The Influence of Teacher-Student Relationships on Mathematics Problem-solving

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ABSTRACT

In this article, we uncovered aspects that students consider when learning to solve mathematical problems. The purpose of this study is to examine students' real experiences with mathematics problem-solving. We examine the method through which students learn to solve mathematical problems in order to develop Higher-Order-Thinking skills. Additionally, this study discusses the pedagogical consequences of contact between teachers and students during mathematical problem-solving. The cognitive and affective components are the factors that decide issue solutions. We investigated the lived experiences of 45 students in solving a mathematical problem using descriptive phenomenology research. As a result, we base our findings on current concerns in education and teacher professional development in order to better understand the influence of teacher-student relationships on mathematics problem-solving.

KEYWORDS: Mathematics Problem solving, Teacher Education, Professional Development, Pedagogy, Colaizzi, Phenomenology

1   INTRODUCTION

The primary goal of mathematics instruction is to increase students' problem-solving ability, which is a lofty aspiration. Analysis, interpretation, reasoning, evaluation, and forecasting are some of the most important abilities in life, and they require the ability to think critically (Wurdinger & Qureshi, 2015). The ability to solve problems is a necessary component of all mathematical curriculum (Singer et al.,2015). Furthermore, when dealing with Mathematics, problem-solving can create an environment that mimics real-world situations, allowing students to hone their skills in addressing difficulties in everyday life (Aydoğdu & Keşan, 2014). People are confronted with larger and more complex difficulties as a result of the world's expressive technical and scientific advancement. It is necessary to find and construct appropriate answers to these issues.

According to teachers, students' anxiety over mathematics is a common occurrence in their classroom. Mathematics is a subject that many of them either despise or like depending on their mood. It has been shown that emotions play an essential role in the learner's learning process when it comes to completing arithmetic problems (Hannula, 2015). One in ten dislike mathematics in general, and specifically the problem-solving process, and claim that it is "too difficult" for them. Students avoided mathematics as a result of these beliefs, and their mathematics performance worsened as a result (Taylor & Graham 2007).

Mathematics teaching is identified as one of the strategies to enhance critical thinking among students. Improving critical thinking among students is one of the competences required by the 21st-century generation (Brucal et al, 2019). Additionally, mathematics teachers have been working with students to strengthen their ability to solve mathematical problems. When it came to solving a math problem, teachers used a variety of ways to meet the needs of their students. However, students continue to struggle when it comes to completing a math issue (Fauziah, 2020). As a result, it is vital to identify the instructor and student characteristics that influence arithmetic problem-solving challenges (Agustyaningrum et al, 2021). In light of this, the researcher ponders this important subject, which provides in-depth self-realization. "When solving a math issue, do teachers apply the students' favorite teaching strategies? Is the effort made by teachers commensurate with the needs of students?"

The purpose of this study, we will look at students' actual experiences with mathematics problem-solving in the classroom. We examine the method through which pupils acquire the ability to solve mathematical problems in order to develop Higher-Order-Thinking skills necessary for success. This study also considers the pedagogical implications of contact between teachers and students while students are engaged in mathematical problem-solving activities.

2   METHODOLOGY

A descriptive phenomenological technique was used to describe a person's actual experiences in an attempt to improve daily experience by extracting meaning from the details of it (Wassler & Kuteynikova, 2020). Before, it was used to investigate and relate people's lived experiences, which is still the case today (Christensen et al, 2017).

Through interviews with students, descriptive phenomenology research allows the researcher to gain an understanding of how students see their own techniques of solving mathematical problems. It has been suggested that phenomenological investigation may be considered a source of evidence that goes beyond current understanding and, as a result, can lead to deeper and more fruitful findings.

Researchers submit a request letter to the institution's administration prior to conducting the study. Following the approval of the request, all participants were informed and volunteered to participate in the study.

Students' experiences with mathematics problem solving were investigated, recorded, and analyzed in this study. Through a Semi-structured Interview, we investigated the lived experiences of forty-five (45) students in solving a mathematics problem. The information was gathered through in-depth, open-ended interviews. It was done one-on-one with the students, with follow-up questions to guarantee we got rich replies by capturing multiple facets of their lived experiences and limiting socially desirable responses (Hendricks, 2017). The interview began with the following question: What is your experience with solving arithmetic problems? The success of phenomenological investigations, according to Colaizzi, is dependent on focusing questions on each participant's lived experiences. On the basis of the data provided by the respondents, follow-up questions were asked (Colaizzi, 1978).

A digital audio recorder and field notes were used in the research. All information stated verbally during the interviews was recorded using an audio recorder. During the interview, field notes were also used to record the emotional indicators presented by the participants. The following data processing processes were described in detail: After the study's purpose, all notes and data from the audio were transcribed.

To evaluate the transcribed material, we employed Colaizzi's phenomenological technique. Transcriptions were created while listening to the audios. It is a phenomenological data analysis approach that reveals an active strategy for obtaining the respondents' life experience descriptions (Sanders, 2003). It requires examining data and selecting key statements, which are subsequently formed into meanings.

The respondents' words were used to extract themes and subthemes, which were then condensed using the Colaizzi method's seven steps to yield broader thoughts and ideas. By employing pseudonyms to de-identify the data, confidentiality was maintained throughout the transcription process (e.g. Student 1, Student 2,..., Student 45). To decrease the risk of personal information being released, this was done after the interview.

Theoretically, themes from subgroups with commonalities should emerge. These established themes were to be evaluated and confirmed using Exploratory Factor Analysis in accordance with Matsunaga's concept of "How to Factor-Analyze Your Data Correctly: Do's, Don'ts, and How- To's" (Matsunaga, 2010) and Hair's concept of "Multivariate Data Analysis" (Hair, 1998). This statistical technique is used to reduce enormous amounts of data to a smaller number of fundamental components, and it has since become the most frequently utilized teaching tool for students when dealing with arithmetic problems. For the 2019-2020 academic year, a new group of 200 students from various year levels at a non-STEM middle school explored further into sixty aspects of these themes. There were 114 female students (57%) and 86 male students (43%) with twenty percent (20%) from Grade 7, 22.5 percent (22.5%) from Grade 8, 17.5 percent (17.5%) from Grade 9, and 40 percent (40%) from Grade 10. One hundred and twenty-seven students (63.5 percent) scored below average, 48 students (24 percent) scored average, and 25 students (12.5 percent) scored above average, according to the results.

3   RESULTS AND DISCUSSION

The statements of the 45 respondents were transcribed in order to generate themes. In the seven phases of the Colaizzi method, four themes emerged: affective aspects such as feelings and self-efficacy, as well as social factors such as group learning activity and the relationship

between the teacher and the students. The statements were grouped together based on their commonalities, which resulted in the formation of subthemes, as seen in the following table.

Table 1. Themes and sub-themes obtained from data analysis.

Theme	Sub- theme
Sentiment	❖ Positivity
	❖ Anxiety
	❖ Regret
Personality	❖ Self-reliance
	❖ Self- motivation
	❖ Self- assurance
Group Learning Activity	❖ Group discussions
	❖ Collaborating in Groups
Teacher-Student Relationship	❖ Teacher's Guidance
	❖ My teacher, my mother

The data in the table above demonstrates that student sentiments had a role in the teaching-learning process. Positive and negative sentiments are experienced by all problem solvers, and these feelings might have an impact on their solution process. Emotions are a critical component of the problem solver's ability to self-regulate (Hannula, 2015). The results of the current study revealed that students experienced emotional distress when confronted with a mathematical difficulty. There was a sense of disappointment with regard to the subject matter present. During the observations, some students expressed frustration with their lack of acquired skills, which was noted by the observers. Based on their previous experience, they were unsure whether or not they could come up with a workable method that would generate the correct response. They were apprehensive, which may have led in them becoming discouraged about the topic. Findings from the study demonstrated that their emotional attributions to their perplexity, fears, and uncertainties are a contributing factor to their academic shortcomings.

However, several students claimed that they are capable of understanding the concepts and are willing to collaborate with their peers, which is a positive development. Their confidence and self-esteem are enhanced when they work as a team. As can be seen, practically all of the students prefer to participate in group activities rather than working independently. When participating in group conversations, the vast majority of participants overcome their fear and feel less intimidated because there is no emotional barrier that prevents them from expressing their opinions. As a result, individuals are able to complete the task successfully and increase their self-confidence (Azimova, 2020).

Students have also expressed their belief that understanding mathematical problem solving is dependent on their subject teachers. They were more motivated to learn if their teacher was comfortable to talk to and knowledgeable about the topic matter. This is especially true if their subject teacher is similar to their mother, who has guided them during the entire period of time.

Some students felt confident in their ability to complete a maths task on their own. They were determined to use their own initiative to discover solutions to the mathematical challenges that they were confronted with. According to Bandura, this is referred to as self-efficacy, and it refers to the process of actualizing an individual's ability or skills (Bandura & Walters, 1977). The following table (Table 2) contains samples of forty-five student's narratives organized according to the themes and their associated subthemes, as determined using the Colaizzi technique of analysis.

Table 2. Themes and Sub-themes and Example of Narratives

Themes and Sub- themes	Examples of Narratives
Sentiments	
❖ Positivity	❖ For me, solving mathematical problems is a pleasurable experience...." – (Student 24)
	❖ "I'm glad my teacher thought my work was worthwhile." - (Student 11)
❖ Anxiety	❖ "In regards to the subject, "I'm feeling apprehensive." - (Student 32)
	❖ "I am afraid of numbers" – (Student 3)
	❖ "I am apprehensive about sharing my response...
	❖ I'm having second thoughts about my responses". –(Student 44)
❖ Regret	❖ "I was disappointed when my answer was incorrect.". – (Student 27).
	❖ "I'm disappointed if my grade is low." – (Student 15)
Personality	
❖ Self-reliance	❖ "In my opinion, it is preferable to solve problems on my own". (Student 21)
	❖ "I'm capable of managing myself..." – (Student 7)
❖ Self- motivation	❖ "I am inspired when our teacher gives us the freedom to do whatever we want." - (Student 18)
	❖ "I'm am encouraged to establish my own learning objectives.". (Student 2)
	❖ "I am inspired to conduct research on the subject." – (Student 34)
❖ Self- assurance	❖ "I am confident in my answers during the quiz..." - (Student 18)
	❖ "I believe that problem solving is simple...
	❖ "I feel confident in my ability to pass this topic." – (Student 4)
Group Learning Activity	
❖ Group discussions	❖ "I learn a lot when we discuss our lessons with my classmates"- (Student 38)
	❖ "I easily understand the topic when we discuss it by groups."- (Student 44)
❖ Working with the Group	❖ "I enjoy solving mathematical problems specially when we work it by group" – (Student 40)
	❖ "Me and my classmates are working together to answer our assignments"- (Student 5)
Teacher-Student relationship	
❖ Teacher's Guidance	❖ "Our teacher guided us in our lessons…"- (Student 15)
	❖ "I love my teacher because she guided me…" – (Student 27)
	❖ "I need teacher's guidance for me to understand

❖ My teacher, my mother	the lesson." –(Student 33)
	❖ "My teacher is like my mother". –(Student 11)
	❖ "I like the way our teacher treat us, she treat us like her children… she care for us". – (Student 14)
	❖ "…easy to talk to, like my mother." – (Student 21)

The researcher developed a 7-point Likert - scale from 1-Strongly Disagree to 7-Strongly Agree based on the topics and subthemes that were generated (see Table 2). A total of 200 participants answered 60 Likert-scale questions to record their experiences in mathematics problem solving.

Both Kaiser's eigenvalue and the scree test were used to determine how many significant factors were evident (Kaiser, 1960). In order to proceed with the analysis using the Exploratory Factor Analytic technique, the following should be done as ad-hoc or assumptions (Hair, 1998).

Table 3.KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.820
Bartlett's Test of Sphericity	Approx. Chi-Square	4882.504
	Df	1596
	Sig.	.000

Kaiser Meyer Olkin (KMO) and Bartlett's tests were performed to measure the strength of the relationship between the variables in Table 3. Kaiser proposed for a beginning point of 0.5 (KMO value) (which was only marginally approved) (Kaiser, 1960). According to the table above, the KMO Measure of Sampling Adequacy is.820, which is more than 0.5, meaning that the responses produced by the samples are "adequate" (Table 3).

In addition to the Pearson correlation coefficient, the Bartlett's Test can be used to determine the strength of a link between two variables. It was proved in the same Table that the Bartlett's Test of Sphericity was statistically significant, indicating that factor analysis was required. As a result, it does not function as an identity matrix (Table 3).

Table 4.Total Variance Explained

Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	11.983	19.971	19.971
2	4.294	7.157	27.128
3	2.975	4.958	32.086
4	2.304	3.840	35.926
5	1.999	3.332	39.258
6	1.839	3.065	42.322
7	1.696	2.827	45.149
8	1.513	2.521	47.670
9	1.482	2.471	50.141
10	1.411	2.352	52.493

11	1.365	2.275	54.767
12	1.272	2.120	56.887
13	1.258	2.096	58.984
14	1.221	2.035	61.018
15	1.108	1.847	62.866
16	1.100	1.833	64.699
17	1.017	1.696	66.395

Eigenvalue reflects the number of extracted factors.

Using the information in Table 4, it was discovered that the Statistical Product and Service Solution (SPSS) extracted factors and the cumulative percentage were both 66.395 percent. The variance was explained by these 17 factors to the tune of 66.395 percent. All of the remaining factors were found to be non-significant. The scree plot was used to help researchers find additional potentially significant features. Examining the results of Cattell's scree test (see Figure 1) confirmed that rotating these seventeen components was suitable, as the bend in the elbow happened after each of the seventeen factors was rotated.

The scree plot is a graph of eigenvalues against all factors that is used to estimate the number of elements that should be removed from the data. The point on the curve where the curve begins to flatten is the point of interest. The curve begins to flatten between the ages of 18 and 19, as shown on the graph. It should be noted that factors 18 and onwards have an eigenvalue less than 1, implying that the model must have either sixteen or seventeen components.

As a primary output of the principal components analysis, the rotated component matrix (with variables in rows and components in columns) shown in Figure 2 is considered to be the most important result. It comprises estimates of the correlations between each of the variables and each of the estimated components of the relationship. The figure shows that the variables i16, i31, i32, i33, i34, i35, i36, i37, i39, and i44 are loaded in component 1. Component 2 is heavily loaded with the items 1, 3, 5, 6, 8, 14, and 18. Component 2 is also heavily loaded with the items 1, 3, 5, 6, 8, 14, and 18. The elements loaded in component 3 are i46, i47, i48, i49, i50, and i56. Figure 2 contains a listing of all of the variables loaded from components 4 through 17.
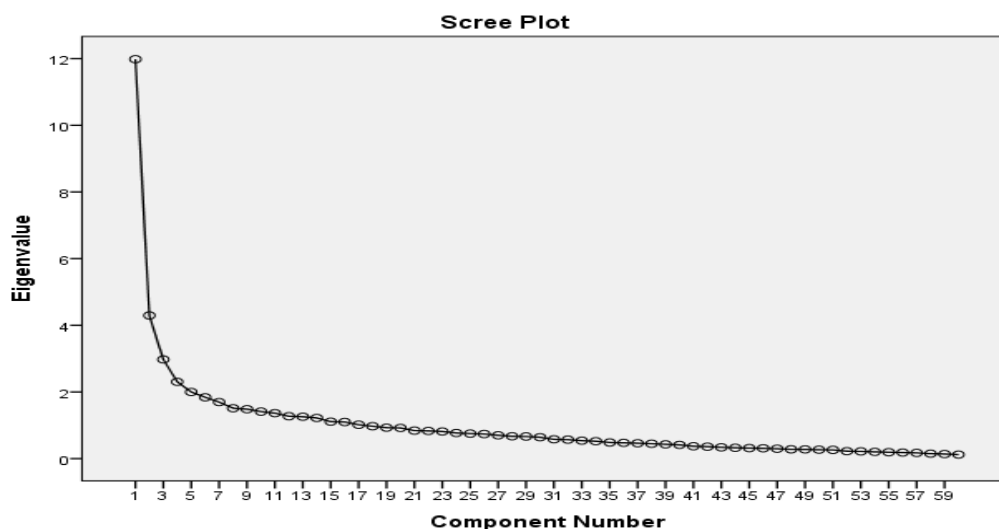

Figure 1. Scree Plot with 60 elements based on Principal Component Analysis (PCA)

The loading of the components/factors was done in a size-based manner. The factor loading with the highest strength at the top was 0.739, while the factor loading with the lowest strength at the bottom was 0.410. (Figure 2).

	Component																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
i34	.739																
i36	.724																
i35	.719																
i31	.670																
i39	.667																
i32	.666										-.413						
i33	.654																
i37	.646																
i16	.547														.434		
i44	.538																
i6		.790															
i5		.767															
i1		.730															
i8		.649															
i18		.596															
i14		.422															
i3		-.411															
i50			.698														
i46			.689														
i56			.645														
i47			.583														
i49			.531														
i48			.448	.404													
i59				.605													
i58				.594													
i57				.591													
i55				.527	.462												
i54				.474			.445										
i26					.662												
i25					.595												
i27					.533												
i12					.530												
i24					.435												
i60						-.678											
i30						.669											
i28						.551											
i29						.496											
i20							.754										
i38							.723										
i53								.620									
i11								.510									
i52								.481									
i22									.744								
i23									.677								
i4										.735							
i7										.425							
i10											.587						
i19											-.436						
i17																	
i13												.820					
i21												.453					
i45													.750				
i40													.424				
i51																	
i41																	
i2														.746			
i42															-.786		
i15																.709	
i43																	.755
i9																	.410

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 22 iterations.

Figure 2: Matrix of Rotated Components

Figure 2 demonstrates that the variables i16, i31, i32, i33, i34, i35, i36, i37, i39, and i44 are loaded into component 1 by the variables i31, i32, i33, i34, i35, i36, i37, i39, and i44. Component 2 is heavily loaded with the items 1, 3, 5, 6, 8, 14, and 18. Component 2 is also heavily loaded with the items 1, 3, 5, 6, 8, 14, and 18. Component 3 contains the entries i46, i47, i48, i49, i50, and i56. In addition, all other variables from components 4 to 6 were loaded.

	Rotated Component Matrix[a]					
			Component			
	1	2	3	4	5	6
i34	.739					
i36	.724					
i35	.719					
i31	.670					
i39	.667					
i32	.666					
i33	.654					
i37	.646					
i16	.547					
i44	.538					
i6		.790				
i5		.767				
i1		.730				
i8		.649				
i18		.596				
i14		.422				
i3		-.411				
i50			.698			
i46			.689			
i56			.645			
i47			.583			
i49			.531			
i48			.448	.404		
i59				.605		
i58				.594		
i57				.591		
i55				.527	.462	
i54				.474		
i26					.662	
i25					.595	
i27					.533	
i12					.530	
i24					.435	
i60						-.678
i30						.669
i28						.551
i29						.496

Figure 3: Six-factored Rotated Component Matrix

As a result, i32 is heavily loaded on components 1 and 11, and i16 is heavily loaded on components 1 and 15 (cross-loading). In addition, i48 is heavily loaded on components 3 and 4, i54 is heavily loaded on components 4 and 5, and i55 is heavily loaded on components 4 and 5. (see Figure 2).

We must compare the item loading tables after the rotation; the one with the "clearest" component structure (Figure 3) has the best fit to the data, with minimal (only 1) item cross-loadings and no factors with fewer than three items (in fact, there are 10, 7, 6, 6, 6 and 4 items for the 6 components, respectively). The six-component item loading tables (Figure 3) will obviously be employed (Osborne et al, 2014).

Based on the findings, the theme for Factor/Component 1 items was 'Teacher-student relationship,' the theme for Factor/Component 2 items was 'Sentiments', the theme for Factor/Component 3 and 4 items was 'Personality' and the theme for Factor/Component 5 and 6 items was 'Group learning activity.' In the correlation matrix, these six components initially accounted for 66.395 percent of the total variance (Table 4). Furthermore, when determining variables, the percentage of total variation explained is critical, and 66.395 percent is the acceptable minimum (Hinkin, 1997). If the loadings were weak (.40), items with cross loadings (i.e., those that load considerably on two or more factors) were eliminated. Finally, the factors were given names depending on the information included in the factor items. In conclusion, an exploratory factor analysis of the 60 Likert-scale items yielded a four-factor basic structure that may be understood.

4   CONCLUSION

One of the successful method for students to learn how to solve arithmetic problems was to have their teacher help them while they practiced on their own time. Students must be guided by their teachers in order to improve their mathematical abilities. It is easier for them to make a positive impact when they understand that their teachers support students via learning activities while taking their feelings into consideration and adapting educational opportunities to match their needs. The study found that the interaction between the teacher and the students during learning activities, which is a social component, is the most highly associated element that impacts the mathematical performance of students, as evidenced by the results.

CONFLICT OF INTEREST: "Authors declare no conflict of interest."

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The Learning Skills Deficit among Higher Education Students

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Abstract

Remedial learning has been an ongoing trend within higher education for some time, but a cumulation of structural issues at both post primary and tertiary/higher education level has compounded the problem. This paper analyses the problem and considers the extent to which intervention at practitioner level can alleviate problems (and to what extent structural change is required).

Keywords

Education, Higher Order Thinking, Higher Education, University, Learning Skills

Introduction

Increasing numbers of universities are offering and even mandating remedial instruction for their incoming freshman students. The early iterations of this were centred around students will special needs, but it has latterly been offered to students with issues in literacy, numeracy, and study skills more generally. There seems to be a growing consensus that while students clear the basic hurdle of entry requirements (such as milestone qualifications at the end of post primary education, like A levels, SATs, etc), they are not quite up to speed on aspects of university level learning (Knight & Yorke, 2003). Those of us who teach at tertiary level will certainly have encountered students who struggle with the demands of college level learning. As a tutor for well over a decade I can attest to the steep learning curve I experienced in reconciling myself to the fact that our students need more help than what our university system is designed to give them. University tuition is focused on content but demands – and assumes – learning skills that are often underdeveloped (Zimmerman & Schunk, 1989). It may be that some of us teach at very prestigious colleges, where students are well prepared and equally well motivated. My (admittedly anecdotal) evidence would suggest that even here, tutors are encountering not insignificant numbers of students who are – at best – just keeping their head above water.

There is clearly (perhaps up for debate on the extent) a gap between what students learn in post primary education and what we expect our students to be able to do at third/college level. Some years ago, I attended a faculty meeting at a US university that I was visiting. The question of the market competitiveness of US 'four year' liberal arts programs (traditionally seen as the most prestigious undergraduate programs to attain) versus the three year degree programs in many European (including UK) universities arose. I highlighted that most of the demands on my advising of undergraduate students was to determine the quickest means of graduation through maximizing the opportunities to shorten the four-year degree. It would seem that the four-year degree program is increasingly viewed as less competitive than other degree programs primarily due to the length and associated expense (in combination with a lack of earning due to full time enrolment). It was pointed out to me by my US colleagues (I am not from the US) that the four-year program is designed to provide an additional year (first/freshman year) to allow students to get up to speed with higher education demands.

It is fair to consider why it is that, in many higher education settings, our students seem to be underserved by their post primary education, at least in terms of preparation for university level study. If one of the functions of post primary education is to ready students for further education, or lifelong learning generally, then clearly it is not serving all students as they progress (Knight & Yorke, 2003). Now, we might question whether that's fair. High school (or secondary school; I'll use the term 'post primary') is designed to provide the entire school going cohort of young people – including the majority who don't go to university – with the critical tools known as the three Rs, which is a core rationale for mass education in all economic systems. We need adults capable of functioning in our global integrated economy, and not everyone needs a degree. As the American comedian, George Carlin, remarked many years ago: 'governments don't want a population capable of critical thinking, they want obedient workers, people just smart enough to run the machines and just dumb enough to passively accept their situation'. He is perhaps not wrong. Mass education systems from primary through to post primary are also burdened, in many contexts, with the additional task of nation building, ideological or socio-cultural conformity and/or citizenship education.

They are not expected to be proficient at research, for example, as we understand it in academia.

So it would seem that the issue of underserved and patchily prepared students entering university level study reverts back to the tertiary level sector to resolve. The current focus is primarily on literacy, numeracy and (particularly in the western context) the provision of English as an Alternative Language (EAL) support, for the many non-native English speaking students pursuing degree programs in North America or the UK, Australia, etc. There are also writing centres open to students (Brown & Glasner, 1999) (Brookhart, 2010).

The problem, as I've experienced it, is that students are receiving this kind of support extraneous to normal class instruction. The upskilling of tertiary learners is seen as *supplementary* to university education, something that is separate from the primary concern of content delivery and subject mastery. I would question whether this best serves our students. As Alvin Toffler wrote in Future Shock over fifty years ago 'tomorrow's illiterate will not be those who cannot read or write, but those who have not learned how to learn, unlearn and relearn' (Toffler, 1970). The study skills, the mastery of learning processes is not supplementary to our higher education mission – it is central to it. In fact, we really need to ensure that our students get this right before anything else.

I had reason more recently to reflect on the transition from post primary to university level learning when I undertook research as part of an education training course. My topic was on the experience of students who had completed the International Baccalaureate and had entered university. As part of this I also undertook a literature review on the comparison between the International Baccalaureate (IB) system and the Advanced Placement (AP) system (Foust, Hertberg-Davis, & Callahan, 2008) (Park, Caine, & Wimmer, 2014). Consistently, the IB was considered the better system in preparing students for university level study. I also drew on primary data from social media as part of this research. In unsolicited testimony gathered from videos posted by former IB students on YouTube, IB students reported being well prepared for university level study, citing their work level demands throughout the IB Diploma stage and specific experience in preparing for the Extended Essay and the importance of the Theory of Knowledge.

The Contours of the Problem

What do I mean by 'problem'? I think one of the key elements contributing to high drop out rates, low completion rates and mixed student experience at university level learning is down to the steep learning curve students have when they make that jump from post primary to third level/university. Because while it is clear that the mandate for post primary education is focused on content and the three Rs, there are skills specific to university level learning, which students are expected to possess, but not given an opportunity to develop. Often, this is not prioritized in the remedial programs that are instituted in many universities.

For many students it is 'sink or swim'. A substantial proportion of students do manage to swim. But many more sink. It's not as if the skills I'm referring to are only relevant to university level learning. These skills are proving increasingly valuable in the work landscape of the twenty first century. Our problem emanates from several sources. First, post primary has its particular focus, which is to serve the entire national population with the provision of general education and preparation for employment. Universities are tasked with the

production of higher-level learning for specialized and knowledge intensive domains, as well as research output necessary to sustain development in technologically advanced economies. The jump from one to the other by seventeen- and eighteen-year-olds is quite stark. One of the reasons is that they tend to view the university experience as an extension and continuation of post primary learning, rather than the rupture that it really is. We are not, on the whole, informing our students about the vastly different learning environment of higher education relative to high school.

Most of the tutors at university level are – at the very least – educated to post graduate (MA) level. PhD level qualifications are now the minimum for most faculty positions and tutor roles can only really be secured (if they can be secured beyond casual part time work) through demonstration of research output through publications. Therefore, the personalities that undergraduates encounter at the front of the classroom at university is several levels above them in education attainment. How many university faculty have teacher training qualifications? With the exception of US liberal arts colleges, university 'classes' are hardly intimate learning settings. Dozens, if not scores, of students are positioned anonymously in large lecture hall settings where the sage on stage model prevails. Knowledge is transmitted from expert to novice. It's a tried and tested method. It is also economically efficient. It is also limited in terms of pedagogical development.

This distance is problematic. Without invoking the 'ivory tower' metaphor there is sometimes a failure by faculty to understand or appreciate the skill level (or lack thereof) of many undergraduate students. Let's consider a fairly typical pattern of university assessment and reflect on where the typical post primary/freshman student is relative to those assessments.

Students will often be asked for a term paper, usually accompanied by a word limit, and framed on the basis of a prompt. The prompt can be very specific and focused or merely provide broad guidance and parameters. The student is then expected to take the time to research the subject and formulate an argument, presenting it in line with typical academic conventions. The student will be confronted by a high stakes examination, where their knowledge retention, problem solving, and analytical skills are tested in a timed setting through an unseen paper (students only know the questions when they sit the exam). Students might be required to present on a topic, demonstrating their ability to communicate ideas orally to their peers through the use of visual aids. Students might be tasked later in their degree with a literature review, where they must collate, evaluate, analyse and synthesise existing research on a given (or chosen) topic.

In all of these exercises (and this is not exhaustive) students are set a task, required to prepare, and are graded on the deliverable. Their grades are cumulative (course work grades are combined with final assessment) and the students' performance is evaluated on the application of a grade based on their completion/submission of the assignment deliverables.

The problem is that very little mentoring or guidance actually takes place. Tutors are time poor. So this begs an important question that we should reflect on. Have we as tutors and educators ever actually witnessed our students get training on the skills required to complete these assessment deliverables successfully. Assuming that the A grade (or first-class mark) is the headline standard, and assuming also that a rubric for achieving that is transparent for the student (which is often not the case), we should reflect on the extent to which our students are often unprepared.

Here are the skills needed for the successful completion of such assignments.

- **Time / Project Management** (the effective planning and organization of task administration and completion)
- **Self-Directed Learning** (the ability to take the initiative with respect to assignment execution and completion)
- **Reading** (not in terms of literacy, but in terms of content assimilation and understanding)
- **Topic selection** (accounting for feasibility and scope; assuming it is not chosen for them within the syllabus or course guide)
- **Systematic research** (efficient use of the resources at the disposal of all students in the university library)
- **Summarizing & Paraphrasing** (effective utility of relevant topic information gathered)
- **Organizing information** (creating categories, identifying themes and imposing structure and order on reviewed source material)
- **Analysis of information** (applying concepts to data and generating insight)
- **Oral and Written Communication** (assembling a deliverable that accurately conveys insight, knowledge and ideas effectively and persuasively)

For most of us with advanced graduate and/or terminal degrees quite a lot of this comes naturally. We received no specific training, perhaps, and we 'figured it out' ourselves. But the vast majority of our students are not going to pursue PhDs. They may not, therefore, benefit from an innate assemblage of skills like these. But they still need to develop and hone these skills to some extent. The issue is that most students who arrive at university have only a patchy grasp of these. Yet we have to consider that these skills are not necessarily taught explicitly at undergraduate level. The major reason for the disjuncture in learning ability centres ultimately on the divergent modalities of post primary and university level education, and this can be summed up in one idea: learner autonomy.

Pupils at secondary school adhere to detailed curriculum and common or standardized assessment processes. They often absorb uniformly disseminated content in the form of approved textbooks. Above all, post primary pupils are enmeshed in a system of strong pedagogical practice with extensive contact time with teachers. While elements of all of that are present in the university setting the major difference is the more aloof role of course tutors – who are not teachers so much as academics – and the reduced contact time, and greater level of ambiguity around a lot of the learning content. Students, as distinct from pupils, find themselves with a lot of latitude, are less directed and less managed. Therefore, the training needed to be more proficient in the skills outlined above is largely a self-directed task and relies heavily on individual motivation and initiative. And this is where things start to break down for many students. Many are able to take the initiative and master the learning curve successfully. Many do not.

Students struggle with self-direction. They struggle with the blank page, with understanding requirements. They do get some guidance on more particular elements of university level academics, such as using the extensive library system. However, guidance is usually cursory at best and is often available passively on websites. Students will get some exposure to subject specific methodology. But in many courses this is heavily focused on quantitative methods, and not really on developing these important skills. The reality is that students don't engage in deliberate cultivation of these skills because they don't know what they don't

know. They also, even if they receive an orientation brief on university library use for example, don't connect its importance their own studies.

Bridging the Gap

So how to fix this. The evolution of 'remedial' learning in university is often seen as an implicit criticism of high school education. And that criticism may not be without some foundation, not least given the over emphasis in many settings on lower-level learning skills such as rote memorization of content and the predominance of description over analysis. Higher order thinking skills are not being taught or reinforced nearly as sufficiently as they should be. But universities are not off the hook either. That gap exists, and the university remedial support systems have located their interventions beyond the primary pedagogical setting of the classroom. That is, students must seek supplementary assistance in writing centres and support offices. Remedial interventions are too often (but not always) reactive interventions sought at the initiative of desperate students, and usually very late in the assessment process (a few days before submission). If at all. Many students do not seek this support even though they are made aware of it. The first step, therefore, is greater integration of this upskilling into classroom level learning and connecting it directly to content delivery and assessment.

For this to happen universities are going to need the cooperation of their faculty. This is not without challenges, given the casualization of academic work in more recent times. Nevertheless, a certain amount of time is going to be required to specifically instruct students, with frequent practical reinforcement, on the various skills outlined. They're going to have to conduct library searches, work on refining topic choices and research questions, get guidance on a more project management approach to their assignments, guidance and practice on summarizing and paraphrasing (a lost art, it seems), coaching on written and oral communication skills. Simply throwing broadly defined assessment exercises at them and expecting them to learn to swim is not helping many of our students. This is more easily integrated into liberal arts degrees (given the structure of these degrees and the stress on general education courses as part of the program) but it should be frontloaded to the first year of degree commencement in any degree.

The second element is the reinforcement of these skills through repeated exposure throughout the following years of study. Universities are actually perfect settings for this to happen. At tertiary level, we have learners engaged (especially at undergraduate level) for extended periods of time in a structured curriculum that is already tiered in terms of learning levels. However, it is not enough, as we know, to simply teach someone. They should also learn by doing. They must practice, and this holds true for study and learning as much as any practical discipline. The practice of developing skills in isolation or supplementary to core learning is hindering the improvement of student learning skills. Our assessment processes are directly implicated in this. There is too much risk for students to learn by doing because their assignments are usually consequential to the overall grade. There is no opportunity for them to develop the skills we're expecting and demanding before they have to present their efforts to be graded. It's a bit like asking a first-time driver to do a driving test with only a few driving lessons. What we should be doing is spiralling our students' learning experience within the entire length of the three/four-year program of study. The idea of spiralled learning is difficult to implement in the modular system but it is possible. But, once again, it does require buy in from program tutors. Explicitly building on earlier assignments, going into

greater depth, placing additional demands on them to reinforce what is already known and expanding on requirements, will entrench knowledge and understanding more fully. This, of course, requires that we spiral the curriculum (a la Bruner).

We must reduce the risk of learning for students in terms of grading and assessment (Robinson, 2011). In short, we must give students a chance to practice – and make mistakes – without worrying about their grade. It is possible to add an additional element to the recognizable repertoire of formative, summative and standardized assessment. In these traditional forms of assessment students are given a task, and once they submit the deliverable, they receive a grade. Feedback is (or should) be given, but the benefits are likely to elude the learner if they are not compelled to improve on the shortcomings identified by the instructor (Jonsson & Prins, 2019). Writing, for example, as Kellogg notes, is re-writing (Kellogg, 1994). This is where our system underserves: we provide feedback to tell students where they went wrong but they never have to revisit the exercise to make those improvements. Ipsative learning and assessment has become an important additional consideration in teaching and learning. Ipsative assessment – the cultivation and acknowledgement of 'self' improvement – allows students to experiment and improve gradually over time, building on previous iterations of work towards marked improvement (Hughes, 2014). Hughes defines it as 'comparing existing performance with previous performance'. There is no excuse for not doing this within a degree program, particularly an undergraduate degree of three or four years.

Conclusion

The problems that we might encounter in experimenting with our learning practices in this way are not insignificant. First, institutional resistance is going to be substantial, for several reasons. Beyond bureaucratic and administrative conservativism there is the obvious issue of dramatically increased workloads (in terms of reviewing and giving feedback) by already harried teaching faculty. I would submit that this emanates from the fact that universities have lost their way to a great degree in terms of their mission. The modern academic is often an afterthought in modern academia. Of paramount importance in many academic contexts are the twin pillars of research output and external grant funding. Seventy plus percent of teaching faculty in US universities are either adjunct or short-term contract faculty. The casualization and 'gig-ification' of the higher ed teaching profession has spread more widely. The sheen has definitely worn off an academic career. Implementing such a significant change in pedagogy, one that demands a greater level of input from faculty, is unlikely to happen while faculty struggle to sustain a viable career path.

Nevertheless, there are some options for intervention within our current system, which allow individual faculty and program leaders to integrate something approximating a consequential engagement with the question of academic learning skills. The following recommendations provide a heuristic for the higher ed tutor and program leaders to enhance the skills necessary for successful completion of higher education degrees. They should, so far as practicable, be integrated into existing modules, preferably in the early stages of the course so that students have the benefit of developing these skills well in advance of any assignment deadlines.

- **Time management** (scaffold and structure assignments by breaking up individual components of the assignment and creating milestones from conceptions from completion, including set milestone submissions charted along a critical path)

- **Self-Directed Learning** (encouraging students to consider self-directed topic selection within the confines of course subject matter)
- **Reading** (we need to be more open about what our reading expectations are and how our students should maximise their efficiency in reading)
- **Topic selection** (supervised brainstorming in groups or pairs on proposed topics with feedback loops into whole class discussion; included is supervisory guidance on feasibility and scope)
- **Systematic research** (Provide a workbook for students to systematise their research process; providing a sequential rubric for them to undertake research)
- **Summarizing & Paraphrasing** (this should be practiced more; freshman seminars or dedicated classes should be given over to honing both of these skills)
- **Organizing information** (workshops in class on the creation of themes, developing categories, and the creation of essay and term paper reading records)
- **Analysis of information** (workshops on overcoming the description versus analysis problem; outlining possible analytical tools in research and understanding and walking through the structure and execution of analytical arguments in published research)
- **Oral and Written Communication** (guidance and instruction on the practical assembly of papers from blank page to final submission)

Higher education learning is much more demanding on students than post primary (Blythe, 1998) (Zimmerman & Schunk, 1989) (Vygotsky, 2004). Higher order thinking skills are in greater demand. The ability to organize, analyse, and synthesise information in large volumes and communicate ideas and argue persuasively are in greater demand. Yet the training our students receive in this regard is paltry, compounded by more limited contact time and the fact that entry level undergraduate students are still in high school mode when they arrive. They are not properly briefed on the path they are about to take. University education is becoming increasingly expensive and is now a more consequential decision for many young people.

The least we can do is recognize that we in higher education have a responsibility to be more transparent about higher education demands and shoulder more of the responsibility for overcoming this shortfall in learning skills by our students.

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The Pandemic, Mental Health & How Educators Can Promote – and Undermine – Academic Integrity

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ABSTRACT

This presentation discusses student engagement and academic integrity as well as the responsibility of the educator based on insights gained through personal experience of teaching writing courses at an undergraduate level at Deree – The American College of Greece. The student body at Deree is diverse, consisting of students from Greece and 56 countries and regions, with English being the language of instruction. Research has shown that the demands of attending a foreign university can push students toward breaches of academic integrity. The overall question this presentation addresses is what insights educators gained through virtual classes held March 2020 up to June 2021, and the subsequent return to campus in September 2021. More specifically, the presentation explores the effects of this return on students' academic performance and integrity as well as the role of the educator in encouraging student morale and morality while respecting mental health challenges. The initial hypothesis of this presentation was that the return to campus would be perceived as a joyous event, inspiring students to engage in their studies with more zest. However, personal observations indicate that the initial excitement and enthusiasm have turned into frustration, even panic, with students often falling behind with their assignments as well as disregarding feedback, course and college policies. On their side, and owing to their own mental and emotional exhaustion, fear of complaints, or compassion for the student, instructors might accept work potentially written by a ghost writer. This presentation stresses the need for educators to pull students toward authentic learning and offers some suggestions as to how to achieve a balance between respecting students and promoting academic performance.

KEYWORDS: Foreign university; virtual classes; Covid-19; mental health; academic integrity; contract cheating; ghost writer; the role of the educator.

User perceptions of serious games and their features

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Abstract. Two-way, interactive and tailored education is a more promising form of education compared to traditional one-way passive education, as early literature evidence suggests. However, building a serious game that can engage users in the same way as an entertainment game, while incorporating both learning and gamification elements can be quite complicated. That is why the game concept, technology and features need to be designed carefully, in a user driven way. The authoring team makes use of their expertise in serious games in order to include engaging learning activities for the participants of the study. In particular, this study explores how users perceive the different elements, features and design of a collection of serious games on sex education. It shows which elements are of more importance to the users, what gives them a good experience, and what facilitates their learning. Findings are presented along with current research in this area, to conclude on the key elements for designing an effective and engaging serious game, based on user feedback. This study will be a step toward the design of tailored and relevant education interventions that will promote active learning, rather than passive one-way learning.

Keywords: serious games, features, digital interventions, user perceptions, sex education.

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1. Introduction

Recent research has indicated that individuals often underestimate their probability of facing unpleasant events or outcomes, such as contracting a Sexually Transmitted Infection (STI) (Eleftheriou A B. S.-S., 2019), and that this could be addressed appropriately using a sex education intervention. For example, an educational game (serious game) that focuses on the users and their immersion and engagement with a simulated population could potentially challenge the users' perception of invulnerability, as they encounter various people and scenarios that affect their health throughout the game (Eleftheriou A B. S., 2017).

Designing serious games with the purpose of effective learning and behavioural change, while keeping the user immersed and engaged can be quite complicated. Active learning can be achieved through serious games, but many design factors have to be considered in the game development process, in order for the intervention to have an impact. Additionally, the impact of such interventions is closely related to the context of the user needs, which can be better understood by mapping user perceptions to serious games design elements. Therefore, in order to develop better informed and effective serious games, a user-centered approach needs to be adopted, involving users in the design process (Cheek C, 2014).

The authoring team conducted a short analysis of certain game features and elements under the main areas of design and accessibility, including insights from current research on the topic.

As part of the sGuide sex education digital intervention (sGuide Sex Education Intervention), fourteen serious games were developed using Unity (Unity). The games vary in concept and characteristics, and tackle different sex education topics. In Phase 1 of testing, the sGuide intervention, which also included text, videos, infographics and quizzes was given to fourteen beta testers who tried out different games and provided feedback. The games were then improved and adapted according to the user feedback, and in Phase 2 a selection of the games was given to nine university students, who again provided feedback through a survey and interviews.

The purpose of this study is to take a closer look at user perceptions of serious games, how certain game elements and types affect their enjoyment and learning experience, and how to move to a more user-driven development of serious games. The research hypothesis is that in the case of serious games, learning holds a predominant position in user priorities, followed by enjoyment, scoring and storytelling.

2. Methods

Game Types and Points of View

The game types and points of view in this section are described in the way they were utilized in the
serious games developed as part of sGuide.
A game's perspective is determined by the camera and who you are in the game. Points of view in a
gaming context may have different effects because they may impact the sense of involvement or
immersion of the player according to their perspective and agency in the game.

First person view

The camera's perspective is from the player's point of view, and the player controls the game from
their view directly. The main character is the player themselves, and they can act as though they are
part of the environment. This point of view offers an intimate level of interactivity, where the player
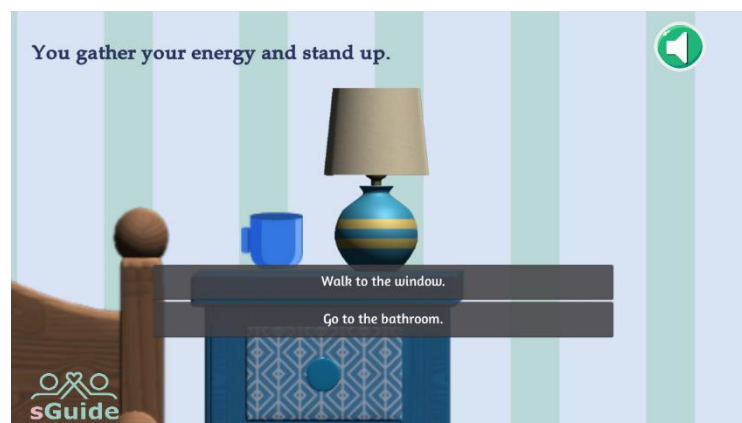can be more invested to the story.

*Figure 1 Screenshot from first person view game in sGuide
(Preventive Care)*

Third person view

The player watches a story envelop as they would a movie, and their character from an over-the-
shoulder or behind-the-back perspective. A third person perspective can be limited or omniscient. In

third person limited the player only sees the events and story from the outside, while in omniscient they know the thoughts and feelings of the characters.

Figure 2 Screenshot from third person perspective game in sGuide (Condom Use)

Visual Novel

A visual novel is an interactive fiction video game genre originating in Japan, that uses storytelling and small interventions from the player to drive the narrative.
Visual novels often use multiple branching storylines to create multiple endings, allowing freedom of choice to the user along the way.
Visual novels can tell a story both from a first and third person point of view.

Figure 3 Screenshot from Visual Novel game in sGuide (STIs)

Non-linear gameplay (branching narratives)

Non-linear gameplay, or branching narratives is when the game can be completed in different sequences according to the player's actions. At certain points of the game, the player has to make decisions that affect how the story envelops. Non-linear gameplay offers greater freedom to the player, as they feel they have agency in the story.

Branching storylines can offer multiple endings, and are often used in visual novels.
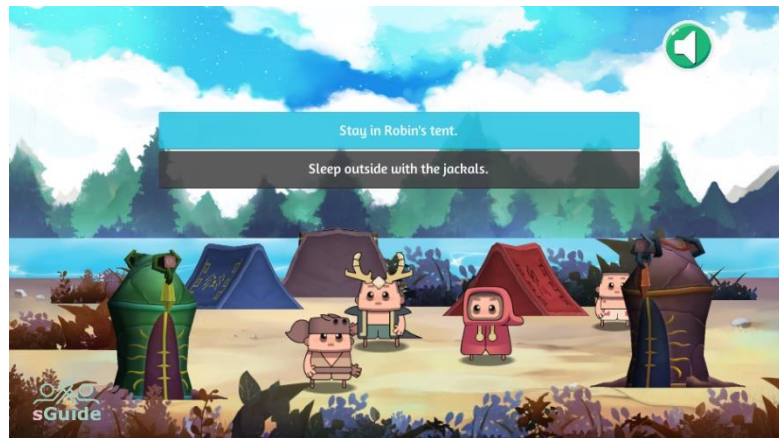
Figure 4 Screenshot from branching narrative game in sGuide (Sexual Responsibility)

Quiz Format

In some of the games, instead of following a specific storyline, the player is presented with different scenarios or situations, and then they have to select the correct response. Alternatively, they are presented with images of objects where they have to identify them by name. This usually happens by giving a multiple choice list to the player.

In most of the games studied in this study, quiz-like questions are also embedded into non-linear gameplay.

Figure 6 Screenshot from Quiz Format game in sGuide (Contraception)

Figure 5 Screenshot from Quiz Format game in sGuide (Gender Identity)

Game Design Elements

Aesthetics, Realism and Graphics

Something that has been overlooked in the design of serious games, is the importance of narrative and

aesthetics, as well as the principles of emotional design, which successful digital games have managed to
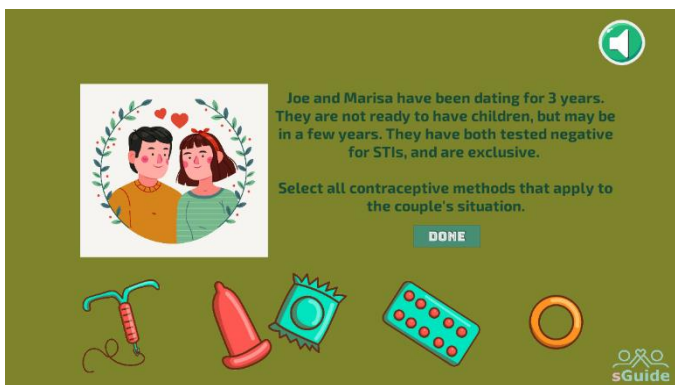
tap into. Studies have demonstrated that narrative and aesthetics in serious games positively influence the perceived learning by facilitating a state of psychological flow and enjoyment. Aesthetics in a digital

game can refer to the sensory phenomena (visual, audial, aural, embodied) which the player can perceive (Alexiou A., 2020).

In addition, it has been shown that elaborate or ultra-

realistic graphics are not always necessary to induce a positive player experience and elicit emotional responses in players (Gerling,

2013). A well perceived aesthetic perspective in graphical design can be achieved through the colour palette, the choice and look of environments, character representation style, regardless of the level of fidelity.

However, realism does not solely depend on graphics, but also on the credible responses of non-player

characters (NPCs), and sound. These three elements are demanded by players, regardless of their age or

culture. An ideal solution would be to develop realistic game environments, while maintaining the focus

on the learning aspect by not overcrowding the game world with unnecessary complex objects (Ravyse, 2017).

Characters, Dialogue and Storytelling

Throughout the history of human culture, stories have been used as a medium to connect cultural values and learning or moral items in a meaningful correlation. Stories are relatable and can make teachings more memorable and understandable for the human brain (Kampa A., 2016).

In serious games, interesting characters, dialogue and narration can be used to immerse the player into the story and consequently transmit the key messages that need to be learned. Characters bring action to the story, and trigger involvement by identification of the player with the characters (Cheek C, 2014).

In storytelling, dialogue plays an important role in driving the story forward, and imbuing it with emotion and relatability.

Learning

The main purpose of serious games, and what differentiates them from traditional video games is learning and transmitting certain key messages to the player. Often serious games aim to introduce new perspectives, which can be achieved with character identification and engaging stories. However, often in serious games, not enough emphasis is given on developing a model that successfully integrates educational theory and game design aspects, in order to maximize the impact of educational games (Kiili, 2005).

Scoring

Scoring in serious games is an element that has to be carefully designed in order to motivate the player to keep playing and learning, while assessing their performance. It gives players a clear and attainable goal, that provides a structure to their gameplay. It is especially motivating to players when it is publicly accessible in the form of leaderboards, where they can see their progress and performance compared to other people. However, it can have its drawbacks, for example when players act with the sole aim of achieving a higher score (Toups, 2009). This is especially disadvantageous in the case of serious games, where the main purpose is learning and assimilating the material, or understanding certain perspectives.

Instructions and Navigation

Writing good instructions to accompany a game can lift much of the confusion the player may have regarding the controls and goal of the game.

Goal, Challenge and Feedback

Studies have shown that clear goals, challenges that match the player's skills, and immediate feedback are key elements to designing an effective serious game that has an impact on the players' learning (Wang, 2014).

Inclusion

Players feel that diverse game characters are important for their gaming experience, as well as societally.
This is especially the case in the LGBTQIA+ community, people with disabilities and ethnic minorities (Diversity & Inclusion Study, 2020).
Therefore, diversity and representation of all groups is something that needs to be considered in order to develop an inclusive game, and achieve player identification with the characters.
Historically, in the most famous games where players piloted characters around space, main characters
were designed to be male. From 2017 to 2021, over a 100 games were surveyed, and nearly 80 percent
of the game main characters were male, 54 percent were white, and only 8 percent had a female main character of non-white ethnicity. It's also worth noting that 31 percent of the games had only male characters (Diversity in gaming, 2021).
A 2015 survey of students between the ages of 11 and 18 showed that less than 40 percent of
high-school boys preferred to play as male characters, while 60 percent of girls preferred female ones
(The games industry is wrong about kids, gaming and gender, 2015).

3. Procedure

Eight games were selected from sGuide for this study, which showcase different characteristics and game concepts as described in the previous section. These are listed in table 2 in Section 3.1.
Beta testing of the games was conducted in two phases.

Phase 1: Phase 1 was conducted online, with users being between ages 24-35. The feedback collected from the beta testers at the end of each game is listed and categorized into themes that have to do with the game concept and design elements (tables 3,4,5,6). The occurrences and mentions of each theme are counted to present an indication of the design elements that are more important to serious games users (tables 7,8).

Phase 2: Phase 2 was conducted physically, in a university classroom with computer science students. The beta testers played all the games, and were then asked to fill in a survey with questions about their design elements and impact. User interviews were also conducted, producing more user feedback that was again categorized into themes (table 9).

	Phase 1	Phase 2
No. of participants	14	9
Age range	24-35	17-20
Gender	64% female, 36% male	78% male, 22% female
Place	Online	University Classroom

Table 1 Participant information from Phase 1 and 2 of beta testing

The main difference in the methodology of the two phases, is that in Phase 1 the users gave game-specific feedback after playing each game, while in Phase 2 the users played all the games, and then filled in a survey and gave more generic worded feedback. It is worth noting that after Phase 1, the games were revised according to the user feedback that was collected, and their revised versions were presented to beta testers of Phase 2.

In the feedback tables, light red was used to indicate negative feedback or feedback for improvement, while light green was used to indicate positive feedback.
The insights derived from the feedback collected in both phases, as well as from the survey and user interviews from Phase 2 are then combined and presented.

Game categories

The games used in both beta testing phases are listed in table 2, in four distinct categories, along with their main characteristics and game format.

It should be noted that the games have some common characteristics, such as they are in 2D, they are single-player games and at the time they were only offered in English.

Game\Characteristics	Point of View	Branching Narrative	Characters	Quiz Format
Gender Identity	Third person	No	Multiple	Yes

Preventive Care	First person	Yes	Player as main character	Partly
Camping Series (3 games)	Third person	Yes	Multiple, player acts as the main character	Partly
Visual Novel (3 games)	Third person	Yes	Two	Partly

Table 2 Game titles and their main characteristics

4. Results

I.   User Feedback from Phase 1

I.   Gender Identity (quiz format)

In this game, the camera view slides through a series of characters. Each character tells a story that shows their experience with gender roles and identities. In each case, the player is then given a list of gender identities from which they have to choose which gender identity matches the character the most. In the end, the player is asked to select how they would communicate with a transgender person in a respectful way. This game mostly follows a quiz format, as the player is not directly interacting with the characters' story, but is however put in the process of understanding their different perspectives.

User feedback:

Themes	Feedback
Navigation, Instructions	"…make it obvious that to move to the next dialogue you need to click anywhere on the screen."
a. Challenge b. Learning	"…show the character's story somewhere along with the gender identity choices to be able to look back at it. For someone quite new to the topic might not be able to remember everything and link up the dots."
a. Feedback b. Scoring c. Learning	"In the game, when you answer multiple choice questions, you get a point for correct answer and no point for wrong answer. However it is important to also learn what is the correct answer once you answer wrong so that you learn from the mistake."
a. Learning b. Interactive c. Enjoyment d. Storytelling	"The game was the best so far, it was nice to have short texts for each person and then have to identify their gender."

Table 3 User Feedback on Gender Identity (Quiz Format) game (Phase 1)

II.   Preventive Care (First Person View)

In this game the player is the main character and has a first person point of view. They find themselves in a specific situation and can choose how to interact with the environment and other characters. The character in this game has just finished having sex with their partner, and has to select appropriate ways to wash up, how to communicate with their partner regarding STIs, and what action to take if they believe they have an STI.

User feedback:

Themes	Feedback
Inclusion	"A slightly woman-focused topic. Not necessarily a bad thing but wonder if there could be an option to choose between male-female and get more sex-specific info."
a. Feedback b. Learning	"It would help to get some feedback at the end with the mistakes or the steps you could have taken to increase your score."
a. Interactivity b. Enjoyment	"I liked this type of game! It was slightly different from the previous ones; more action driven than a quiz-like game."

Table 4 User Feedback on Preventive Care (First Person view) game (Phase 1)

III.   Camping Game Series

The camping game series consists of three games that take place in a camping setting. The topics of the games are:
   a.   You are responsible for your own sexual health
   b.   Condom use
   c.   Communication and consent

This series follows a protagonist character that interacts and goes on adventures with a group of other characters. The other characters include intelligent agents who provide insights to the protagonist, as well as characters with whom the protagonist navigates romantic and sexual relationships. Throughout the games, the player makes decisions on how the protagonist will act, how they will communicate their feelings to their partner, and other choices affecting their sexual health. According to the player's choices, the story may follow different paths and conclude in multiple endings.

The player gets points when they communicate their feelings, respect their partner, and avoid sexual risks by making responsible choices.

User Feedback:

Themes	Feedback
Scoring	"…it wasn't super clear how you score a point."
Graphics	"Graphics need improvement."
Scoring	"How do I know if my score is good or bad?"
Scoring	"…it is not clear what that score is about, doesn't get displayed anywhere or is not clear if it counts somewhere. I get it that it goes up and down depending on the responses but still, what is a good score, where can I see my score of each exercise, is there an overall score, what is the maximum score and out of that how much did I get?"
a. Interaction b. Learning	"I was actually disappointed it ended so quickly and wanted to go back and try different answers."
a. Goal b. Scoring c. Interactivity d. Instructions e. Learning	"I am not sure if this is the point of the game but when the instruction says I will be losing points when I make a decision that is disrespectful I automatically wanted to collect points therefore I was clicking what I perceived as "respectful" and not really what I would do in reality. I wonder if the point collection was not an aim in the game, if lessons would be "learnt" better because I could have failed to stay safe and then learnt a lesson because of it. Then I would avoid doing the same mistake in real life. Maybe I will try to "lose points" in the next chapter to see what happens!"
a. Scoring b. Instructions	"There should be an introduction to the scoring system. I couldn't tell whether I performed well or not, or which of the questions contributed to the score."
Accessibility	"You should have translations to multiple languages."
a. Storytelling b. Learning c. Enjoyment	"I loved the dialogues in the game. The game was enjoyable and educational."

Table 5 User Feedback on the Camping Series (Third person view, branching narratives) games (Phase 1)

iii. Visual Novel

There are three games that fall under the Visual Novel category. In the forest game, the player follows a story envelop between two characters who talk about their relationships and sexual orientation, and has to answer questions related to the topic.

In the Sherlock Holmes themed games, the player follows a discussion between Sherlock and John. In the first case the player has to follow the clues provided to determine which STI John suffers from, and in the second case they have to determine the sexual dysfunction John suffers from, as well as its causes. The player can also guide the line of questioning that Sherlock follows in order to discover more clues that are relevant.

User Feedback:

Forest Game (Attraction, LGBTQI+)	
Themes	**Feedback**
Inclusion	"It would be awesome if the user could select to play the game with female characters instead of male."
a. Feedback b. Learning	"It would be good to highlight the correct answer during the game if the player makes a mistake."
a. Interactivity b. Learning c. Accessibility	"…found it too academic…Also the game was slightly long considering the amount of times the user was required to make a choice."
Accessibility	"When it becomes nighttime and the scene becomes dark the box with the text also becomes darker making it difficult to focus on it."
a. Challenge b. Learning	"The difficulty level was a lot higher than the previous topics. I find that some of the questions were long and phrased in a way that I had to take some time to fully understand them before answering."
Storytelling	"The game was a nice way of introducing these notions through storytelling."
Sherlock Holmes games (STIs, Sexual Dysfunction)	
Themes	**Feedback**
a. Storytelling b. Interactivity c. Learning d. Enjoyment	"It was funny, to the point and highly interactive."
a. Storytelling b. Enjoyment	"The dialogues in the game were super witty and amusing."
Inclusion	"The game on sexual dysfunction was quite male-centered."
a. Storytelling b. Enjoyment	"There was a continuation of the story in some of the games, which I enjoyed."

Table 6 User Feedback on Forest and Sherlock (Visual Novel) games (Phase 1)

Game/ Themes	Scoring	Goal	Challenge	Learning	Storytelling	Enjoyment	Interactivity
Gender Identity							
Camping Series							
Visual Novel							

Preventive Care						
Total number of mentions	6	1	2	11	6	6	5

Table 7 Feedback mapping into design and gameplay related themes (Phase 1)

Game/ Themes	Accessibility, Language	Inclusion	Instructions, Navigation	Feedback	Graphics
Gender Identity					
Camping Series					
Visual Novel					
Preventive Care					
Total number of mentions	3	3	3	3	1

Table 8 Feedback mapping into design and accessibility related themes (Phase 1)

Trends from Phase 1

Trends arise from the user feedback, showing the elements that are more significant for the user experience in these serious games, according to the themes that were most mentioned. It should be noted that not all users attempted all the games from the list.

The themes or game elements that were mentioned the most (regardless of negative or positive content) were the following, in descending order:
1. Learning
2. Enjoyment, Storytelling, Scoring
3. Interactivity

An important observation is that when the user knows they are playing a serious game, rather than an entertainment game, their main expectation shifts from enjoyment to learning. During their experience, they align with the educational purpose of the game, and if their learning expectations are not met, they question how the key learning messages could have been better transmitted. More specifically, if a learning message exists, by the end of the game they want to feel certainty and security in their understanding of it. On the other hand, in the cases where positive remarks were made on the learning aspect of the game, the players also seemed more immersed and engaged, and their experience was more fulfilling.

Enjoyment and storytelling are also at the top of the list of elements that matter to serious games players. A good story, characters and dialogue keep the player invested, and learning becomes a side

effect of being engaged with the story. In this case, only positive comments were made regarding either enjoyment or storytelling.

Another of the main recurring themes that arise from the feedback is the games' scoring system, when there is one. The player wants to know how it works and how they can maximize their score. From the moment they realise a scoring system exists, they want to have clarity on how to increase their performance. If there is a lack of clarity or consistency, their engagement and immersion in the game can be easily broken and turned into confusion or anxiety.

However, it is interesting to see that in cases where the game offers space for experimentation and learning through making mistakes in a safe setting (mainly in non-linear games with branching narratives), users are more interested in trying out different paths of the story, and expressing what they would do in real life, rather than being concerned with score. This indicates a great case where a scoring system may be superfluous or even confusing, as by "hacking" the scoring system to maximize their score, the player misses out on getting the full experience of the game by making different choices.

Clarity in learning can still be provided through appropriate feedback mechanisms, while keeping a consistent scoring system in the background. This can bring learning to the forefront as the main goal, instead of performance.

Interactivity was next on the list of most mentioned themes. It has mostly positive mentions, with the users feeling more excited when a game is highly interactive, and less so if too much time passes without being given an opportunity to interact.

In Visual Novel games, storytelling and enjoyment had the highest number of positive mentions, and a correlation between them is obvious. The game type that had the most positive impact on learning was Branching Narratives (Camping Series).

Another interesting observation is that the themes with the least number of mentions were graphics and goal, once more indicating that both entertainment and serious games can be successful regardless of the graphics, as long as other design elements that are important to the user are taken into account.

Inclusion is also a theme that is pointed out, as when there are elements of gender identification with the character, they would expect the game and learning messages to be tailored to their personal identities and needs.

Following the feedback collection from Phase 1 of the beta testing, improvements were made on the games to address comments on scoring, feedback, instructions and navigation, as well as the goal of the games.

In Phase 2, the users were given the revised versions of the games.

II.   User Feedback from Phase 2

After the second round of testing (Phase 2), feedback was collected in two ways:
1. User Survey
2. User Interviews

User Survey

The user survey mainly contained questions that investigate which type of game was more enjoyable and interactive for the users and which helped them learn the most, and how much certain game elements such as language, animation, and storytelling affected the user experience.
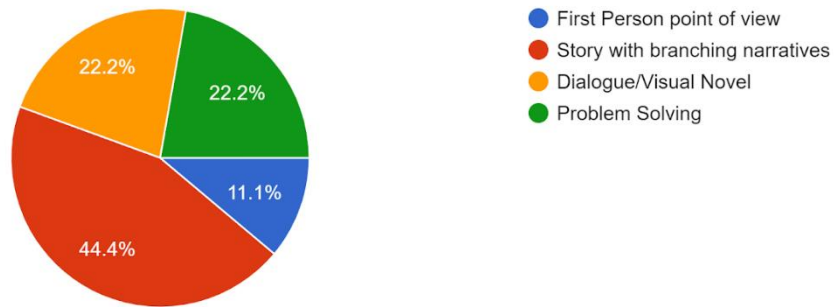
Which type of game was the most enjoyable?
9 responses

- First Person point of view
- Story with branching narratives
- Dialogue/Visual Novel
- Problem Solving

22.2%   22.2%   11.1%   44.4%

Figure 7 Enjoyment according to game type

Which type of game was the most interactive and immersive?
9 responses

- First Person point of view
- Story with branching narratives
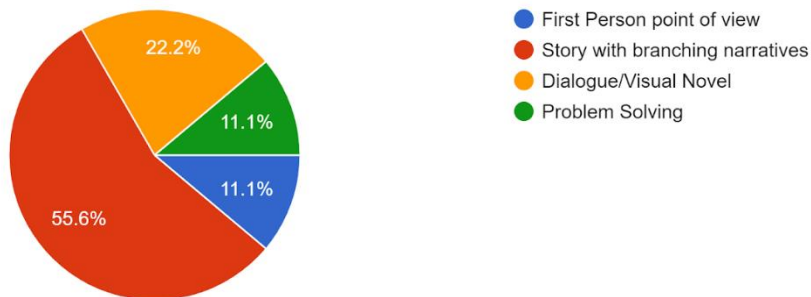- Dialogue/Visual Novel
- Problem Solving

22.2%   11.1%   11.1%   55.6%

Figure 8 Interactivity and immersion according to game type

Which type of game helped you learn the most?
9 responses

- First Person point of view
- Story with branching narratives
- Dialogue/Visual Novel
- Problem Solving
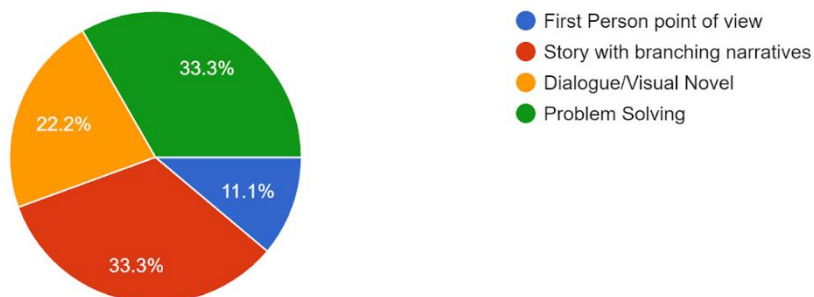
33.3%   22.2%   11.1%   33.3%

Figure 9 Effectiveness of learning according to game type

Figure 10 Effect of graphics on user experience

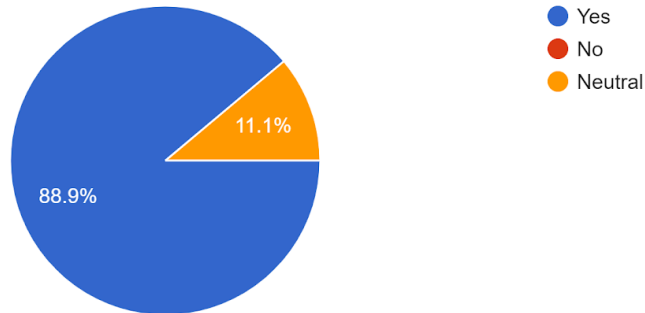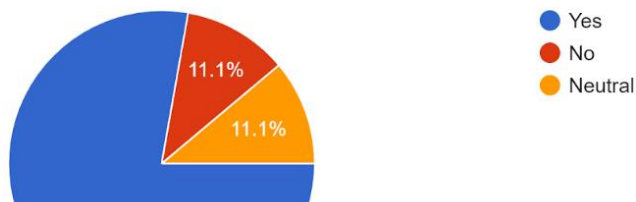Do you find it more enjoyable when the game has a story or narrative?

9 responses

- Yes
- No
- Neutral

Figure 11 Enjoyment related to story and narrative

Do you feel it helps your learning when the game has a story or narrative?

9 responses

- Yes
- No
- Neutral

How did the graphics of the games affect your experience?

9 responses

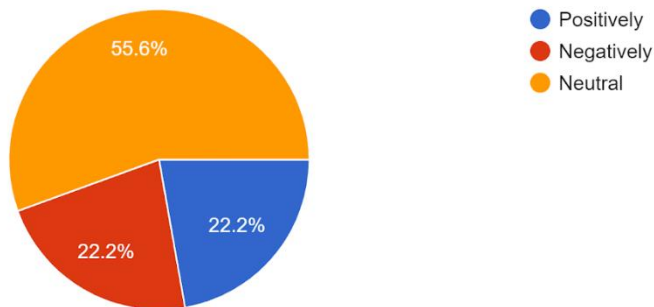

- Positively
- Negatively
- Neutral

Figure 12 Effectiveness of learning related to story and narrative

Which character format do your prefer?

9 responses

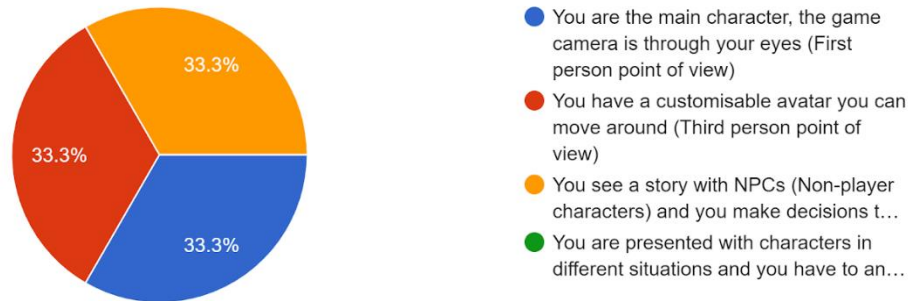- You are the main character, the game camera is through your eyes (First person point of view)
- You have a customisable avatar you can move around (Third person point of view)
- You see a story with NPCs (Non-player characters) and you make decisions t…
- You are presented with characters in different situations and you have to an…

33.3%
33.3%
33.3%

Figure 13 Preference of character format

Did you find the dialogues between the characters realistic?

9 responses

- Yes
- No

22.2%
77.8%

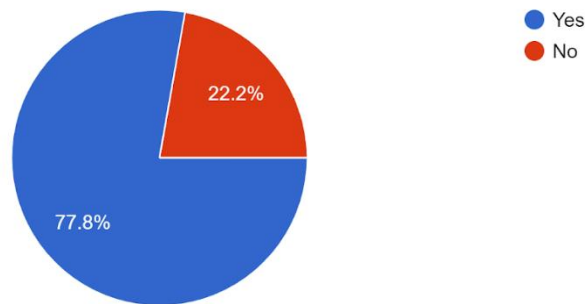*Figure 14 User perceptions on game dialogues*

Would it add to your experience if there was more animation in the games?
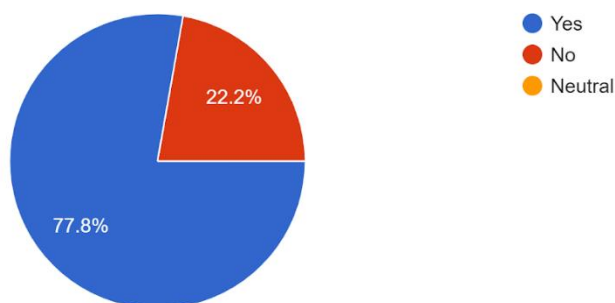
9 responses

- Yes
- No
- Neutral

22.2%
77.8%

Figure 15 User perceptions on game animations

Did you feel the games were inclusive?
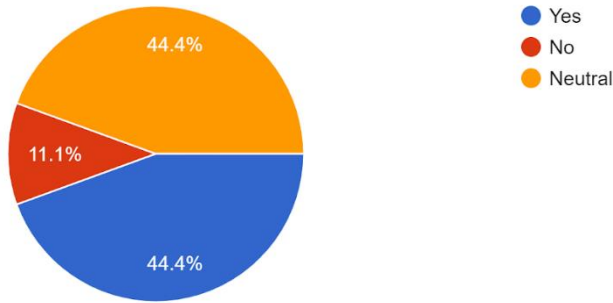9 responses

Figure 16 User perceptions on inclusivity of games

How did the language affect your experience?
9 responses
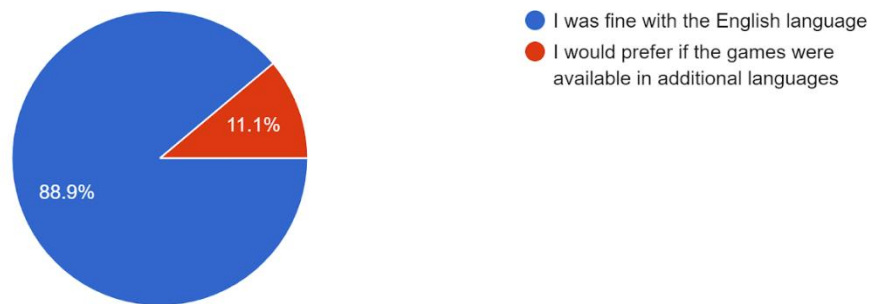
Figure 17 Effect of language of games

User Interviews

After the testing and survey were completed, there was a discussion with the participants, and they were also asked to provide feedback in a form, shown in the table below.

Themes	Feedback
Graphics	"I would like to see more realistic characters that look my age instead of cartoons that look younger. It was a bit childish."
Interactivity	"I would like to have more choices in the branching narrative games, that affect the ending more drastically."
Inclusion	"There should be warnings when something will be shown that may trigger experiences of abuse or similar in players."

Learning	"I would like to see more explicit content."
Inclusion	"I didn't realize the main character was of a different gender than mine. It made me feel confused."
Challenge	"I felt I already knew most of the information provided."

Table 9 User feedback categorised in themes (Phase 2)

Trends from Phase 2

The most enjoyable games for the participants of Phase 2 were the Camping Series games, i.e. the non-linear branching narrative games, which were also ranked as the most interactive and immersive. However, in the question of which type of game helped their learning the most, the Quiz Format (or problem solving) games were ranked the same as the branching narrative games, showing that the way the learning element is incorporated is also important.
Another important element that arises is interactivity, as the participants would like to have more opportunities to interact with the game and affect the story (especially in branching narratives).

Almost everyone found that when games have a storytelling element they are more enjoyable, verifying the correlation between storytelling and enjoyment that was drawn in Phase 1. They also stated that storytelling helped them with learning.

Again in the context of serious games, learners were not as concerned with graphics, as most of them were neutral about them affecting their experience. However, most participants believe that if more animations were used in the games it would add to their experience.

In terms of how characters were employed in games, opinions and experiences differed, as preference between character formats (first person point of view, customizable avatar the player can move around, NPCs where the player can make decisions in their story), was equally distributed.

Identification with the game characters is extremely important for users, especially adolescents who participated in Phase 2. Often they were confused about the gender of the character they controlled, and if it was a different gender from their own gender identity they were often upset and engagement with the game experience was broken. This goes to show that inclusion of all gender identities and sexual orientations is important to players in order to be immersed in the story and game. However, it has to be used in combination with personalization elements, for example giving the players the choice of building a customizable avatar and/or shape the story itself. They would also prefer more realistic characters instead of cartoons, which again is a factor that would increase identification of the player.

5. Discussion

The design decisions that need to be taken when developing a game are countless, and the process becomes even more complicated in the case of serious games, where effective learning is a crucial requirement, on top of requirements like enjoyment, interactivity, and accessibility.

Research shows that in order to address user needs and create effective and informed serious games, a user driven approach should be followed in the game development process and selection of different game elements.

This study was done by analyzing user perceptions of serious games and their features, developed as part of sGuide, a digital sex education platform.

Even though there were limitations in the participant groups, as the majority had a similar educational and ethnicity background, and there was an under-representation of minority groups, this is a first step in understanding how users perceive serious games and their features, and how different game types and design elements can enhance or disrupt the user experience and effective learning.

The results showed that in their experiences with serious games, users most of all value learning, and that an important design factor is how to transmit key learning messages through play in an effective manner. It can also be deduced that when players feel they are learning, they seem more immersed and engaged in the game, and their experience is more fulfilling. It is not clear however if learning causes the immersion or the other way round, or both.

Enjoyment and storytelling are also at the top of the list of elements that matter to serious games players. A good story, characters and dialogue keep the player invested, and learning becomes a side effect of being engaged with the story, as the participants said that storytelling helps them in learning. Another important element is interactivity, as users seem to enjoy serious games more when there is high element of interactivity, as opposed to not having many opportunities for action.

In Visual Novel games, a positive correlation was drawn between storytelling and enjoyment, while the game type that had the most positive impact on learning was Branching Narratives (Camping Series). A correlation can be drawn here as well, between learning, enjoyment, interactivity and immersion as in Phase 2 the most enjoyable, interactive and immersive games were the Camping Series games.

Another interesting observation is that the themes with the least number of mentions were graphics and goal, once more indicating that both entertainment and serious games can be successful regardless of the graphics, as long as other design elements that are important to the user are taken into account. Inclusion and especially personalization were important for the participants to be able to feel identification with the game characters, as well as more realistic and relatable characters.

In summary, the most important elements for users were: **Learning, Storytelling, Enjoyment, Interactivity and Identification.**

The results show that for a serious game to be successful, user-driven development is crucial. User needs need to be acknowledged during the design process, in order to be able to create tailored, interactive content for active and effective learning.

Conclusion

The outcomes indicate that a well-designed game concept, with a good story, inclusive characters, and successful incorporation of the learning element, are the foundations of a successful serious game, as opposed to elaborate graphics and functionality.

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Using Mantel-Haenszel, Distractor Response, and Logical Data Analyses in Detecting Differential Item Functioning in a Senior Science High School Entrance Examination

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ABSTRACT

This study detected Differential Item Functioning (DIF) and its causes (gender-based, curriculum-based and school-based) in a Senior Science High School Entrance Examination using Mantel Haenszel, Distractor Response and Logical Data Analyses employing focus group discussions, semi-structured interviews and questionnaires. The DIF detecting methods revealed the presence of gender, curriculum and school biases across subtests. The causes of DIF were difference in the span of focus and interest, test sophistication, use of jargon, availability of materials in school, activity exposure, curriculum difference and teacher quality. Items with DIF, regardless of the group membership of examinees, with unreasonable difficulty that unfavorably affected the test performance of the students, were recommended for replacement or revision; for students to be assessed properly using tests with reviewed, evaluated and improved items.

1   INTRODUCTION

The surging issue of detecting differential item functioning in measurement has come to the forefront in the field of testing. Unfair assessment arises when a student's test performance is imprecise because it disadvantages the student because of his/her group membership. It is important to understand that it occurs when it is not the student's ability that causes low performance, but the student's group membership does. Unfairly penalizing a group of test takers due to their gender, race, ethnicity, socioeconomic status, religion or other such group defining characteristics adds to the unfairness of a particular assessment tool. Naturally, bias items display differential item functioning that underestimate or overestimate the value of variables the items are designed to measure (Salubayba, 2013) [1].

Questions of test bias are intertwined with the questions on the validity and reliability of a particular instrument. The first critical element to an effective assessment item is validity. It is important to detect biased items because they may result in a dubious differential performance for test takers of the same ability.

The removal or revision of potentially and identified biased items is required in all tests, may it be a wide scale, high stakes or a simple teacher made test used in the classroom. It is vital that before the administration of any assessment instrument, the biased items must be detected first and then either eliminated or revised (Pedrajita, 2007) [2].

Differential item functioning (DIF) analysis is one method to investigate biases in written tests at the item level. DIF is evident in a test item when despite the effort to control for overall test performance, test-takers from different majority and minority groups have a different probability of answering an item correctly or when test takers from two subgroups with the same trait level have different expected scores on the same item (Camilli & Sheppard, 1994) [3]. DIF Detection involves comparison of the performance of matched majority (or reference) and minority (or focal) group examinees. Thus, an item that exhibits DIF may or may not be biased for or against any group (Kanjee, 2007) [4].

Entrance Examinations are conducted in educational institutions to select and sift prospective students for admission. Given that test fairness is related to the interpretations and uses of test scores as well as the claims made from those interpretations and uses; it is critical to obtain and weigh validity evidence to support or refute the score interpretations, their uses, and the potential socio-political consequences in order to evaluate fairness (Banerjee, 2016) [5].

The study generally aimed to produce a fairer – more reliable and valid Entrance Examination for Senior High Students of a selected Science High School. Specifically, it aimed to detect the presence of large DIF in the items of the examination and determined the causes of DIF.

The use and misuse of high stakes tests are a controversial topic in public education, especially in the Philippines, where they have become especially popular in recent years because of its use to not only assess students but attempts to increase the quality of education through fair testing (Maca & Morris, 2014) [6].

Bias comes in many forms which can be evident in gender, cultural, ethnic, religious, or class. The origin or cause of item bias can be identified using Logical Data Analysis (LDA). Curriculum bias is affected by the content of the curriculum that is taught in science and non-science high schools. The extent to which curriculum may be biased for or against examinees from science or non-science institutions has little to never been the focus of empirical researches.

Furthermore, potential sources of such bias might be group differences in examinees, such as differences in subject inclination, subjects taken during prior education and schema being trained as a science or a non-science high school student (Kunnan, 2004) [7].

The type of school from where the test takers are from significantly affects the knowledge of the examinees in terms of content. Therefore, school bias with regards to school type (public versus private) occurs when the knowledge on a specific content of a test of the examinee is comparatively more for one group of students than for others.

Gender biased tests are those that favor one sex or one gender group. This type of test is specifically prohibited because of the discrimination it produces among males and females (Einarsdóttir and Rounds, 2009) [8].

Various aspects of fairness including fairness with respect to standardization, test score use and item bias have been the center of attention. However, the DIF concept (Perrone, 2006) [9] and detection developed by the Educational Testing Service (ETS) in 1986, is the standard of psychometric bias analysis.

Accordingly, DIF which may reflect measurement bias has received a great deal of attention in educational measurement. There is no single best method of DIF analysis which is effective and useful for all purposes (Millsap & Everson, 1993; as cited in Van den Noortgate and Boeck, 2005) [10].

2   RESULTS

The validity and reliability of the test were established before the detection of DIF. Validity ranged from slightly adequate to adequate in the six main disciplines represented by each subtest found in the test.

The result of the Cronbach coefficient alpha indicated that the Senior High School Entrance Examination is reliable in measuring the examinees' achievement and academic knowledge on topics needed for senior high school STEM strand.

The DIF detecting methods revealed the presence of gender, curriculum and school bias across subtests. The causes of DIF were noted as difference in the span of focus and interest, test sophistication, use of jargon, availability of materials in school, activity exposure, curriculum difference and teacher quality.

The results of both statistical procedures and the logical data analysis showed that there are more items in the examination that displayed gender-based DIF against female examinees, curriculum-based DIF against Non-Science high school examinees and school-based DIF against Private school examinees.

Items with unreasonable difficulty that unfavorably affected the test performance of the students were recommended for replacement or revision to the school test committee to ensure that the students would be assessed properly using only a test with reviewed, evaluated and improved items.

3   DISCUSSION

Item bias is attributable to the degree of item validity. Test bias is a major threat against validity and therefore test bias analyses should be made before the administration of the test itself. If a test has poor validity, there is no justification for using the test results for their intended purpose (Fraenkel and Wallen, 1994) [11].

Content validity is a logical process where connections between the test items and the subject matter related tasks are established. Bias in content validity is evidenced either by items that ask information that disadvantaged students have not had equal opportunity to learn or by wording of the question is unfamiliar and a disadvantaged student who may "know" the answer is unable to respond because he/she did not understand the question.

The test's validity was estimated by gathering a group of subject matter experts (SMEs) to review the test items. The content validity of the Senior High School Entrance

Examination was based on whether the items adequately and properly sampled the universe of items that probe understanding of the content domains. The scale below, adapted from the study of Pedrajita (2007) was used in quantifying the adequateness of the items in the subtest.

Table 1 Scale for Quantifying Adequateness of Items for Content Validation

Value	Implication
86%-100%	Adequate
71%-85%	Moderately Adequate
56%-70%	Slightly Adequate
41%-55%	Slightly Inadequate
26%-40%	Moderately Inadequate
Below 25%	Inadequate

Internal consistency is typically a measure based on the correlations between different items on the same test. It measures whether several items that propose to measure the same general construct produce similar scores. It is usually measured with Cronbach's alpha coefficient. Nunnally and Bernstein (1994) [12] published the interpretation of the Cronbach's Alpha value, supported by the work of Cronbach in 1951.

Table 2 Interpretation of the Cronbach's Alpha Value

Cronbach's Alpha	Internal Consistency
$\alpha \geq 0.9$	Excellent
$0.9 > \alpha \geq 0.8$	Good
$0.8 > \alpha \geq 0.7$	Acceptable
$0.7 > \alpha \geq 0.6$	Questionable
$0.6 > \alpha \geq 0.5$	Poor
$0.5 > \alpha$	Unacceptable

The test was considered a valid measurement of achievement in the six main disciplines. In terms of content validity, the Senior High School Entrance Examination was moderately adequate in representing the universe of content standards needed to probe understanding of the content domain for Senior High School STEM strand.

Table 3 Overall Validity of the Senior High School Entrance Examination

Subtest	Number of Basic Content Standards	Actual Number of Basic Content Standards in the Examination
Language Proficiency	9	6
Mathematics Proficiency	10	7
Science Process Skills	5	3
Science Proficiency		
Biology	5	5
Chemistry	9	8
Physics	19	13
Earth Science	3	3
Mechanical and Spatial Skills	1	1
ICT Skills	1	1
Total	**62**	**47**
Remarks	**76% - moderately adequate**	

The Cronbach's Alpha coefficient values of Language and Mathematics Proficiency showed acceptable reliability for the two subtests while the alpha for the Science Process Skills subtest meant a questionable reliability. Mechanical and Spatial subtest and ICT subtest got alpha values that connoted poor reliability while all subparts under the Science

Proficiency subtest got unacceptable reliability. The overall Cronbach's Alpha Coefficient that was computed for the Entrance Examination is 0.899, indicating a good reliability.

Table 4 Test for Reliability – Cronbach Alpha Coefficient Values per Subtest

Subtest	Number of Items (N)	Cronbach's Alpha Coefficient
Language Proficiency	30	0.711
Mathematics Proficiency	40	0.723
Science Process Skills	30	0.682
Science Proficiency		
Biology	15	0.368
Chemistry	15	0.435
Physics	15	0.327
Earth Science	15	0.403
Mechanical and Spatial Skills	20	0.596
ICT Skills	20	0.589

The Mantel-Haenszel procedure identified a total of 25 items showing severe gender-based DIF. Six items showed large DIF in favor of female examinees and 19 items in favor of male examinees. This indicates that the items mentioned were more difficult to answer if an examinee belongs to the disadvantaged group.

Table 5 Identified Potentially Biased Items Using Mantel-Haenszel Procedure

Subgroups (Reference and Focal)	Potentially Biased Items Against	Number of Items
Gender	Male Examinees	6
	Female Examinees	19
School	Public Examinees	6
	Private Examinees	68
Curriculum	Science HS Examinees	8
	Non-Science HS Examinees	92

The procedure also identified a total of 100 items showing severe curriculum-based DIF. Eight (8) items showed large DIF in favor of the Non-Science High School examinees and 92 items in favor of Science High School examinees. This indicates that the items mentioned were more difficult to answer if an examinee belongs to the disadvantaged group. There were 74 items identified showing severe school-based DIF. Six (6) items showed large DIF in favor of the Private School examinees and 68 items in favor of Public School examinees.

On the other hand, using Distractor Response Analysis, there were 21 recorded items in the whole examination that showed DIF between male and female examinees. All 21 items were found potentially biased against female examinees with Item 4 under Earth Science as an exception, having a distractor A, as potentially biased against male examinees.

Examining the curriculum-based, the results of DR analysis revealed that there were 78 items that were potentially biased against a particular subgroup and there were 59 items flagged with school-based DIF found in the Entrance Examination using the DRA procedure. Ten (10) items showed DIF against the reference group and 49 showed DIF in favor of the reference group.

Table 6 Identified Potentially Biased Items Using Distractor Response Analysis

Subgroups (Reference and Focal)	Potentially Biased Items Against	Number of Items
Gender	Male Examinees	1
Gender	Female Examinees	21
School	Public Examinees	11
School	Private Examinees	51
Curriculum	Science HS Examinees	15
Curriculum	Non-Science HS Examinees	69

Review of the potentially biased items in this study was adapted from the practice stated by Reynolds (2006) [13] in his research where he stated that LDA involves determining whether the flagged item is (a) easier for the reference than the focal group; (b) easier for the focal than the reference group or (c) of equal difficulty among the comparison groups. Only the DIF displaying items were tackled in the interviews and focus group discussions and not the DIF-free or items with moderate to negligible DIF. Part of the procedure was to know if there are items that are construct irrelevant and was pinpointed by the subject expert and item writers in the given questionnaire.

All items identified as displaying DIF under MH and DRA procedures were considered potentially biased and were discussed in the FGDs, unstructured interviews and pinpointed in the questionnaires given to the item writers. The examinees pinpointed the difficulties they encountered and the techniques they often use to answer the item/s despite the difficulties. They were also asked as to why they found a particular item, specifically the DIF items, difficult for them to answer.

Table 7 Themed Causes of Item Bias based on Logical Data Analysis Procedure

Evaluated Biases	Causes of Item Bias
Gender-based DIF	Span of Focus
Gender-based DIF	Interest
Curriculum-based DIF	Test Sophistication Training
Curriculum-based DIF	Use of Unfamiliar Words
Curriculum-based DIF	Use of Available Materials
Curriculum-based DIF	Curriculum
Curriculum-based DIF	Type of Activities
School-based DIF	Level of Exposure and Experiences
School-based DIF	Teacher Factor

The LDA revealed that in the gender-based DIF, the common reasons for the biases are the difference in the span of focus between male and female students and the difference in their interests. On the other hand, the common reasons for curriculum-based DIF were gathered as their readiness for any kind of test or test sophistication, use of unfamiliar words,

use of available materials in the school, types of activities they are exposed to and lastly, the curriculum difference itself. The causes of DIF in school type bias were the level of exposure and experiences of the students and the quality of teachers that they have in school.

4   METHODOLOGY

Descriptive research design was employed to determine items exhibiting DIF, to know the underlying causes of DIF in the entrance examination. The researcher considered non manipulative variables and establishes a formal procedure, in this study, to detect DIF and determine the causes of DIF. The reliability and validity of the entrance examination was computed then three matched groups in terms of curriculum, school and gender were used for Mantel-Haenszel statistic, Distractor Response Analysis and Logical Data Analysis for comparison. The groups were compared in terms of their probability of success on each item on all the subtests in the entrance examination. The comparison groups were as follows: science high school and non-science high school completer-examinees, public and private completer-examinees and male and female completer-examinees.

Table 8 Descriptive Research Design

Matched Groups	Reference Group	Focal Group	Intervening Variables	Dependent Variables
Curriculum	Science HS	Non-Science HS	1. DIF Analysis -Mantel-Haenszel Statistic - Distractor Response Analysis	Curriculum-based DIF
School	Public	Private	2. Logical Data Analysis 3. Content Validity	School-based DIF
Gender	Male	Female	4. Internal Consistency Reliability	Gender-based DIF

The 200-item Entrance Examination was subdivided into six main skills that an incoming Senior High School that is STEM inclined. No field/pilot testing was conducted and the reliability and validity of the test were not established prior to the administration of the examination. There is no table of specifications for the test.

Table 9 Six Subtests Under the Senior Science High School Entrance Examination

Subtest	Number of Items
Language Proficiency	30
Math Proficiency	40
Science Process Skills	30
Science Proficiency	60
Mechanical and Spatial	20
Information, Communication and Technology	20
Total	**200**

The researcher conducted a cognitive interview with the available item writers to examine the content of the examination against the prescribed syllabi for the subtests found in the examination. Focus group discussion and interview with the stakeholders – the administration of the school, the testing committee, the test item writers and the examinees who took the test were conducted.

The scores of the examinees in the test served as the primary data for the study. The test papers and results were gathered through the registrar and admission committee of the school for the quantitative study.

Content validity and internal consistency reliability were established with the help of subject matter experts (SMEs) and Cronbach's Alpha Coefficient, respectively. DIF detecting procedures were employed to detect gender-based DIF, curriculum-based DIF and school-based DIF. Mantel-Haenszel Statistic and Distractor Response Analysis were the methods used to detect items exhibiting DIF. In the Mantel-Haenszel procedure, the basis for flagging the item as potentially bias was the value of delta-MH. The classification used by the Educational Testing Service (ETS) was used in tagging the items as negligible, moderate and exhibiting large DIF. Only the items with large DIF were flagged as potentially bias to a specific matched group. In the Distractor Response Analysis, the chi square for each distractor was computed and significant values were evaluated and flagged as potentially bias against a specific matched group.
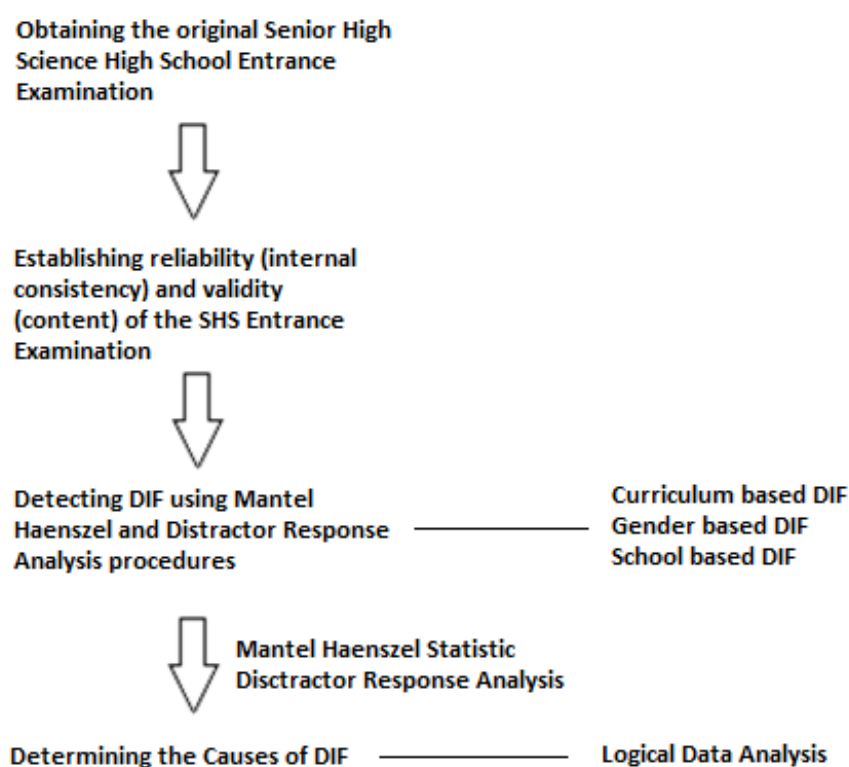

Figure 1: Methodological Flowchart

For the qualitative part, which is the Logical Data Analysis, the subject matter experts and item writers were interviewed and focus group discussions were conducted in accordance with the comparison groups to know the causes of DIF.

The analysis of data included (1) validity and reliability procedures, specifically, content validity and internal consistency reliability; (2) DIF analysis procedures such as Mantel-Haenszel statistic and Distractor Response Analysis for the quantitative part of the study; and (3) knowing the causes why the items are exhibiting DIF using the qualitative method, Logical Data Analysis.

Distractor analysis involves the calculation of bivariate frequency distributions for unscored items as categorical variables. The chi square for each distractor was computed and significant values were evaluated and items containing DIF exhibiting distractors were flagged as potentially biased items against a specific matched group.

Another DIF analysis procedure is Mantel-Haenszel statistic. The MH DIF statistic defines DIF in terms of the ratio of the odds of a correct response on the studied item for the reference group to the odds of a correct response for the focal group.

The Mantel-Haenszel Statistic computed for each item in all the subtests was further classified into items with negligible, moderate and large DIF according to the classification used by the ETS to specify the degree of DIF. In this study, only the items which fell on "C" category or large DIF, were evaluated.

Table 10 Summary of Selected Item Bias Detection Models

Item Bias Model	Focus of Analysis	Measure of Bias
Distractor Response Analysis	Difference in proportions selecting distractors	Significance of Chi-square
Mantel-Haenszel	Perform statistical test for evaluating the amount of DIF	Significance of Chi-square and large DIF Effect (C items)

Items that are flagged with DIF were not automatically revised or discarded. Being flagged with DIF means the item is potentially biased but this empirical evidence of differential performance between groups is not enough to reject the item/s out of the Entrance Examination. Instead, further acquisition of logical reasons as to why it displayed DIF was further investigated using Logical Data Analysis.

5   CONCLUSION

In terms of content validity, the Senior High School Entrance Examination items were moderately adequate (76%) in representing the universe of content standards needed to probe understanding of the content domain for Senior High School STEM strand. The alpha value indicated that the entrance Examination as a whole has good reliability. After careful considerations, all of the null hypotheses in the MH procedure and DRA were rejected, in favor of the alternative hypotheses, in all subtest.

The causes of item bias based on Logical Data Analysis (LDA) procedure revealed that in the gender-based DIF, the common reasons for the biases are the difference in the span of focus between male and female students and the difference in their interests. On the other hand, the common reasons for curriculum-based DIF were gathered as their readiness for any kind of test or test sophistication, use of unfamiliar words, use of available materials in the school, types of activities they are exposed to and lastly, the curriculum difference itself. The cause of DIF in school type bias were the level of exposure and experiences of the students and the quality of teachers that they have in school.

The results of the DIF detecting procedures, after logical analysis, revealed that there are more items in the examination that displayed gender-based DIF against female examinees, curriculum-based DIF against Non-Science high school examinees and school-based DIF against Private school examinees.

The presence of DIF displaying items directly affected the validity of the examination. The three subtests with the highest number of items flagged as potentially bias across matched groups were Language Proficiency, Mathematics Proficiency and Science Process Skills. The validity of the three subtests were all slightly adequate with 60% to 70% accuracy. The reliability of Language Proficiency and Mathematics Proficiency were both acceptable except Science Process Skills with a questionable reliability value.

The high adequacy of the subtests was supported by the results attained by the DIF detection procedures. The causes of DIF were more on the difference of interest between males and females, subject matter schema between Science and Non-Science high school examinees and availability of materials for ICT between Public and Private school examinees.

The examination's overall reliability was computed to be good but majority of the subtests have unacceptable to questionable reliability and only two subtests got an acceptable reliability value. Although the overall alpha computed was good, following the test development procedure and increasing the number of items can actually improve the examination itself.

The overall validity of the examination was computed to be moderately adequate. Out of 62 learning competencies that the examination should contain, 47 were actually embedded in the items of the test. A moderately adequate validity is already acceptable in statistical terms but aiming for a higher validity can increase the truthfulness of the assessment in evaluating and assessing the test takers' ability. Detecting items that are potentially biased against a particular subgroup and finding the causes of DIF through logical analysis could help in eliminating biased items and increasing the validity of the test.

CONFLICT OF INTEREST: Authors declare no conflict of interest.

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YOUTH AT RISK OF EARLY SCHOOL LEAVING: EXPLORING EDUCATIONAL STRATEGIES

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ABSTRACT

There is general agreement among scholars and policy makers that Early School Leaving (ESL) represents a serious social phenomenon that has many negative consequences on the individual, economic development, and on society as a whole. ESL is considered a serious social problem, as well as an important phenomenon on the public agenda and education policies of Romania. As part of the Erasmus+ project Orienta4YEL, a multidimensional study was conducted and the data shows that Romania also experiences unpreparedness of school and community to embrace the whole spectrum of early school leaving. The study design employed individual interviews for members of school leadership team and administration (N=9), focus groups for general and vocational secondary schools and high schools teachers/trainers (N=63), and focus groups for young people representatives (N=91) as data collection tools. The empirical findings of the study revealed that in Romania there is a convergence of opinion on the most relevant factors that cause young people to leave school before completing compulsory education. Therefore, personal challenges are the one that contribute the most to the risk of early leaving, followed closely by family reasons and institutional factors. Therefore, this paper explores the challenges that are aimed at improvements in the early school leaving rate. Specifically, the analysis will shed light on the prevention strategies that have been developed and implemented, as well as on the deficit perspective on early school leaving within institutional and national policies. By addressing the existing supporting educational actions in areas where economic and social conditions are an obstacle for pupils, this paper will furthermore particularly analyse the potential barriers which arise on the system's ways of reducing the early leaving rate in order to better identify, prepare for, and respond to this phenomenon.

Keywords: early school leaving, risk factors, support strategies, education policy

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