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Editorial

The usual September/October 2021 issue was delayed to be November/December 2021 due to the postponement of the 2020/21 SEAAIR Conference brought about by the Covid-19 pandemic. Regardless of the delay, we have continued with the instituted "preliminary review" process to "screen out" papers before the formal double-blind review process. This has consistently resulted in 60% of papers being declined due to relevance to JIRSEA's focus on Higher Education issues or Institutional Research and those that do not meet the "sound scientifically grounded" research requirements of JIRSEA. Of the 20 papers that went through the Preliminary Reviews with revisions re-submitted, 12 papers are accepted for this issue publication after the rigorous and stringent vetting process, with 2 non-follow-ups. The first paper looked at working women's resilience in an academic environment; with 3 papers looking at the academic teaching-learning within the pandemic context; 5 papers covering academic assessment or e-testing, assessment & remote learning, 2 papers on the context of language learning; and 1 paper investigating the role of higher learning institutions in enhancing the socio-economic status of the local community.

We also continue with our tradition of celebrating the "Best Paper Award" and 2 "Outstanding Paper Citations" selected by a panel of peer reviewers. These papers were invited to be re-submitted to the JIRSEA after additional and substantial modifications to bring the conference paper to the requirements of JIRSEA's stringent publication requirements. The Best Paper covered methods for improving publication rates across more diverse academic communities. The two Outstanding papers looked at the Philippines nurses competencies assessment and development with the other showcasing gamified e-quiz mobile application influences among Higher Education students

The key synopses of these thirteen papers are as follows:

- **Article 1 – Susan T. Mostajo, Olivia M. Legaspi, and Ma. Virginia G. Aguilar,** *all from De La Salle University – Dasmarinas, Philippines* used a mixed-method approach and open-ended questions to explore working women employed in educational institutions of their resiliences through a resilience scale to assess their resiliences. Results revealed individual and community resiliency characteristics that enabled the participants to deal with the challenges. The findings pointed out some implications for practitioners to foster the value of resilience in developing mental health programs for this population, especially during a pandemic outbreak.

- **Article 2 – Constantino Terrenal Ballena** of De La Salle University- Dasmariñas, Cavite, and **Bernard S. Feranil** of Cavite State University, Indang Cavite, Philippines examined extant literature focused on remote learning in the context of the Covid-19 pandemic. The thematic analysis resulted in four major themes which

are: 1) concerns about the shift to remote learning, 2) impact of remote learning, 3) challenges in the shift to remote learning; and 4) coping with the challenges in remote learning. These four salient themes show how the transition from face-to-face to remote education has confronted and made an impact on all teachers, students, parents, and administrators. These circumstances reaffirm the opportunities to harness educational institutions' resilience, motivation, and competencies as participants in the education process.

- **Article 3 – Jiraporn Meesanga, Kamonwan Tangdhanakanond, and Shotiga Pasiphol** *all from the Faculty of Education, Chulalongkorn University* set the research objectives as 1) developing an electronic item bank for measuring the learning outcomes based on the Thai Qualifications Framework for Higher Education (QTF: HEd) of undergraduate students in education programs and 2) assessing the efficiency of the electronic item bank. The results of the research showed that: 1) The electronic item bank consisted of five components of user management, item management, examination management, evaluation management, and scoring management, and 2). The evaluation of the electronic item bank by experts revealed that the overall quality of the system was at the highest level with the students being highly satisfied with the system.

- **Article 4 – Thao-Trang Huynh-Cam** *of Chaoyang University of Technology, Taiwan and Dong Thap University, Vietnam*, **Somya Agrawal & Long-Sheng Chen** of *Chaoyang University of Technology, Taiwan*, *with* **Tzu-Lin Fan** *from Hsiuping University of Science and Technology, Taiwan* explored how MOODLE, an open-source learning management system (LMS), is utilized as a means of e-assessment in English reading and listening courses to assist undergraduates of English as a Foreign Language (EFL) and educational teams in HEIs. This is conducted to explore the maintenance of high levels of students' retention and to reduce the percentage of poor learning performance during the Covid-19 pandemic lockdown. The experimental results showed that students' listening and reading performance in the *final tests* was higher than that in the *pre-tests* and the participants also had positive attitudes towards e-assessment. The analysis results are expected to be a roadmap for e-assessment in teaching English listening and reading skills

- **Article 5 – Kiran Fahd, Sazia Parvin, Sitalakshmi Venkatraman, Antony Di Serio, Anthony de Souza-Daw, Anthony Overmars, and Samuel Kaspi** *all from the Melbourne Polytechnic, Victoria, Australia, and* **Shah J. Miah** *from The University of Newcastle, NSW, Australia* focused on the challenges associated with electronic examinations or online exams in HE and the strategies to address them during the COVID-19 pandemic. Using a design-based research approach they

designed, implemented, and evaluated an innovative framework for online exams within a context of an Australian HE mixed-sector. They conducted an exploratory study on the quality of the process flow of the proposed Online Exam for Bachelor of Information Technology (OEBIT) framework. A triangulation of both qualitative data from focus groups and quantitative data from student outcomes provides the validity of data and confirms the completeness of the results. The successful deployment of the generalized framework with a smooth transition from pen-paper-based examination to online exam demonstrates its real-life application.

- **Article 6 – Aziz Ahmad and Muhammad Saeed** *both from the Institute of Education and Research, University of the Punjab, Lahore, Pakistan s*tudied the development and validation instruments of academic performance through literature, content validation, reliability, and validity estimates of academic practices of academics. It covered the research and teaching performance of university teachers having foreign and domestic doctoral education from an internationalization perspective. The study background was to develop and validate these instruments based on Adcock and Collier's (2001) framework for the instrument with the validation process by an expert panel review to refine instruments and ensure content validity. Statistically, composite factor analysis was conducted for the teaching-related instrument to ensure construct reliability and construct validity using SmartPLS 3. These resulted in the 'academic research performance instrument (ARPI)' and students' evaluation of teaching quality (SETQ) instruments.

- **Article 7 – Vo Thi Kim Anh** *of the University of Foreign Language Studies, The University of Danang*, **Vincent Pang** *of Universiti Malaysia Sabah* conducted a study to evaluate online teaching activities for English-majored students in universities in Vietnam during COVID 19 pandemic from lecturers' perspectives. In this research, the CIPP (Context, Input, Process, product) evaluation model was applied as a framework with the qualitative approach. The research revealed that universities that educate English-majored students had prepared themselves to react quickly to a sudden change in the teaching context though some issues like online teaching methods and lecturers' ICT skills were, in fact, great challenges for universities to maintain their teaching quality.

- **Article 8 – Mohamad Yusak Anshori, Denis Fidita Karya, Firly Irhamni, and Dwi Handayani** *all from the Universitas Nahdlatul Ulama Surabaya* proposed and tested an integrative multi-perspective framework to identify the entrepreneurial intention amongst undergraduate students of 5 different universities who attending a project-based course of entrepreneurship in Surabaya. The main purpose of this study was to identify the interrelations among psychological safety toward entrepreneurship

education process through team learning and team performance perceived behavioral control, self–regulated learning, and entrepreneurial intention using structural equations modeling in which the dimensions of these constructs were disentangled and treated as latent variables that were indirectly inferred from multiple indicators. The results suggest that the entrepreneurship intention components do affect PBC respectively, the antecedent variables are also interrelated with each other. The empirical analysis supports all the hypotheses that the entrepreneurial intention of students implies that psychological safety and self–regulating learning are moderators of the entrepreneurial intention-action translation.

- **Article 9 – JS Keshminder, Nurshamshida Md Shamsudin, Mohd Syuhaidi Abu Bakar, Wan Nor I'zzah Wan Mohamad Zain, Roziah Mohamad Janor, and Siti Aekbal Salleh** *all hailing from Universiti Teknologi MARA, Selangor, Malaysia,* employed a mixed-methods approach involving site observation and a survey questionnaire to investigate the role of higher learning institutions in enhancing the socio-economic status of the local community. This focused on the aspects of improved public transportation and facilities; development in the areas around the campuses; propelling business and services; knowledge building; income generation and employment creation. The findings indicated that all the aspects were highly attained, given the positioning of the higher learning institutions, which were near the residential areas. The study also suggested that collaboration between the local authorities and the state government is needed to improve the ways university-community partnerships can stimulate societal progress.

- **Article 10 – 21st SEAAIR Conference "Best Paper" Award** of **Jay Somasundaram** *from Central Queensland University, Australia,* **P. A. Danaher** *from the University of Southern Queensland, Australia, and* **Mohammad G. Rasul** *from Central Queensland University, Australia* developed and promulgated methods for improving publication rates across more diverse academic communities, including, but not limited to, those academic communities associated with this conference. The research used two complementary methods for knowledge development and consolidation often used in the applied social sciences: (1) environmental scanning; and (2) the Delphi technique. Six interrelated categories: (1) writing volume; (2) writing quality; (3) collaborative publications; (4) institutional responsibilities; (5) publication strategies; and (6) diverse authorial voices were discovered.

- **Article 11 – 21st SEAAIR Conference "Outstanding Paper" Citation** of **Fatima C. Tanzo** from *Bukidnon State University* developed a competency assessment tool fitted to Philippine nursing practice as a benchmark for student nurses to prepare them for expected competencies in the actual nursing practice. The study was anchored on the theory of Patricia Benner and the NCCS of 2012. 11 major themes and 141 performance indicators resulted in three major competencies are labeled as Client Care, Management and Leadership, and Research. This will be used as a basis to assess the student nurses' competencies as to their readiness for the world of work.

- **Article 12 – 21st SEAAIR Conference "Outstanding Paper" Citation** of **Rosfuzah Roslan** *from Universiti Tun Hussien Onn Malaysia, and Universiti Putra Malaysia Malaysia*, **Ahmad Fauzi Mohd Ayub, Norliza Ghazali & Nurul Nadwa Zulkifli** *all from Universiti Putra Malaysia, Malaysia* showcased the influence of perceived ease of use, perceived usefulness, social influence, and perceived enjoyment towards continuance intention in using a gamified e-quiz mobile application among Higher Education students. The study showed that there is a positive relationship between perceived ease of use, perceived usefulness, social influence, and perceived enjoyment with continuance intention. Further analysis showed that social influence and perceived enjoyment influence the continuance intention among the students. These findings indicated that effective gamification elements embedded in a mobile educational application and usage influence from the educators and peers exert highly significant strength towards retaining the students' interest in an educational product.

JIRSEA Editor: Assoc. Prof. Teay Shawyun, Ph.D.

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DISCOVERING THE RESILIENCE OF WORKING WOMEN FROM ACADEMIC INSTITUTIONS IN THE PHILIPPINES DURING THE COVID-19 PANDEMIC CRISIS

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ABSTRACT

The unprecedented challenges brought about by the COVID-19 pandemic tested people's resilience. The abrupt change in the conventional delivery of teaching and other services of educational institutions caused a lot of adjustments that schools and their employees need to manage. Drawing from their own experiences as motivation, the authors investigated the resilience of Filipino working women from the academe during this extraordinary time. Using a mixed-method approach, open-ended questions to explore the participants' experiences and a resilience scale to assess their resilience were utilized. Three hundred twenty-six women employed in educational institutions served as participants. Results revealed individual and community resiliency characteristics that enabled the participants to deal with the challenges. The findings pointed out some implications for practitioners to foster the value of resilience in developing mental health programs for this population, especially during a pandemic outbreak.

Keywords*:* challenges during pandemic, ways of coping, resiliency characteristics and behaviors

Introduction

According to the World Risk Report 2015, the Philippines is the third country with the highest disaster risk in the world. Every year, Filipinos encounter natural calamities yet they survive and recover afterward. This is the Filipino *katatagan* (Hechanova et al., 2015) otherwise known as resilience, defined as the process of adapting well in the face of adversity, trauma, tragedy, threats, or significant sources of stress such as family and relationship problems, serious health problems, or workplace and financial stressors (APA, 2012). Yoda et al. (2020) refer to it as the capacity to bear changes in the environment and the ability to recover after a shock. Resilience is also described as the ability to adapt to the new life brought about by the disaster (in a timely and robust manner) (Bollettino et al., 2018). It also refers to the process of effectively coping with and adapting to adverse circumstances, threats, loss, and stressful situations (Hamby, et al., 2016) and the individual's capacity to live a functional life despite traumas and adversities (Mostajo, 2010).

Donato and Lorica's (2020) study among Filipinos from Cagayan (northern part of the Philippines) revealed that the participants demonstrated their resilience in their adaptability and flexibility through positive cooperation, coordination, and communication during typhoons and floods. Likewise, Orio (2016) found optimism, sense of coherence, hardiness, and religiosity/spiritual coping as indicators of the resilience of Cebuanos after the super typhoon Yolanda (Haiyan). De Leon (2002) claimed that resiliency among Filipino families comes from strong adherence to religion, tightly knit family relationships, voluntary sense of service, and self-reliance. Hechanova et al.'s (2015) study on the survivors of super typhoon Haiyan revealed the crucial role of the formation of groups, more than enhancing individual efforts in achieving resiliency.

The COVID-19 pandemic brought another challenge to Filipino resilience when the Philippines ranked first in COVID-19 cases in ASEAN and landed in the top 20 worldwide (World Health Organization [WHO], 2020). Amidst the chaos the pandemic has brought, household adjustments are understandably integral to the management of the many challenges families experience. With a traditional family structure where the mothers, even if working, are still in charge of the various household concerns, the burden of coping with these challenges is much felt by the Filipino working mothers. According to Ferrer and Lagos (2016), women have been predominantly stereotyped as weak victims in the context of disasters, yet have proven to be more resilient than men and can assume critical leadership roles during emergencies and disaster situations. Drolet et al. (2015) said that while the vulnerabilities of women in times of disaster are evident, so too is their resilience shown in their capacities to care for their children and family members, and in engaging in multiple activities and tasks. In a recent study of Filipino teachers' resiliency by Lacaba et al. (2020), the participants revealed that their resiliency is manifested in their will to stay strong amidst the difficulties brought about by inclement weather in the islands and the necessity of earning for their own sake and their family as well.

During these trying times, studies proved unfavorable effects of the pandemic on people's psychological and mental well-being (Castelli et al., 2020; Solomou & Constantinidou, 2020; Wang et al., 2020; Xiong et al., 2020 cited in Tan et al., 2021). It was furthered in the same article that people's well-being to better understand their ability to thrive in adverse conditions was the focus of many studies. As such, various organizations crafted mental health programs and strategies to take care of the employees' wellbeing as well as to maintain a more resilient society (APA Foundation, 2020; Buenaventura, Ho & Lapid, 2020; DOLE Philippines, 2020).

Cognizant of the importance of exploring women's resilience, researchers recognized the benefit of discovering sources of women's strength in coping with life challenges. Pillay (2020), in her study of women leaders in higher education institutions, acknowledged the contribution of psychological strengths like positive affect and mindfulness in increasing resilience. This accordingly can be used by institutions in fostering the internal strengths of leaders in the workplace. The same finding is congruent to the study of Lian and Tam (2014) in their attempt to identify building factors of resilience to enhance effective coping strategies among working females to thrive and sustain satisfying careers in the workplace. They further recommended the provision of programs that focus on teaching resilience particularly in understanding and effectively coping with stressful situations to reduce developing health risks.

Following this, the current study investigated the resilience of Filipino women employed in educational institutions during the COVID-19 pandemic as they tried to balance their roles as wives, mothers, and workers. It specifically explored these research objectives: (1) to know the level of resilience of the Filipino working women; (2) to recognize the challenges experienced by working women from educational institutions in the Philippines during the COVID-19 pandemic and the effects of these challenges to them; and (3) to discover how the Filipino working women in the academe coped with these challenges.

Methodology

Design

This study utilized a mixed-method research design with a purposive sampling technique to address the research objectives. The current global scenario on mobility restrictions brought by the pandemic made the researchers utilize internet-mediated research (IMR) wherein the primary data was gathered through online platforms. IMR is "research involving the remote acquisition of data from or about human participants using the internet and its associated technologies" (British Psychological Society in Padayachee, 2016).

Participants

The participants were Filipino women working from educational institutions in the three major islands of the country: Luzon, Visayas, and Mindanao. From the original 383 recorded participants, 326 remained after removing those who were not employed in the academe and those who do not have children. Each of them was invited to participate in the study voluntarily. No incentive was given for their participation. Strict observance of ethical standards was carried out of which the participants were assured. Out of these respondents, 279 or 85.58% are living with a spouse or partner while 47 or 14.42% are solo parents. The respondents' ages range from 24 to 63 years old where the majority of them, 183 or 56.10%, have 3 to 4 children.

Instrument and Data Analysis

The two instruments utilized in this study were: (a) the modified Personal Resilience Scale (PRS) that determined the resilience level of Filipino working women, measuring five resiliency characteristics, where four of the characteristics (confidence, social support, adaptability, purposefulness) were taken from Cooper et al. (2013) and the fifth (perseverance) was added by the researchers taken from various literature as another resiliency characteristic; and (b) the open-ended questionnaire composed of four questions that described the challenges experienced by these working women and the effects of these challenges to them, how they coped with these challenges, and the factors that contributed to their coping.

The PRS was subjected to a reliability test with Cronbach's alpha result of .962 interpreted as excellent. The mean scores in the PRS were analyzed using this scale: *1.00 – 1.75 (Very Low); 1.76 – 2.51 (Low); 2.52 – 3.26 (High); and 3.27 – 4.00 (Very High).*

Thematic analysis was used to statistically treat the qualitative data, wherein the participants' online responses were coded and analyzed to conceptualize themes. The process of analysis went through phases such as familiarization of the data, initial coding, searching for themes, reviewing themes, defining and naming themes, and producing the report (Braun & Clarke, 2006). Both the questionnaire and the results were validated by colleagues from the De La Salle University-Dasmarinas, College of Education - Graduate Studies who are experts in both quantitative and qualitative research methods. The conceptualized themes were reflective of the majority (more than 50%) of the participants' responses.

Due to geographical constraints and mobility restrictions implemented to lessen the spread of the coronavirus, the instrument was administered using Google form and sent to the participants via email and Facebook Messenger.

Results and Discussion

This study investigated the resilience of Filipino women from the academe during the COVID-19 pandemic which specifically explored the level of resilience of these working mothers, the challenges they experienced and the effects of these challenges on them, and how they coped with these challenges.

The Level of Resilience of the Filipino Working Women

Table 1. Resiliency Level of the Participants According to Characteristics

Resiliency Characteristics	Mean	Verbal Interpretation
A. Confidence	**3.18**	**High**
When given a new task, I am confident that I will succeed.	3.31	Very High
My self-belief is not affected by a task that doesn't go to plan.	3.05	High
I feel positive about the future.	3.50	Very High
Successes are easy to remember, and failures are easy to forget.	2.87	High
B. Social Support	**3.35**	**Very High**
I have people at work who I can speak to about issues in the office.	3.33	Very High
I find it easy to ask for help from my colleagues.	3.28	Very High
I ask for assistance from others when I feel the need to.	3.41	Very High
I can discuss my job and its challenges with people outside of work, such as family members and close friends.	3.37	Very High
C. Adaptability	**3.28**	**Very High**
When one attempt fails, I learn from it and change my approach next time.	3.38	Very High
I have strategies in place for dealing with stress.	3.27	Very High
When there is a fundamental change, I learn to be creative by aligning new ways of dealing with the current reality.	3.27	Very High
I am more likely to say "yes" than "no."	3.18	High
D. Purposefulness	**3.31**	**Very High**
I don't lose sight of my goal when I encounter difficulty.	3.31	Very High
I am committed to my job.	3.55	Very High
I don't usually worry about issues that I have no control over.	2.99	High
I have strong goals that are clear in my mind.	3.38	Very High
E. Perseverance	**3.33**	**Very High**
I am determined to achieve certain things in my lifetime.	3.39	Very high
I have a strong motivation in achieving what I want.	3.41	Very high
I am not easily discouraged by difficulties that come my way in accomplishing goals.	3.22	High
I have the patience in dealing with difficult situations.	3.28	Very high
Average Mean Score	**3.29**	**Very High**

As reflected in Table 1, the overall level of resilience of the working mothers as measured by the PRS is very high with an average mean score of 3.29. This indicates that respondent-working mothers have a very high capacity to recover quickly from the difficulties that they may have experienced during this pandemic. Remarkably, none of the resiliency characteristics got a score lower than the high level.

This very high resilience was made possible by the social support that these working moms received with a mean of 3.35, the highest among the means of the five characteristics. The importance of this social support is emphasized by De Leon (2002) when she discovered that the Filipino families' resilience comes from tightly knit family relationships, among others. Likewise, the study of Hechanova et al. (2015) revealed the crucial role of the formation of groups in enhancing individual efforts to achieve resiliency. The other resiliency characteristics which also received very high means were perseverance (3.33), purposefulness (3.31), and adaptability (3.28). These characteristics can be manifested in the adaptability and flexibility behaviors (Donato and Lorica, 2020) of Filipinos during calamities, as well as in their optimism, sense of coherence, hardiness, and religiosity/spiritual coping (Orio, 2016). Of all the resiliency characteristics, confidence got only a high level (3.18) description. These findings may imply that even if the confidence level of the respondents was not very high, it was compensated by the presence of the other resiliency characteristics which have very high levels.

Table 2. Resiliency Level of the Participants According to Age

Age Group	Confidence	Adapt-ability	Social Support	Purpose-fulness	Perseverance	Average & Verbal Interpretation
20-29	3.07	3.18	3.17	3.11	3.33	3.17 (High)
30-39	3.14	3.26	3.37	3.22	3.25	3.25 (High)
40-49	3.22	3.29	3.36	3.35	3.36	3.32 (Very High)
50-59	3.18	3.27	3.36	3.37	3.36	3.31 (Very High)
60-69	3.25	3.25	3.12	3.17	3.25	3.21 (High)
Total	3.18	3.28	3.35	3.31	3.33	**3.29 (Very High)**

When disaggregated by age using a 10-point interval (Table 2), there seem to be slight differences in the areas of *confidence, social support, and purposefulness*. Those in the 20-29 and 30-39 scored lower compared to the other age groups in the area of *confidence*. In terms of social support, the 60-69 had a slightly smaller mean compared to the rest. Lastly, the 20-29 had a lesser score in *purposefulness* compared to the other respondents. Nevertheless, the overall resilience level of the participants according to age is very high with an average mean of 3.29. The results also showed that those in 40-49 and 50-59 have very high resilience with a mean of 3.32 and 3.31 respectively.

Several studies proved that resilience is related to age wherein as the person grows older, the stronger the resilience (Lundman et al., 2007; Portzky et al., 2010). It was noticed, however, in the current study that the level of resilience slightly declined with the participants in 60-69, the age of retirement in the Philippines.

Table 3. Resiliency Level of the Participants According to Marital Status

Marital Status	Confidence	Adapt-ability	Social Support	Purposefulness	Perseverance	Average & Verbal Interpretation
Living with spouse/ partner	3.21	3.30	3.36	3.33	3.35	3.35 (Very High)
Solo parent	3.05	3.12	3.27	3.19	3.20	3.17 (High)
Total	**3.18**	**3.28**	**3.35**	**3.31**	**3.33**	**3.29 (Very High)**

As regards marital status (Table 3), the resiliency level of the participants is also very high. On the other hand, there is a slight difference when grouped according to a marital arrangement with solo parents (high) appearing to be lower compared to those living with spouse/partner (very high). Specifically, there are slight differences in the areas of confidence and adaptability. Those living with their spouse or partner scored higher compared to the solo parents. This can be explained by the study of Grzankowska et al. (2018) stating that when coping with life challenges, single mothers rely on their resources to a greater extent compared to mothers in relationships who can receive support from their partners.

The Challenges of Filipino Women Working in the Academe during the COVID-19 Pandemic and Its effects on their Wellbeing

The challenges experienced by the participants and their effects as determined from their self-reports were categorized into four superordinate themes conceptualized to reflect "individual crises amidst the pandemic crisis" as shown in Table 4.

Table 4. Themes Reflecting the Working Women's Challenges

Superordinate Themes	Subordinate Themes
ADAPTABILITY versus INFLEXIBILITY	• Adjustment to Alternative Work Arrangement and Digital Learning Modality • Enhancement of Technical Competency
CONNECTIVITY versus INACCESSIBILITY	• Social Restrictions • Technical Constraints
RESOURCE AVAILABILITY versus FINANCIAL DISTRESS	• Job Loss • Unforeseen Expenses
SELF-CARE versus SELF-NEGLECT	• Physical Fatigue • Emotional Disturbances • Mental Exhaustion

Theme 1. Adaptability *versus* Inflexibility

The unprecedented changes brought by the pandemic necessitated the participants to make sudden adjustments to their daily routines and usual way of doing things.

"Work-from-Home" has been adopted by most organizations as an alternative work arrangement when community quarantine was enforced. The participant-teachers, as part of the academe, carried out Emergency Remote Teaching to ensure continuous delivery of educational services which required them to enhance their technical competency as digital platforms are needed to facilitate the teaching-learning process. This caused a certain degree of difficulty since these teachers were used to a face-to-face encounters with their students and were not adept at using computer applications in their lesson delivery. Similarly, the school administrators and non-teaching employees who also worked remotely experienced this challenge. To quote some of the mothers' statements, one stated: *"I have limited knowledge on using different online platforms."* and another said: *"Tons of things to prepare for the new learning modality. New system, policies, and procedures must be in place."*. Additionally, a mother said *"Supervising online classes and giving instruction online are challenging. Everything must be carefully thought of, planned, and executed. It was quite rough and tough."* This is a challenging experience for the participants because they are not familiar with telecommuting arrangement.

Part of the difficulties the mothers experienced is making their home their workplace. Since Filipinos traditionally have an extended family wherein multiple generations live under one roof (Buenaventura et al., 2020), their homes may not be a conducive place where they can work from home without disturbance from other family members doing their respective tasks. As experienced by the participants, family members inadvertently encroach on each other's working area and cause distractions while performing work duties. Because the mothers are at home, they also claimed that they could not help but perform their home duties including assistance to their children's home-based learning during their official work time. This also resulted in their difficulty in adjusting to new guidelines, meeting deadlines, and facilitating online classes or tasks. Thus, feelings of being ineffective and unproductive, inability to accomplish voluminous tasks, and difficulty in managing the overlapping responsibilities of being a worker, mother, wife, and taking care of a sick family member emerged. One participant expressed that *"the transition to distant learning modalities requires time and physical endurance which sometimes makes me unable to perform some of the mommy duties"*. Another said, "*...I always ask myself – can I be an effective teacher? Are they learning?"*. Moreover, a participant stated that *"taking care of a sick 81-year-old father, having a 27-year-old son with autism, multiple tasks as a teacher, housewife, and mother"* were her challenges while another mother dubbed her challenge as accomplishing "work-FROM-home and work-FOR-home" tasks. The current study's finding regarding dual/multiple roles as one of the challenges of working mothers is consistent with the study of Bhattacharjee and Tripathi (2012), who found that stress was high for working mothers because of the dual roles they were performing. Similarly, the survey conducted by Microsoft company showed lack of separation between work and life negatively impacts the well-being of remote workers (Spataro, 2020). Thus, working mothers need to demonstrate adaptability against inflexibility to overcome these challenges. In support, Donato and Lorica (2020) considered adaptability and flexibility as resilience characteristics of people who face calamities.

Theme 2. Connectivity *versus* Inaccessibility

Connectivity as a challenge was magnified by social restrictions and technical constraints as experienced by the participants. Accordingly, physical/social distancing and restrictions for face-to-face interaction had caused an unfavorable impact on their socio-emotional well-being. A participant said, "*Actually it is hard because there are so many things that I have to consider such as not having face-to-face conversation or discussion, and we have to consider first our health in dealing with other matters.*" which is more or less the same experience as another mother who said, "*Unable to talk properly to co-workers regarding work-related issues, updates and concerns due to limited face-to-face encounter.*" Difficulty in communication was also expressed by other participants stating that "*It is hard to communicate with others.*" which also led to feelings of isolation as appeared in the online responses. Likewise, there were also mentions that they were challenged by the restrictions in going out to buy the things they needed and in doing stress reliever activities. This finding is consistent with the studies of Meng et al. (2020) and Subramanyam et al. (2018). Both studies confirmed debilitating worry and depressive symptoms as effects of mandated isolation/quarantine. Generally, the physical presence of a *kapwa* during special occasions to celebrate, talk to and laugh with, and/or trying times to help, listen, and cry with as an expression of love, care, and empathy for one another matters most for Filipinos. *Kapwa*, a Filipino core value, in which a person shares identity and consciousness with the "other" person (Aguila, 2015) proves that Filipinos value relationships, especially the affectional attachment that binds them with their family, relatives, friends, and colleagues. This is being recognized as important by the mothers. Furthermore, the technological platforms espoused in accomplishing tasks and in conducting meetings, conferences, and social events also prevented physical interaction and communication. These circumstances led to the participants' feelings of isolation, loneliness, and disheartenment which is analogous to the argument of Newby et al. (2020) that loneliness and social isolation are risk factors for poor mental health.

Moreover, technical constraints due to poor/unstable internet connection adversely affected their work efficiency and productivity, and self-efficacy. Online classes are either cut or interrupted; others could hardly access if not disconnected. Some working mothers have outdated computers/gadgets which worsened inaccessibility. They perceived these as obstacles in performing their duties effectively. One mother mentioned: "*The challenging one is my gadget. I use only an android cellphone, no laptop so it's hard to do my report in my job.*". Another statement of a mother reflects the connectivity struggle: "*Connectivity to the internet and the use of laptop/computer are the real challenges.*"

Having those challenges mentioned, the working mothers from the academe need to creatively resolve inaccessibility to triumph over the identified effects on them.

Theme 3. Resource Availability *versus* Financial Distress

Added to the situations' complexity brought by the pandemic are the financial difficulties encountered due to job loss and the emergence of unforeseen expenses. This is revealed by the mothers' statements like "*Our financial problem is at the top since my husband lost his job due to the pandemic.*" and "*Financial crisis, utility bills like internet and electricity are the challenges.*"

Many establishments declared closure or retrenchment which adversely affected economically disadvantaged families. As expressed by the working mothers, their husbands' loss of jobs led them to become the sole breadwinners providing the family's basic needs including medical assistance to sick family members. Thus, survival became a tough concern to them who at the same time was anxious and uncertain about their job security. Similar to the findings of Newby et al. (2020), uncertainty as experienced by the majority of the mothers together with financial distress are significant risk factors for mental health.

Unforeseen expenses like increased budget for internet load, purchase of gadgets, and subscription to stronger data to proficiently perform their jobs online and for their children's digital learning aggravated the financial distress. The necessity to properly manage what was available and to find other financial resources became vital for working mothers to overcome their overthinking, anxiety, hopelessness, and irritability. Analogously, Ettman et al. (2020) stated that COVID-19 economic consequences combined with the context of the pandemic itself increase the prevalence of symptoms associated with depression.

Theme 4. Self-care *versus* Self-neglect

Results revealed harmful effects of the pandemic to the participants' physical, emotional, and mental wellbeing due to difficulties related to work arrangements, learning modalities, technical competencies, connectivity, finances, and the concept of the virus itself. Quoting a few of the responses demonstrating the effects of the challenges to the working mothers, one said, *"My emotional and physical aspects are more affected because I get exhausted dealing with tasks at home and school. Emotionally, I get stressed thinking about how I will be able to accomplish all these tasks."* Another participant said, *"Sometimes I feel alone, I feel tired, can't sleep easily because of thinking on where or how I can earn more money to support our family living."*.

The harmful effects on their physical wellbeing were manifested through various symptoms of stress such as physical fatigue (tiredness, weakness), getting sick (headache/migraine, body/back pains, eye strain), and losing/gaining weight. They also lacked sleep, had less opportunity for stress-reduction activities, thereby believing that they lacked work-life balance. Undesirable effects on their emotional wellness were displayed through behaviors like being temperamental (easily getting annoyed, irritability/being moody, anger), feeling demotivated (losing hope/giving up, disappointment, frustration), loneliness/sadness, and intense fear of contracting the virus. Consequential effects on their mental wellness were exhibited through anxiety, overthinking of the future, being paranoid of the virus, compulsion in observing health protocols, mental exhaustion in planning for strategies to survive, and inability to focus/concentrate. Additional statements of the participants expressing harmful effects of their experiences during the pandemic are*: "Saturating and frustrating."; "I feel anxious."; "I feel physically drained, emotionally tired, and financially drained."; and "It brings me stress and anxiety."*

The findings under this theme are congruent to Petsanis' claim that COVID-19's threat to an individual's life affects behavior (WHO, 2020, para 4). Therefore, these unfavorable effects on their mental health entail self-care to thrive. Measures to sustain good mental health relative to the effects

of the pandemic were recognized by researchers and professionals as a necessity (Iob et al., 2020; Spataro, 2020).

How the Filipino Working Women in the Academe Coped with the Challenges

Table 5. Themes Reflecting the Working Women's Ways of Coping

Superordinate Themes	Subordinate Themes
SELF-EFFICACY	• Enriching Work-Life Balance • Valuing Strengths
SOCIAL RELATEDNESS	• Sustaining Social Support System • Extending Self as Support for Others
SPIRITUAL CONNECTEDNESS	• Deepening the Faith • Being Grateful
SELF-NURTURANCE	• Fostering Self-care • Educating the Self

To cope with the challenges of the pandemic and its effects on them, the participants benefitted from several factors that contributed to their resilience. Four themes emerged from the responses of the participants to show how they coped with their challenges during the pandemic outbreak as shown in Table 5.

Theme 1. Self-efficacy

"Self-efficacy" as a superordinate theme was derived from the subordinate themes "Enriching Work-life Balance" and "Valuing Strengths". These were analyzed from the participants' ability to maintain work-life integration through prioritization and time management and through self-awareness in recognizing their potentials in dealing with adversities. This theme is congruent to the result of PRS relative to the participants' resiliency characteristics such as high level of confidence, and very high level of adaptability, purposefulness, and perseverance.

Filipino resilience has been tested in history by both natural and man-made calamities (Hechanova et al., 2015; Adviento & De Guzman, 2010). Amidst adversities, Filipinos would commonly say *"Kaya ko/natin ito!"* (I/We can do it!). This reflects Bandura's self-efficacy, the concept of having self-trust or confidence in ones' competency to produce favorable outcomes. Few excerpts from the mothers' statements reflecting self-efficacy are: *"I guess my self-confidence and resilience…"; "My strong personality…"; "I can adjust to it."; "I accept the challenges and don't give up";* and *"I do my best and eventually learn new things."* This trait, coupled with other resiliency factors like adaptability and perseverance helped the working moms cope with the unprecedented challenges in the alternative work arrangements, learning modalities, volume and demands of work-home responsibilities, technical competencies, connectivity, and financial distress. They made efforts to enrich work-life balance through prioritization, time management, and enjoyment in the opportunity to be with their family while working from home. Prudence, wise spending, and resourcefulness in finding additional income were also observed by the participants.

Congruently, self-efficacy is fostered through valuing of strengths as analyzed from the participants' responses. They observed self-awareness through recognition of their potentials in dealing with adversities like courage, perseverance, conscientiousness, resourcefulness, optimism, open-mindedness, and flexibility. Looking at the brighter side of circumstances, having the freedom to make decisions, appreciation of what is available, learning from experiences, being more cautious with health protocols, and awareness of essential information about the pandemic added to the participants' resiliency. Retooling through webinars to improve their technical competency also helped them triumphed over the challenges. Nicodemes and Avila (2020) recognized comparable characteristics of the mothers like composure, optimism, conscientiousness, information dissemination, compliance, resourcefulness, and health consciousness as positive behaviors during the pandemic.

Additionally, purposefulness contributed to the participants' resilience. This is similar to Orio's (2016) findings that perseverance and purposefulness are characteristics of a resilient individual. Despite the uncertainty, the working mothers remained focused, strongly motivated, and determined to achieve their goals. Accordingly, the pandemic made them better realize the significance of their roles - mother, wife, friend, colleague, and employee - which fostered perseverance and optimism in them.

Theme 2. Social Relatedness

"Social Relatedness" was conceptualized from subordinate themes like "Sustaining Social Support System" and "Extending Self as Support for Others". The subordinate themes refer to the participants' means of nurturing interconnectedness as well as efforts to collaborate and serve those in need. This theme is remarkably associated with the very high level of social support from the PRS result.

As reflected in the responses, results showed that the working mother-participants put their best efforts to sustain the social support system. They ensure that they have time well spent with their loved ones, talk online with friends and colleagues, join a group of online spiritual activities, and maintain collaboration with professional groups. A response from a participant to demonstrate social support system was "*The open communication between me, my head and colleagues make the work lighter. The support from my family in all aspects keeps me going.*". Similarly, the statement *"I have competent people around me who help me."* and *"I have my support system, my colleagues and my family who always support me to overcome these new challenges."* support this theme. Interestingly, a participant responded, *"My husband helps me in managing the household chores and in taking care of our kids during his off-duty as a PNP officer."* The importance of friends was also mentioned by a mother-respondent, *"Talking to a friend and sharing my experiences and how do I feel sometimes makes me feel better.";* and by another who stated, *"I try to call some friends and talk to them, so my thoughts are diverted for a while."*

The finding on the relevance of social support is parallel to that of De Leon (2002) specifying that close family bonds, social support, and service to others are contributory factors to resilience. During the pandemic, better community relationship was nurtured demonstrated through deep social connections and expression of concern for others. Collaborative efforts of individuals,

communities, and the government surfaced in most areas of the country to help one another survive. The mothers also benefitted from the *"Ayuda"* (social amelioration programs/operations) distributed to affected families/communities in the form of cash and/or relief goods as an expression of kindness, care, and compassion. Quoting Deyro, "The emergence of several volunteer-driven relief operations amid the COVID-19 pandemic is proof that Filipino *Bayanihan* thrives in times of crises, that people, regardless of their social status, can set their differences aside to come together and work towards a singular goal" (CNN Philippines, 2020). "*Bayanihan*" is a Filipino core value reflecting the community spirit of helping one another especially in times of need without expecting anything in return. This relatively provided emotional strength among Filipinos during difficult times, including the mother-participants. The importance of social support in triggering the resilience of individuals as a finding of the current study was previously expressed in several studies (Yoda et al., 2020; Orio, 2016; Hechanova et al., 2015; Landoy et al., 2015). Accordingly, the support of family, friends, colleagues, and community makes individuals stronger to face challenges and make the victims of disasters or calamities bounce back and start anew.

Extending ones' self in support of a "*kapwa*" is provided by the participants by simply making themselves available online to offer advice, moral support, or an ear to listen, and even free service by professionals. These undertakings further developed interpersonal intimacy among families and communities intensifying their emotional bonds. Accordingly, social capital - the bonds, bridges, and linkages (re)built with various social actors enables resilience (Robles & Ichinose, 2017).

Theme 3. Spiritual Connectedness

"Spiritual Connectedness" as another superordinate theme was derived from subordinate themes such as "Deepening the Faith" and "Being Grateful". "Deepening the Faith" was interpreted from the participants' self-report of being more faithful, reflective, and prayerful to maintain a stronger relationship with God while "Being Grateful" was analyzed through the participants' discernment of gratitude by being more appreciative of what they have and realizing God's love and mercy during this extra-challenging time.

Spirituality is a significant positive predictor of psychological wellbeing which means that spiritual individuals are more likely to be psychologically well (Basileo, 2019). This has been found predominant to the participants based on the results of the current study. Results showed that they believe in the presence of an Almighty Father who is in control of everything. That amidst uncertainty, or when problems become complicated and/or solutions seem not within human being's capacity like the pandemic, the mothers turn to God whom they believed has always the best plan for them. As expressed by a participant, *"I lean more on my faith through prayers believing that things will get better soon with God's grace and mercy"*. This was supported by other participants' statements like *"I rely upon Him. He will give me the security in dealing with the challenges", "I keep the faith",* and *"I surrender all my problems to God. I never forget to ask for His divine guidance".* Faith gives them the courage and strength to keep going amidst adversities because they believe that there is a compassionate God whom they can always trust and lean on. Similarly, De Leon (2002) confirmed that faith plays a role in the Filipino family's resilience. The mothers further claimed that the pandemic made them more prayerful and has deepened their relationship

with God. Activities like attending online church events, prayer meetings, and reading the scriptures are some undertakings they engage with to strengthen their spirituality.

Gratitude was also realized by the participants during this extraordinary time which also contributed to their resilience. This is similar to the findings of Mary and Patra (2015) that gratitude has a significant relationship with resilience. The mothers became more appreciative of what they have by counting their blessings, valuing the people around them, and realizing God's love and mercy for keeping them safe and healthy.

Theme 4. Self-nurturance

The last superordinate theme is "Self-nurturance" with "Fostering Self-Care" and "Educating the Self" as subordinate themes to express the participants' ability to address the unfavorable impact of the pandemic on their mental health, and by making themselves more knowledgeable in keeping themselves healthy being cognizant of their limitations.

Cognizant of the difficulties and possible effects on their mental health, the participants adopted several ways to stay healthy, happy, and resilient by fostering self-care and educating themselves.

To nurture wellness, they strived to have "me-time" usually spent for relaxation or stress-reliever activities like gardening, watching movies/comedy films, singing with the *Videoke*, playing with their children and/or pets, chatting with friends and co-workers, or just simply taking a break, rest or sleep. They ate well, took vitamins, exercised, and strictly observed health and safety protocols. Self-care strategies as a way of coping are necessary to safeguard wellbeing. This was emphasized by Mostajo, et al. (2018) in their study on the wellness and engagement of school administrators. Indeed, work-life balance became a priority of the mothers through proper time management. Some of the participants' statements supporting this are: *"I plan my tasks ahead of time"; "I try my best to balance being an administrator and a mother"; "I prioritize my tasks and have a to-do-list"; "I take things one at a time"; "Proper scheduling of household chores"; and "I organize my time."*

Remarkably, the working moms recognized their limitations and acknowledged the need to seek help from others when needed. This result is related to the findings of Mills, et al. (2020) that self-awareness and self-compassion are important for self-care in promoting wellness and resilience. The mothers also tried to educate themselves about mental health by reading and/or attending free webinars about wellness, coping with mental health issues, time management, and stress management provided by their schools and professional organizations. The organization-initiated mental health programs are in harmony with the call for employers to take care of the wellbeing of their employees (APA Foundation, 2020; DOLE Philippines, 2020). Sensibly, the adverse effects of the pandemic are addressed through collaborative management strategies to help people maintain their well-being towards a more resilient society (Buenaventura, Ho & Lapid, 2020).

Conclusions

Educational institutions were not spared from the disruptions brought by the pandemic which consequently led them to suddenly modify their operations, shift to other teaching and learning platforms, and carry out alternative work arrangements. These changes brought lots of adjustments and challenges to the schools' management and employees. Drawing from their own experiences as motivation, the authors investigated the resilience of Filipino women working in the academe, the challenges they experience and the effects of these challenges on them, and how they cope with their challenges during this extraordinary time.

The findings indicated that the Filipino mothers working in the academe have a very high level of resilience manifested by their resiliency characteristics and behaviors, thus having the strong capacity to recover quickly from the difficulties they may have experienced during this pandemic. This claim is substantiated by the results of the PRS, and the various themes conceptualized from the participants' online responses in the open-ended questions. The results may reflect themes that are consistent with the larger body of work regarding experiences of working women but may suggest some unique patterns among working mothers in the academe during a pandemic.

Implications

Primarily, the unveiled strengths of the participants and their communities may point to some implications for practitioners to foster the value of resilience in developing mental health programs for working mothers since the findings provided information to better understand the experiences of working women as they took on roles being a wife, mother, and worker yet remain resilient amidst life adversities. Similarly, the findings could also serve as a guide in formulating a resiliency program for working mothers who are experiencing considerable difficulty in coping with the challenges of the pandemic by assisting them to develop relevant characteristics and behaviors resembling those demonstrated by the participants of this study.

Likewise, results might also have implications on how schools formulate relevant institutional policies and programs affecting the participants' working conditions during pandemic which could better help them become more resilient and sustain their engagement with their respective institutions despite the adversities.

Implications on programs related to gender sensitivity may also be suggestive looking at a perspective that in a generally patriarchal society like the Philippines, the Filipino working women were able to stand up and used their resiliency to manage their and their family's lives well amidst this pandemic.

Recommendations

Having these conclusions and implications, the researchers recommend that the information derived from the findings of this article be a basis for practitioners in addressing areas of concern like well-being during extra-ordinary times, stressing how the working women from the academe were able

to maintain their mental health as they faced the challenges brought about by the pandemic. This significantly suggests for an integrated program to be crafted to strengthen the working women in the academe's strong points and address areas that need to be uplifted.

Future research direction may delve deeper into these experiences for more responsive mental health programs relevant during pandemic outbreaks to foster individual and community resilience.

Being aware of the limitations of this study regarding its method, future studies may utilize other qualitative research methods like in-depth interviews and focus group discussion to gain a deeper understanding of the lived experiences of this population and obtain better insights into the issue being investigated especially when restrictions for a face-to-face interaction are lifted and/or when the situation already allows the conduct of such methods.

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REMOTE LEARNING AMID A GLOBAL CRISIS: A LITERATURE REVIEW

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ABSTRACT

The purpose of this paper is to examine extant literature which focused on remote learning in the context of the Covid-19 pandemic. It follows qualitative research design particularly thematic synthesis in reviewing and analyzing 102 research articles published from February 2020 to December 2020. These articles, which reflect the experiences of 34 countries across the globe, are methodically selected following inclusion and exclusion criteria. The thematic analysis results in four major themes which are: 1) concerns about the shift to remote learning, 2) impact of remote learning, 3) challenges in the shift to remote learning; and 4) coping with the challenges in remote learning. These four salient themes show how the transition from face-to-face to remote education has confronted and made an impact on all teachers, students, parents, and administrators. These circumstances reaffirm the opportunities to harness educational institutions' resilience, motivation, and competencies as participants in the education process. While national and institutional support is made available, it is clear that both the pandemic and remote learning have obliged stakeholders of education to become more inventive and collaborative in the teaching-learning process as a way to cope with the challenges. The study recommends conducting a more inclusive literature review of relevant research articles that are published beginning 2021 to determine how all stakeholders of the teaching and learning process have adjusted during the second year of this crisis.

Keywords: Covid-19 pandemic, distance learning, online education.

Introduction

Even before the surge of a global crisis, remote learning has already been used as a form of education where the student and the educator are not in a face-to-face mode in a conventional classroom setting. Information is relayed through advanced communication tools, such as discussion boards, video conferencing, and distance assessments. According to Laschewski (2011), remote or online learning is defined as a collection of learning arrangements comprising of three building blocks, specifically, modern information, communication technologies (personal computer or other devices), and the Internet. On the other hand, computer-based, web-based, technology-based learning, and virtual education opportunities are categorized as the applications and processes involved to further scaffold online learning (Reshma et al., 2017). With the advancement of technologies, the addition of social media and Web 2.0 machineries into the picture catalyzes to augment online learning experiences as they are reported to be the most favored tools available to the present (Vaughan et al., 2013).

Meanwhile, in an unprecedented turn of events, the Covid-19 pandemic has transformed the way students are educated around the globe within a short period (Chung et al., 2020). This global crisis has exposed incipient vulnerabilities in educational systems around the world. Ananga (2020) argues that as the world continues to endure these unfortunate realities of COVID-19 and its challenges especially in the education sector, appropriate strategies need to be adopted to continue to engage learners for teaching and learning. Against the backcloth of this virus outbreak, countless policy initiatives are being propelled by the governments and educational institutions across the world to continue teaching activities all the while containing the virus. In addition, there is ambiguity and disagreement about what to teach, how to teach, the workload of teachers and students, the teaching environment, and the implications for education equity (Zhang et al., 2020).

Ali (2020) asserts that universities and educational institutions worldwide are moving aggressively towards online learning or E-learning and with the sudden shift to emergency remote learning during the pandemic, this e-learning appears to be the spotlight on learner's needs as these are the focus of all educational processes. Siron et al. (2020) investigated factors affecting the use of e-learning during the Covid 19 in Indonesia and concluded that the students' intention in using remote learning was due to numerous variables such as perceived enjoyment, students' experience, computer anxiety, and perceived self-efficacy. In Pakistan, a study on the attitudes of higher education students towards obligatory distance education reports that a massive majority of learners are unable to access the internet due to technical as well as financial constraints (Adnan & Ankar, 2020).

In terms of the current status of learning amidst the pandemic, a study on online education reveals that some of the challenges faced by teachers and students include internet connectivity, infrastructure and system; interaction, interest and commitment; literacy problems; inadequate synchronous/online class count and duration, and poor parent-student-teacher cooperation (Aydin & Erol, 2020). Furthermore, findings from the study of Dawadi et al. (2020) indicate that the pandemic has had serious impacts on students' learning and well-being and that it potentially widens the gap between advantaged and disadvantaged learners in their equitable access to quality

education. It was also supposed that the challenges experienced by the education sector are mainly due to the government's faulty implementation strategies and inability to implement those policies as Gamage et al. (2020) asserted that there is still a lack of institutional provisions for academic integrity management in the context of Covid-19. In South Korea, one study found that the factors such as classroom interaction, student motivation, course structure, teacher knowledge, and class facilitation are positively influencing students' satisfaction and learning outcomes amidst the pandemic (Baber, 2020). In New Zealand, Hodges and Martin (2020) reported that from the students' perspective, their online initiatives enriched capability but required adaptability, flexibility, and resilience. In terms of the teaching process, a study in India concludes that educators face tons of challenges in online teaching, the most common is the lack of technical facilities, constant family disturbances, absence of clarity and direction, and deficiency of technical knowledge (Joshi & Bhaskar, 2020). Meanwhile, in the belt of Science education, Landicho (2020) highlights that the most evident change prompted by the shift to online education is the nonexistence of laboratory activities where students need to conduct real-life science experiments. Teachers also had to struggle with how to conduct laboratory classes under safe distancing and how to substitute traditional, high-stakes written assessments (Lau et al., 2020).

From one country to another and from various fields of discipline, insulating the consequences of the unexpected shift to remote learning on the teaching-learning process is indeed challenging, considering the lack of distinction in the timing over which most universities and educational institutions shifted to online, and because of the parallel health, economic, and other critical encounters that may also affect students' academic success. Relevant studies would appear to have diverse results when placed in a global perspective. Given the many relevant studies that deal with Covid-19 and distance education, only one academic paper written by Pokhrel and Chhetri (2021) had been carried out so far to analyze published researches focusing on the impact of the Covid-19 pandemic on online teaching and learning. Consequently, this paper aims to provide a more comprehensive and more in-depth literature review taking remote learning from a global standpoint.

Objectives of the Study

This study generally intended to conduct a literature review and analysis of the teaching and remote learning experiences of education institutions across the globe amid a global crisis. Specifically, the paper attempted to identify the dominant themes that ran across the literature which focused on remote learning. The results of this study could be an invaluable reference by future researchers whose studies focus on post-pandemic online-learning modality.

Framework of the Study: Thematic Synthesis

Literature reviews may either be an integral part of a research project or a stand-alone study (Xiao & Watson 2016 as cited in Templier & Paré 2015). Stand-alone literature reviews abound, and these have been conducted following appropriate typology depending on their purpose. Among the types of literature reviews, systematic review, meta-analysis, literature review or narrative review, and thematic synthesis appear to be the most commonly used as a framework (Grant & Booth, 2009; Neely et al., 2014; Oosterwyk et al., 2019; Xiao & Watson, 2016; Synyder, 2019; Thomas &

Harden, 2008).   The present study was anchored on thematic synthesis, which utilizes thematic analysis to extract and synthesize data (Xiao & Watson, 2016; Oosterwyk et al., 2019; Neely et al., 2014; Thomas & Harden, 2008). The resulting themes "are used to answer the research question" (Thomas & Harden 2008 as cited in Xiao & Watson, 2016, p. 101). Thematic synthesis served as the framework of the present study in conjunction with Cooper's (1988) resulting in the authors' modified framework in Figure 1, which outlines five steps.
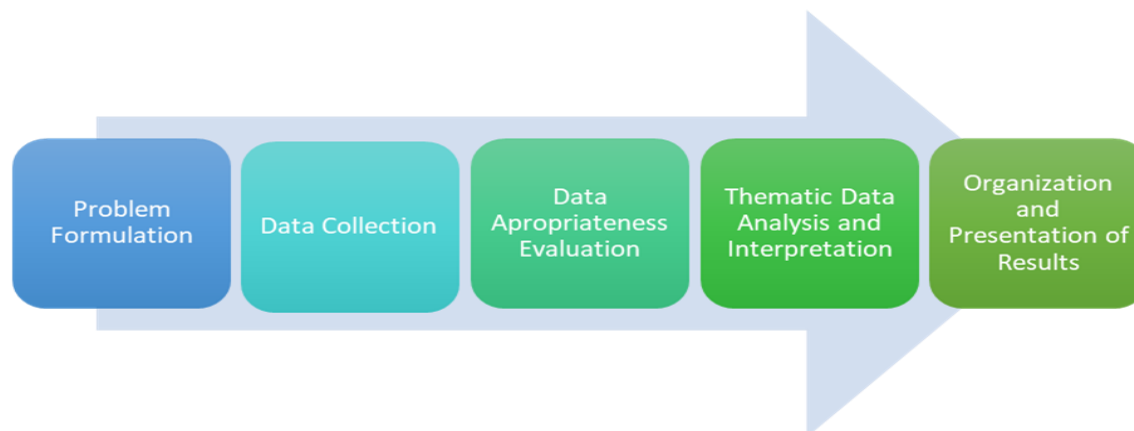
Figure 1: Literature Review Framework

These steps include (1) **problem formulation**, which clearly stipulates what researchers intend to do (goals or objectives) with the plethora of literature on a particular topic, it likewise describes the audience for whom the review is intended; (2) **data collection**, which highlights the ways by which these literature or studies will be gathered; (3) **data appropriateness evaluation (coverage)**, which underlines the researchers' thorough sifting through the collected literature in order to exclude those that are not directly responsive to the goal of researchers as outlined under the problem formulation; (4) **thematic data analysis and interpretation**, which underscores the steps that will be carried out in thematically analyzing the collected literature (Thomas & Harden 2008 as cited in Xiao & Watson, 2016, p. 101); and (5) **organization and presentation of results**, which accentuate not only how the findings of the review are to be organized and presented vis-à-vis its goals or objectives but also the point of view (perspective) that the researchers take in discussing the results.

Method

Research Design

This study followed qualitative research design in light of Thomas and Harden's (2008 as cited in Xiao & Watson, 2016, p. 101) thematic synthesis and Cooper's (1988) procedure for synthesizing literature were utilized as a framework for the problem formulation, data collection, data appropriateness evaluation, data analysis and interpretation, and organization and presentation of results. For this study, remote learning is defined as a process of learning where the student and the educator, or information source, are not physically present in a traditional classroom environment. Information is relayed through technology, such as discussion boards, video conferencing, and

online assessments. The focus of this study is to review the literature on remote learning experiences of educational institutions during the surge of the Covid-19 pandemic in 2020.

Data Collection Technique and Data Appropriateness Evaluation

The purpose of data collection was to find empirical studies be they quantitative, qualitative, or mixed methods conducted on remote learning amid the Covid-19 pandemic in online education published in peer-reviewed journals from February 2020 to December 2020. The data collection had three major sources, namely, electronic databases; backward searching; and forward-searching (Oosterwyk et al., 2019; Xiao & Watson, 2016). The first included Web of Science, EBSCO, and ProQuest; Google Scholar, Directory of Open Access, Journals Educational Resources Information Center (ERIC), JSTOR, and International Teaching and Learning Journals were likewise used. Backward searching, on the other hand, was undertaken to cull relevant journal articles by using the list of references found at the end of a journal article. Lastly, the authors identified journal articles that have cited some important articles that were included in the review; Google Scholar and the ISI Citation Index were utilized for this purpose.

In light of Xiao and Watson (2016), the following keywords, which were derived from the objective of the present study were used: "education and Covid-19 pandemic", "distance education during a pandemic", "distance learning during Covid-19", "online learning in the middle of Covid-19 pandemic", "Online teaching strategies during Covid-19 pandemic", "e-learning", "remote learning", "e-learning and pandemic" "remote learning and Covid-19", "challenges and issues in remote learning", "shift to distance learning", "continuous learning during Covid-19", "remote learning readiness" "Coronavirus and online learning", "home learning during a pandemic" and "distance education challenges".

To make the data collection and selection process very systematic, inclusion and exclusion criteria were in place following Oosterwyk et al. (2019), and Xiao and Watson (2016). The level of education, where remote learning was utilized (primary, secondary, undergraduate, or graduate), was not considered as a factor for exclusion or inclusion of the studies. The context or country by which the studies were conducted was also not a gauge in selecting the articles. The articles were sourced across countries. However, the period from which these articles were published was an important factor for determining the appropriateness of the literature to be included in the corpus of the present study. This period for selecting the data was crucial because February 2020 to December 2020 was considered as the transitional stage of almost all learning institutions to online or remote learning due to the Covid-19 pandemic. The focus of data collection was to include all forms of online or remote learning amid the Covid-19 pandemic regardless of the level of students. Finally, the literature to be included in the present review should be full-text peer-reviewed research journal articles. Papers that were published as abstracts only were not included in the review. After a thorough data appropriateness evaluation (a process of inclusion and exclusion) of all the collected research articles, a total of 102 articles constituted the corpus as shown in Table 1.

Table 1: Countries Represented in the Literature Review

Countries	f
USA	20
Indonesia	14
Turkey	8
UK	6
China	5
India	5
Malaysia	5
Ghana	3
Pakistan	3
Philippines	3
Canada	2
Namibia	2
Nigeria	2
Singapore	2
South Korea	2
Spain	2
Australia	1
Bangladesh	1
Belize	1
Bhutan	1
Bulgaria	1
Ethiopia	1
Republic of Fiji	1
Italy	1
Kenya	1
Morocco	1
Nepal	1
New Zealand	1
Oman	1
Palestine	1
Saudi Arabia	1
South Africa	1
United Arab Emirates	1
Zambia	1
TOTAL	**102**

The USA and Indonesia topped the list with 20 and 14 articles respectively. The majority of the countries represented had only one article each. Finally, 79 or 77.45% of the 102 articles had undergraduate or college level as their research context; 16 or 15.69% had Pre-K to post-secondary; six (6) or 5.88% had across-level context (primary to college), and one (1) or 0.98% had graduate education as its context.

Data Analysis

Content analysis (Merriam & Tisdell, 2017) and thematic analysis (Xiao & Watson, 2016) were used to analyze the corpus based on the main topic of the studies. It is described as a method to classify written or oral materials into identified categories of similar meanings (Moretti et al., 2011). After thoroughly studying the corpus, the 102 articles were initially categorized into major topical themes. New themes were added until data themes reached saturation, which means that all new data could be categorized under the already developed themes. All of these articles were tabulated using three columns: column 1, Research titles and corresponding authors; column 2, Background and Objectives of the study; and column 3, salient findings. Next, the salient findings across the articles were subjected to axial coding (Merriam & Tisdell, 2017), which is comparing and contrasts them to come up with common themes. The themes were finalized following Ballena and Liwag's (2019) CERES criteria namely: Conceptual Congruence; Exhaustiveness, Responsiveness to the research objectives, Exclusivity of themes, Sensitivity to the qualitative data.

Results

After a thorough content and thematic analysis of the 102 research articles related to remote learning during the Covid-19 pandemic, the study found four major themes that emerged from the recurring initial codes after doing the axial and selective coding namely: 1) concerns about the shift to remote learning, 2) impact of remote learning, 3) challenges in remote learning and 4) coping with the challenges in remote learning.

Concerns about the Shift to Remote Learning

Concerns about the shift to remote learning came out to be one of the themes established during the literature review. The subthemes herein including their frequency of occurrences in literature are shown in Table 2.

Table 2: Concerns about the Shift to Remote Learning

Shift to Remote Learning	f
Students' constructive attitude	19
Teachers' preparedness	13
Management/ Institutional preparedness	13
Proactive transition to remote learning	6

Students' constructive attitude was the foremost major sub-theme (19) found in the literature when educational institutions abruptly shifted to remote learning from the traditional face-to-face mode. Given the shift to remote learning due to the global crisis, students in higher education institutions exhibited a constructive attitude towards online learning modality (Unger & Meiran, 2020; Syauqui, et al., 2020; Pasaribu & Dewi, 2020; Smith, 2020; Allo, 2020). Undergraduate students did not exhibit resistance to a distance learning environment and did not have difficulties accessing online learning (Unger & Meiran, 2020; Syauqui, et al., 2020). Moreover, university students were observed to be more articulate with their feelings and opinions through various online resources and reported general satisfaction with online transition (Pasaribu & Dewi, 2020; Smith, 2020; Allo, 2020). High school students, on the other hand, favored attending school over the remote learning modality which compelled them to stay at home due to the pandemic (Yates, et al., 2020).

Teachers' preparedness, on the other hand, came second (13). Prospective teachers exhibited good tech skills to engage in online learning activities and had the necessary technological tools to facilitate online interactions (Mulenga & Marban, 2020). Lecturers in universities possessed intermediate digital proficiency which meant that they were able to use a range of applications effectively (Pete & Soko, 2020). Additionally, teachers feel well-equipped to provide remote learning support for pupils but are quite unsatisfied with the quality of their home working environment (Lucas, et al., 2020). It is noteworthy that in terms of teacher preparedness, teachers' ICT competence is an important element in their efforts to adapt to online educational technologies (Wen & Tan, 2020). Teachers who were able to adapt to this new context are becoming online

teachers while navigating new subject positions (Jocuns et al., 2020). Teachers were also successful in carrying out online learning activities and giving student works synchronously or asynchronously depending on school policies (Atmojo & Nugroho, 2020). Teachers across K-12 levels have also demonstrated preparedness to cope with the challenges that go with the shift to remote learning; they have shown pedagogical practices that fit the level of their pupils (Song et al., 2020).

Management of institutional preparedness, as a sub-theme also came second. Critical to the implementation of remote learning is the earning management system (Young & Donovan, 2020; Atmojo & Nugroho, 2020) and the use of resources such as laptops, mobile, and smartphone devices (Pete & Soko, 2020; O'keefe et al., 2020). Ananga (2020) was convinced that e-learning delivery should become an option for higher education so the management had to adopt a macroscopic perspective of overall planning (Song et al., 2020).

Proactive transition to remote learning was exhibited when there was a quick transition to the online form of education due to the onset of the pandemic nature of the COVID19 virus. Teachers and school principals held a proactive attitude and displayed a high degree of psychological adaptation in transitioning to a new pedagogical model, swiftly adjusting their mindsets and proactively facing the challenges (Basilaia & Kvavadze, 2020; Song et al., 2020).

By and large, teachers' preparedness, the management or institutional preparedness, proactive transition to remote learning were subthemes that cut across primary through secondary education and the higher education institutions in their shift to remote learning due to the pandemic.

Impact of Remote Learning

As education institutions struggle to cope with this global crisis, all stakeholders experience the unforeseen impact of remote learning due to the Covid-19 pandemic. Hence, the second theme. The subthemes herein including their frequency of occurrences in literature are shown in Table 3.

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Table 3: Impact of Remote Learning

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Impact of Remote Learning	f
Positive behavioural intention and achievement of learning success	5
Increase in independence and social engagement	5
Maintaining student learning experience	5
Increase in course withdrawal and failure	3
Parent and student satisfaction	3
Resilience of educators	1
Students' self-development and evaluation	1
Unity among stakeholders	1
Development of digital compassion	1
Teacher performance and quality of education	1

Results of the analysis revealed that *positive behavioral intention and achievement of learning success* were some of the major impacts of remote learning. Wilson et al. (2020) argue that the

effectiveness of online learning, student autonomy, and self-regulation, the impact of social connections, and the contextual space in which these variables are present contribute to the overall higher education learning success. Furthermore, students' and instructors' characteristics, internal motivation, infrastructure, and system quality, course and information quality, and the learning environment all had a positive and significant effect on online learning in the context of Islamic Religious Higher Education (Yudiawan et al., 2020). From students' perspectives, their online initiatives enriched capability but required adaptability, flexibility, and resilience (Hodges & Martin, 2020).

Another impact of remote learning is an *increase in independence and social engagement.* The literature shows that online learning has offered the students under discussion with opportunities to exercise learner autonomy and enhance social engagement (Pasaribu & Dewi, 2021). It was also observed that in online environment students work more easily in individual tasks, but not in team works. (Angelova, 2020). Interestingly, students were able to find a "voice" in the online learning environment which they could not in normal classroom interaction; notably, though, there has been an increase in independence and social engagement especially students in higher education than students in middle schools (Jocuns et al., 2020).

Remote learning also had an impact on *maintaining the student learning experience* because of the existence of an operating virtual campus and an online library that made the transition easier (Nogales-Delgado, 2020). The effectiveness of higher education's ability to transition to online platforms while maintaining value within the student learning experience was also noteworthy (Wilson, et al., 2020). Further, access to IT, their parents' engagement, and the type of support received from their schools were important factors that affect pupil engagement level in the primary and secondary levels (Lucas, et al., 2020). The parental engagement was not a factor affecting university students' online learning experience.

On the contrary, remote learning amidst the pandemic resulted in a *decrease in course completion and increase in course withdrawal and failure* as faculty experience teaching a course online did not mitigate the negative effects of moving to virtual instruction (Bird, et al., 2020). Furthermore, the uncertainty generated at all levels might have caused some discouragement, feeling of isolation and this may have affected the students' study process (Nogales-Delgado, 2020). Despite the said negative impact, the analysis revealed *parent and student satisfaction.* Parents of middle school students were generally in favor of the use of the online platform to supplement in-class face-to-face education (Tanık-Önal & Önal, 2020). It was also found that interaction in the online classroom, student motivation, course structure, instructor knowledge, and facilitation–are positively influencing students' perceived learning outcomes and student satisfaction (Baber, 2020). Students also manage to focus better in online lectures (Angelova, 2020).

Other impacts of remote learning include the *resilience of educators* at the elementary, middle, and high school levels (Fackler & Sexton, 2020); *students' self-development and evaluation,* where undergraduate students could self-evaluate the development of their skills using judgment resources (Pasaribu & Dewi, 2021); *unity among stakeholders* wherein governments, schools, social organizations, school committees, parents came to sit together to determine and formulate online learning goals that are in line with a national curriculum based on humanism (Rusi, 2020);

development of digital compassion, as observed in the students' reflective writings (Pasaribu & Dewi. 2021). Finally, the literature reveals that remote learning has impacted *teacher performance and quality of education* most especially the primary school teachers who needed to make many pedagogical adjustments with their pupils (Rusi, 2020).

Challenges in Remote Learning

With the sudden shift of education to remote learning, some challenges were identified by numerous researchers. These challenges as well as their frequency of occurrences in literature are shown in Table 4.

Table 4: Challenges Encountered in Remote Learning

Challenges in Remote Learning	f
Poor Internet connectivity and accessibility issues	29
Lack of social interaction and student engagement	17
Lack of technological resources or devices and/ or poor network infrastructure	13
Lack of training, technical knowledge and online pedagogical competencies	7
Inadequate feedback and assessment strategies/ maintenance of academic integrity	7
Negative attitude and/ or perception	6
Unfavourable home learning environment	5
Lack of practical, laboratory and off-campus activities	3
Deficit in curriculum planning and preparation	3
Inadequate synchronous class time	3
Unsatisfactory national/ institutional support for students	3
Emotional tension and psychological stress	1
High cost of data and internet packages	1
Over exposure to online class	1
Use of maladaptive strategies	1

A thorough analysis showed that across countries, *poor Internet connectivity and accessibility issues* were the most pressing challenge that confronted the delivery of instruction when educational institutions across levels shifted to remote learning due to the pandemic. To mention a few from the review, Pete and Soko (2020) noted that in Ghana, Kenya, and South Africa, there is an alarming substantial digital differentiation in terms of internet accessibility among university lecturers and learners. Similarly, in Pakistan, many undergraduate and graduate students did not have internet access because of technical and economic issues (Adnan & Anwar, 2020). In the US, many families lack broadband access at home and may rely on adults' mobile devices that have limited data plans (Young & Donovan, 2020); while in China, unstable Internet connections are one of the major factors to affect the effectiveness of online classes (He & Xiao, 2020).

The second most pressing challenge was *the lack of social interaction and student engagement.* To note a few, Adnan and Anwar (2020) found that undergraduate and graduate education students in Pakistan underscored the following issues: lack of face-to-face interaction with the instructor, response time, and absence of traditional classroom socialization. In Turkey on the other hand, "[s]tudent participation problems, . . . limited interaction, student disinterest, and frivolity, when

compared to face-to-face education", were among the important findings of Aydin and Erol (2020, p.68). In the US, lack of personal interaction, and overall decreased ability to learn entirely online were identified as challenges to continued academic success (Unger & Meiran, 2020). In South Korea, educators reported unenthusiastic involvement of students, and the learners were merely submitting assignments (Yu & Jee, 2020). Finally, the issue of student engagement has not only been underscored in higher education but also primary and secondary schools (Lusa et al., 2020).

The third challenge was the *lack of technological resources or devices and/ or poor network infrastructure.* Zhang et al. (2020) noted that online teaching in China is constrained by infrastructure. In Pakistan, student participation in online classes is reportedly minimal due to the limited or non-availability of e-devices for all students at home (Noor et al., 2020). Meanwhile, in the Philippines, students were not ready to cope with the paradigm shift based on not having a computer of their own for school works (Ochavillo, 2020). Lack of technological resources, internet, appropriate learning environments, learning opportunities, and appropriate resources for online or distance education are also noted in Turkey (Dayumgac et al., 2020).

Another challenge found in the literature is the *lack of training, technical knowledge, and online pedagogical competencies.* To cite a few, Joshi et al. (2020) note that lack of training, lack of clarity and direction, lack of technical knowledge were evident among educators in India. Unfamiliarity with e-learning is likewise a challenge in Indonesia (Octaberlina & Muslimim, 2020). Lack of knowledge about how to evaluate the learners' knowledge and skills through e-learning is also a challenge observed in Turkey (Korkmaz & Toraman, 2020). In China, the proportion and efficiency of the use of online teaching resources are still rather low since many teachers had no previous experience in online teaching (Zhang et al., 2020).

Inadequate feedback and assessment strategies/ maintenance of academic integrity is another challenge observed across the literature. Concretizing this challenge is the lack of nonverbal communication as an effective communication strategy in classroom discourse (Jocuns et al., 2020); difficulty in providing feedback to students and not being able to reach all the learning outcomes determined for learning (Korkmaz & Toraman, 2020); and lack of institutional provisions for academic integrity management in the context of COVID-19 (Gamage et al., N. 2020).

A negative attitude and/ or perception about remote learning is a challenge that can be attributed to a lack of student motivation, school/university administrators' attitudes, and behaviors towards educators who teach online during the obligatory online education period (Korkmaz & Toraman, 2020). Sadly, some students even perceived that online learning constricted them to a particular style; others even felt that it was a waste of time. (Lau et al., 2020). It can be noted that the widening of education's digital divide may also cause these negative attitudes towards online education (Shraim & Crompton, 2020).

In the literature review, *an unfavorable home learning environment* is likewise seen as a challenge. This is where students' working or studying space is not conducive for learning (Kaisara, & Bwalya, 2020); and disturbance at home is observed (Faize & Nawaz, 2020). Having an unfavorable home learning environment as a challenge has been stressed greatly in primary and secondary pupils (Blagg et al., 2020).

The *lack of practical, laboratory, and off-campus activities* is a challenge that impedes the effectiveness of remote learning (Faize & Nawaz, 2020). The absence of laboratory activities, field visits, and other off-campus engagements (e.g., tours), and the sudden shift to online delivery of lessons may also hamper students' progress (Landicho, 2020).

The deficit in curriculum planning and preparation can be a reason that the teacher managing classes in online learning are still not in line with student expectations (Syauqi et al., 2020). Consequently, *Inadequate synchronous class time* was also observed where most pupils spent less than three hours per day on remote learning activities in the US. (Eivers et al., 2020). Likewise, in Turkey, there was an observable inadequate synchronous /online class count and duration for students' online learning (Aydin & Erol, 2020).

Unsatisfactory national/ institutional support for students is observed among the literature as a challenge since multiple inequalities of rural students make them in a disadvantaged position compared to urban students (Belay, 2020). The pandemic potentially widens the gaps between advantaged and disadvantaged children in their equitable access to quality education (Dawadi et al., 2020). Jones and Sharma (2020) commented that students are deprived of quality education at present because of inadequate preparation by educational institutions for such a mode of teaching.

Other salient challenges that were observed in the literature are *emotional tension and psychological stress,* where students are noted to exhibit some degree of emotional tension and stress, which warranted emotional adjustment (Song et al, 2020); *high-cost data and internet packages* (Noor et al., 2020); *Overexposure to online class* (Jocuns et al., 2020*)* and students' *use of maladaptive strategies* (Munsell et al., 2020).

Coping with the Challenges in Remote Learning

Unfazed by the foregoing challenges encountered by the various institutions which boldly opted to shift to remote learning, they found ways to continue delivering instruction in a fully online modality. Table 5 shows the various ways institutions undertook in braving the challenges they experienced.

Table 5: Coping with Challenges in Remote Learning

Coping with Challenges In Remote Learning	f
Technical resolutions	24
Pedagogical strategies	10
Institutional and management strategies	9
Motivation, competency and skills development	6
Psychological and social support	4

Across the literature, a *technical resolution* is observed to be the most significant practice to cope with the challenges brought about by the shift to remote learning. This includes the following: (1) utilization of various learning and meeting applications and social media platforms (Chukwuemeka et al., 2020; Rini et al, 2020; Romero-Ivanova et al, 2020; Oznacar & Mehtap,

2020), (2) the use of TV and radio education (Belay, 2020; Chukwuemeka et al., 2020), (3) investment in faster internet devices and enhanced network capacity to mitigate the slow internet connection (Ilonga et al. 2020; Ali, 2020), (4) the use of virtual laboratories, remote control labs or video-based laboratories and online simulations (Gamage, et al., 2020), (5) the use of smart tools in teaching (Zayapragassarazan, 2020), (6) continuous strengthening technical infrastructure and (7) determining cyber security strategies (Tosun, 2020).

Several *pedagogical strategies* were also identified by many researchers to help relieve the challenges of remote learning. These approaches can be summarized as follows: (1) integration of research and exploration to increase future teachers' abilities to conduct experiences in their future classrooms (Brown, 2020); (2) utilization of collaborative learning approaches and embracing a team approach to teaching, with a common curriculum at the center (Oznacar & Mehtap, 2020; Pace et al., 2020; Vanourek, 2020), (3) the use offline teaching strategies such as printed teaching materials, modules, textbooks to support the success of online learning (Rusi, 2020), (4) incorporating authentic assessments and personalized learning resources during online classes (Pace, et.al, 2020); (5) formation of students' e-learning circles, initiation of online discussion forums and online mentoring (Zayapragassarazan, 2020) and lastly, (6) the use of seven principles for good online teaching which are (a) encouraging contact between students and faculty, (b) developing reciprocity and cooperation among students, (c) encouraging active learning, (d) giving prompt feedback, (e) emphasizing time on task, (f) communicating high expectations, and (g) respecting diverse talents and ways of learning (Munna & Shaikh, 2020).

The use of effective institutional and management strategies also helped in hurdling the challenges. Some of the strategies highlighted in the literature include re-creating the structure of the regular school day and regular grading practices (Vanourek, 2020), maintaining sustainable academic support and communication, imposing legal resolutions and restructuring, ensuring a sufficient number of qualified personnel for online teaching and non-academic processes (Tosun, 2020), school principals' macroscopic planning and strategizing and school teachers' microscopic viewpoint for teaching practices in K-12 education (Song et al., 2020)

Few other ways of coping with the challenges of remote learning include encouraging teachers across levels of education to maintain *motivation,* and undergo *competency and skills development* in using the online learning system (Young & Donovan, 2020). Finally, providing sustainable psychological and psychosocial support is also another way to cope with the challenges; this can be done using meeting students' social, emotional, and nutritional needs, reaching out to individual students and families regularly, and by providing online mental health services (Vanourek, 2020).

Discussion

This study analyzed available research articles on the shift to remote learning amid the COVID-19 pandemic; a majority of these articles were in the context of higher education (undergraduate education) followed by articles in the context of primary to postsecondary levels. It utilized a modified version of Cooper's literature review framework (1988); the modified framework focused on the following steps: problem formulation, data collection, data appropriateness evaluation,

organization, and presentation of results. In this paper, the role of remote learning in teaching and learning amidst the COVID19 pandemic became clearer across all levels of education, especially the undergraduate level. The four major themes such as 1) concerns about the shift to remote learning, 2) impact of remote learning, 3) challenges in remote learning, and 4) coping with the challenges in remote learning have reflected the experiences of the educational institutions across the globe when they were compelled to shift to remote learning due to the COVID-19 pandemic.

It has been observed that literature whose context was across levels, primary to higher education (with only one case of graduate education), highlighted generic issues such as change of pedagogical approaches (Dawadi et al., 2020) or alternative approaches (Fackler & Sexton, 2020; Nogales-Delgado et al., 2020). Corollary, IT and internet-related concerns have been a common issue in the literature regardless of the education levels and socio-economic status of the countries where the studies were conducted such as in Turkey (Akbulutet al., 2020; Dayumgac et al., M. 2020; Korkmaz & Toraman, 2020), Pakistan (Adnan & Anwar, 2020; Faize & Nawaz, 2020), the Philippines (Moralista & Oducado, 2020; Ochavillo, 2020), Indonesia (Octaberlina & Muslimim, 2020), Malaysia (Chung et al., 2020), Ghana (Demuyakor, 2020), China (He & Xiao, 2020; Jocuns et al., 2020; Zhang et al., 2020), England (Lucas, et al., 2020), Saudi Arabia (O'Keefe et al., 2020), the USA (Smith, 2020; Vanourek, 2020; Young & Donovan, 2020). Likewise, the disparity between the advantaged and disadvantaged students regardless of the education levels and socio-economic status of the countries has also been underscored.

One important reality in the shift to remote learning modality as an emergent response to the pandemic among the primary and secondary and postsecondary educational institutions has been the involvement of parents (Blagg et al., 2020; Eivers et al., 2020; Lucas, et al., 2020; Rusi, 2020; Song et al., 2020). The role of parents in the education of their children has been emphasized because of the children's lesser autonomy compared to undergraduate students.

The shift to remote learning has averted the educational process from discontinuation in almost all educational institutions across the globe. The positive impacts of remote learning significantly surpass its negative bearings. Vaughan et al. (2013) contended that the integration of distance education tools and software platforms functions as a reinforcement to strengthen remote learning experiences and enhance online teaching practices. However, as noted in this study, with these impacts come to the challenges that include the restructuring of programs and curricula, adequacy of teacher competencies, the restrictions on technical and network resources, and the consequences of other elements such as reduced social engagements among learners and teachers.

In this study, other conceivable problems with the shift of the curriculum into a remote learning format are all associated with pedagogical, institutional, and national administration issues vis-à-vis the level of education. Opportunities to explore innovative solutions are available which involve identification of suitable digital learning platforms, designing of effective online curricula and proper planning, scheduling of activities based on the observable learning experiences and outcomes, and continuous strengthening of national and institutional support for online education (Zayapragassarazan, 2020). Finally, all the innovative solutions across all levels of education, from primary to undergraduate and even graduate education, should "institute teaching and learning on the grounds of a pedagogy of care, not on purely didactic and insensitive grounds" (Bozkurt & Sharma, 2020, p.iii).

Conclusion

The inputs presented in this literature review highlight remote learning, whether synchronous or asynchronous, as the most viable option for educational delivery especially in the arrival of the COVID-19 as a global threat. Following the four major themes discovered in this literature review, the study concludes that the national government and education institutions play a great role in maximizing the quality of online education which can be reinforced by affording sustainable support for educators' professional developments for online instruction, more online training for learners and adequate provision for content development, network infrastructure, and multi-media integration. Parental supervision is also very critical in the educational achievement of learners and the overall online learning practice.

Limitations of the Present Literature Review

The literature search for the studies was extensive and systematic using a framework to find as many related studies as possible, and these were sifted through following inclusion and exclusion criteria. Findings were limited to the 102 research articles available at the conduct of the study. The present literature review did not include studies that were conducted about remote learning amid COVID19, from January 2021 until the present time because the authors intended to make a thematic synthesis of the experiences of the various educational institutions across the globe when they inevitably shifted to remote learning due to the pandemic.

Recommendation for Future Research

Another inclusive literature review of relevant research articles that have been published beginning 2021 may be conducted following the literature review framework of the present study to determine how all stakeholders of the teaching and learning process have adjusted during the second year of this crisis. A thematic synthesis literature review of studies focusing on the educational institutions' experiences worldwide published in 2021, the second year of the pandemic, would certainly serve a valuable contribution to the existing literature as it gives a global perspective on how various educational institutions have made substantial adjustments to sustain quality education in the context of remote learning. The literature review may include studies that examined the gradual shift to the face-to-face modality of learning in various countries.

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DEVELOPMENT OF ELECTRONIC ITEM BANK FOR MEASURING THE LEARNING OUTCOMES OF STUDENTS IN UNDERGRADUATE EDUCATION PROGRAMS

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ABSTRACT

The objectives of this research were 1) to develop an electronic item bank for measuring the learning outcomes based on the Thai Qualifications Framework for Higher Education (QTF: HEd) of undergraduate students in education programs and 2) to assess the efficiency of the electronic item bank. The research sample consisted of 1,631, obtained through multi-stage sampling. The statistics used in this research were the following: descriptive statistics, discrimination parameter, difficulty parameter, OUTFIT MNSQ, INFIT MNSQ, Deviance Statistic (G^2), Akaike information criterion (AIC), and EAP reliability. The results of the research were as follows: 1.) The electronic item bank consisted of five components; user management, item management, examination management, evaluation management, and scoring management. The electronic item bank has the mean of item difficulty parameter of 0.069 and the mean of item discrimination parameter of 0.862. The test randomized from the electronic item bank has the outfit MNSQ values ranging from $.75$ to 1.19, and the infit MNSQ values ranged from $.85$ to 1.15. The EAP reliability was 0.707. The structural validity test revealed that the multidimensional approach was a better fit than the composite approach and consecutive approach, respectively. The cut-off score of the learning outcome obtained by analyzing the criterion zone on the Wright map was dichotomous: pass and fail. 2.) The evaluation of the electronic item bank by experts revealed that the overall quality of the system was at the highest level. Additionally, the students were highly satisfied with the system.

Keywords: Thai Qualifications Framework, Multidimensional Item Response Theory, validity and reliability of measurement.

Introduction

The change of global society has affected Thai society. Moreover, Thai society is facing rapidly changing economic, social, political, technological, energy, and environmental situations. As a result, Thailand has built various policies to drive the country forward on par with other countries. In particular, higher education management is considered as a response to solving critical problems and guiding the sustainable development of the nation and the locality by accelerating to strengthen the immunity in the country under the philosophy of sufficiency economy. Additionally, it must promote the development of the country to be able to compete in the ASEAN community and the Global community, which gives importance to the development of people and Thai society for quality. All higher education institutions have to upgrade the quality of their programs, enhance the quality of graduates to be accredited at ASEAN and global levels. Therefore, the Ministry of Education has the policy to reform education by establishing the Thai Qualifications Framework for Higher Education (TQF: HEd) as a framework for the country's qualification system in higher education to help systematically set standards in educational management at every stage by providing opportunities for higher education institutions to organize courses as well as a variety of teaching and learning processes. This is to ensure the quality of graduates who will meet the standard of learning outcomes that are expected to be able to pursue careers with happiness and pride. The satisfaction of graduate users and being a good person in society helps to strengthen and develop the capability of Thailand. (Office of the Higher Education Commission, 2009)

The bachelor's degree in education programs is of greatest importance in raising the quality of teachers which will contribute to education in the development of the country. Because teachers are responsible for providing education for the country's citizens, the country has good citizens as an important force in driving economic and social development affecting the further progress of the country. Currently, it is found that the teacher production system has problems. For instance, the teacher production institutes have very different standards, the curriculum of each institute does not emphasize the integration of new teaching competencies and the respective government agencies that are responsible for examining the quality of curriculum standards of teacher-producing institutions lack rigor and seriousness, etc. (Rohitasthira, 2016). Therefore, the quality of graduate teachers should be measured and evaluated to ensure that they are consistent with the graduate learning outcomes of the Thai Qualifications Framework for Higher Education (TQF: HEd) to ensure the quality of teachers. At present, there are no specific tools to measure and evaluate learning outcomes.

Existing measuring tools are knowledge, which is a form of knowledge test in each subject that can measure learning outcomes in this area very well. The moral and ethical aspect has several tools to measure this for teachers that can be applied. In addition, the measurement of morals and ethics should be depended on observing relevant behavioral expressions to measure more accurately.

Therefore, the researcher does not aim to develop a tool to measure learning outcomes in such areas. However, it aims to develop tools to measure learning outcomes for various skills, including cognitive skills, interpersonal skills and responsibilities, numerical analysis skills, and communication and information technology skills. As previously mentioned, all skills are essential for 21st-century learners that enable students to successfully live in today's world. There should be specific and quality measuring instruments for assessing such skills. Learning management skills is considered a basic competency for the practice of teaching professions. Despite some instruments for evaluation and assessment when students practice teaching in schools to increase the reliability of the measurement and evaluation process, there should be a measurement instrument based on the Thai Qualifications Framework for Higher Education (TQF: HEd) of undergraduate students in education programs and additional standards for assessing these skills. For this reason, the researcher is interested in developing the quality of measurement instruments that provide accurate and useful information. This measuring instrument has psychometric properties in terms of validity, reliability, and good item statistics (Friedenberg, 1995), in which the model for measuring learning outcomes relates to a psychological variable. Variables are typically made up of sub-dimensions or sub-elements and tests that measure latent trait or ability of the test taker to these variables often have a structure of properties within complex variables. This means that test-takers will need more than one ability to answer these tests. Therefore, the multidimensional latent traits are valid and appropriate properties for both analyzing and interpreting the latent trait or ability of the test taker. To conduct a proper analysis, Multidimensional Item Response Theory Model: MIRT Model should be used (Kanjanawasee, 2012).

Nowadays, computers used in examinations are convenient, economical, and quick in conducting tests and collecting data, as well as making the effective management of the examination. The researcher aimed to develop the electronic item bank for measuring the learning outcomes based on the Thai Qualifications Framework for Higher Education (TQF: HEd) of undergraduate students in education programs using computerized testing. The exams of the measurements are stored in the electronic item bank with the management system that can be a source of exam collection and can use the exam systematically. The electronic item bank consisted of items for 4 domains; 1) cognitive skill, 2) interpersonal skill and responsibility, 3) numerical analysis, communication, and information technology skills, and 4) learning management skills. Any associated party was able to access the item bank and acquired a set of items for their educational measurement and evaluation. Accurate measurement and evaluation were crucial for planning and development in education.

Literature Review

Thai Qualification Framework for Higher Education (TQF: HED)

Thai Qualification Framework for Higher Education; TQF: HED is a tool for implementing policies to develop quality and educational management standards as stipulated in the National Education Act. National education standards and higher education standards can be concretely implemented in higher education institutions. The TQF: HED has clear guidelines for curriculum development, a change in teaching methods of teachers, student learning as well as measurement and evaluation of learning outcomes to ensure graduates meet the *academic achievement standards.* It focuses on the standard of graduate learning outcomes to guarantee graduate quality and communicate with relevant agencies and stakeholders to understand and be confident in the graduate process. It also aims to provide qualifications or degrees of any higher education institution in Thailand that is recognized and compared with good higher education institutions both domestically and internationally. (Office of the Higher Education Commission, 2009)

The standards of learning outcomes are set in the bachelor's degrees in education programs which are following the TQF: HED in 6 domains: (Office of the Higher Education Commission, 2009) 1) ethics and moral, 2) knowledge, 3) cognitive skill, 4) interpersonal skill and responsibility, 5) numerical analysis, communication, and information technology skills, and 6) learning management skill.

At present, there is no specific measurement and evaluation tool for measuring the learning outcomes based on the Thai Qualifications Framework for Higher Education (TQF: HEd) of undergraduate students in education programs. This research aims to develop a tool to measure learning outcomes of student teachers in 4 domains; 1) cognitive skill, 2) interpersonal skill and responsibility, 3) numerical analysis, communication, and information technology skill, and 4) learning management skill. Domains 1-3 are essential skills for learners in the 21st century and will enable students to succeed live today. As for learning management skills, it is a primary qualification necessary for practice in teaching professions. Although there are some tools for educational measurement and evaluation, students practice teaching in schools. But to increase the reliability of the measurement and evaluation process, there should be a measurement tool that is consistent with the Thai Qualifications Framework for Higher Education (TQF: HEd) for undergraduate students in education and additional standards for assessing these skills. For this reason, the researcher is interested in developing an electronic item bank to measure learning outcomes according to the Thai Qualifications Framework for Higher Education (TQF: HEd) for undergraduate students in education programs.

When higher education institutions can organize courses as well as a wide range of teaching and learning processes, it can provide students with the standard of the expected learning outcomes.

This will enable students to become qualified graduate teachers which will lead to the development of the quality of education and further development of the country.

Multidimensional Item Response Theory Model: MIRT Model

Multidimensional Item Response Theory (MIRT) is developed in response to today's increasingly complex psychological and educational processes, making assessments more reliable. This theory can explain the relationship between test-takers traits and characteristics of the item. The test-takers traits include more than one ability to estimate parameters of the item and the test-takers. (Reckase, 2009) Therefore, the model used to estimate test takers' latent traits should be a multidimensional item response theory (MIRT Model). There are two types of MIRT models based on the concept of creating a different item.

Adams et al. (1997) define two different types of multidimensionality: between-item multidimensionality and within-item multidimensionality. The between-item multidimensionality occurs when the items are unidimensional, i.e., each item measures a single latent trait and each item is assigned to one and only one dimension. Several combinations of items, which are referred to as subtests or subscales, are designed to measure multiple dimensions, but each item belongs to only one dimension. The within-item multidimensionality occurs when items or a handful of them are multidimensional, i.e., each item is designed to measure simultaneously more than one dimension.
By creating an item structure to measure learning outcomes in this research, the measurement of the traits is relevant to the between-items multidimensionality, that each item only evaluated one trait at a time, but multiple latent traits could influence an individual success. Each influential latent trait was relevant to the other. According to MIRT Model, there is more than 1 latent trait influencing individual success on an item so it can be implied that there are 2 or more examinees' parameters. Therefore, considering the multidimensional ability of the test takers, it should help make them more consistent with the data. When the test taker uses systematically different multidimensional abilities to answer the test item, it correlates with the item difficulty parameter and item discrimination parameter and affects probability in answering the exam correctly. A multidimensional approach should be a better fit for data analysis (Kanjanawasee, 2012). Based on the literature review, MIRT Model should be fit for this research.

The Electronic Item Bank

The electronic item bank in this research is an item banking that has developed computer programs to have the ability to be a source of items collection, to support the management of items collection, and to use the systematic test for the assessment of learning outcomes per the Thai Qualification Framework for Higher Education (TQF: HED) of students in undergraduate education programs. At present, there is no electronic item bank of this kind. The electronic item bank has components that

are consistent with the components of the information system (Angsuchoti, 2019) as follows: 1) Hardware means a computer device used to collect data and process data to create information such as computers. In addition, information systems are stored in the network, which is a link between multiple computers together.; 2) Software is an instruction set or computer programs that are written to operate a computer.; 3) Stored Data is data that is collected in a computer system and will be run for processing by various applications.; 4) Personnel is an information system that will not be able to perform various tasks by itself if there is no one to manage them. The people here are (1) the user is generally the person who uses the information generated by the computer system; (2) The operator is generally the person who brings the information into the computer system, process the data and generate information, and wait for results from the computer system; and (3) the system operator and program developer. The system administrator is responsible for controlling the hardware system. For program developers, including personnel who are responsible for developing various applications to work for the computer, order processing and creating information in various work systems, and so forth.; 5) Procedures tell the user how to use the information from the computer system.

For the development of the electronic item bank in this research, it is the development of computer programs to be used as a data collection source, data processing of exams, quizzes, tests, and assessments for instructors to measure the learning outcomes of students in bachelor's degree in education programs. In addition, instructors can also select a test that matches the objectives of an examination.

The development of the electronic item bank has the same steps as the development of an information system. (Angsuchoti, 2019) as follows: 1) a survey for preliminary information on various issues related to the work system, i.e. the problem analysis, the *definition* of *scope* and requirement of the item bank, the development feasibility, the strategies that will improve the operational efficiency, and the cost estimation.; 2) Demand analysis is a survey of the user needs, usage in each area, the advantages and disadvantages of the current method of work to develop into a logical model.; 3) Detailed design of various parts of the system, including the display of results, data entry, retention processes, operations, and personnel related to the new system by starting the design from the device and computer program technology to be developed.; 4) Information systems development with programs and instruction sets so that the item bank can store the exams into the repository, select the exams from the repository for use, publish the exams, provide information about the exam repository and maintenance of security system of the exam repository.; 5) Procurement of equipment and instruction sets of the system to bring the equipment and components of the system to install and develop the new system of future demands.; 6) Testing the system before putting it into practice.; 7) Installation of the system and having to test the use of the new system to see if it is a function according to the intended purpose and design.; 8) Inspection by specialists bring the developed information system to the experts to evaluate the system.; 9) System

trial with the sample group.; 10) User satisfaction.; 11) Maintenance After the system has been installed and used.

The conceptual framework of the research

Electronic item bank

| Thai Qualification Framework for Higher Education (TQF: |

The quality of items
- discrimination parameters(a)
- difficulty parameters (b)

| Multidimensional Item Response Theory (MIRT) |

The quality of tests
-The index of appropriate item
- EAP reliability
- Construct Validity by using MIRT

| Setting the cut-off |

The efficiency of the electronic item bank:
Before using
- utility
- feasibility
- propriety
- accuracy

After using
- service workability
- user experience
- user interface: visualization
- user interface: design
- user interface: Informative and comprehensible

Figure 1: Research Framework

From the study of learning outcomes according to the National Higher Education Qualifications Framework of students in educational bachelor's degree programs. This makes the researcher interested in developing items and tests that are unique in the assessment of student learning outcomes based on the Thai Qualification Framework for Higher Education (TQF: HED) of undergraduate students in education programs. The quality of items and tests is checked to obtain accuracy, appropriateness, validity, and reliability by applying the Multidimensional Item Response Theory (MIRT) and a cut-off score, which is defined for use in interpreting the tests. Thereafter, the quality of the items and tests is collected in an electronic item bank for learning outcomes under the TQF: HED for undergraduate students in education programs which higher education institutions can use to measure and assess the effectiveness of whether the graduate production has reached the expected quality or not. It can be used as evidence of educational quality assurance and the results obtained from the measurement and assessment can be used to create guidelines for further development of undergraduate students.

Methodology

The researchers employed a quantitative method to develop and evaluate the effectiveness of an electronic item bank for measuring learning outcomes based on the Thai Qualification Framework for Higher Education (TQF: HED) of undergraduate students in education programs. The details are as follows.

Research design

It was considered the components of the developed electronic item bank, the quality of the items collected in the electronic item bank, and the quality of randomized tests from the electronic item bank. In addition, the cut-off scores for the test were set for interpreting learning outcomes under the Thai Qualification Framework for Higher Education (TQF: HED) of students in undergraduate education programs; and to assess the effectiveness of the electronic item bank.

Population

The participants in this research were 20,616 fourth-year undergraduate students for the second semester of the academic year 2019 in 51 autonomous universities or Rajabhat universities. (Source: Office of the Higher Education Commission, 2020)

Sampling is divided into two groups:

The first group was used to check the quality of the items before being stored in the electronic item bank as 4th-year undergraduate students in education programs. The sample size was determined using Yamane's Tables (Yamane, 1976, as cited in Vollakitkasemskul, 2011). Considering the sample size at the 99% confidence level when the discrepancy was 5%, the sample size was 869 people. Therefore, to strengthen the research and consider based on the feasibility of data collection, the researcher applied the scaling of the sample to 1,014 people, which were obtained by multi-stage random sampling.

The second group was used to examine the quality of a randomized test from the electronic item bank and check the quality of the electronic item bank for measuring learning outcomes based on the Thai Qualification Framework for Higher Education (TQF: HED) of 617 fourth-year undergraduate students in education programs. The sample size was determined by applying the sample size criteria of Comrey and Lee. Comrey and Lee (2016) stated that factor analysis should have a sample size of 500, which was very good, and should not be less than 200. Because the sample size was too small, it can lead to high errors and discrepancies in measurement, and low reliability. The sampling was chosen using the multi-stage random method.

Instruments in the research

1. The multiple-choice situational test was used in this research according to the Thai Qualification Framework for Higher Education (TQF: HED) of undergraduate students in education programs, with a score ranging between 0 and 1.

2. The questionnaire was used to check the system of the electronic item bank by the experts and was the rating scale (very strongly agree, strongly agree, agree, strongly disagree, very strongly disagree) with 17 items for evaluating the efficiency of the electronic item bank in 4 areas: utility, feasibility, propriety, and accuracy.

3. The questionnaire was used to assess the undergraduate students' satisfaction with using the electronic item bank system and was the rating scale (very good, good, barely acceptable, poor, very poor) with 15 items, divided into 5 aspects, namely 1) service workability, 2) user experience, 3) user interface: visualization, 4) user interface: design and 5) user interface: informative and comprehensible.

Data Collection

1. The researcher and the experts created items to measure learning outcomes based on the Thai Qualification Framework for Higher Education (TQF: HED) of undergraduate students in education programs that matched the operational definition, consisting of 4 areas: 1) cognitive skills, 2) interpersonal skill and responsibility, 3) numerical analysis, communication, and information technology skills, and 4) learning management skills. There was a total of 8 factors, namely 1) problem-solving ability, 2) intellectual leadership, 3) interpersonal relationships, 4) responsibility, 5) information technology ability, 6) communication ability, 7) learning management ability, and 8) measurement and evaluation of learner ability. It was a multiple-choice situational test, with a score of 0, 1, and a total of 342 items.

2. The created items were taken to check the content validity by experts. The researcher selected only the item with the IOC value between 0.60 – 1.00. Therefore, there were 330 passing items.

3. There was an examination of the quality of each item according to the multidimensional item response theory (MIRT). A total of 10 tests were collected and tested on the first group of 1,014 people, and the concurrent calibration method was used in the measurement.

4. Quality items were selected to be stored in the electronic item bank by considering the discrimination parameter according to the criteria of Baker and Kim (2017), eliminating items with negative discrimination parameters and selecting items with discrimination parameters of 0 or higher, and considering the difficulty parameters. The researcher accepted the items with the difficulty parameter between -3 and +3 as the quality items.

5. The researcher and the computer programmer jointly developed a computer program system, the electronic item bank for measuring learning outcomes according to the Thai Qualification Framework for Higher Education (TQF: HED) of undergraduate students in

education programs. The structure of the electronic item bank has been written, namely the database selection, program selection, security system, and computer programming instructions. There were also the main components in the operation of many computer programs in this structure of the electronic item bank.

6. The quality check of the system of the electronic item bank computer program was conducted by the 5 experts who had opinions on the system in 4 aspects, utility, feasibility, propriety, and accuracy.

7. The qualified items were stored in the electronic exam bank for measuring learning outcomes according to the Thai Qualification Framework for Higher Education (TQF: HED) of undergraduate students in education programs.

8. The system of the electronic item bank has randomly arranged a test of learning outcomes according to the Thai Qualification Framework for Higher Education (TQF: HED) of undergraduate students in education programs. The test contained a total of 78 items for quality checks.

9. The test was taken for a try-out with 617 students in the second group of samples 617 by using computer-based testing to test the quality as follows: 1) Construct validity by using the multidimensional analysis method; 2) The item fit statistics by using OUTFIT Mean Square and INFIT Mean Square; 3) The EAP reliability by using ConQuest program and undergraduate students to assess their satisfaction with using the electronic item bank system.

10. The student's test results were collected to determine the cut-off score by criterion zone on the Wright map from analysis by the ConQuest program.

11. The results of assessments of the students' satisfaction with using the electronic item bank system were collected and analyzed by using descriptive statistics.

Data Analysis

1. The quality of each item was analyzed according to the multidimensional item response theory (MIRT) considering the discriminant parameters and the difficulty parameters by analyzing the data in the R program before putting the item into the electronic item bank.

2. The analysis was done on the data to examine the quality of the test randomly acquired from the electronic item bank by using the ConQuest program.

3. The analysis was done on the data to determine the cut-off score of the learning outcome measurement according to the Thai Qualification Framework for Higher Education (TQF: HED) of undergraduate students in education programs by using the ConQuest program.

4. The analysis was done on the results of the quality assessment of the system of the electronic item bank computer program from experts and the results of the students' satisfaction

assessment for using the electronic item bank using descriptive statistics such as mean and standard deviation.

Research Ethics

The conduct of the research took into account the primary human research ethics, consisting of 3 principles: 1) Respect for the person, 2) Beneficence, and 3) Justice. We have requested permission to conduct a local study from the relevant agencies and ask for cooperation in providing information. We have received consent to participate in the research from the sample and maintained the confidentiality of the sample group.

Results of the research

1. The results of the development of the electronic item bank for measuring learning outcomes according to the Thai Qualifications Framework for Higher Education (TQF: HEd) for undergraduate students in education program consisted of: 1.1 Components of the developed electronic item bank 1.2 The quality of the items collected in the electronic item bank 1.3 The quality of the tests randomly drawn from the electronic item bank and the determination of the cut-off scores of the test as follows:

1.1 Components of the developed electronic item bank:

1.1.1 User management consists of logging in through the user's website and registering the user by dividing the user into two groups: the test taker and the administrator.

1.1.2 Item management consists of a) Managing the details of the item, including information, questions, answers, indicators, components, skills to be measured which the administrator can add, edit, delete or turn off and on the status of the data; b) Conditions are determined in the preparation of the test set, such as taking the test from a random system, taking the test from the custom criteria, taking the test from the test set and ending the acceptance of the test; and c) Test set is a list of available items with test set codes, year of testing, created date, test set name, details of all items in that set, print out, delete, and end the test set as well as being able to add test sets from the system by randomly selecting the items to arrange the test sets according to the conditions, which are: The item was randomly assigned with 3 indicators according to the level of difficulty which the system determined to select in the random type selection box as follows: a) Custom randomization can indicate the number of items with difficult, medium, and easy for each of the 3 items in each indicator; b) Randomly selected from the student's year criteria, they can be chosen from years 1-5.

1.1.3 Examination management consists of a) The process for conducting the test which starts when the test taker presses the button to enter the test. The computer screen shows all 78 items of the test. It is a multiple-choice situational test for the test taker to click on only one of the most correct options. Test takers can change their answers by clicking on the new answer they want after selecting all the answers on each page, click the arrow for next to start the next page, or when

they can't do the item, they can skip that item first and click the arrow for previous to answer that item again. The test takers keep doing the test until they reach the last page by clicking the submit answer button. If the test takers do not select all the answers, the system will show the unselected item and press to select the complete answer and click the resend button. The test time is 1 hour and 30 minutes. The system will automatically display a countdown timer until the timer expires, it will be considered the end of the test or if the test taker completes the test before the specified time, the test can be sent immediately. b) Assessment of the test takers' satisfaction with using the electronic item bank by answering the questionnaire and c)The test report is the part where the test takers can know the test result immediately after the test is completed. The test results are reported as an observed score for each skill and total score, pass/fail assessment results for each skill, and totals in the form of tables and pie charts. The test takers can press to save the test results. When the test results are known, the test is completed.

1.1.4 Evaluation management consists of a) The report of individual examination results showing information on the test sequence, student ID, name, surname, institution, year, grades obtained, time is taken and test scores; b) The report of institutional examination results showing the number of undergraduate students taking the test for each year, the average score of each skill, the average score of each year of each institution; c) The report of the overall examination results of all test takers from all institutions as information about the number of undergraduate students taking the test for each year, the average score for each skill, the average score for each year by showing the comparison results of all institutions that conducted the test; and 4) The results of the questionnaire shows the scores of undergraduate students' satisfaction towards the use of the system, i.e. mean scores and standard deviations.

1.1.5 Scoring management consists of a) managing the test scores of all test takers showing the results of the basic statistical analysis of the test and b) taking the data out of the system to print the test results data of the test takers.

1.2 The quality of the items collected in the electronic item bank was found that there were 279 items, with the items having the discriminant parameters between 0.139 and 2.499. The mean of the discriminant parameters of all items was 0.862 and the difficulty parameters were between -2.827 and +2.688, classified as easy, medium, and difficult items, with the mean of all item's difficulty parameters of 0.069. It was a moderately difficult item and can be classified well as shown in the table.

Table 1: The results of the quality of items based on the multidimensional item response theory (MIRT) for each factor stored in the electronic item bank.

Factors	Discrimination parameters (a)	Difficulty parameters (b) (number of items)			All items
		Easy exams (-3 ≤b<-1)	Medium exams (-1 ≤b<1)	Difficult exams (1 ≤b< 3)	
Problem-solving ability	0.233 - 1.961	-2.309 – (-1.142) (15)	-0.967 – 0.972 (18)	1.110 - 1.912 (17)	50
Intellectual leadership	0.233 – 2.499	-2.031 – (-1.086) (9)	-0.652 – 0.558 (10)	1.013 - 2.027 (9)	28
Interpersonal relationships	0.182 – 2.175	-1.795 - (-1.043) (15)	-0.499 – 0.964 (18)	1.218 - 2.118 (20)	53
Responsibility	0.194 – 2.498	- 2.201 - (-1.139) (7)	-0.907 – 0.765 (7)	1.162 - 2.688 (7)	21
Information technology ability	0.176 – 2.301	- 2.254 - (-1.043) (13)	-0.927 – 0.827 (21)	1.002 - 1.909 (9)	43
Communication ability	0.300 – 2.457	-2.827 - (-1.040) (7)	-0.717 – 0.516 (7)	1.013 - 2.432 (7)	21
Learning management ability	0.174 – 2.135	-1.570 - (-1.126) (9)	-0.829 – 0.395 (15)	1.064 - 1.981 (9)	33
Measurement and evaluation of learner ability	0.139 – 1.853	-1.985 - (-1.104) (9)	-0.665 – 0.383 (12)	1.115 - 2.233 (9)	30
Total	a average = 0.862	b easy average = -1.535 (84)	b medium average = 0.082 (108)	b difficult average = 1.540 (87)	279

1.3 The quality of the test and the results of the determination of the cut-off scores of the randomized test from the electronic item bank found that:

1.3.1 The results of the structural validity test using multidimensional analysis of the test were analyzed by the competing model. The multidimensional approach, consecutive approach, and composite approach were analyzed based on the coherence of the model with the empirical data by Deviance Statistic (G^2) and Akaike information criterion (AIC) and based on the comparison of harmony between the models by likelihood ratio, which was equal to the difference of G^2 between the models by using the Chi-Square. It can be seen that the test had various statistical values that

showed consistency. The Deviance Statistic (G^2) and Akaike information criterion (AIC) of the multidimensional approach were the lowest compared to the composite approach and consecutive approach. Therefore, it indicated that the model of measuring learning outcomes based on the Thai Qualifications Framework for Higher Education (TQF: HEd) of undergraduate students in education programs was the most suitable for the multidimensional model and when testing the difference of G^2 between the composite and multidimensional approach, and consecutive and multidimensional approach was found that there was a statistically significant difference at the .05 level.

Table 2: Structural validity test

Model	G^2	AIC	n
Composite approach	53794.409	53952.409	79
Consecutive approach	54280.224	54452.224	86
Multidimensional approach	53729.526	53917.526	94
Difference of G2 (Model 1 and 3): $\chi2 = 64.883$, df = 15, $p < .05$			
Difference of G2 (Model 2 and 3): $\chi2 = 550.698$, df = 8, $p < .05$			

      1.3.2 The results of evaluating item fit according to the multidimensional item response theory (MIRT) with 78 items revealed that OUTFIT MNSQ ranged from .75 to 1.19 and INFIT MNSQ ranged from .85 to 1.15.

      1.3.3 The results of the test for the EAP reliability were 0.707. When separated into dimensions, including problem-solving ability, intellectual leadership, interpersonal relationships, responsibility, information technology ability, communication ability, learning management ability, and measurement and evaluation of learner ability, the reliability values were 0.521, 0.548, 0.600, 0.572, 0.531, 0.564, 0.587 and 0.593, respectively.

Table 3: EAP Reliability of the test based on the dimensions

Dimensions	EAP reliability
The whole test (composite approach)	0.707
Problem-solving ability	0.521
intellectual leadership	0.548
interpersonal relationships	0.600
responsibility	0.572
information technology ability	0.531
communication ability	0.564
learning management ability	0.587
measurement and evaluation of learner ability	0.593

      1.3.4 The result of determining the cut-off score by analyzing the criterion zone on the Wright map from the ConQuest program. This research had a Wright map showing the criterion

zone of behavioral levels that indicated learning outcomes based on the Thai Qualifications Framework for Higher Education (TQF: HEd) of undergraduate students in education programs. Each item corresponded to the test construction and contained 1 threshold, which was a point divided into two parts of learning outcomes between pass and fails. The area above the threshold indicated the competency level that had passed while the area below the threshold indicated the competency level that had failed. From the Wright map, it was found as follows: 1) the area of cognitive skills had the cut-off score of 10 and 6 on the problem-solving ability and intellectual leadership respectively; 2) The area of interpersonal skill and responsibility had the cut-off score of 12 and 3 on the interpersonal relationships and responsibility respectively; 3) The area of numerical analysis, communication, and information technology skills had the cut-off score of 4 and 5 on information technology ability and communication ability respectively; 4) The area of learning management skills had the cut-off score of 3 and 4 on learning management ability and measurement and evaluation of learner ability respectively. This showed that undergraduate students with competence in each area passed the criteria when the score was greater than the cut-off score given both factors as shown in Table 4.

Table 4: The average competency level (the cut-off score) and the cut-off score of each factor.

The 4 areas	8 factors (The total score)	The average competency levels (the cut-off score)	The cut-off score
Cognitive skills (full score: 24 points)	Problem-solving ability (15)	0.284	10
	Intellectual leadership (9)	0.180	6
Interpersonal skill and responsibility (full score: 21 points)	Interpersonal relationships (15)	1.189	12
	Responsibility (6)	0.216	3
Numerical analysis, communication, and information technology skills (full score: 15 points)	Information technology ability (9)	-0.286	4
	Communication ability (6)	1.323	5
learning management skills (full score: 18 points)	Learning management ability (9)	-0.355	3
	Measurement and evaluation of learner ability (9)	-0.212	4
The total		**0.292**	

2. The results of the assessment of the efficiency of the electronic item bank were as follows:

2.1 The electronic item bank was evaluated by 5 experts before being fully released. The result revealed that the electronic item bank was highly rated by experts (M= 4.74, SD= 0.41). As seen in Table 5, the table informed expert rating on each domain; 1) utility (M= 4.70, SD= 0.50), 2) feasibility (M= 4.76, SD= 0.40), 3) propriety (M= 4.76, SD= 0.40), and 4) accuracy (M= 4.73, SD= 0.33).

Table 5: The expert rating on the electronic item bank

No.	Description	M	SD	Rating
1.	*Utility*	*4.70*	*0.50*	*Highest*
1.1	Service was designed around users and their needs.	4.80	0.45	Highest
1.2	Service was responsive, reliable, and worth trying.	4.60	0.55	Highest
1.3	Service was useful for the associated party.	4.60	0.55	Highest
1.4	Information from the service was helpful for substantial development in the educational program.	4.80	0.45	Highest
2.	*Feasibility*	*4.76*	*0.40*	*Highest*
2.1	Service was user-friendly and practical.	5.00	0.00	Highest
2.2	Service was acceptable by general standard.	4.80	0.45	Highest
2.3	The testing outcome was correct and reliable.	4.60	0.55	Highest
2.4	Service was accessible and efficient.	4.80	0.45	Highest
2.5	Service was able to correctly measure the learning outcomes of students based on TQF: HEd.	4.60	0.55	Highest
3.	*Propriety*	*4.76*	*0.40*	*Highest*
3.1	Instruction was informative, clear, and concise.	5.00	0.00	Highest
3.2	Several contents in each testing were appropriate.	4.60	0.55	Highest
3.3	The testing period was noticeable and appropriate.	4.80	0.45	Highest
3.4	The user interface was well designed and workable.	4.60	0.55	Highest
3.5	The testing outcome was applicable.	4.80	0.45	Highest
4.	*Accuracy*	*4.73*	*0.33*	*Highest*
4.1	The testing objective was clear.	5.00	0.00	Highest
4.2	The service algorithm worked precisely.	4.80	0.45	Highest
4.3	The testing report was precise according to the examinee's trait.	4.40	0.55	High
	Total rating	*4.74*	*0.41*	*Highest*

2.2 The results of the undergraduate students' satisfaction assessment for using the electronic item bank revealed that they were highly satisfied (M= 4.64, SD= 0.69). As seen in Table 6, the table informed the rating on each domain; 1) service workability (M= 4.69, SD= 0.61), 2) user experience (M= 4.72, SD= 0.62), 3) user interface: visualization (M= 4.51, SD= 0.84), 4) user interface: design (M= 4.63, SD= 0.71), and 5) user interface: informative and comprehensible (M= 4.63, SD= 0.68).

Table 6: The rating on the electronic item bank

No.	Description	M	SD	Rating
1.	*Service workability*	*4.69*	*0.61*	*Highest*
1.1	Tools on the user interface were workable.	4.72	0.58	Highest
1.2	The service algorithm was appropriate.	4.68	0.60	Highest
1.3	Service was responsive and workable.	4.67	0.64	Highest
2.	*User experience*	*4.72*	*0.62*	*Highest*
2.1	Service responsiveness was acceptable.	4.74	0.60	Highest
2.2	The testing period was noticeable.	4.70	0.67	Highest
2.3	The user got a notification if skipped the item.	4.73	0.60	Highest
3.	*User interface: Visualization*	*4.51*	*0.84*	*Highest*
3.1	The homepage was visually appealing.	4.51	0.85	Highest
3.2	The color tone was well balanced.	4.46	0.86	High
3.3	The user interface design was tidy.	4.57	0.80	Highest
4.	*User interface: Design*	*4.63*	*0.71*	*Highest*

No.	Description	M	SD	Rating
4.1	The filling form was well placed.	4.62	0.71	Highest
4.2	Service tools were well placed.	4.63	0.73	Highest
4.3	Several items per page were appropriate.	4.65	0.70	Highest
5.	*User interface: Informative and comprehensible*	*4.63*	*0.68*	*Highest*
5.1	Text and pictures in the user interface were comprehensible.	4.57	0.75	Highest
5.2	Text and pictures in the user interface were legible.	4.63	0.69	Highest
5.3	The testing report was informative, clear, and concise.	4.70	0.61	Highest
	Total rating	*4.64*	*0.69*	*Highest*

The criteria for interpreting the results were as follows: (Wongrattana, 2017)

The average score 1.00-1.49 was useful/possible/appropriate/correct/lowest satisfaction.

The average score 1.50-2.49 was useful/possible/appropriate/correct/low satisfaction.

The average score 2.50-3.49 was useful/possible/appropriate/correct/moderate satisfaction.

The average score 3.50-4.49 was useful/possible/appropriate/correct/high satisfaction.

The average score 4.50-5.00 was useful/possible/appropriate/correct/highest satisfaction.

Discussion

The results of the research were discussed as follows:

1. The development of the electronic item bank for measuring learning outcomes based on the Thai Qualifications Framework for Higher Education (TQF: HEd) of undergraduate students in education programs has a similar process found in a study by Paungsombat and Senarat (2019), developing the item bank for testing and diagnostic programs for problem-solving skills; and Krungkraipetch (2011), developing the item bank and organizing an examination with a computer program. There is a process of creating a test, examining the quality of the test, and selecting a quality item through the criteria collected in the item bank that is made into a database stored on the computer. In addition, the electronic item bank developed by the researcher contains the main components of the computer program following the components of the item bank of Janpla and Wannapiroon (2019). The electronic item bank of this study consists of user management and item management, which helped create items, edit items, and select items by random to arrange test sets according to the different *levels* of difficulty. Therefore, users can select items as needed, which are suitable for use in measuring the skills of students in each year. After completing the management of the item set, users can do both computer-based tests and paper-based tests depending on the user's convenience. If there are no computers, users can print out the tests available in the electronic item bank for paper testing, which is convenient for users. The electronic item bank is managed by logging in to the test via the designated website,

conducting the test, and knowing the results immediately. The system can report the results of individual, institutional, and overall test-takers at all institutions. All test takers' scores are managed and any associated party was able to export needed information from the system. Therefore, it can be seen that the electronic item bank is similar to the development of test item banking on English language substance for Pratomsuksa 4 students by Tangtong (2016), which stores quality items in Google Drive that users can create and edit items, randomly select items based on learning standards and indicators, discrimination parameters and difficulty parameters as well as printing a test that can be selected as needed. Moreover, the number of items available in the item bank for this research is appropriate according to Embretson and Reise (2000). This shows that there is no restriction for several items stored in the electronic item bank, but the items should be item discriminated and difficulty covering all ranges of abilities and there may be at least 100 items. The quality of the items selected by the researcher to be stored in the electronic item bank is consistent with Baker and Kim (2017), criteria of the discrimination parameters, which is the items with the discriminant parameters of 0 or higher selected. The difficulty parameter ranges from -3 to +3 Logic. It can also be seen that the items stored in the item bank are divided into 3 levels of difficulty: 1) Easy Level ($-3 \leq b < -1$) 2), Medium Level ($-1 \leq b < 1$) and 3) Difficult Level ($1 \leq b < 3$). Most of the items are moderate difficulty, but to develop a good item bank, there should be equal or similar items in each difficulty level. However, the development of this item bank is early development. Therefore, the additional item bank can be developed in the future. This is in line with Boonsri, Tangdhanakanond, and Kanjanawasee (2018) for the quality of the learning outcome measurement based on the Thai Qualifications Framework for Higher Education (TQF: HEd) of undergraduate students in education programs. Items were randomly acquired from the item bank to form a test to analyze the quality of the test according to the Multidimensional Item Response Theory (MIRT). The results of the analysis show that the items of OUTFIT MNSQ and INFIT MNSQ meet specified criteria and are consistent with Wright and Masters (1982, as cited in Chianchana, 2009) proposing the use of OUTFIT MNSQ and INFIT MNSQ between .75 and 1.33. Lunz et al. (1990) suggest that the OUTFIT MNSQ and INFIT MNSQ ranges between .60 and 1.50, indicating that the model is appropriate for the item. When examining the structural validity test by the competing model among multidimensional approach, consecutive approach, and composite approach, this reveals that the learning outcome measurement model according to the Thai Qualifications Framework for Higher Education (TQF: HEd) of undergraduate students in education programs is most suitable for the multidimensional approach. The statistical results of the analysis are consistent in the same direction. Therefore, it is sufficient evidence to indicate that the structure of the variables in this research is suitable for the measurement of the multidimensional approach. As for the reliability analysis of the test, it is found that the whole version of the EAP reliability and the reliability value when separated into dimensions. It is consistent with the criteria of Kanjanawasee (2013) who states the criteria

for considering the reliability coefficient of the measuring instruments should not be lower than .50. This indicates that the measurement quality of reliability meets the criteria. To obtain the cut-off score of the measurement, the researcher presents it using the criterion zone on the Wright map. The method for constructing the cut-off score from the criterion zone provides the right interpretation due to analysis according to the Multidimensional Item Response Theory (MIRT).

2. This is an analysis that corresponds to the nature of the multidimensional variables. Thus, it should be helpful for measurement accuracy (Nuansri, 2016) in line with Briggs and Wilson (2003), who explains that if there is statistical evidence to support the method, the measurable trait is multidimensional. As a result, the interpretation of the analysis results is very important. If the measurable traits are multidimensional, then they are analyzed and interpreted as that unidimensional. It is considered an inaccurate, non-representative of the true competent person and will have a significant impact on the process of measurement and assessment that has a high bargaining power or involves decision-making.

3. The importance of evaluating the effectiveness of the electronic item bank for measuring learning outcomes per the Thai Qualifications Framework for Higher Education (TQF: HEd) of undergraduate students in education programs is to check the system quality of the computer program development. In this research, the electronic item bank is evaluated its efficiency by experts before full release. Using Stufflebeam's evaluation model covers 4 domains: 1) utility, 2) feasibility, 3) propriety, and 4) accuracy. This is like Kanjanawasee (2012), which can assess whether the developed system can be used in practice or not, in line with the guidelines of Chaimongkol (2015). There is an evaluation of the quality of the electronic item bank after actual use with students and participants are asked to evaluate their experience with the electronic item bank. The highlight of this evaluation is to know whether the developed electronic item bank can respond to the use of the sample group or not because the results of the assessment will lead to the development of the electronic item bank in the future. (Chin, Diehl, and Norman, 1988; Navas et al., 2007) Therefore, it can be assured that the electronic item bank is of standard quality and can be used practically, that is, the electronic item bank for measuring learning outcomes based on the Thai Qualifications Framework for Higher Education (TQF: HEd) of undergraduate students in education programs is effective.

Implications

1. Educational institutions can use the electronic item bank to measure learning outcomes based on the Thai Qualifications Framework for Higher Education (TQF: HEd) of undergraduate students in education programs. In addition, they can also apply to measure cognitive skills, interpersonal skills and responsibility, numerical analysis, communication,

and information technology skills as well as learning management skills among undergraduate students in other fields to use the information obtained from the measurement and evaluation as a guideline for further student development. The implementation should take into account the availability of computer equipment and the internet network because it is an online test that is accessed through a browser such as the Internet Explorer from the given URL. Therefore, the person who uses the test must be proficient in using computers to facilitate the students who take the test using computers. Moreover, during the test teachers should focus on encouraging students to be attentive to the questions and options and try to do the test to the best of their ability.

2. The test developed in the research can be applied to undergraduate students in education programs from year 1 until year 5. The test applied to students in each year should have a different proportion of difficulty and the difficulty level of the test depends on the measurement objectives. For example, if measuring the exit exam, the difficulty level should be increased or if measuring the student development, the proportion of the difficulty level should be reduced. The developed items have difficulty levels including the easy, medium, and hard levels and those who use the tests can specify the difficulty level of the items as needed to obtain information for use in planning, designing learning management, and organizing additional activities for undergraduate students in education programs on an ongoing basis until students achieve the expected learning outcomes.

Recommendations

1. In further studies, the items in the electronic item bank should be developed into a multimedia computerized to encourage the test takers to be more interested during the test or developed into computerized adaptive testing that can be tested to suit the examinee's ability level.

2. In this research, the test is the multiple-choice situational test and the score ranges between 0 and 1. In future research, another model should be developed. Alternatively, a combination of models may be used to measure learning outcomes according to the Thai Qualifications Framework for Higher Education (TQF: HEd) of undergraduate students in education programs.

3. The development of the electronic item bank based on professional standards and ethics for teachers should be studied or the electronic item bank should be developed that corresponds to the learning outcomes according to the Thai Qualifications Framework for Higher Education (TQF: HEd) of undergraduate students in other programs.

Conclusion

The electronic exam bank, for measuring learning outcomes based on the Thai Qualifications Framework for Higher Education (TQF: HEd) of undergraduate students in education programs, is developed as a source of quality item collection. The quality of the items and the test is examined by applying the Multidimensional Item Response Theory (MIRT). This analytical technique is appropriate for the test structure of the psychological variables so that the validity and reliability of the instruments can provide accurate and useful information. Furthermore, the thing that should be taken into account is the criterion of the test. In this research, after developing the test, the cut-off scores were also set by analyzing the criterion zone on the Wright map from the ConQuest program to be used as the criteria of test to measure learning outcomes based on the Thai Qualifications Framework for Higher Education (TQF: HEd) of undergraduate students in education programs. Furthermore, the electronic item bank is efficient, is suitable, and can be used systematically. Based on user need, the users can select the test and can do both computer-based tests and paper-based tests depending on the user's convenience. In the case of a user who conducts the test using a computer, the test taker can log in to the test system through the designated website, take the test, and know the testing result immediately after testing is done, which makes it convenient and fast. It gives information that reflects the results of the educational management of each institution. The institution is aware of the student teachers' learning outcomes whether they achieve the goals that the curriculum aims for or not. This will lead to the development of students until they become qualified graduate teachers.

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USING MOODLE-BASED E-ASSESSMENT IN ENGLISH LISTENING AND READING COURSES: A VIETNAMESE CASE STUDY

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ABSTRACT

With the advances of technology and the Internet, computer-based assessment (e-assessment) has been in high demand in higher educational institutions (HEIs), especially during the Covid-19 pandemic lockdown, due to the convenience, ease of use, and accuracy. Consequently, this study aims to explore how MOODLE, an open-source learning management system (LMS), is utilized as a means of e-assessment in English reading and listening courses to assist undergraduates of English as a Foreign Language (EFL) and educational teams in HEIs to maintain high levels of students' retention and to reduce the percentage of poor learning performance. The participants were 120 undergraduates and four teachers of six listenings and six reading courses in a public university in Vietnam. The research data was the results of the *pre-test*, *mid-term*, and *final test* on both English listening skills and reading skills recorded in the MOODLE system during the second semester of the academic year 2019-2020. The average scores of *pre-test*, *mid-term*, and *final tests* on each skill were taken and used as the benchmark for measuring listening and reading performance. In addition, a self-report survey was conducted after an experiment to investigate the participants' attitude towards MOODLE-based e-assessment. The experimental results showed that students' listening and reading performance in the *final tests* was higher than that in the *pre-tests* and the participants also had positive attitudes towards e-assessment. Particularly, the average scores of listening skills were 3.82/10.00 (*pre-test*), 4.51/10.00 (*mid-term test*), and 6.00/10.00 (*final test*) while those of reading skills were 4.55/10.00 (*pre-test*), 4.85/10.00 (*mid-term test*), and 5.43/10.00 (*final test*). The analysis results are expected to be a roadmap for e-assessment in teaching English listening and reading skills during the Covid-19 pandemic lockdown to maintain high levels of students' retention and to reduce the percentage of poor learning performance.

Keywords: Institutional research, MOODLE, e-assessment, learning management system, English listening and reading performance development

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Introduction

With the advances in the Internet, technology, and e-learning, computer-based assessment (e-assessment) has increasingly become popular and there is a high demand for it in colleges and universities at all levels. Especially, during the lockdown period of the COVID-19 pandemic, e-assessment provides a unique solution to address the urgent need of monitoring the learning progress of students (Abduh, 2021). E-learning is defined as virtual distance learning using digital devices, such as computers, laptops, tablets, smartphones, and the Internet, which can help learners acquire "new knowledge and skills linked to individual learning goals to improve organizational performance" (Clark & Mayer, 2016). It is a form of interactive learning in which the class material is available online and therefore it facilitates and expands the boundaries both inside and outside the classroom (Á. Tóth & P. Tóth, 2006). The e-learning platform can also provide immediate feedback about the student's learning activities (Berry, 2005; Bajahzer, 2008) which encourages students to reflect their understanding and to attempt to assuring whether their knowledge has improved. Therefore, e-learning has attracted a large community of stakeholders, such as educators, trainers, instructional designers, multimedia technicians, and students (Dong & Li, 2005). E-learning also benefits teachers and students as they can learn independently, access knowledge assets flexibly as well as improve their technical skills, teaching, and learning motivation in terms of flexibility, convenience, ease of access, consistency, interaction, repeatability, student-centered learning, backup support, and low costs. Moreover, e-learning encourages students for self-directed learning and educational teams for updating the curriculum (Elzainy et al., 2020).

In e-learning systems, learners can access course materials in various formats such as texts, images, and sounds, as well as interact with teachers and/or classmates, via message boards, forums, chats, video-conference or other types of communication tools (Clark & Mayer, 2016). For pedagogical purposes, e-learning facilitates registering, monitoring, and evaluating activities of students and teachers, and course contents' management via the Internet. Various kinds of e-learning platforms, such as Moodle, Canvas, Blackboard, and Desire2Learn have become key components in implementing technology in pedagogy (AlJarrah, Thomas & Shehab, 2018; Elfeky et al., 2020). Some of them are commercial e-learning platforms like Blackboard and others are open-source platforms like MOODLE. However, technology alone is not enough, instead, technology should be used effectively to support pedagogy goals and to improve the quality of the learning process (Cohen & Sasson, 2016). To choose "which" platform fits the context of universities and meets pedagogical purposes well, an e-learning platform must be measured regarding its importance "why?", its implementation "how?", and its benefits "for whom?".

Similarly, electronic assessment (e-assessment) is an end-to-end electronic assessment process, in which information and communication technologies (ICTs) are fully used for the entire assessment process from the testing design, the testing implementation until the response recording and feedback providing (JISC, 2007; Cohen & Sasson, 2016). Compared with face-to-face learning and

paper-based/on-site assessment, e-learning and e-assessment provide more advantages (Khorsandi et al., 2012; Padayachee, 2018; Alruwais et al., 2018; Elzainy et al., 2020; Sánchez-Cabrero, 2021) as they provide constructive and immediate feedback which give more chances for students' self-directing learning, increase students' motivation, and help students improve their learning performance. Especially, e-assessment ensures students make fewer errors when they fill out the answer sheets. They also decrease the need for in-class attendance and hence reduce the costs and difficulties with traveling. E-assessment helps students who live in remote and rural areas learn and assess in their locations. For teachers, direct feedback assists them to identify what knowledge is confusing and solve out before the final exams. E-assessment also helps them keep track of the students' performance and facilitates the tasks of grading a large number of students in a short time. Moreover, e-assessment can randomize the test items which paper tests cannot do. Furthermore, e-assessment assists to minimize the chances of cheating by setting a timer, providing questions in different orders, and making log security facilities available, such as checking identification and password verification.

Importantly, the COVID-19 pandemic outbreak has changed the educational scenario all over the world. In Vietnam, the Ministry of Education and Training (2020) required educational teams in all schools and HEIs to implement e-teaching, e-learning, and e-assessment, especially in the pandemic lockdown period. However, e-learning platforms and e-assessment tools for self-study and self-assessment are not available in many colleges and universities. This study aims to introduce how MOODLE, an open-source learning management system (LMS), is utilized as a means of e-assessment in English listening and reading courses for undergraduate non-major English students studying at a public university in Vietnam. The objective is to assess the effectiveness of MOODLE as a means of e-assessment in English listening and reading courses during the period of the COVID-19 pandemic. We contend that MOODLE system will help HEIs maintain high levels of students' retention in English courses and reduce the percentage of poor learning performance. Within the context of Vietnam during the COVID-19 pandemic lockdown period, the current study aims to answer the following research objectives:

1. To examine if MOODLE is a suitable platform for enhancing English listening and reading performance effectively.
2. To explore if MOODLE is suitable for the e-assessment of English listening and reading skills.
3. To measure how successful MOODLE was in assisting undergraduate students to improve English listening and reading performance.

The remaining paper has been structured as follows. Section 1 introduces the motivations for e-learning and e-assessment. Section 2 provides the context of English teaching and assessment in Vietnam, the literature review of technology-enhanced language learning, MOODLE functions that facilitate e-assessment, and English listening and reading testing. The study's methodology,

conceptual framework, and samples are presented in section 3 and the results of the study are analyzed and discussed in section 4. Practical implications are highlighted in section 5. Finally, the conclusion and possible future research directions are discussed in section 6.

Background and Literature Review

The Context of English Teaching and Assessment in Vietnam

In recent years, 98% of Vietnamese students have majorly learned English at all school levels from kindergartens, primary schools, high schools, colleges, and universities to foreign languages centers nationwide (V. Nguyen, 2003; N. Nguyen, 2017. Hoang (2010) reported that approximately 94% of undergraduates and 92% of graduates studied English as a compulsory subject in their educational curriculum. In 2006, the Ministry of Education and Training required 67% of junior high schools and 86% of senior high schools to have three hours of English study per week. In addition, university students of non-English majors were required to study English for approximately 200 hours over four years (Ton & Pham, 2010) and achieve at least B1 Level Certificate of Foreign Language Proficiency apart from their core program diploma as one of the compulsory graduation requirements (Ministry of Education and Training, 2009). Furthermore, it was found that at least 5% of Vietnamese officers were required to achieve at least a B1 Level Certificate of Foreign Language Proficiency by 2015 and 30% of them obtained this Certificate by 2020 (Prime Minister, 2008). Therefore, the hours of English study per week in primary schools and high schools have effectively increased from three to four since February 2019 (Ministry of Education and Training, 2018).

To meet the learning needs of a diverse population, many English courses, training programs, and testing centers are being developed and offered by thousands of schools, both public and private universities, and foreign languages centers nationwide (V. Nguyen, 2003; N. Nguyen, 2017). Particularly, Dong Thap University (DThU), one of the public universities located in rural areas in Mekong Delta, offers a range of English courses annually and provides a high-quality setup environment for the English teaching and learning process. The increasing number of English enrollments in DThU results is not only due to students' high level of motivation but also to the communicative language teaching methods utilized in the English classrooms. These teaching methods, such as "calling for learner involvement, allowing learners' choice, changing teachers' and students' roles, and breaking down hierarchical barriers in the classrooms" (Larsen-Freeman, 2000) assist students to develop their English competency and commutative skills since many students in English classrooms in Vietnam are highly influenced by English teachers' methodology (Nguyen, 2017). Recently, the traditional classrooms with face-to-face lectures together with the distinctive relationship between teachers-as-superiors and students-as-inferiors have been replaced by student-centered activities in a communicative learning environment (Vu & Peters, 2021).

Interestingly, the number of individuals who take English proficiency has been increasing in DThU every year. Table 1 reports that there is a considerable number of undergraduates who registered for the English Proficiency Tests (EPTs) in the period 2017-2021. For instance, in 2018, the highest number is 4,743; whereas the lowest number is 326 in 2021 due to the COVID-19 pandemic lockdown. The number continuously remains at a high level in 2019 (n=2,646), in 2017 (n=1,823) and in 2020 (n=1,556), respectively.

Table 1. The Number of Official Enrolled Test Takers in the Period 2017-2021

Year	Number of official enrolled test takers	
2017	1823	
2018	4743	
2019	2646	
2020	1556	
2021	326	*Delayed in 4 months by Covid-19*

(Source: Foreign Languages and Informatics Centre, Dong Thap University, Vietnam, June 2021)

However, annually, the average success rate is appropriately medium. Table 2 displays that over the period 2017-2021, although the number of test-takers in 2018 is at the highest position (n=4,743), the number of successful test-takers in 2020 remains in the first place (n=831/1,556, 53.41%). The second and the third positions for the success rate are occupied by the year 2019 (n=1,328/2,646, 50.19%) and by the year of 2017 (n=901/1,823, 49.42%), respectively. The lowest success rate falls to 48.77% (n=159/326) in 2019 and is followed by 48.79% (n=2,314/4,743) in 2018.

Table 2. The Number of Successful Test Takers in the Period 2017-2021

Year	Number of official test takers	Number of successful test takers	Percentage (%)
2017	1823	901	49.42
2018	4743	2314	48.79
2019	2646	1328	50.19
2020	1556	831	53.41
2021	326	159	48.77

(Source: Foreign Languages and Informatics Centre, Dong Thap University, Vietnam, June 2021)

In practice, it is found that a large number of students showcase low English proficiency although they passed the general English entrance exams for DThU. In addition, listening and reading skills seem to be hard for students despite the qualified facilities provided by the university, enthusiastic and experienced teachers, and communicative teaching methods. Students' low English listening and reading proficiency level may result from their teacher-dependent learning habits originating from their high schools where English knowledge, such as grammar and structure had gained more attention, rather than English application/competence. Moreover, during high school education, the focus is more on studying for tests and the national high school graduation exams (Hoang, 2010; Nguyen, 2017). Students have very little opportunity to engage in the activities for listening and

reading skills development in the English language classroom which weakens their English listening and reading performance. These engagements are considered important as "the extent to which students are actively involved in a variety of educational activities that are likely to lead to high-quality learning" (Coates, 2005: pp.26) and provoke a high quality of effort in the learning process (Kuh, 2001). The other reason is that classroom time is limited to 30 hours per semester for each skill with a large number of students in each English class, teachers cannot cover the teaching materials or individually help students improve their listening and reading performance. Teachers also have insufficient time to evaluate students' self-study process and help students outside classrooms. Importantly, sample practice tests on listening and reading skills for self-study and self-assessment are found to be absent in DThU.

The Concepts of Assessment and E-Assessment

Assessment is one of the components of the educational process which is considered an effective main tool to evaluate the progress and the effectiveness of courses, curriculum, learning programs learning process as well as educational policies (AIAli, 2021). Assessment is a systematic process for collecting, analyzing, and using information from the outcomes which are measured at the end of the courses/programs by a variety of methods to improve students' learning performance (Darandari, 2017; Akib & Ghafar, 2015) and support students to become self-learners (AIAli, 2021). Assessment and teachers' teaching methods have a strong and important relationship with students' learning styles. Assessment tools and methods engage students in a constructive assessment environment to develop a positive trend towards the evaluation process (AIAli, 2021). Assessment is indispensable for universities since "its application successfully leads to expected goals achievements, such as raising the academic level, developing creativity, and achievement communication between the aspects of the educational process (Azizi, 2018; AIAli, 2021).

Electronic assessment (e-assessment) has been in existence for decades and is increasingly becoming a popular trend in HEIs due to its convenience, ease of use, and accuracy. E-assessment originated with a machine for automatic testing designed by Sidney L. Presses in the 1920s (Skinner, 1958; Alruwais et al., 2018). E-assessment refers to the electronic assessment in which information and communication technologies (ICTs) are used for assessing learners' knowledge and recording their responses via online LMS (JISC, 2007) and to implement the assessment process more effectively and efficiently (Al-Azawei et al., 2019). Marriott (2009) emphasizes that e-assessment can increase learners' motivation showcasing a positive impact on their academic performance. E-assessment has more benefits than traditional assessment methods, such as providing direct feedback, supporting a fast, flexible, and enjoyable environment as well as reducing teachers' time of grading students (Alruwais et al., 2018). However, for pedagogical benefits, e-assessment technologies need to be carefully selected as they need to be linked to appropriate resources, core programs, good quality, and timely feedback (JISC, 2007) and should be aligned with the purposes and objectives of the assessment. They also need to maintain the

features of traditional assessment, such as validity, reliability, fairness, and accessibility (Baker, *et. al.*, 1993; Shute, 2009).

MOODLE Platform and Its Functions for E-Assessment

MOODLE stands for Modular Object-Oriented Dynamic Learning Environment, one of the most user-friendly and flexible open-source LMS enabling users to download, use, modify, and distribute it freely (Sharer, 2003). MOODLE is available free of charge under the terms of the General Public License (GNU) and has no licensing cost. Therefore, MOODLE is accessible to everyone in contrast to commercial software, such as Blackboard (http://www.blackboard.com) and WebCT (http://www.webct.com), for which the licensing fees have been highly increasing (Brandl, 2005). MOODLE constitutes itself as a virtual learning environment where the learning process is completely online to support a collaborative learning environment based on the constructivist pedagogy (Oproiu, 2015). MOODLE also offers integration with the core curriculum, class schedule, registration, and evaluation. As a courseware package and learning system, MOODLE provides several features for conventional classroom instructions, extra work outside classrooms as a delivery system for blended course formats, and/or a single e-learning platform (Brandl, 2005; Coskun & Arslan, 2014). MOODLE is designed to assist educators who want to create high-quality online courses and enables various online interactions between teachers and students. Table 3 presents the activities and modules that can be performed in MOODLE.

Table 3. Activities, Modules, and Tasks in MOODLE Platform

Activity	Module	Tasks
Creation	Database	Building, displaying, searching, and sharing data collection
Organization	Lessons	Uploading, arranging, and accessing materials together with electronic lectures (e-lectures) via SCORM package
Delivery	Assignments	Giving, collecting, evaluating students' works, giving feedback and/or comments together with grades Used for submitting assignments via online text tool and attachments
	SCORM package	Uploading e-lectures
	Workshops	Conducting online (live) meetings via the BigBlueButtonBN tool
Communication	Chats, Forums, News	Exchanging ideas, communicating, adding posts and emailing
Assessment	Quiz	Designing and building quizzes with a variety of item tasks, such as multiple choice, matching, true/false, drag and drop, short answer, and embedded answers. Extracting overall grades and feedback

For assessment and quiz modules, teachers can design and build quizzes by typing new test items and question types, such as multiple-choice, matching, True/False, and embedded answers (Cloze)

directly on MOODLE or by browsing from their computers (Brandl, 2005). For listening tests, teachers can upload and/or embed audio and video files from other websites. Teachers can also create various quizzes and set the test duration, submission deadline, the number of attempts, and feedback and explanation for incorrect answers. Moreover, teachers can retrieve the overall grades of all the tests and the learning process and testing duration of not only the entire class but also every individual student. Furthermore, teachers can extract individual responses and track students' learning process and self-assessment. Therefore, teachers can identify the weak students and know which part and/or knowledge students are still confused about so that they can individually help them. Through the grade export feature, teachers can download the entire assessment results of their classes in Excel documents.

For students, they can do the exams/exercises and receive immediate test scores and feedback without waiting for a long period for marking/evaluation. Students can track and review their mistakes through immediate feedback and/or explanation functions. This feature affects significantly and positively students' learning performance since "blocking students from viewing the questions after submitting the answers or limiting the time to ensure that all students are taking the test at the same time, will restrict the effectiveness of the test as an assessment tool" (Ronles & Braathen, 2002). These tests and exercises can be taken as many times as students want and need (Broskovic, 2014).

According to Bajaahzer (2008, pp.56), indispensable users on MOODLE include administrators, teachers, and students. The essential features, functions, applications, and relationships among these users are displayed in Figure 1.
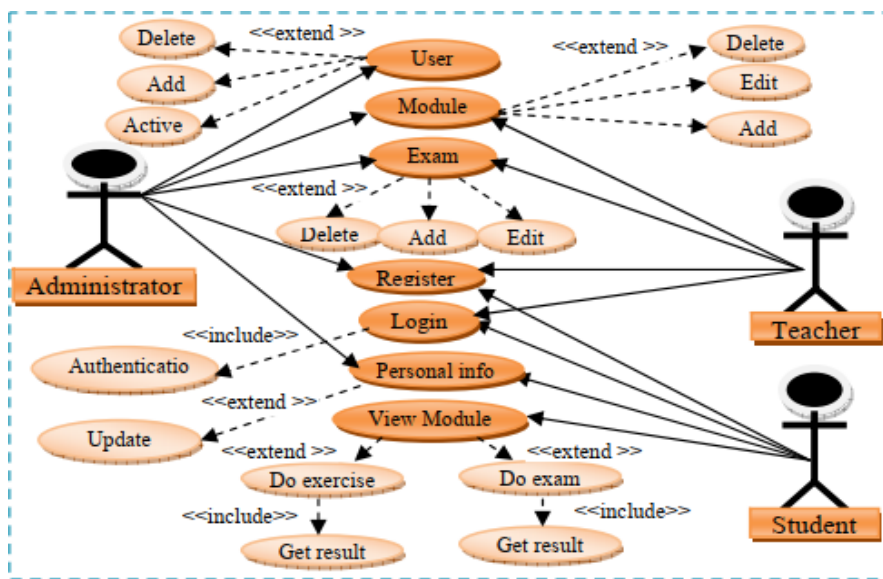
Figure 1. Assessment/Testing Functions for Administrators, Teachers, and Students in MOODLE (Bajaahzer, 2008, pp.56)

Administrators can use all the functions on the system. They can create courses, assign roles for users, add or remove students, teachers, and courses as well as backup data. Teachers can post e-lectures and materials on MOODLE, add questions in the question banks, create quizzes as well as retrieve students' grades/scores. Students log in, do an exam, and get the results and feedback.

Institutional Research in Students' Learning Performance

Institutional research (IR) includes some activities that provide numerical evidence to support institutional planning, policy development, and decision-making within HEIs (Haskell, 2017). Among IR issues, improving students' learning performance is crucial since it affects both individual and organizational performance (Cheng et al., 2020). Usually, students' learning performance should be seriously evaluated since they not only impact students' motivation but also affect teaching quality and shape the design and delivery of university courses (Agrawal et al., 2019). In the work of Cheng et al. (2018), they indicated that poor interest can undermine the learning motivation of students, thereby increasing the risk of dropping out. Many published IR studies focus on assessment for learning (AlAli, 2021; Azizi, 2018; Alruwais et al., 2018; Al-Azawei et al., 2019). Following this trend in IR issues, this study attempts to discover the effectiveness of utilizing MOODLE as a means of e-assessment in English learning performance in HEIs.

Research Gaps

The research gaps are highlighted from the Vietnamese context of teaching English and literature review as follows:

1. English is one of the compulsory subjects in the Vietnamese educational system nationwide (Prime Minister, 2008; Ministry of Education and Training, 2018) and English proficiency e-assessment is a prior solution for the English proficiency testing system in Vietnam (Ministry of Education and Training, 2017). However, the research study on e-assessment with English listening and reading courses in Vietnam is very limited.
2. E-learning and e-assessment are the unique solutions for addressing the urgent need of keeping education in progress (Abduh, 2021) during the COVID-19 pandemic lockdown. Nevertheless, e-learning and e-assessment systems for self-study and self-assessment are absent in Vietnam in general and in DThU in particular.
3. E-learning, a learning management system (LMS), and e-assessment, which provide flexibility for students to have the exams, highly increase students' motivation showcasing a positive impact on their academic performance (Marriott, 2009) and effectively support

educational teams (Alruwais et al., 2018). MOODLE provides several features for conventional classroom instructions, extra work outside classrooms as a delivery system for blended course formats, and/or a single e-learning platform (Brandl, 2005; Coskun & Arslan, 2014). However, the research gap is that most research was carried out with the use of technology and examination for users' perceptions. Therefore, a study on MOODLE-based e-assessment which is linked to pedagogical objectives and specific learning content is needed.

Methodology

Research Design
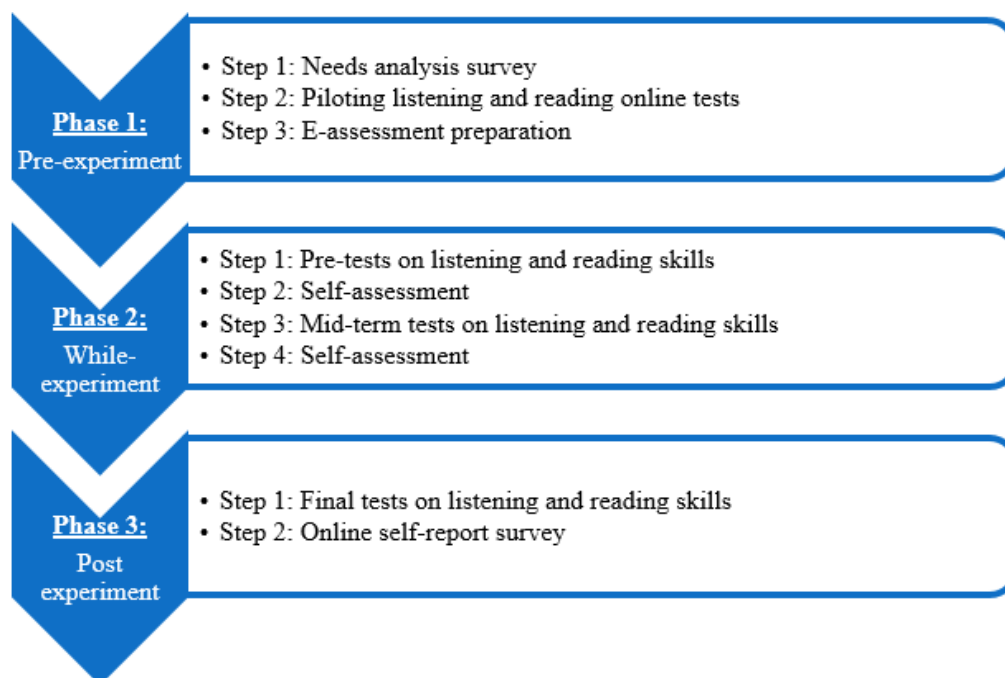
Figure 2. Research Design

This was a descriptive study conducted over 15 weeks during the second semester of the academic year 2019-2020. Figure 2 summarizes the research process mainly based on the background and context of Dong Thap University, Vietnam. The present study includes three phases: Pre-experiment (Phase 1), While-experiment (Phase 2), and Post-experiment (Phase 3).

Phase 1: Pre-experiment consisted of two tasks: needs analysis survey, piloting online tests on listening and reading skills, and e-assessment preparation. This phase aims to:

1. Investigate whether MOODLE is a valid and fair assessment tool,

2. Learn if MOODLE environment is unknown for students and examiners,
3. Measure the validity and reliability of listening and reading tests,
4. Identify whether these tests should be designed either following the school testing framework or only for the skill and knowledge development,
5. Examine whether any necessary preparation should be added; for example, mock tests are necessary or not, supporting technical teams should be offered or not, and whether any technical obstacles should be solved before and during the e-assessment process, and
6. Compare on-site (face-to-face) assessment and online assessment.

- Step 1: A needs analysis survey was used to indicate issues relating to students' needs, students' expectations, and their background for research context of teaching and learning English listening and reading skills at DThU and research design. The survey was also used to determine whether MOODLE environment is unknown for students
- Step 2: Piloting listening and reading online tests on MOODLE was implemented to meet all six purposes in this phase.
- Step 3: E-assessment preparation offers an orientation on MOODLE-based e-assessment and training sessions for how to log in, assess the tests, do and submit the tests, retrieve test grades/results as well as extract feedback, and/or correction on MOODLE for the participants.

Phase 2: While- experiment includes four tasks: pre-tests, self-assessment, mid-term tests, and self-assessment. This phase aims to measure students' behaviors and performance during the online assessment. For example, several attempts on self-assessment tests serve benefits to students as they offer many chances for them to take responsibility for their self-learning process (Cohen, 2016), especially when the students receive immediate feedback during the e-assessment process. This phase also aims to compare the benefits between on-site (face-to-face) and online assessment.

- Step 1 and Step 3: Pre-test and mid-term tests on both listening and reading skills were conducted to measure students' performance.
- Step 2 and Step 4: Self-assessment was implemented for investigating students' behaviors and measuring their self-learning process.

Phase 3: **Post-experiment** comprises two tasks: final tests and an online self-report survey. This phase aims to measure students' listening and reading performance and examines students' and teachers' attitudes towards MOODLE-based e-assessment.

- Step 1: Final tests on listening and reading skills were for benchmarking
- Step 2: Online self-report survey for both teachers and students was delivered to investigate their opinions and attitudes towards MOODLE-based e-assessment.

All three tests: *pre-, mid-term*, and *final tests* in Phase 2 and Phase 3 were administered through MOODLE in the computer rooms with recorded cameras under the teachers' observations. The allotted time for each listening test was 30 minutes and for each reading, the test was 60 minutes. Students were not allowed to use dictionaries, smartphones, or any online support during these tests. The average scores of *pre-test, mid-term*, and *final tests* on each skill were recorded on MOODLE and were then retrieved and used as the benchmark for measuring students' listening and reading performance after the experiment.

Sample

The MOODLE-based e-assessment for self-assessment data set had four English teachers and 145 non-English major students who enrolled in six English listening courses and six English reading courses of Foreign Languages and Informatics Center (FLIC) at Dong Thap University (DThU), Vietnam. This data set was collected during the second semester of the academic year 2019-2020. In total, usable responses were obtained only from 120 undergraduate participants, resulting in a return rate of 82.8%. The students' majors were Literature (n=10, 8.3%) Business (n=16, 13.3%), Accounting (n=8, 6.7%), Chinese (n=15, 12.5%), Political Science (n=5, 4.2%), Physical Education (n=4, 3.3%), Geography (n=4, 3.3%), History n=3, 2.5%), Pre-school Education (n=27, 22.5%), Information Technology (n=12, 10%), and Primary Education (n=16, 13.3%). Data of 25 students were not included as they dropped out or were suspended before this study was conducted. The purposes and procedure of the study were clarified to the participating students and teachers, and their permission was obtained. Students' identities will not be disclosed for ethical reasons. The confidentiality of the collected information was maintained.

The students were randomly divided into three groups as described in Table 4. The participants in the three groups were different among Phase 1, Phase 2, and Phase 3 to satisfy reliability requirements for the testing scale.

- Group 1 includes 10 students. This group was assigned for Phase 1 to find the answer to Purposes 1-6 (refer to Section 3.1).
- Group 2 consists of 20 students. This is the preparation group that was also assigned for Phase 1 to double-check if all six purposes were satisfied or not.
- Group 3 comprises 90 students. This is the experimental group which was remained for Phase 3 to conduct, measure, and evaluate students' listening and reading performance through MOODLE.

Table 4. Student participants assigned in Phase 1 and Phase 2

Codes	Group	No of students	Assigned phase	Distribution
L1 → L10	Group 1	10	Phase 1: Pre-experiment	Basic foundation
R1 → R10				
L11 → L30	Group 2	20		Preparation
R11 → R30				
L31→L120	Group 3	90	Phase 2: While-experiment Phase 3: Post-experiment	Experiment
R31→R120				

Notes: L=Listening; R=Reading

Similarly, a total of 1,450 listening test scores and 1,450 reading test scores of 120 undergraduates were extracted on MOODLE. Out of which, 1,200 test scores on each skill were selected for the research sample data since they fulfilled all the test items, yielding a rate of 82.8%. The remaining 250 test scores of each skill (20.8%) which had a high percentage of missing answered items in the ten listening tests and the ten reading tests were excluded in the study.

Table 5. The Total Selective Sample

Sample	Year of study	Number of respondents	%	Number of listening test scores	%	Number of reading test scores	%
Teacher		4	100				
Students	I	10	8.3	100	8.3	100	8.3
	II	37	30.8	370	30.8	370	30.8
	III	58	48.3	580	48.3	580	48.3
	IV	15	12.5	150	12.5	150	12.5
	Total	120	100.0	1,200	100	1,200	100

Table 5 reports a total selective sample including respondents' rates and the rates of test scores in both listening and reading tests. The data was collected from four levels of the university timeline. 8.3% (n=10) of the respondents were first-year students, 30.8% (n=37) were second-year students, 48.3% (n=58) were third-year students, and 12.5% were fourth-year students (n=15). Table 5 also shows that the student's test scores for both skills were the highest from the third-year students (48.3%, n=580), and the lowest was from the first-year students (8.3%, n=100). The test-scores from second-year students and fourth-year students were 30.8% (n=370) and 12.5% (n=150), respectively.

Data Collection

This study employed two data collection methods. The first method of data collection was the results of ten multiple-choice questions (MCQs) listening tests and ten MCQs reading tests recorded in the MOODLE system during the second semester of the academic year 2019-2020. These tests were selected from the available question banks of the Foreign Languages and Informatics Center

(FLIC) of DthU. These were examined for validity and reliability by experts and uploaded into MOODLE after Phase 1 was completed. These tests were scheduled as a *pre-test*, *self-assessment, mid-term test*, *self-assessment*, and *final test*. The mean values of *pre-test*, *mid-term test*, and *final test* of all 90 participants in Group 3 in Phase 3 were taken for benchmarking.

The second set of data was from the online self-report survey which was conducted with 90 students and four English teachers in Phase 3 via the MOODLE system after the course completion. The estimated time for participants to complete the self-report survey was five minutes. To prevent unauthorized access, participants used their passwords during both the data collection times. The participants completed the questionnaire in either Vietnamese or English, according to their personal preferences. The participants were asked about their opinions towards e-assessment, the difficulties they encountered in working on the MOODLE system, the most useful features of the system, and the benefits of using the MOODLE-based e-assessment on listening and reading skills. Furthermore, participating teachers were asked for their suggestions for improving MOODLE-based e-assessment.

Results

Results of Needs-Analysis Survey
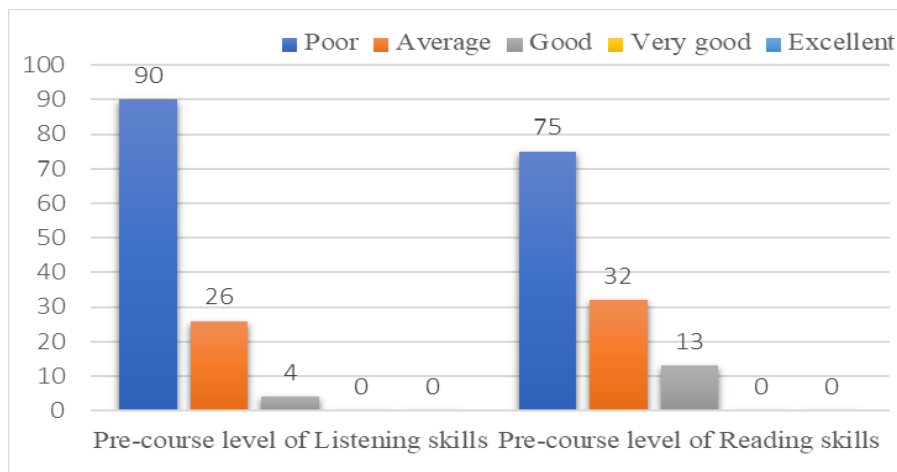
Figure 3: Undergraduates' Pre-Course Level of Listening and Reading Skills

A needs-analysis survey was conducted in the first class for all the 120 participated undergraduates to indicate issues relating to students' needs, students' expectations, and their background for reality (context) research of teaching and learning English listening and reading skills at DThU. The survey was also used to determine whether the students agreed to listening and reading e-assessment or not. The results of the survey showed that all students shared a similar background. In particular, they had learned English in the suburbs and remote areas where the English language was taught at

the basic level. The teaching mainly focused on English grammar and structure for tests, and English listening and reading skills gained less attention. They had never experienced e-assessment and MOODLE-based self-assessment. They passed the general English entrance exams for DThU. Their pre-course level of listening and reading skills was poor. Figure 3 reports that there has been a considerable number of students who obtained low listening and reading level before taking the English listening and English reading courses. Figure 3 also shows that the highest number of students at the *poor* level of pre-course listening skills is 90/120 (75%) and of reading skills is 75/120 (62.5%). The second and the third positions for the pre-course listening (L) and reading (R) skills are occupied by the *average* level (Ln=26/120, 21.7%; Rn=32/120, 26.7%), respectively and by the *good* level (Ln=4/120, 3.3%; Rn=13/120, 10.8%), respectively. None of the students showcased a *very good* and *excellent* level of each of the skills.

In addition, the exposure students had about English learning (i.e., the period of learning English) varied for each student. Figure 4 shows that a maximum number of students have the shortest *<1-month* learning period of English listening and reading skills which is 63 (52.5%) and 36 (30%), respectively. On the contrary, the lowest position remains for the students who have *>6-months* listening learning period (n=3, 2.5%) and of the *4-5 months* reading learning period (n=12, 10%). It was also found that approximately equal number of students have *1-2 months* period of learning listening and reading which is 29 (24.2%) and 30 (25%) respectively. Similarly, an almost equal number of students have *2-3months* of learning period which is 15 (12.5%) and 17 (14.2%), respectively. The *>6-month* reading period belongs to 25 students (20.8%).
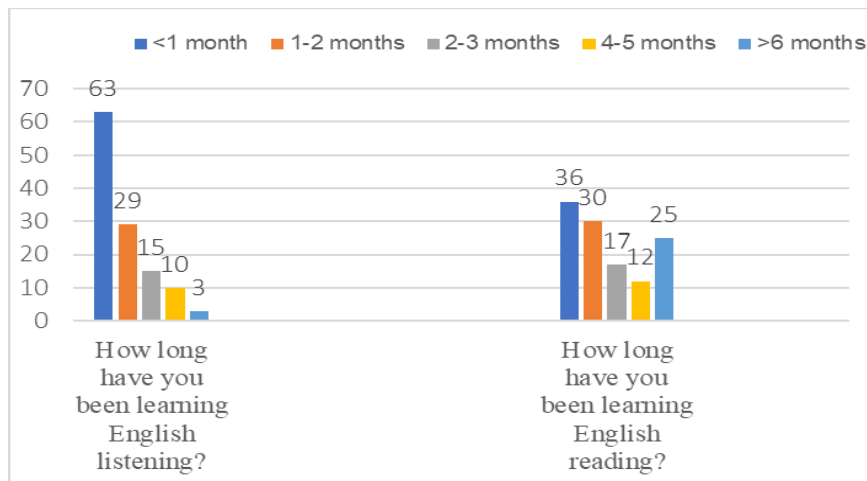
Figure 4: Responses to Learning English Listening and Reading Period
on Needs-Analysis Scale

Results of Testing Scores for Group 1 and Group 2 in Phase 1 (Pre-Experiment)
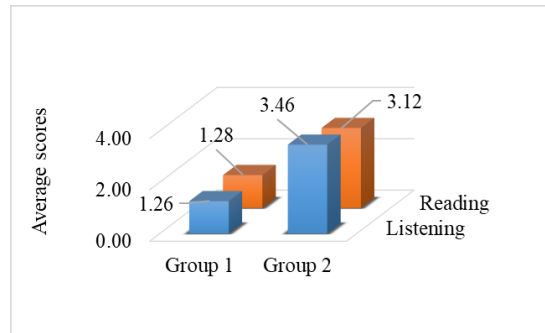
Figure 5: The Listening and Reading Overall Average Scores for Group 1 and Group 2

Figure 5 reports the overall average scores of listening and reading tests for Group 1 and Group 2 in Phase 1. Particularly, the overall average scores of the listening tests for Group 2 and Group 1 were 3.46/10.00 and 1.26, respectively. For reading tests, the overall average scores of Group 2 were 3.12/10.00 and of Group 1 were 1.28/10/00. Group 2 outperformed Group 1.

Figure 6a shows the listening scores and Figure 6b reports the reading scores for each student in Group 1. Considerably, only one student gained the highest score 7.71 for a listening test (LS3) and 4.1 for the reading test (RS3). In all, 70% of students (n=7) received zero scores in the listening test (LS1, LS2, LS4, LS5, LS8, LS9, LS10) and 50% of students (n=5) received zero scores in the reading test (RS1, RS4, RS6, RS8, RS9, RS10). The reasons may be the validity and reliability of listening and reading tests do not meet the testing requirements. Another possibility is that students are unfamiliar with MOODLE system, and/or students are trying to cope with the technical problems. Therefore, after solving all the problems caused in Group 1, the researchers piloted e-assessment with Group 2 to well-prepare qualified conditions for the experiment, to ensure fairness in assessment, and guarantee validity and reliability of MOODLE-based e-assessment.
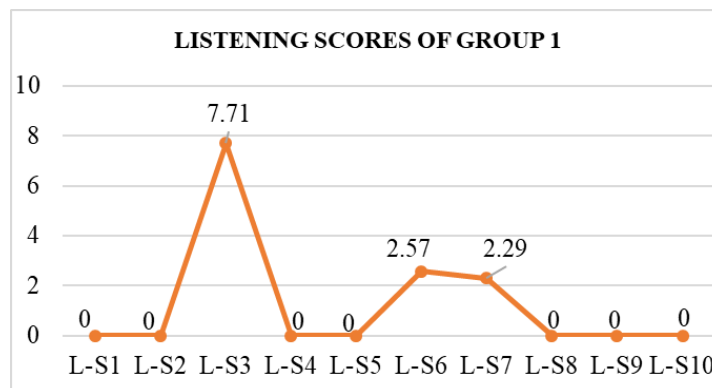
Figure 6a: The Listening Scores for Each Student in Group 1
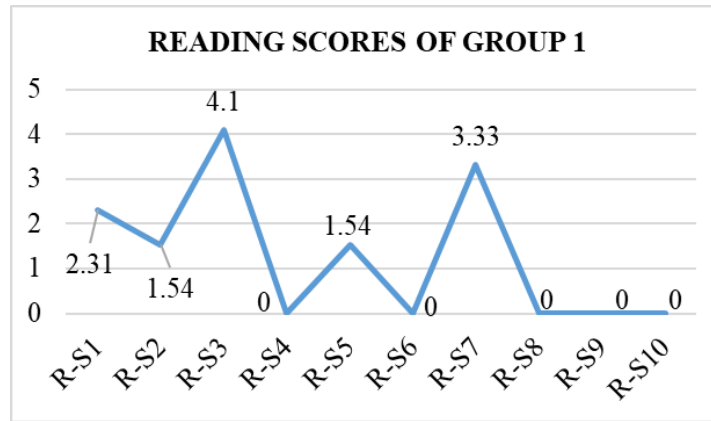
Figure 6b: The Reading Scores for Each Student in Group 1

Figure 7a displays the results of the listening scores of each student in Group 2. The highest score of the listening test was 5.43 for LS27; whereas the lowest score was zero for LS11. The scores of the remaining students were ranging from 1.43 (LS15) to 5.14 (LS28).
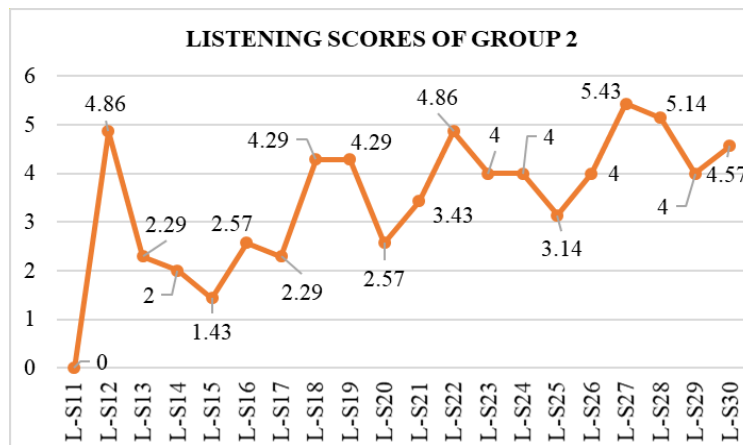
Figure 7a: The Listening Scores for Each Student in Group 2

Figure 7b presents the results of the reading scores of each student in Group 2. The highest score of the reading test was 4.87 for RS21, while the lowest was 0.51 for RS24. The scores of the remaining students were between 2.05 (RS11) and 4.62 (RS14). No student received a zero score for the reading test.
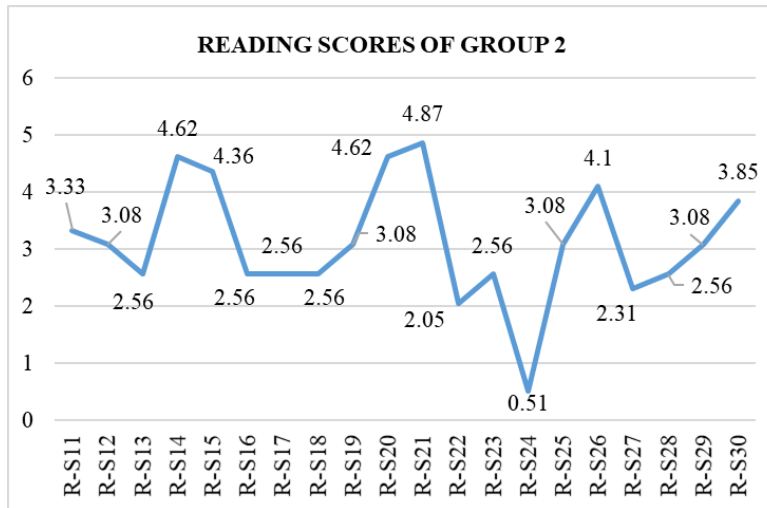
Figure 7b: The Reading Scores for Each Student in Group 2

This step showed that all the problems during the e-assessment in the pre-experiment phase were successfully solved. It also indicates that mock tests are indispensable to prevent lack of adequate experience, log, and submission obstacles when conducting e-assessment. Therefore, the MOODLE-based e-assessment was ready for further experiment with Group 3.

Results of Testing Scores for Group 3 in Phase 2 (While-Experiment) and Phase 3 (Post-Experiment)

Figure 8 below shows the comparative results of English listening and reading *pre-, mid-term*, and *final tests* scores for Group 3. The English listening and reading performance of students' *final tests* is considerably higher than that of the *pre-test* and *mid-term tests*. For instance, the listening average scores were 3.82/10.00 for *pre-test*, 4.51/10.00 for the *mid-term test*, and 6.00/10.00 for the *final test*, whist the reading average scores were 4.55/10.00 for *pre-test*, 4.85/10.00 for *mid-term*, and 5.43/10.00 for the *final test.* It can be concluded that MOODLE-based e-assessment for self-assessment as described above was successfully implemented and was found to be suitable for improving English students' listening and reading performance.

	Pre-test	Mid-term test	Final test
■ Listening	3.82	4.51	6.00
■ Reading	4.55	4.95	5.43
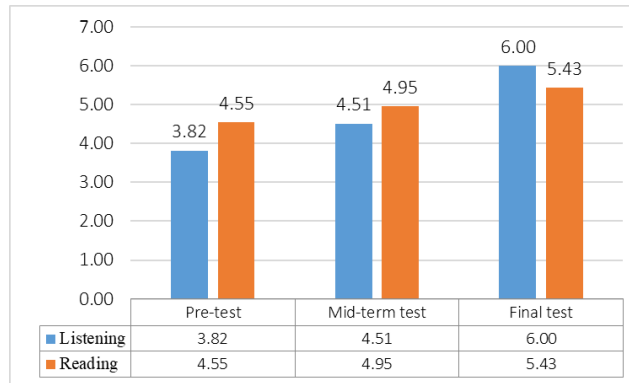
Figure 8: Average Scores of *Pre-, Mid-,* and *Final* Listening and Reading Tests of Group 3

Results of Students' Opinions Towards E-Assessment

Generally, for the opinions about e-assessment, the results of the self-reported survey indicated that 97.8% (n=88) of students preferred e-assessment rather than traditional assessment because e-assessment provided immediate feedback and the test takers do not need to wait for a long grading time.
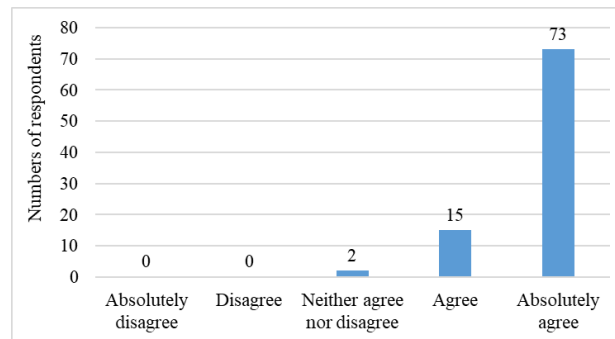
Figure 9: Results of Students' Opinions Towards MOODLE-Based E-Assessment

Figure 9 presents the results of students' opinions towards the use of MOODLE-based e-assessment. In all, 73 out of 90 (81.1%) respondents agreed and 15 out of 90 (16.7%) of them agreed that MOODLE-based e-assessment assisted them to improve their listening and reading performance, while 2 out of 90 (2.2%) students had a neutral response. No one disagreed or disagreed. Therefore, it can be indicated students had positive opinions towards listening and reading tests using the MOODLE system.

Regarding undergraduates' favorite aspects about on MOODLE system, most frequent responses focused on "*I get the grades/marks directly*", "*direct feedback helps me know why I am wrong/which options are correct*", "*I can do the test whenever I am free even in the midnight*", "*I feel that my teachers are beside me*", and "*it's very convenient*". The students appreciated the

conduction of the self-assessment tests which are considered mock tests; for example, *"self-assessment tests and mock tests are helpful for training before the online exam"*. However, when using MOODLE-based e-assessment, the participants also faced problems, such as *"Internet connection"* and *"pictures in listening tests cannot be loaded so I cannot do the test"* in the majority.

Results of Teachers' Opinions Towards E-Assessment

All four teachers had positive opinions towards MOODLE-based e-assessment. All the teachers (100%) agreed that online listening and reading tests on MOODLE helped their students gain a higher level of listening and reading performance. They also mentioned that students' results showed improvement due to three reasons: 1) "MOODLE-based listening and reading tests were convenient to practice freely and independently.", 2) "MOODLE provides immediate scores and feedback which assist students to review lessons well.", and 3) "*The test content and items were integrated with the core curriculum of English listening and reading.*" They also provided suggestions for improving the MOODLE-based e-assessment. The suggestions were that *"More examples, contents, consolidated exercises, review sessions should be added."*, "*More guided instructions were needed.*", and "*Teachers and students should be aware of technical problems and have enough computer skills.*" Their favorites were that they could track the students' performance and conduct assessment analysis to find what knowledge was unclear for students and help them solve out before the final exams. Also, e-assessment could reduce their assessing time for a large number of students. Finally, MOODLE can sort questions and randomly select the difficulty level of the tests which paper tests cannot do.

Discussion

This study successfully experimented with e-assessment on MOODLE system. The experimental results showed that students' listening and reading performance in the *final tests* was higher than that in the *pre-tests.* Particularly, the average scores of listening skills were 3.82/10.00 (*pre-test*), 4.51/10.00 (*mid-term test*), and 6.00/10.00 (*final test*) while those of reading skills were 4.55/10.00 (*pre-test*), 4.85/10.00 (*mid-term test*), and 5.43/10.00 (*final test*). Also, the participants (98.7%) had positive attitudes towards MOODLE-based e-assessment. Results of the e-assessment represented evidence-based high-quality evaluation since these tests scores were retrieved from MOODLE which were totally and immediately graded by computers after students' submission. Students' grades were towards more objective assessment strategies. This minimizes the subjective grading and/or ill-concentrations that may happen during the grading process of paper-based tests.

The results also indicated that MOODLE is a suitable platform for English e-assessment and successfully assisted teachers and students within the context of Vietnam during the COVID-19 pandemic lockdown period. Since MOODLE is an open-source LMS, free of charge, with ease of

use, and pedagogicaurposes, MOODLE can be widely used as a means of e-assessment not only in Vietnam but also in developing countries.

For pedagogical objectives for long terms, compared with in-person or on-site assessment, e-assessment offers more benefits since e-assessment can increase students' motivation and help them enhance their learning performance through constructive and immediate feedback which paper tests do not support. Also, it can help students in remote areas to learn, self-assess, and prepare well for their real tests due to e-assessment's flexibility, validity, and reliability. For teachers, they could track the students' performance and conduct assessment analysis to find what knowledge was unclear for students and help them solve it before the final exams. Also, e-assessment could reduce their assessing time for a large number of students. Importantly, MOODLE-based e-assessment supports question sorts in different orders which minimize students' cheating and random selection for various difficulty levels which satisfy the reliability requirement in assessment. For HEIs, e-assessment can help decrease assessing cost in reduced time to increase numbers of students. Especially, MOODLE-based e-assessment supports HEIs where English for testing is focused. The findings in this study are similar to the results in Ridgway (2004), Gilbert (2011), Khorsandi et al. (2012), Padayachee (2018), Alruwais et al (2018), Ghouali et al (2020), Elzainy et al. (2020), and Sánchez-Cabrero et al. (2021).

However, some problems which were found during this research need to be completely solved before conducting an e-assessment as "ideal assessment was based upon optimal evaluation strategies" (Martin et al., 2019; Elzainy et al., 2020). Therefore, some recommendations are discussed as follows:

- The validity and reliability of e-assessment should be established to assure that students achieve their learning performance fairly since digital assessment environments are unknown for students and limited support from a technician will lead to pressure for students and hence result in inferior grades. Whenever, the digital environment is reliable and safe for students, valid and fair assessment tools can be achieved.
- Mock tests should be offered as a preparation and training tool because any technical problems met during mock tests will be solved efficiently and effectively which will help the e-assessment teams "manage the subsequent exams appropriately" (Gürsul & Keser, 2009; Elzainy et al., 2020).
- Professional training should be offered to e-assessment teams to minimize instructors' ill-preparation for and lack of experience of online exams caused by the sudden shift from face-to-face or on-site assessment into e-assessment (Ilgaz & Adanır, 2020; Sánchez-Cabrero et al., 2021).
- A backup version of the questions with the same difficulty level should be available and prepared for students who face submission problems. The answers should not be

displayed to students after submission until all the test takers have completed their answering and examiners' permission has been gained (Fontanillas et al., 2016; Elzainy et al., 2020).

It can be concluded that the findings in this study contribute to higher education institutions that share similar contexts and backgrounds with Vietnam as a developing country. English is a compulsory subject and is one of the graduation requirements in universities. Here, e-assessment forms one of the key success factors to achieve the undergraduates' learning performance.

Conclusion

The results provide a general framework to better address the roadmap of MOODLE-based e-assessment for self-assessment in teaching English listening and reading skills during the COVID-19 pandemic outbreak. For example, students can use MOODLE to self-assess their English competence and improve listening and reading skills. For teachers, MOODLE can help them to monitor their students' self-assessment duration and learning progress even outside classrooms. Furthermore, HEIs could follow this approach to manage teaching and learning processes to maintain high levels of students retention and reduce the percentage of poor learning performance.

Even though it is admitted that this paper does not provide empirical evidence in depth; however, it can help HEIs maintain high levels of students' retention and reduce the percentage of poor learning performance in English courses.

Although this paper focused on MOODLE functions supporting multiple-choice and embedded questions in listening and reading tests without covering all MOODLE functions, it allows an understanding of MOODLE-based e-assessment and explains the process of using the tool which helps the educators to enhance their students' English listening and reading proficiency.

In the university context, it would be better to develop further research related to MOODLE-based e-assessment not only for English but also for other languages. Future studies can conduct a thorough empirical analysis to validate the ideas discussed in this paper. There is also a need for researchers to analyze big data traced on MOODLE through students' behaviors, habits, performance, students' attempts, test results, and feedback on MOODLE to predict learners who have more difficulties. This big data analysis could play a vital role in online course development based on learners' needs to improve learners' success.

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AN INNOVATIVE FRAMEWORK FOR ONLINE EXAMINATION IN A HIGHER EDUCATION SETTING: A RESPONSE TO THE COVID-19 CRISIS

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ABSTRACT

Adopting modern methods for delivering teaching has been a great topic area of research in Higher education (HE). With the advancement of information and communication technologies towards accomplishing various contemporary demands such as Industry 4.0, online-based education has been explored to a greater extent, however, they are still limited. More recently, due to the coronavirus disease (COVID-19) pandemic, online teaching and assessment have become unprecedentedly mandatory in many HE settings. However, with online technologies, there arise new issues and concerns that impact educational quality. In this paper, we focus on the challenges associated with electronic examinations or online exams in HE and the strategies to address them. Using a design-based research approach we design, implement, and evaluate an innovative framework for online exams within a context of an Australian HE mixed-sector. We conduct an exploratory study on the quality of the process flow of the proposed Online Exam for Bachelor of Information Technology (OEBIT) framework. A triangulation of both qualitative data from focus groups and quantitative data from student outcomes provides the validity of data and confirms the completeness of the results. The successful deployment of our generalized framework with a smooth transition from pen-paper-based examination to online exam during the COVID-19 pandemic demonstrates its real-life application.

Keywords: Online examination, design-based research, DBR, Higher Education, Focus Group, Moodle

Introduction

In Australia, tertiary education has been evolving with high-quality participation and unique structural transformations within both the higher education (HE) and vocational education training (VET) sectors since the Dawkins reforms during the 1980s (Richard, Sarah, and Paula 2017). Over the past decades, the HE sector predominantly formed by universities has established high international rankings (Norton and Cherastidtham 2018). Australia is a strong global competitor for onshore international students (Norton and Cherastidtham 2018). Following the 2008 Review of Australian Higher Education, HE and VET providers overlap with universities becoming dual sectors and many TAFE (technical and further education) institutes are becoming mixed-sectors offering a complementary range of both HE and VET programs (Bradley, et al. 2008) (Wheelahan Leesa, et al. 2012). Today, non-university higher education providers (NUHEPs) have become a significant part of Australian higher education (TEQSA 2019). However, all these NUHEPs need to comply with the same requirements of the TEQSA Threshold Standard regulated by the National Tertiary Education Quality and Standards Agency (TEQSA) since 2012 (TEQSA, Application Guide for Registration in any University Category: new providers, registered Higher Education Providers 2020). National universities in Australia are self-accredited, which means their Higher Education degrees are internally regulated. TEQSA only accredits the institutes. On the other hand, NUHEPs must comply with the requirements of the TEQSA Threshold standard regulated by TEQSA (TEQSA 2020), leaving them with several challenges in meeting the quality standards for HE (Harvey, et al. 2016) (Birmingham 2017). COVID-19 pandemic imposed further constraints and raised issues, requiring a rapid shift to online teaching and assessments. We focus on how the rapid shift from pen-and-paper-based exams to online examinations was successfully implemented in such a NUHEP context by adopting a design-based research (DBR) approach in proposing a practical framework.

In general, COVID-19 had posed additional challenges as the students were deprived of on-campus facilities for teaching and personalized academic support, and were the remote-online alternatives were constrained. The impact of remote-online delivery and student learning in HE programs can be further intensified with online assessments where cheating could be more feasible (Khitam 2019) (Bretag, et al. 2019). Students had become anxious about their final examination where online exams had replaced the more familiar and typical pen-and-paper-based exams. In this study, we first explore the challenges and strategies of building and delivering an online exam during the evolving COVID-19 pandemic faced by a NUHEP institute in Australia. We adopt a combination of qualitative and quantitative methods to study a NUHEP institute delivering both HE and VET programs where one of their challenges for online exams was the inability to access private proctor services that several universities took advantage of (Bradley, et al. 2008, Wheelahan Leesa, et al. 2012). This had led the institute to explore and implement remotely invigilated online exams. While several studies on online exams have been conducted in different countries for many years, they were not directly applicable due to the varying socio-economic, cultural, and structural HE

contexts in Australia. This formed the main motivation in this research work to propose and evaluate a framework for the design and development of online exams for a HE program such as Bachelor of Information Technology (BIT) in the NUHEP institute under this study. The focus of proposing a generalized framework is to preserve academic integrity and to evaluate using a triangulation of qualitative data of focus groups and quantitative data of student outcomes for the continuous improvement and validation of the online exam process.

The key contributions of the paper are threefold: i) firstly, we have explored the challenges faced by a mixed-sector higher education institution (NUHEP institute) during the COVID-19 crisis that is not yet commonly studied, ii) secondly, we have taken a systematic DBR approach in proposing and implementing an innovative Online Exam for the BIT, so we refer the framework as OEBIT framework and iii) thirdly, we have evaluated the outcomes of the OEBIT framework developed and applied within the NUHEP institute while it was going through a mid-semester complete shift to online delivery rapidly. Further, the generic and practical nature of the proposed OEBIT framework is of academic interest due to its generalisability and straightforward adaptability to other similar institutes.

The rest of the paper is organized as follows. Section 2 provides an overview of our research approach that adopts the DBR methodology for the development of the proposed OEBIT framework and the research questions. In Section 3, we describe the OEBIT framework in detail within the context of the NUHEP institute under study. Section 4 presents the evaluation of the OEBIT framework using the outcomes achieved by administering the research questions with a focus group. Finally, Section 5 provides conclusions of the study and future work. All abbreviations are listed in alphabetical order.

Literature Review

Summative assessments are a significant part of academic studies on all levels to evaluate student learning at the end of the instructional unit. Traditional summative assessments are predominantly pen and paper-based, closed-book, invigilated, and strictly time-constrained exams (Williams and Wong 2009).

Ana and Paul have developed an online examination system based on multiple-choice questions (Ana and Bukie 2013). In addition to the shortfalls of the multiple-choice questions as a strategy for summative evaluation, it does not work well for at-home un-proctored online exams. Therefore, there is a need to work on the design of the exam questions, in particular measuring the desired learning outcomes achieved by each student. Bengtsson (Bengtsson 2019) promoted take-home exams as an alternative to traditional exams. However, take-home exams are not recommended due to the huge risk of unethical student behavior. Multiple studies have investigated the use of Moodle quizzes as the formative assessment to improve the instructional design in higher education (Cohen and Sasson 2016). Researchers have studied user authentication as one element of online exams

like biometric techniques (Salameh and Shukur 2015) or artificial intelligence approaches to thwart online exam cheating (Alrubaish, et al. 2019) or automatic question bank generation to effectively assess the students (Awat and Ballera 2018). However, there is a lack of studies that have investigated and proposed all the elements of a comprehensive online examination framework i.e. question design, accessibility, communication, security, scalability, and invigilation.

DBR approach is similar to the action research approach and focuses on practical knowledge and solutions. It offers a collaborative approach that engages academics, researchers, administrators, and subject matter experts in the applied educational environment (McKenney and Reeves 2014). The approach provides a systematic evaluation of the effectiveness of educational artifacts. In the existing literature, most evaluations of educational artifacts are not strictly based on DBR and focus on IT techniques involved in online and mobile technology rather than on the evaluation of processes within a HE setting (Anderson and Shattuck 2012). DBR approach is used to design and develop interventions like learning environment design for productively engaging students (Chandan 2019), secondary school workshops on Artificial Intelligence (Estevez, Garate and Manuel Grana 2019), student feedback system (Chavan and Mitra 2019), or evaluation framework for an online training course for online instructors (Shattuck and Anderson 2013). Using DBR in the educational field is not a novel concept. However, it has not been applied as uniquely in this research work where the focus is to design and develop a process-based framework for online exams for summative assessments within an Australian HE mixed-sector context.

Recently, different digital platforms and online technologies are being used competitively to provide education reaching broader and wider geographical locations through blended learning. These advancements support educational institutes to expand and innovate their teaching activities to offer programs to students beyond the barriers and limitations of physical classrooms. In this context, enforcing educational quality by enforcing the integrity of student assessments is of paramount importance. Different system modeling and research studies to review the student learning and assessment activities have resulted in frameworks for educational decision support systems. In an online exam environment, authentication and managing security during conducting exams are of major concern. Thus, different types of challenges and prospects are been reviewed in (Raman, B, G, Vachharajani, & Nedungadi, 2021; Gamage, Silva, & Gunawardhana, 2020) and multiple discussions have been carried out focusing on the student adoption experience not only at a small scale but also at a large, multi-campus higher educational institution (Raman, B, G, Vachharajani, & Nedungadi, 2021). Different solutions are been proposed to make the online exam procedure secure and authentic. New technologies including blockchain-based online examination schemes and authentication have been proposed and implemented to promote academic integrity and to reduce academically dishonest behaviors (Gamage, Silva, & Gunawardhana, 2020; Zhu & Cao, 2021; Holden, Norris, & Kuhlmeier, 2021). Such approaches are of enormous benefit to the online education environment including our previous proposals for online exam adoption techniques (Fahd, Miah, Ahmed, Venkatraman, & Miao, 2021; Ngqondi, Maoneke, & Mauwa,

2021; Fahd, Venkatraman, Miah, & Ahmed, 2021). This paper advances the research in this direction further in proposing the OEBIT framework.

Methodology

We adopt the DBR approach for our research that focuses on developing, evaluating, and reflecting the OEBIT framework for the design and delivery of online exams. In educational research, there is often a gap between the educational research theory and the practice of teaching. DBR approach, an emerging methodology in the educational sector, addresses the gap by aligning the educational pedagogy with the education practice. DBR allows continuous improvement of the educational assessment framework by comparing practices and outcomes through the iterative process of design, evaluation, and redesign. DBR approach focuses on understating and detailing how and why the designed artifact works practically instead of only examining the working of the artifact (Research Collective Design-Based 2003), which was required in this study.

From various literature, we find that DBR is also known as design experiments, design research, and educational design research (Brown 1992) (Collins, Joseph and Bielaczyc 2004) (Mckenney and Reeves 2013). DBR has become increasingly popular in research in the field of education as it is considered as a research methodology designed 'by and for' educators. DBR is defined as "a systematic but flexible methodology aimed to improve educational practices through iterative analysis, design, development, and implementation, based on collaboration among researchers and practitioners in real-world settings and leading to contextually-sensitive design principles and theories". (Wang and Hannafin 2005)

DBR focuses on purpose-built design experiments to enhance educational practices and resolve educational problems by bridging the gap between theory and practice (Cobb, et al. 2003). In practice, researchers work together with academics to identify educational context problems and solve that real problem using the DBR research approach. DBR approach uses the term 'artifact' to denote the object, activity, or process that is an outcome of the research as a potential solution to address the identified problem.
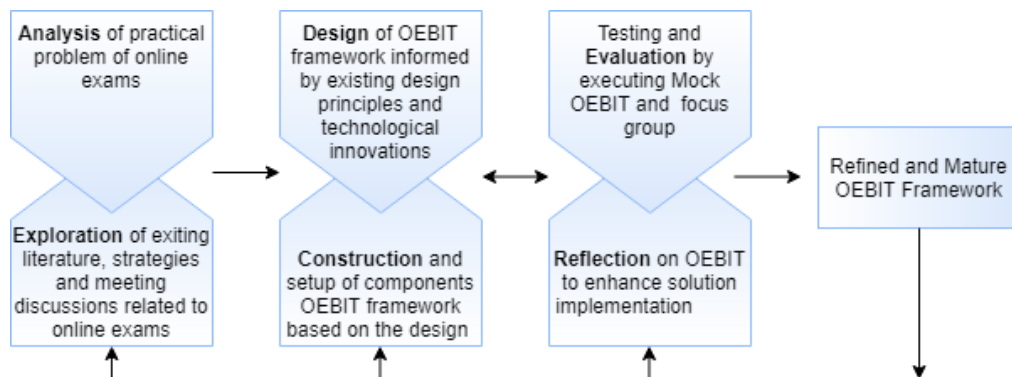

Figure 1: GMDR 3-phased model of DBR Approach for the OEBIT Framework

DBR approach emphasizes the iterative phases of the study analysis, design and development, implementation, and evaluation. To clearly show how this study was positioned within the phases of the DBR approach, it is beneficial to use the 3-phase DBR model the Generic Model for Design Research (GMDR) (Mckenney & Reeves, 2013).

GMDR consists of three main phases adopted for the study as follows:

1. Analysis and exploration – Analysis of problem, explore the options, and set the goal
2. Design and construction – an iterative cycle of design and solution development to reflect the evaluation process.
3. Evaluation and reflection – an iterative cycle of testing, evaluating, refining the solution and reflection by focus group

In this study, the first analysis and exploration phase of GMDR is achieved by: conducting a preliminary literature review; combining findings iteratively to facilitate decision making by key personnel from the teaching team; and collecting other strategies used by other higher education institutions as options to consider. The second phase of GMDR is adopted for the design and construction of the OEBIT framework for the development of an online practice exam using Moodle quiz facility that served as a prototype. The third phase of GMDR is employed to critically review the results of the online practice exam to refine the procedure of the OEBIT framework towards developing and administering the actual online exam for BIT students in the NUHEP institute of the study. Table 1 briefly outlines how the OEBIT framework is developed by mapping with the iterations of the three phases of the GMDR. We also give importance to the final reflection of the OEBIT framework using the single focus group. The participants of the focus group, experts in their fields, are selected based on their extensive research expertise in the field of teaching and learning and real-life experience with different educational systems. The participants of the focus group formed the discussion panel and are also the co-authors of the article. The responses to research questions were administrated by email and online focus group meetings with a clear explanation of the research goal.

The quantitative evaluation is performed on data based on student outcomes i.e. final exams results and attendance. This study has used the probability sampling method where it has given 100% eligible individuals samples as the chance of being chosen for the sample. This study used a heuristic research approach of relying on experts' responses to the research questions which allow achieving a certain degree of reliability and validity as mentioned by (Rapanta, Botturi, Goodyear, Guàrdia, & Koole, 2020). The findings of the study were shared with the focus group participants to validate the findings, called respondent validation adopted from (Nyumba, Wilson, Derrick, & Mukherjee, 2018). Compliance with the policies and procedures ensures the validity and reliability of data across the institute. The reliability and validity of the quantitative data are demonstrated by using the same parameters while comparing the data from different semesters in 2020. Furthermore,

qualitative and quantitative methods triangulation removes the bias and confirms the validity of the results.

The main aim of this research study is to develop, implement and evaluate an innovative OEBIT framework at a NUHEP institute during the COVID-19 crisis. The OEBIT framework is developed to be sufficiently generic that it is adaptable within other contexts of mixed-sector higher education institutions. The research questions considered for this study are:

1. Does the OEBIT framework meet the lecturer and student expectations?
2. Are the OEBIT framework processes sufficient to maintain academic integrity?
3. Does the OEBIT framework impact the design of an exam paper?

Table 1: Mapping of GMDR Phases in Developing the OEBIT framework

Analysis and exploration	Design and construction	Evaluation and reflection
1. Literature review on online exams and challenges. 2. Analyse online exam strategies used by other higher education institutions. 3. Feedback through iterative meetings with key personnel from the administration, management, and teaching teams.	1. Develop a checklist to assure quality and consistency across all online exams 2. Design and setup the online practice exam process 3. Develop and design online practice exams for BIT subjects 4. Apply the OEBIT framework for online practice exams. 5. Use evaluation feedback to make iterative improvements to the design of the final exam. 6. Develop a final online exam following the quality checklist. 7. Design and setup the final online exam process attributes. 8. Develop online exams audited by moderators 9. Apply the OEBIT framework for the final online exam processes.	1. Evaluate the OEBIT framework by adopting it for the online practice exam processes. 2. Conduct statistical analysis of student attendance and performance of the online exam 3. Reflections on the OEBIT framework by the focus group to make ongoing improvement for future online exams

Proposed OEBIT Framework

A traditional pen-paper examination is a summative assessment that is time-constrained and considered as a key determinant of assessing student knowledge and achievement of key learning outcomes of the subject (Venkatraman, 2007). The OEBIT framework is aimed at replacing the traditional pen-and-paper examination process. The OEBIT framework prescribes the management of the remote online examinations to ensure that the quality of the summative assessment adheres to academic policies and standards. The OEBIT is a generalized framework that can be used by other academic institutes for conducting remote online exams.

We describe the methods adopted to develop our proposed generalized OEBIT framework in a NUHEP institute's educational setting for implementing remote online exams. Firstly, the factors considered for developing the framework are listed below:

- Using a familiar Learning Management System (LMS) environment to provide the required security for students and lecturers
- Flexibility in catering to the needs of each subject uniquely
- Enforcing control procedures and quality standards
- Adhering to audit checks
- Enhancing robustness via process flow communications among key components of the framework

The critical components of the OEBIT framework include platform selection, exam structure, exam generation, communication, and proctoring as shown in Figure 2. Some notable features of these components include: making use of Moodle LMS facilities for delivering random question variations, shuffling questions, facilitating students for file uploads, and providing Zoom integration; generating exams that minimize plagiarism by assessing "why" rather than "what"; running practice exams to create familiarity of the online environment for students, provide students an opportunity to check their computer/camera configuration requirements; provide teachers with a test run and an opportunity to improve from any unforeseen pitfalls; running a focus group for sharing ideas and responsibilities; and the setting of proctoring rules such as the creation of small Zoom invigilation groups.
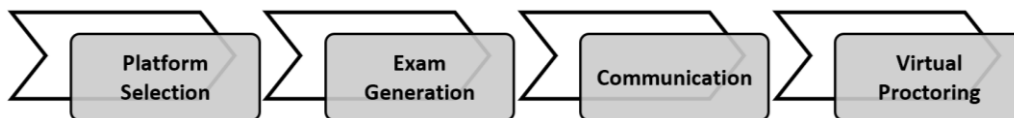
Figure 2: Critical Components of Proposed OEBIT framework

Alruwais et al (Alruwais, Wills, & Wald, 2018) identified the benefits and detriments of having an online assessment from the point of view of educational aims and of different stakeholder entities, including lecturer, student, and institution. In our OEBIT framework, we have not only identified the challenges but also their respective solutions to include the point of view of 5 key stakeholder entities much more comprehensively: lecturer, LMS, student, auditor, and invigilator. Their roles and responsibilities in the OEBIT framework are summarised in Figure 3.
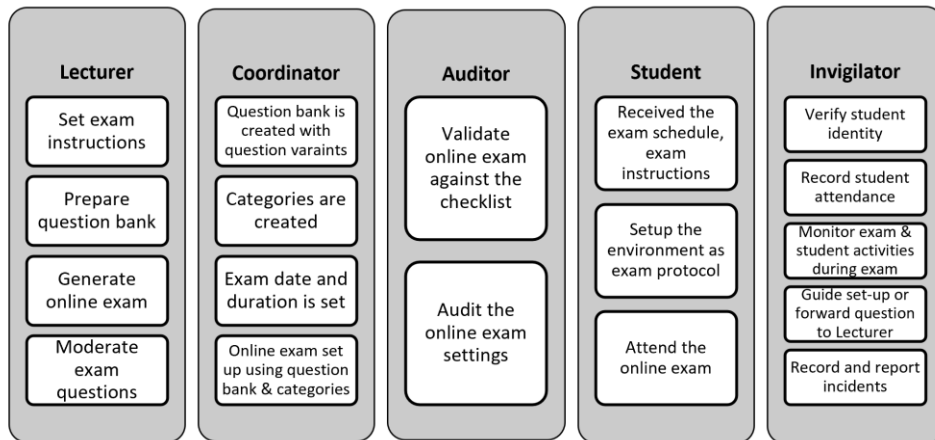
Figure 3: Stakeholder Roles and Responsibilities in OEBIT framework

The Moodle LMS is an existing learning environment familiar to all educators and students of the NUHEP institute and its Quiz facility is employed for developing online exams using the OEBIT framework. Each BIT subject's online exam is embedded in each subject's Moodle shell so only enrolled students of the subject could have access to that exam. To undergo their online exams, the students are required to log in to Moodle with their username and password. After logging in, the students are required to select the scheduled Moodle shell to open the exam link. Students would then proceed to answer the questions one by one in a sequence. Alternately, they could select the question number to answer a particular question directly. When students finish answering the questions, they would click on a submit button to complete their online exam. Invigilators validate the exam submission of the student by verifying through the live student participation link of each exam. Based on the NUHEP context, we considered six out of the eight standards commonly used Online Exam Control Procedures (OECPs) from (Cluskey, Ehlen, & Raiborn, 2011) and these are presented in Figure 4.
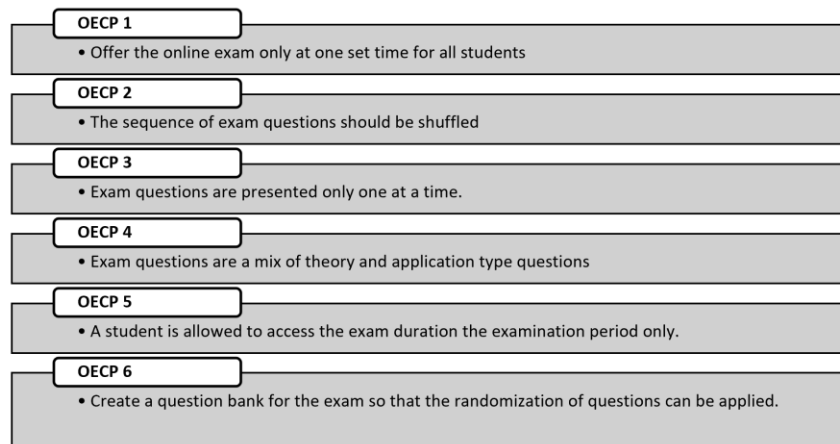
Figure 4: Essential OECPs of the OEBIT framework (adapted from *(Cluskey, Ehlen, & Raiborn, 2011))*

Each online exam based on the OEBIT framework is designed as essay-style Moodle questions that could be attempted only once and completed within a limited period of typically between 2-3 hours as prescribed in the respective Subject Outline. In certain subjects that require students to upload documents as a part of their answer, the exam length would include an additional 30 minutes for uploading their documents during which the students are not allowed to answer questions. All exams are also provided with additional fifteen minutes of reading time. For example, for a 2.5 hour (150 minutes) exam with no documents to upload and that had a start time of 9:15, Moodle timer settings would be set to open at 9:00 am and close at 11:45 am (165 minutes). If that exam required document uploads, the closing time would be set to 12:15 pm (195-minute duration). Students are prohibited from working on their answers during reading time and uploading time which is monitored by the invigilator.

The configuration of each exam setup in Moodle open is flexible to cater to different requirements of the BIT subjects and the "Time Limit" setting determines how long the student is allowed to interact with the exam. This helps the students to be conscious of the time remaining as Moodle displays a countdown clock. Figure 5 illustrates the different configuration setting parameters of a Moodle Quiz based on different BIT subjects' online exam requirements.
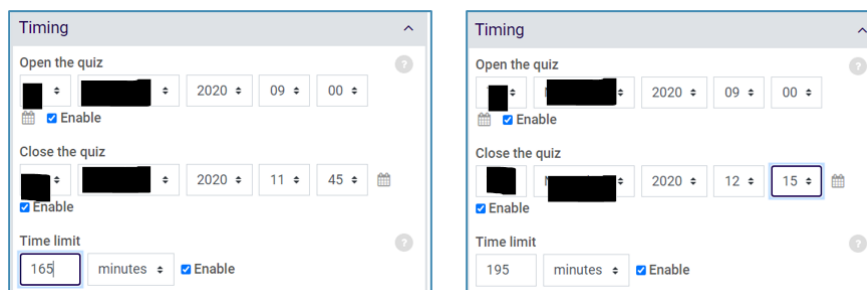
Figure 5: Examples of different Moodle exam configuration settings

As required by the NUHEP institute, the OEBIT framework could cater to unrestricted open book online exams. The framework has processes to check if the design of questions mitigates the ability to answer questions from internet sources. Moodle's configuration to shuffle questions from a minimum of four variants to each question is useful to minimize collusion as each student would get a different exam paper. The design of questions within a question bank is audited and moderated for quality and accuracy.

The OEBIT framework included the preparation of online examination and subject matter with a practice remote-online exam. It is crucial to communicate the format of the examination and details with the students in advance to allow students to clarify any doubts about the exam process. Practice exams are considered a valuable revision strategy by familiarising students with the examination online environment and timing requirements. It is intended that the practice examination boosts confidence and reduces exam anxiety. The preparation and delivery of practice exams also helped in testing and refining the OEBIT framework. The OEBIT framework caters to various communication processes with students via email and SMS related to the exam schedule, exam instructions, online exam protocol, and a detailed set of instructions on how to set up and participate in online exams.

The authors (Prince, Fulton, & Garsombke, 2009) recommended proctoring as the best practice for online exams and the non-accessibility of such professional proctoring tools forms one of the greatest challenges for the OEBIT framework in the NUHEP institute. Though invigilated examinations are generally preferred for course accreditation committees and regulatory bodies, in the Australian context there is no such mandatory requirement for online invigilated exams (Bearman, Dawson, O'Donnell, Tai, & Jorre de St Jorre, 2020; Butler-Henderson & Crawford, 2020; Dawson, 2021). However, adhering to quality assurance and to mitigate academic integrity breaches, the OEBIT framework recommends a separate invigilated Zoom session for every 15-20 students undergoing an online exam. An invigilator was responsible for just one Zoom session to properly manage student authentication and monitoring of the camera view of the student. The invigilation process steps designed in the OEBIT framework are shown in Figure 6.
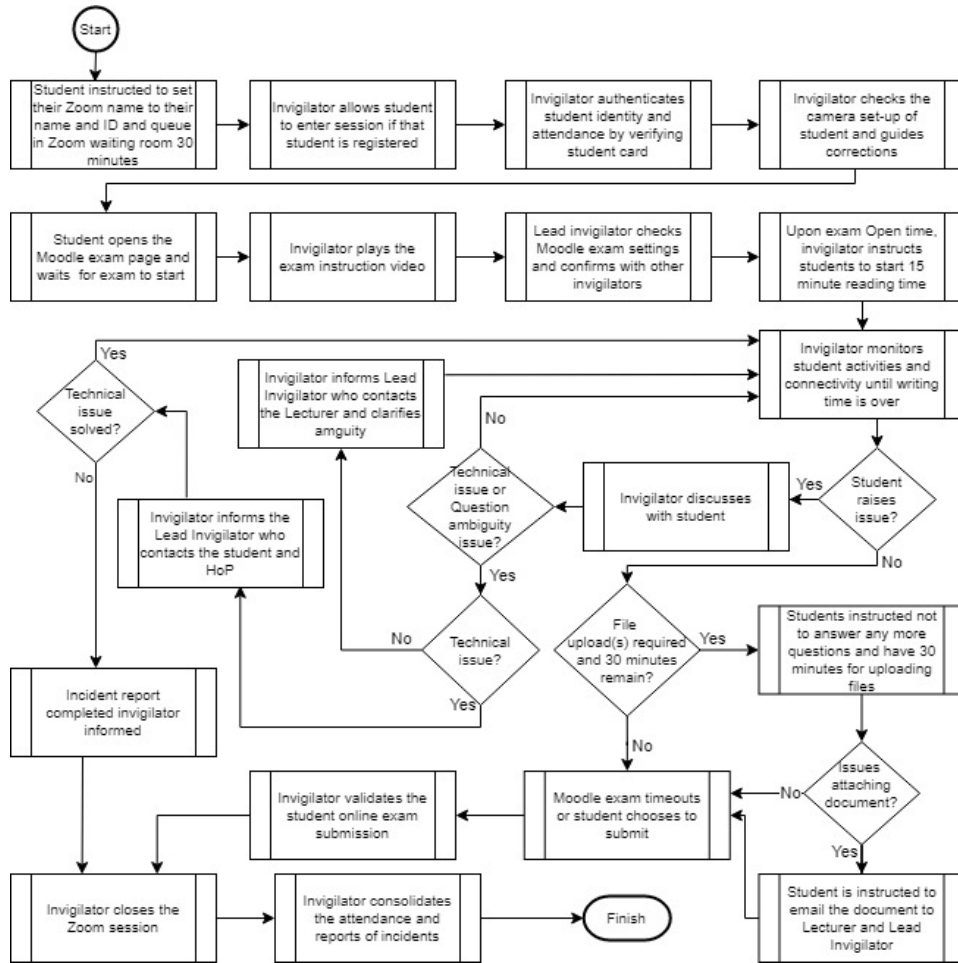
Figure 6: Online exam Invigilation process workflow
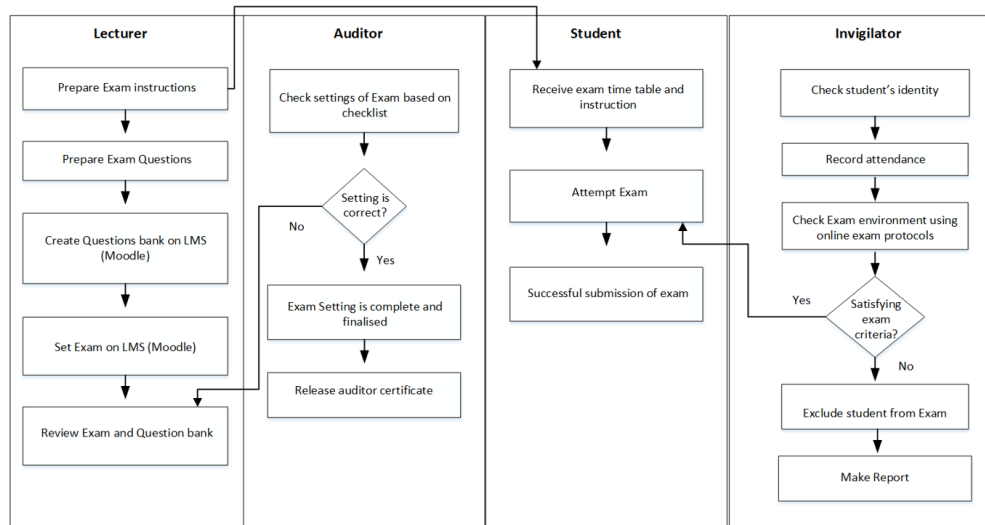
Figure 7: The OEBIT framework workflow

The invigilator performs an identity-check of the student to ensure that the right student is attempting the exam. Students are required to set up their camera to show a side-view that captured themselves and their computer monitor, keyboard, and mouse. Students could inform invigilators about technical issues and could ask invigilators to seek clarification on exam questions from their Lecturers. Students could attend the online exam at home or, if they do not have access to reliable internet at home, from the campus exam venue under the supervision of an on-campus invigilator. Figure 7 shows the interactions between each workflow process of the OEBIT framework for each stakeholder.

This study collected qualitative feedback from the BIT focus group to discuss the effectiveness of the OEBIT framework based on the research questions. The responses of the focus group were useful to analyze the OEBIT processes and to implement improvements subsequently.

Research Findings and Discussion

The application of our OEBIT framework in a NUHEP institute to design and deliver online exams in 2020 during the COVID-19 pandemic was evaluated. The institute had conducted pen-paper-based traditional exams until 2019. The effectiveness of the OEBIT framework was assessed by comparing the outcomes of the online exam versus the pen-paper-based traditional exam. The outcomes were measured based on three indicators: (i) Grade distribution, (ii) Student overall performance, and (iii) Student attendance. The findings of our comparative study are presented below.

Figure 8 shows an overall outcome achieved in 2020 online exams using the OEBIT framework as compared to paper-based exams held for the same subjects in 2019 without the introduction of the framework. Firstly, we observe a well-defined indication that there was a reduction in the failures

(N grade) by 3% with OEBIT adoption in Semester 1 2020, which was further reduced in Semester 2 2020 by 6%. The failure rate slightly increased by 4% in Semester 3 2020, however, more students were able to achieve higher grades in both semesters in 2020. In Semester 1 2020, HD-High Distinction improved by 7% and D-Distinction improved by 3%). The grade distribution displays a much more desired "bell curve" as demonstrated in Figure 8. In Semester 2 2020, the percentage of the higher grades was mostly maintained at par with levels achieved in Semester 1 2020.   The major improvement is demonstrated by a good decrease in the failures (N grade) achieved from 17% in 2019 down to 14% in Semester 1 2020 and further reduced to 8% in Semester 2 2020. These results justify that the use of iterative development of the DBR approach in the continuous update of the framework processes has been effective.
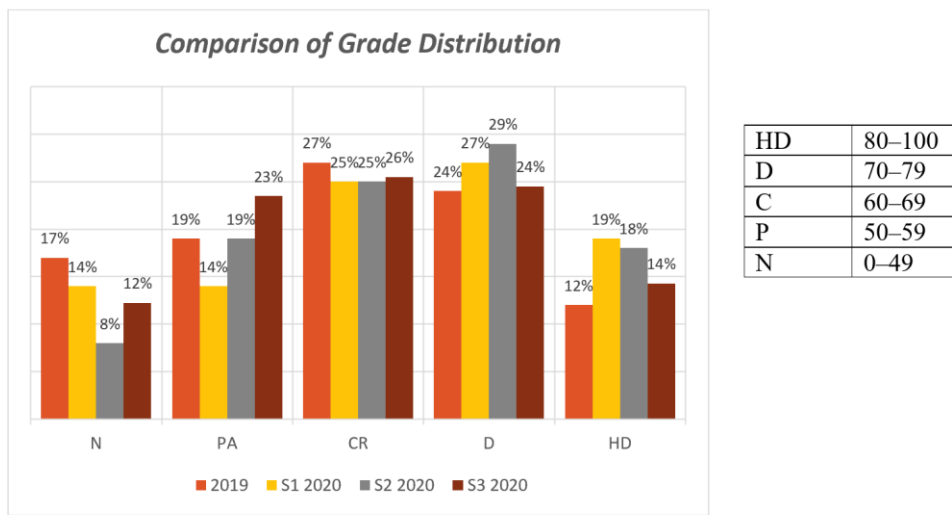
Figure 8: Comparison of Grade distribution

From these measures, there were clear indications that the OEBIT framework had helped to establish similar student outcomes, and comparing the results obtained in the online exam showed even better overall performance than the paper-based exams. The other distinct indication was that students' attendance in the online examination was higher in comparison to previous semesters by 2% in Semester 1 2020 and by 4% in Semester 2 2020 and S3 2020 as shown in Figure 9.

Comparison of Student Participation

Attendance Percentage	
■ 2019	94%
■ S1 2020	96%
■ S2 2020	98%
■ S3 2020	98%

■ 2019   ■ S1 2020   ■ S2 2020   ■ S3 2020
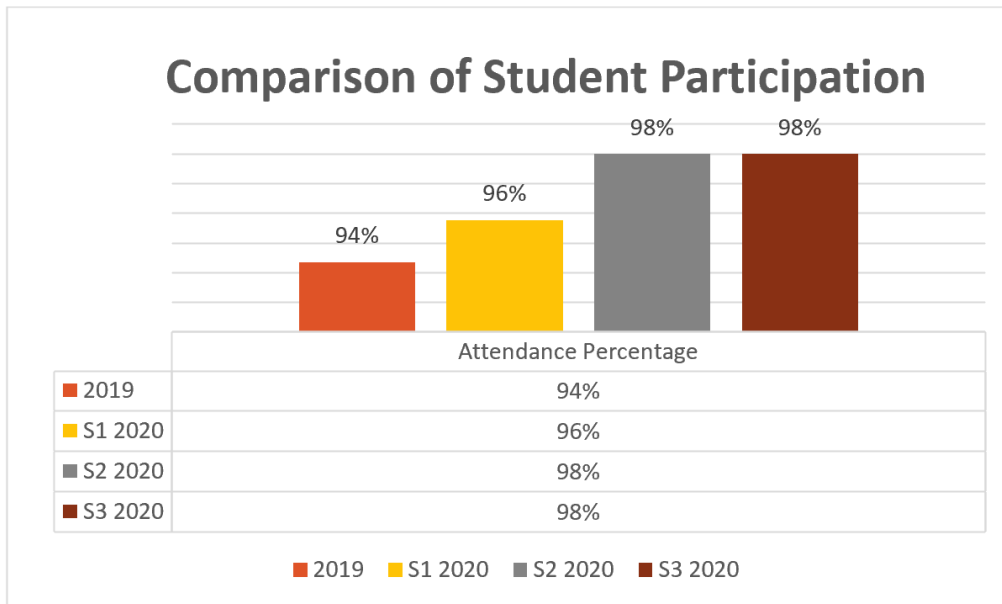
Figure 9: Comparison of student overall attendance

While the abovementioned quantitative indicators show promising improvements in student outcomes with the adoption of the OEBIT framework, we acknowledge that there are more quality factors to be explored to address the research questions. In particular, academic integrity has been reported in the literature as one of the inherent drawbacks of online exams without having professional proctor tools in place. This is also tied in with the design of the questions as they were modified in the OEBIT framework to cater to online unrestricted open book exams. The exam questions were modified to be case studies based on more of assessing higher-order learning skills demonstrated by students. This required to shift the lecturer and student expectations based on the practices that were followed in previous years in traditional exams without the OEBIT framework. Despite efforts taken by Lecturers to re-design exam questions, academic integrity issues that arise with the use of technologies such as smartphones and online search engines were not 100% avoidable in online exams. Lecturers were aware of this, and careful checks and penalties were imposed when there were some traces of answers with copy and paste from the internet or other sources, especially due to a poor question design in certain online exams. Another difficulty was that technical issues at the student end had created delays and some decisions to be made on the fly leading to some confusion among different invigilators on certain exam days. These problems were resolved immediately using the comprehensive invigilation process of our OEBIT framework. Overall, such hiccups during online exam invigilation had not created major issues, and certainly, they were not more than the several issues that were commonly faced during paper-based exams. In general, we observe that the OEBIT framework had helped various stakeholders to think through deeply their roles and responsibilities using the communication processes adopted.

In summary, it has been demonstrated that the proposed OEBIT framework provides an efficient method for online exam design, delivery, and student learning assessment. One of the major outcomes of this research study is the generalization of the majority of components of the OEBIT framework so it can be adopted by other educational providers to prepare and execute remote online exams with minor adaptation to their educational environment. We observe that student outcomes were comparable to the previous year and that students found the online exam experience a positive one. Most students benefited from no or limited traveling time on the examination day. The focus group felt students were appreciative that the mix of questions better tested deep learning of the subject matter with many focus group members able to recall conversations with positive comments from students received, including the enhanced preparation with the online practice examination. These observations were further verified with the focus group study outlined below.

Results of the Focus Group Study

The design, implementation, and execution of the remote-online exam by employing the OEBIT framework were enhanced through the review of the same processes that were adopted in the online practice exam iteratively according to the GMDR model of the DBR approach. The online practice exam served the purpose of the review and prototype stage of the Design-based research methodology. Focus group discussions on the online practice exam had also facilitated the refinement of our OEBIT framework. Finally, after the application of the OEBIT framework for the final online exam, feedback from the focus group was obtained relating to the three research questions asked. Table 2 gives a summary of common themes and findings that emerged from the set of responses obtained from the focus group that was aligned to the research questions.

Table 2: Summary of focus group responses aligned to the research questions

Research Question 1	*Does the OEBIT framework meet the lecturer and student expectations?*
The focus group provided informal qualitative feedback from other lecturers and students in the OEBIT framework meeting their expectations. From the viewpoint of lecturers, the OEBIT framework had well-defined processes and a comprehensive checklist for various audits performed during the entire online exam development. It was a shared opinion that the OEBIT framework established a uniform standard set of processes that had minimized any potential issues with online exam delivery. The group believed that with an OEBIT framework in place, the stakeholders had felt assured that a quick rescheduling of a remote-online exam was possible in any worst-case scenario. There were clear benefits shared concerning fewer resources required due to the non-requirement of certain traditional processes such as printing, securing, setting up the examination venue, and timetabling of rooms.	
Lecturers' expectations related to academic quality were also discussed and agreed to have been achieved by the OEBIT framework with the use of the plagiarism detection	

process and the moderation process. Some lectures argued that creating and marking online exams were slower than pen-and-paper exams, although it was quite a debated topic. However, during the development of the OEBIT framework using iterative development of the DBR approach, continuous updates to the framework processes required a champion to lead the process and the focus group agreed that there was a lack of clarity in this aspect.

Concerns were raised about students who could cheat that can get undetected during the online exam. Other common concerns were about the security of remote-online exams that could be subject to cyberattacks. Legitimate concerns were also raised about disadvantaging students who were subject to obstacles outside their control such as poor internet connections, technical computer issues (e.g., slow computer), taking the exam in their car due to lack of uninterrupted environment in their shared accommodation, or deprived family circumstances. However, it was also noted that the remote-online examination had higher participation than the traditional examination indicating that these concerns did not surface much during the exams.

Most students had the minimum devices with required specifications for smooth conduct of online exams such as two webcams, microphones, web browser, computer/laptop, and reliable internet connection. The students who could not demonstrate that they had the minimum devices in the practice exams were instructed to complete their actual examination in the institute's computer laboratories or library facilities. Furthermore, the online exams for many units required answering questions by typing text only. This minimized the technical requirements for students and the related online technical issues. However, five exams required hand-written answers such as drawing diagrams or the use of mathematical symbols. This required the students to take photos of their written work and upload them. We believe that this had resulted in additional stress on the student's ability to answer the question. However, it was mentioned by the focus group that the practice examinations helped to overcome this issue to a great extent as the students were quite well-prepared for this scenario.

Research Question 2	Are the OEBIT framework processes sufficient to maintain academic integrity?

It was a common understanding of the focus group that the risk of plagiarism and cheating could never be eliminated, whether the exam took place face-to-face or online. Using the OEBIT framework, several techniques were employed to minimize the risks including the preferred use of case study-based questions over theory-based questions so that answers could not be found on the internet. With the setting of four variations for each question which Moodle could deliver randomly, a unique exam paper was automatically generated for each student. Further, Invigilators were able to monitor every student during online exams through Zoom sessions, especially because it was limited to only 20 students allocated to each online Zoom room. With verified

student identification and two cameras to monitor both the students' online computer monitor and their hands/face, the academic integrity issue was well-managed using virtual proctoring and checks.	
Research Question 3	*Does the OEBIT framework impact the design of an exam paper?*

All remote-online questions were problem-solving questions that required applied knowledge, opinions, and insight. Theory-based descriptive and definition/recall-based questions were not considered to be appropriate for open-book remote-online examination. The design of each exam paper was discussed by the focus group and reached a common understanding that the best type of questions were those that were designed based on a scenario or case study.

Questions in first-year subjects' exams were designed for students to demonstrate their understanding, insight, or appropriate application of fundamental theory. Questions for second-year subjects tested students' ability to analyze and demonstrate deeper insights on the topics and their applications. For third-year subjects, the questions were designed to test that students could analyze real-life situations leading to conclusions, as well as generate new ideas and opinions. However, lecturers expressed concerns that not all the learning outcomes would be appropriately tested if all questions were designed in this manner. For instance, mathematics-based topics required hand-written answers that were uploaded, and this could not be avoided to cater to the key learning outcomes of such subjects.

Implication and Recommendations

Educators take utmost responsibility for continuous improvements based on lessons learned and knowledge sharing of best practices. Based on the feedback collected by the focus group, we have examined the strategies to improve and recommend the key processes of the OEBIT framework for a successful deployment of online exams in any other similar educational setting. Table 3 summarises the recommendations through lessons learned during certain key processes identified in the OEBIT framework.

Table 3: Recommendations of key processes in OEBIT Framework

OEBIT Processes	Recommendations through Lessons Learned
Designing Practice Exam	Create a practice exam that allows students to become familiar with the mandatory protocols they are required to comply with during the actual remote-online examination. The practice examination prepares the student for the structure of the exam, the nature of the exam questions, and the invigilation process and protocols.

Designing Final Exam	Additional support staff or professional development of existing staff will help the team to improve their skills in online exam design and process. Identifying each examination requirement much earlier would lead to better management/invigilation of remote-online exams It is beneficial to create an exam bank of case studies and practice-based questions to train students in demonstrating their ability to apply concepts, techniques, and skills. Avoid multipart questions in one question on a page to avoid the student from missing to answer sub-question(s). Avoid questions that refer to or flow from questions on the previous page. Group related questions into sections for students' better understanding. Randomizing questions minimizes the probability of students sharing answers
Exam Duration Setting	Reading time is a significant element of the online exam. It allows the student to settle in with the online exam environment and mentally get prepared and focus on answering the online exam. If the subject has special requirements such as document uploads of answers, they must be indicated in instructions, and where necessary additional time requires to be allocated in the exam duration for smooth invigilation of such online exams.
Security and Authenticity Checking	Moodle LMS-based exam provides secure and authentic user access and appropriate user access rights for audit checks and monitoring are essential. Invigilation through Zoom and cameras gives legitimacy to the online exam process.
Quality Checklist and Testing	An online exam quality checklist serves as a standard process that ensures consistency and enhanced accuracy. The practice exam supports the testing and evaluation to improve or fix any inaccuracies or inconsistencies in the online exam setup.
Communication	Communicating about the remote-online examination requirements and setup before the actual remote-online examination plays an important role. Communicating about the exam duration and structure to the invigilators and students just before their exams alleviates anxiety and stress during the actual exam. Communication to students about the alternative arrangements to replace situations due to any technical hitches of the remote-online exam is essential. Assign dedicated staff as the contact person for students prior, during, and after the remote-online examination as this will allow students to raise issues that can then be resolved quickly.

This study focused on the significance of online exams in the HE sector and how the process of design and administering online exams can be further improved using the DBR methodology. With the current COVID situation, when remote online exam writing by students became mandatory and HE was unprepared with the processes, not many HE providers followed a systemic methodology. When the COVID outbreak occurred, HE providers had scrambled in the middle of the semester to remote learning. Many faculties had to rethink their assessments including exams on the fly. Some HE providers could use exam proctoring services while other institutions explored non-proctored alternatives due to primary constraints of affordability and timely administration. In our study, we have designed, developed, and conducted exams using an innovative online exam framework by applying DBR along with our in-house learning management system based on good practices and assessment theories *(Dawson, 2021) (Bearman, Dawson, O'Donnell, Tai, & Jorre de St Jorre, 2020)*. An online exam is not a novel concept, however, it became an essential assessment method due to COVID lockdowns and distancing requirements without following a systematic analysis and review. Studies have already indicated that most students prefer online exams instead of traditional exams since online exams present a range of benefits for the students *(Butler-Henderson & Crawford, 2020)*. For example, students prefer to type their answers instead of handwriting them and to attempt exams from their familiar home environment without having to travel to the exam venue. However, our research is unique in focussing on the design and delivery processes of online exams that paves way for continuous improvement. Our proposed online exam framework is innovative and the first of its kind as it follows a DBR based iterative design and evaluation methodology. We studied the usefulness and impact of online exams from various stakeholder perspectives that have not been explored before. Furthermore, we claim that we promoted a new application of the DBR methodology that provides a well-fit approach in supporting the continuous improvement process to enhance quality due to its iterative nature of interventions. Further, the qualitative study using focus groups complemented the quantitative study of student outcomes providing completeness of the evaluation of our proposed OEBIT framework. Using such triangulations, we have addressed any threats to reliability, validity, and bias in results that can be associated with our methods, processes, and data collection. We demonstrated that the generalized framework was workable through this study. We have provided sufficient motivation for other HE programs and institutes to apply the framework in their settings effectively.

Conclusions and Future Work

This paper presented several challenges and constraints experienced while conducting a remote-online examination in a higher education institution's unique context during the COVID-19 crisis. With these constraints as inputs, we employed design-based research (DBR) approach to formulating an online exam for the Bachelor of Information Technology (OEBIT) framework. Our proposed framework underwent a holistic systemic approach to design, develop, and administer remote-online examinations in the institute successfully. We developed useful artifacts and

workflows for various processes that resulted in positive outcomes of the OEBIT framework through continuous improvements achieved in student attendance, classroom engagement, and overall results. These outcomes have demonstrated the effectiveness of the DBR approach in our proposed generalized OEBIT framework. Further, we evaluated the application of the OEBIT framework for its generic features in its adaptability to other similar contexts. We employed a focus group study using 3 key research questions and the findings have led to recommendations and best practice guidelines. The triangulation of quantitative and qualitative methods confirmed the validity and reliability of the results obtained.

Future work will consider improvements in the OEBIT framework based on the recommendations made and the best practices gained from other similar institution settings. We would also consider enhanced technologies such as screen lockdowns and software/hardware control that can be used through Moodle's exam browser. We believe the use of multiple cameras and specific software packages such as Mathematical formulas embedded in the LMS environment and other tools that could be integrated into one single software platform would benefit higher education settings to reduce cheating and enhance academic integrity in online exams. In addition, future research will consider the introduction of professional training and scaffolding for various stakeholders as they play a vital role to overcome the issues identified during the invigilation process of the online exams. Future research would focus on improving our proposed OEBIT framework to ensure adaptability in other similar situations for designing, developing, and administering online exams. A comprehensive evaluation of the effectiveness and efficiency of our approach will also be conducted.

Appendix A - Abbreviations List

All abbreviations are listed in alphabetical order.

	Abbreviation	Explanation
1.	HE	Higher Education
2.	BIT	Bachelor of Information Technology
3.	COVID-19	Coronavirus Disease
4.	DBR	Design-Based research
5.	GMDR	Generic Model for Design Research
6.	LMS	Learning Management System
7.	NUHEP	Non-University Higher Education Provider
8.	OEBIT	Online Exam for Bachelor of Information Technology
9.	OECP	Online Exam Control Procedures
10.	TAFE	Technical And Further Education
11.	TEQSA	Tertiary Education Quality and Standards Agency

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DEVELOPMENT AND VALIDATION OF INSTRUMENTATION TO ASSESS UNIVERSITY ACADEMICS' RESEARCH AND TEACHING PERFORMANCE IN PUNJAB, PAKISTAN

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ABSTRACT

The study was aimed to develop and validate instruments of academic performance in terms of research and teaching performance of university teachers having foreign and domestic doctoral education from an internationalization perspective. The study background was to develop and validate these instruments through literature, content validation, reliability, and validity estimates before commencing a large-scale Ph.D. study of assessment of academic practices of academics. As research is scarce in this area in Pakistan and consequently, the comprehensive measures to capture research and teaching performance of academics are also minimal. Adcock and Collier (2001) standard shared framework for instrument development was followed to devise research and teaching instruments. The validation process included expert panel review to refine instruments and ensure content validity. Moreover, composite factor analysis was conducted for the teaching-related instrument to ensure construct reliability and construct validity using SmartPLS 3. The 'academic research performance instrument (ARPI) was finalized through content validation across three dimensions of academic research. The second instrument, 'students' evaluation of teaching quality (SETQ), comprised seven teaching-related dimensions and was found to be reliable and valid after assessing psychometric properties. Both instruments may be used to evaluate the research and teaching performance of academics with foreign PhDs concerning domestic PhDs in the context of social and physical sciences. The instruments and resultant information may also further inform the extent to which the internationalization of research and teaching is taking place at universities.

Keywords. Content validation, foreign returnees, higher education

Introduction

University academics are required to perform several roles and functions to support and achieve institutional objectives and missions. Among them, the research, teaching, and service roles are the most expected. Globally, quality universities prioritize knowledge production and knowledge dissemination as embedded in their mission statements (Cadez et al., 2017). More indicative is the universities' effort to attract competent academics and introduce favorable research policies to produce research and win grants in favor of upgrading their ranking and image (Coggburn & Neely, 2015; Douglas, 2013; Mazzucchelli et al., 2018; Shin & Cummings, 2010; Ter-Bogt & Scapens, 2012). Moreover, research in a particular academic field advances the knowledge base and leads to academic awards and honors (Hardre et al., 2011; Smith et al., 2013). Therefore, expertise is considered a critical factor in knowledge production and can create enriched instructional opportunities for students (Griffin et al., 2018).

Both components of (research & teaching) involve numerous activities and practices that require to be delivered strategically and competently. Research and teaching have become the essential part of a globalized competitive system partly based on evaluating academic competencies (Thornton et al., 2018; Jenkins et al., 2007). In this context, scholarly productivity has gained significant attention among stakeholders in knowledge-based societies (Shin & Cummings, 2010; Webber, 2011). Policymakers and administrators are crafting better research measures and factors that best represent essential scholarly products (Allen et al., 2018).

Recently a body of research has been rapidly growing, focusing on returnee scholars' academic contributions. This growing body of research may be partly attributed to amidst increase of return migration to countries of origin to gauge knowledge and technology transfer, reintegration process, and academic performance. In Pakistan, investigations involving returned academics are somehow a neglected area. Recently, few studies have focused on individual dimensions such as research performance (Baloch et al., 2020) and reverse cultural shock (Aktar et al., 2018). Still, overall, research is scarce on a scholarly investigation to gauge the performance of academic returnees in different dimensions. Consequently, instruments to gauge different dimensions of academic performance in the Pakistani university context are also almost non-existent. Therefore, to fill this gap and bring new insights, the current study is designed to develop and validate instruments' regarding academics' performance, especially in research and teaching domains, before conducting a large-scale Ph.D. study concerning the assessment of academic performance. In this regard, different indicators and factors are included during the development process to gauge academic research and teaching performance to obtain a more enriched snapshot of performance.

In this context, the purpose of this research is to develop the measures of academic performance in the domains of research and teaching quality in Punjab, Pakistani context that may be applicable across social and natural sciences. So that academic performance in these domains could be gauged mainly to compare the academic performance of foreign returnees having doctoral education with their domestic counterparts. Initially, Adcock and Collier (2001) standard shared framework for instrument development was followed to devise instruments. This model carefully considers that indicators and resulting scores greatly represent the essence of concepts formulated in the systematized definition (Adcock & Collier, 2001). Further, the development process was informed and refined by guidance produced by leading experts in the field to ensure that instruments are valid in various dimensions and able to elicit the required information.

In this study, content validity is greatly emphasized as an initial study. Content validity is an important aspect and provides evidence regarding the degree to which the instrument,s elements are relevant and representative of the construct under question in connection with the purpose of the instrument (Almanasreh et al., 2019). Content validity plays a central role in the development of any instrument and prerequisite for evaluating other validity pieces of evidence (Slocumb & Cole, 1991). This validation mostly requires a panel of experts to review the constructed instruments to judge relevance, representativeness, and other essential aspects. In the current study, all the measures along with objectives and operational definitions of constructs were sent to a panel of international experts (10 experts) specialized in higher education through emails for content validation of the instruments. They were requested to review and provide feedback regarding instruments and items' relevance, representativeness, clarity, and overall alignment. Based on the invaluable experts' feedback, instruments were modified to be more relevant, clear, and representative. The study was conducted to prepare the instruments related to academic performance in the domains of research and teaching of university teachers having foreign and domestic doctoral education. More specifically, the following objectives were addressed:

- To prepare an instrument to assess the research performance of university academics associated with general public-sector universities.
- To prepare an instrument to assess the teaching performance of university academics as perceived by students

Literature Review

Academic performance may be assessed to include several academic domains, such as research, teaching, services both internal and external, and contribution to society, to name a few. Eventually, performance may be determined based on single or combining multiple areas for various purposes in the given context. As the current research includes academic domains of research and teaching, literature regarding these domains is presented to develop or identify factors to measure research and teaching performance keeping in view research objectives.

Firstly, research performance is judged on various dimensions based on several indicators ranging from research in different recognized publication outlets, funded projects/studies, presentations (Altbach, 2015; Cadez et al., 2017; Iqbal & Mahmood, 2011; Porter & Umbach, 2001; Shin, 2011), memberships to various academies (White et al., 2012), nature of research collaborations to research dissemination in top tier journals, citations and overall impact (Harvey et al., 2010; Long et al., 2009). Research activities also include gathering and analyzing data, supervising postgraduate students and their class projects, obtaining patents and licenses (Nafukho et al., 2019), getting research grants, performing editorial duties (Creswell, 2012), and engagement in various academic activities (Hug et al., 2013). Abramo and D'Angelo (2014) asserted that research activity is a production process in which the inputs consist of human, tangible, and intangible resources, and where output, in this case, comprises the new knowledge. Knowledge production has a complex character of both tangible natures (publications, patents, conference presentations, databases, etc.) and intangible nature (tacit knowledge, consulting activity, etc.). Among these indicators, some are given more importance for different purposes in judging the research performance at various levels and in different contexts (Zhang & Shin, 2015).

Moreover, Wilder and Walters (2018) assert that measuring scholarly outputs generally involves two approaches: contribution studies and productivity studies. Contribution studies evaluate the scholarly contributions of researchers, universities, departments/centers, or any other contributor to a well-defined body of literature. While productivity studies assess the scholarly outputs of particular contributors holistically, often for comparative purposes. Although, no study can include all the research outputs due to, to name a few, feasibility, discipline variations, and databases coverage. In essence, research assessment may include a range of indicators across various dimensions of research to allow evaluation as per the study's purpose. The assessment process may involve technologies, bibliometrics, self-reported data and academics CVs, etc., with unique combinations and weightage given to each scholarly aspect. Self-reported research data is also seen as a credible source and often used in the survey due to its simplicity despite some inconsistency due to recall errors (Aiston & Jung, 2015; Allison & Stewart, 1974; Creswell, 1985; Xie & Shauman, 1998; Zhang & Shin, 2015).

In the current study, different indicators are included to gauge the research performance of academics. In this regard, firstly, the construct of research productivity is considered due to its broad encompassing nature to embrace a variety of indicators. As the literature suggests that research performance may be evaluated by a variety of indicators ranging from research publications, including sponsored research, through presentations to lending your services both within the institution and external academic engagement. Moreover, in addition to these academic research activities, collaboration in research in the form of co-authorship with domestic colleagues and with the international community is positively viewed. Therefore, research collaboration is considered an important dimension and also linked with increased productivity (Engels & Ruschenburg, 2008). Research collaboration greatly facilitates the

capacity building of researchers and improves the chances to access skills, funding, and facilities, along with increasing research visibility (Katz & Martin, 1997). The dimensions of collaboration are also incorporated in the assessment of academics in this study. Both domestic and transnational research collaborations are considered to enrich the evaluation process. Domestic collaboration indicates the degree of engagement with the domestic system and colleagues while undertaking different research activities and contributing to healthy academic culture. While transnational collaboration and joint publications are essential aspects of internationalization. Foreign education from leading institutions is usually associated with forming international academic links and collaboration in the future ((Eduan, 2019) and also contributes to the endogenous growth of source countries (Dustmann et al., 2011; Saxenian, 2005). As a result, in addition to research productivity, dimensions of collaborations are considered in the current study as the assessment involved returned academics having a foreign doctorate.

Based on literature insights, the study operationalizes research performance as various academic research outcomes in terms of quantity and quality of research and the nature of research collaborations. Specifically, the 'research performance' instrument is designed to assess key research performance areas, such as the overall productivity of research outputs, domestic research collaborations, and transnational research collaboration regarding the academic activity. Overall research performance encompasses the key research outputs such as peer-reviewed articles produced, books/chapters published, presentations given and funded projects conducted, etc. while domestic research collaborations aspect concerned with academics' co-authorship at the same university or anywhere in Pakistan and their memberships/engagements for research purposes in Pakistan between the years 2018-till date. Finally, the transnational research collaborations dimension captures the detail of global academic connectivity (Internationally collaborative work) for various research and academic purposes between the years 2018-till the date. This information suggests the international dimension of their academic products and services. Among the different types of publications and nature of collaborations, publishing in international journals and transnational scholarly collaborations are generally highly recommended in developing contexts, especially in the Pakistani context, in which this study is based. Overall, three different facets of research performance are conceptualized in the current study as bibliometrics and research evaluation literature growingly consider that construct of research performance has multiple facets and relevant indicators (Moed, 2017).

Further, the teaching function disseminates the latest knowledge and skills to equip students with 21st-century skills. The globalization of education encourages institutions to deliver academic excellence and maintain quality instructional standards (Thornton et al., 2018). Students' evaluation of teaching (SET) is one of the widely used ways to gauge teaching quality at universities for various purposes ranging from teaching improvement, appraisal, and institutional accountability (Spooren *et al*., 2017). Although there is some debate over the

reliability and validity of students' evaluations of teaching, SET has become institutionalized to a large extent. Several studies consider SET a relatively reliable and logical source (Marsh, 2007; Nasser & Fresko, 2002; Zhao & Gallant, 2012) and are also associated with students' learning gains (Wachtel, 1998). Students' evaluations have yielded reliable results across various studies, partly because students have direct and extended teaching experience (Jimenez, 2008 as cited in Manrique, 2016). Teaching encompasses several dimensions and activities; consequently, its measures are generally multidimensional (Spooren et al., 2017). Effective teaching is conceptualized in various ways in different contexts, resulting in various conceptual frameworks guiding instrument development (Devlin & Samarawickrema, 2010; Penny, 2003).

Based on the previous studies and literature (Al-Hinai, 2012; Baliyan & Moorad, 2018; Bedggood & Donovan, 2012; Ching, 2018; Feldman, 1976; Hsu & Chiu, 2009, Lu & Wu, 2018; Manrique, 2016; Marsh, 2007; Richardson, 2005), important dimensions of teaching were identified, and relevant specific items were devised in the current study to develop teaching quality measure to be used in Pakistani context across different universities and disciplines. Specifically, instruction (using effective teaching strategies with enthusiasm and encouragement of participation), utilization of learning aids (De Neve & Janssen, 1982), the impact of instruction or students' outcomes, organization of the course, subject mastery, assessment and feedback, and interpersonal skills (Feldman, 2007; Marsh, 2007). These dimensions and related aspects facilitate the student learning process leading to enhanced learning outcomes as found in previously mentioned investigations. Among these dimensions, some dimensions were identified that seemed suitable in the studied context.

Moreover, Vermunt and Verschaffel (2000) asserted that, based on a substantive literature review, three domains of activity namely, cognitive, affective, and regulative play an important role in students' learning. The cognitive aspect is concerned with processing the content of learning, such as understanding concepts, making relationships between concepts, etc. While affective domain encompasses the different emotions and feelings that may arise during the learning process and may affect the learning process, for instance, motivating oneself during a learning task. Finally, the regulative domain deals with regulating the cognitive and affective aspects of learning and indirectly facilitating the learning process (Knol et al., 2016; Vermunt & Vermetten, 2004). Therefore, these aspects are also incorporated in the instrument about various dimensions of teaching, and some items correspond to these domains of activity. For instance, a) explaining subject matter coupled with real-life applications of concepts in an organized fashion facilitate effective cognitive functioning, b) meaningful connecting with students through interpersonal behaviors to promote positive emotional climate and to encourage participation/initiative, c) providing guidance in the form of feedback and addressing learning issues encountered by students.

The current study conceptualizes teaching quality as the extent to which various instructional processes have been successfully executed by employing a set of competencies/behaviors and resources with the effect of improved student learning and enhanced instructional practice. In the current study, based on literature and operational definition of teaching quality, seven important dimensions were identified perceived as centered at the heart of the teaching process. Moreover, the instrument construction process is predominantly guided by constructivist teaching principles. To this end, in light of the study's purpose, important factors and conceptualizations are realized about research and teaching performance areas as the basis to develop relevant specific indicators capturing the constructs. A depiction model is created in figure 1, followed by factors and definitions in a summarised form (Table 1).
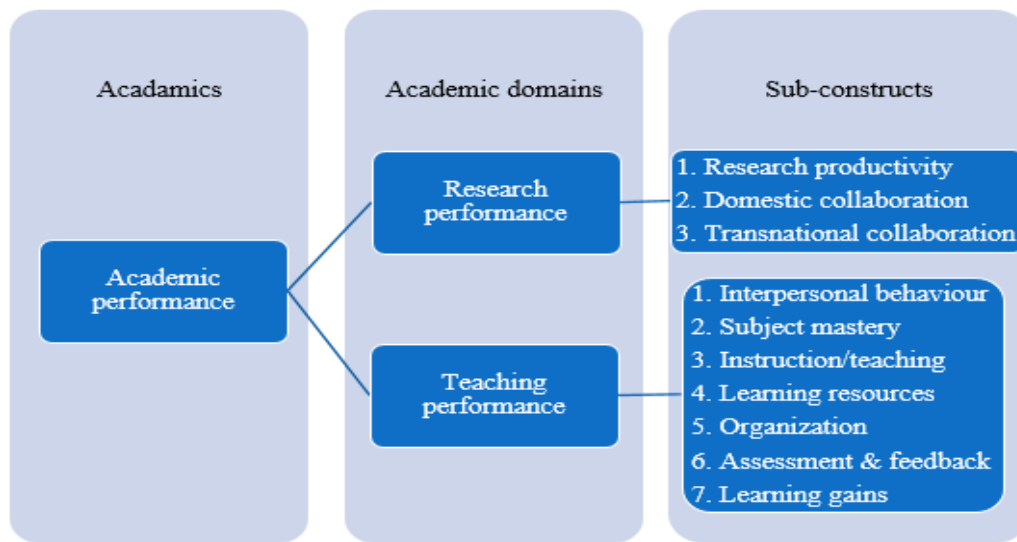
Figure 1: Research Model Involving Key Constructs and Sub-Constructs

Table 1: Description of the Constructs and Sub-Constructs as Conceptualised in the Study

Constructs and sub-constructs	Description
A. Research performance	Academic research outcomes in terms of quantity and quality of research and nature of research collaborations
i. Research productivity	Research productivity encompasses the key research outputs such as peer-reviewed articles produced, books/chapters published, presentations given and funded projects conducted, etc.
ii. Domestic research collaborations	This aspect concerned with academics' co-authorship at the same university or anywhere in Pakistan and their memberships/engagements for research purposes in Pakistan between the years 2018-till date.
iii. Transnational research collaborations	This dimension captures the detail of global academic connectivity (Internationally collaborative work) for various research and academic purposes between the years 2018-till the date.
B. Teaching performance	The extent to which various instructional processes have been successfully executed by employing a set of competencies/behaviours and resources with the effect of improved student learning and enhanced instructional practice.
i. Interpersonal behaviour	The degree to which interpersonal skills are exercised to connect with students meaningfully.
ii. Subject mastery	The degree to which teacher exhibits a state of art knowledge, understandings and applications related to subject.
iii. Instruction	The degree to which teacher employs various instructional methods and techniques in line with overarching learning objectives.
iv. Learning resources	The degree to which teacher uses the available learning resources and facilitates students in introducing and using various resources.
v. Organization	The degree to which subject matter is dealt with in an organized fashion within the given time bound.
vi. Assessment/feedback	The degree to which assessment and feedback procedures are employed in such a way to foster students learning.
vii. Learning gains	The degree to which students have achieved learning outcomes in different accounts.

Methods

Instrumentation Development

Adcock and Collier (2001) standard shared framework for instrument development was followed to devise instruments. This standard shared framework for instrument design carefully considers that dimensions, relevant indicators, and resulting scores should greatly represent the essence of concepts formulated in the systematized definition. The process involves literature searches, identifying dimensions and relevant indicators, items generation, content validation from experts, and field test to conduct factor analysis leading to the assessment of construct reliability and construct validity. Following the guidelines, the current study was based on the development of academics' research performance instrument (ARPI) and student evaluation of teaching quality instruments (SETQ) based on content validation, construct reliability, and validity. The overall development process is mirrored in the second

figure below. Further details of the process for each instrument are provided in the proceeding sections.

Figure 2: Instrument Development Process

Academics Research Performance Instrument (ARPI)

Overall, during the development of the questionnaire, various aspects were included that are deemed most important, globally accepted, and widely used in most of the universities worldwide for multiple purposes from research assessment, individual promotions, institutional ranking to awards and honors. Therefore, based on literature review and research evaluations criteria employed by leading universities across the globe, specific research-related aspects were included in the research performance to fully design the questionnaire fulfilling the aim of the current study. Specifically, the instrument of research performance of academics was devised to include three dimensions such as overall research productivity, domestic research collaborations, and transnational research collaboration concerning academic activity. Specifically, research performance encompassed the key research outputs such as peer-reviewed articles produced, books/chapters published, presentations given and funded projects conducted, etc. while domestic research collaborations aspect concerned with academics' co-authorship at the same university or anywhere within the country and their memberships for research purposes in Pakistan. Finally, the transnational research collaborations dimension captured the details of global academic connectivity or internationally collaborative work for various research and academic purposes between specified periods.

After developing a pool of items about the above-mentioned three research dimensions, an expert panel review process was employed to refine and generate new items sequentially to ensure the instrument's content validity. During the process, the request for feedback was sent to numerous experts with common specialization in higher education research via emails. During the process, ten experts agreed to provide feedback; among them, eight were international academics, while two were domestic university academics in Punjab, Pakistan. All of the academics had doctorates serving different universities and were accessed through emails after visiting faculty profiles of different universities. An instrument draft was sent to experts along with instrument purpose and operational definitions of constructs to yield

judgments about relevance, representativeness, clarity, and overall alignment. Especially, they were requested to rate each item's degree of relevance or representativeness regarding research dimensions (research productivity, domestic collaborations & transnational collaborations). Overall, 23 indicators were retained, some items seemed redundant, while a few indicators were found ambiguous and irrelevant leading to deletion of these items.

They also provided valuable feedback apart from judging item relevance to increase response rate and ease of providing research information on the part of university teachers. For instance, some reviewers asserted that some specified time should be mentioned in the instrument while guiding the university teachers so that research outcomes may be comparable across foreign and domestic Ph.D. holders and disciplines, etc. Moreover, while administering the instrument, a few experts suggested asking people to estimate or approximate the publication record that occurred between specified periods rather than asking teachers to mention the *exact publication record*. Therefore, the wording in guiding the respondents was changed to include *estimation* so that respondents may feel better while providing their publication record, leading to improve response rate. Finally, two experts highlighted that information about publications as first or secondary authors should be amended to include all publications, whether primary or supporting. They believed that academics often think of their work as publications and do not divide it so distinctly between the first and second authors. To this end, these suggestions were incorporated in the different sections of the instrument. Table 2 indicates the experts' feedback and retained indicators.

Table 2: Content Validation of 'Academics Research Performance Instrument' (ARPI) Based on Experts' Opinion

Research Dimensions and Definitions	Preliminary Indicators with Improved Version in Bracket Based on Experts' Feedback	Experts' Suggestions
1. Research Productivity. Research productivity refers to the various academic research outcomes in terms of quantity and quality of research either independently or collaboratively realised between specified period	Articles published in national journals	Retained
	Articles published in international journals	Retained
	Books Published (Books & edited books published in national or internal publication outlets	Suggested to improve
	Chapters authored for national publisher	Retained
	Chapters authored for international publishers	Retained
	Research presentations in national conferences & seminars	Retained
	Research presentations in international conferences & seminars	

	Funded projects conducted, sponsored by national and internal bodies (split into two distinct items: Funded projects conducted, sponsored by national bodies; Funded projects conducted, sponsored by international bodies	Suggested to improve
	Citations across all scholarly work published between specified period (Google scholar citations across all scholarly work published between specified period)	Suggested to improve
	Scientific distinctions and awards received at university/national level (split into two distinct items: Scientific distinctions and awards received at university level; Scientific distinctions and awards received at national level	Suggested to improve
2. Domestic Research Collaborations. This dimension concerns with academics' co-authorship at the same university or anywhere in Pakistan as primary or supporting contributor and memberships/engagements for research purposes in Pakistan between the specified period.	Academic articles published with domestic co-authors	Retained
	Books published with domestic co-authors (Books & edited books published with domestic co-authors)	Suggested to improve
	Edited books published with domestic co-authors	Suggested to merged in previous item
	Research memberships of national journal editorial boards	Retained
	Memberships of various national scientific organisations/associations	Retained
	Memberships of different expert panels that evaluate national projects/proposals	Suggested to remove
3. Transnational Research Engagement This aspect relates to the researcher's international co-authorship of academic work as primary/supporting contributor (including in-press publication) & academic memberships for research purposes between specified period.	Co-authorship (foreign) as primary and supporting authors in the following research outlets: a. Journal articles b. Books/Edited books c. Chapter d. Reports (this sub-item is excluded)	Suggested to improve
	Memberships of international journal editorial boards	Retained
	Memberships of international scientific organisations/associations	Retained
	Member of review teams/panels for articles/research work	Suggested to remove
	Inviting foreigners for conferences or for other academic purposes	Suggested to remove
	Participation in expert panels that evaluate international projects/proposals	Retained
	Translations of foreign work	Retained

Students' Evaluations of Teaching Quality (SETQ)

Based on the previous studies and literature, important dimensions of teaching were identified, and relevant specific items were devised in the current study to develop teaching quality measures to be used in the Pakistani context across different universities and disciplines. Initially, a collection of about 90 assessment items was compiled from a primary literature review and grouped into seven latent factors or variables with multiple indicators. Moreover, the construction process, compatible with operational definition, follows a broader framework in developing the instrument and includes instructional features of design, implementation, facilitation, effects, and teacher personal and interpersonal skills. These features and relevant items have been developed predominantly through the lens of constructivist principles of teaching and learning.

Similarly, an expert panel review process was employed to refine and generate new items sequentially to ensure the content validity of the SETQ as employed in the ARPI instrument's content validation. Based on experts' reviews and suggestions, factors and relevant items were refined. Some items were removed, which were seen as irrelevant and mismatched to the overarching focus of the instrument. Moreover, a few words were replaced with more meaningful words that convey the intended meaning. In conclusion, based on experts' views, the instrument was made more representative, clear, and congruent with the instrument focus and overarching research purpose.

Afterward, to assess the measurement model, the instrument was administered from 333 university students (200 females; 133 males) studying in two different general public sector universities in Lahore. Students were associated with natural and social sciences subjects. Among them, nearly 53% were enrolled in honors-level programs, about 26% were in master's study, around 14% were doing MPhil, and the remaining 1% were Ph.D. scholars. The data collection was primarily completed with the assistance of Google Forms, and about 20% of respondents filled the instrument as paper-based.

The measurement model of the SETQ was composed of seven latent variables with multiple indicators for each latent variable. The latent variables include interpersonal behavior (6 items), subject mastery (5 items), teaching/instruction (7 items), learning resources (5 items), organization (6 items), assessment/feedback (8 items), and learning gains (6 items). The items were measured on a five-point Likert scale ranging from never (1) to always (5). CFA was run on the final data set using SmartPLS 3 software to verify further items and dimensions hypothesized earlier based on literature and expert opinion.

Firstly, to evaluate the measurement model, the constructs' loading, reliability, and convergent validity are assessed. Results are shown in Table 3. Loadings should be above .70 to consider the item as reliable (Garson, 2016; Hair et al., 2020). For the data, all the loadings are above

the acceptable cut-off. The composite reliabilities for all the constructs are also above the generally recommended threshold of .70 (Garson, 2016), indicating good reliability (0.947-0.905). Further, Cronbach's Alpha was used to assess the extent to which a different set of questions taps a single underlying construct. Allen et al. (2018) and Fayers and Machin (2016) recommend that Cronbach's Alpha values should be around .9 ideally and anything above .7 or around .7 is considered appropriate for most research purposes Results exhibits that Cronbach's Alpha values for the constructs vary from 0.936 to 0.868 suggesting the indicators are consistent. Convergent and discriminant validity were also evaluated for the constructs. Convergent validity may be assessed using Average Variance Extracted (AVE), the criterion for which is AVE values should be 0.5 or greater to establish this validity (Hair et al., 2020). For this study, the AVE values for the constructs are above 0.5, thus establishing convergent validity.

Table 3: Construct Reliability and Construct Convergent Validity

Dimensions and related items	Loadings	Cronbach's Alpha	CR	AVE
I. Interpersonal Behaviour		0.904	0.926	0.677
The teach had shown concern to students' problems.	0.848			
The teacher had flexibility to accept diversity of opinions.	0.799			
The teacher treated students with kindness.	0.818			
This teacher was helpful to students.	0.867			
The teacher cared about how students feel.	0.828			
The teacher inspired me in this course	0.774			
II. Subject Mastery		0.868	0.905	0.656
The teacher presented up-to-date knowledge of the latest developments in the subject/field.	0.841			
The teacher provided a syllabus that covered all necessary contents of the course.	0.764			
The teacher shared knowledge beyond the curriculum.	0.771			
The teacher combined theoretical concepts with real world applications	0.844			
The teacher answered competently to every question asked by students	0.825			
III. Instruction/Teaching		0.917	0.934	0.669
The aims and objectives of the course were clear to me	0.791			
The teacher utilized a variety of teaching techniques (quizzes, group work, projects etc.) in the course.	0.794			
The teacher accommodated the students with different learning abilities	0.847			
The teacher provided meaningful opportunities for active student participation in learning activities.	0.846			
The teacher taught students how to independently derive knowledge rather than showing it straightway	0.870			
The teacher displayed enthusiasm and humour.	0.749			
The teaching methods were in line with the course objectives.	0.825			

		0.878	0.912	0.674
IV. Learning Resources				
The books/materials suggested for the course were relevant to course objectives.	0.727			
The teacher provided guidance about using online learning resources	0.859			
Online learning resources (e.g. journals, articles, e-books) suggested by the teacher were easily accessible	0.847			
The teacher utilized available learning resources in the classroom.	0.882			
The teacher helped students to utilize lab or library resources	0.781			
V. Organization		0.888	0.915	0.642
The teacher presented content in an organized manner	0.748			
The teacher managed class time effectively.	0.774			
The teacher created an environment in which students felt comfortable asking questions and expressing their views.	0.817			
The workload of the subject (e.g. Assignments, projects) given to students was appropriate	0.805			
The subject matter was taught at an appropriate pace	0.828			
The teacher helped students for learning other than class time.	0.834			
VI. Assessment and Feedback		0.936	0.947	0.692
The teacher communicated the assessment and evaluation criteria for the course.	0.840			
Assessment and evaluation methods were in line with course objectives.	0.823			
Students were assessed from a variety of assessment techniques.	0.838			
Assessment techniques were interesting to promote deep learning beyond memory recall.	0.863			
The teacher provided examples of excellent work.	0.827			
The teacher provided timely feedback on assessment to help me learn.	0.854			
Enough time were provided after assessment to improve the learning	0.817			
The teacher was fair in assessment.	0.788			
VII. Learning Gains		0.930	0.945	0.743
I improved my understanding in this subject course.	0.834			
I understood the concepts, theories or important ideas presented in this course.	0.869			
The information/materials provided for a course help me to learn independently.	0.894			
The teacher taught the students to use high level thinking in this course (e.g. analyzing ideas, synthesizing ideas, making judgments about information, applying information to new situations).	0.873			
My perspective expanded (e.g. intellectually, culturally) about the material studied in this course.	0.887			

Finally, discriminant validity assessment is carried out using the heterotrait-monotrait ratio of correlations (HTMT), which is one of the recommended methods for this purpose (Henseler

et al., 2015). Researchers may employ cut-off points of 0.85 and 0.90 to assess results, and the more lenient threshold of 0.90 may be used to assess the discriminant validity of similar concepts (Hair et al., 2020). In this study, the constructs are similar as all are related to the one higher-order construct of teaching quality; therefore, the more liberal cut-off point 0.90 is used. Results signify that HTMT scores are below 0.90 thresholds, satisfying the discriminant validly (table 4).

Table 4: Discriminant Validity (HTMT)

Variables	A	IB	LG	LR	O	SM	T
Assessment							
Interpersonal behaviour	0.802						
Learning gains	0.855	0.708					
Learning resources	0.895	0.748	0.800				
Organization	0.891	0.838	0.845	0.891			
Subject mastery	0.867	0.847	0.839	0.877	0.897		
Teaching	0.886	0.818	0.843	0.880	0.895	0.870	

Discussion

The purpose of this research was to develop the measures of academic performance in terms of academic research and quality of academics' teaching in campus-based higher institutes of central Punjab that also may be economical and multidisciplinary. The intent is to compare foreign scholarship returnees (having foreign Ph.D.) with the reference group of non-returnees (having domestic Ph.D.) in the future by employing these measures. As there is a need to develop more comprehensive tools to assess academic performance in various domains especially academic research and teaching in the Pakistani institutional context. The main intent behind the development is to design such instruments that would enable the assessment of research and teaching performance of academic returnees (having foreign PhDs) and non-returnees (having domestic PhDs) serving in public-sector universities of Punjab. The reference group (non-returnees) is added to facilitate comparative assessment and interpretation of performance as performance assessment is mostly dependent upon the reference group (Daumiller et al., 2019). Firstly, the academic research performance instrument (ARPI) was developed based on three sub-constructs (research productivity; domestic research collaboration; transnational research collaboration), capturing different dimensions of research keeping in view academic returnees and internationalization of academic activity. Literature review greatly facilitated identifying these research constructs and various relevant indicators. Overall. This instrument encompassed the key research outputs such as peer-reviewed articles produced, books, edited books, chapters published, presentations given and funded projects conducted, etc. while domestic research collaborations aspect concerned with academics' co-authorship at the same university or anywhere within the country and their memberships for research purposes in Pakistan between specified periods. Finally, transnational research collaborations dimension captured

the detail of transnational academic connectivity (internationally collaborative work) for various research and academic purposes. In this effort, multiple indicators are included, which is considered an appropriate approach in research performance assessment especially involving different disciplines (Hicks et al., 2015; Gogolin & Stumm, 2014). Overall, the emphasis is largely on production, participation, associations, and collaboration patterns among academics, with the focus on comparing returnees and non-returnees. There is a growing consensus in research evaluation literature that research performance is a multifaceted construct (Moed, 2017) and studies have growingly been conducted by incorporating this multitude of dimensions approach.

Keeping in view the instrument,s nature, experts' judgments were obtained to evaluate its representativeness, clarity, readability, and degree of correspondence with the overarching purpose of the research purpose. In the instructions section of this instrument, approximately and estimation words are incorporated into direction and statements to facilitate academics/respondents to remember or indicate the information with ease rather than asking to write the exact record in paper-based data collection. As many do not remember offhand the answers without referring to the database or CVs. Further, publication in the national language is also considered in assessing research records in addition to the English language to avoid a biased account where publishing in English counts more than publishing in Pakistani or any other language. This instrument may be employed in a variety of different ways. For instance, the data can be gathered from digital databases, peer reviews, academics' CVs, or self-report questionnaires based on instrument information. Every source has its strengths, limitations, coverage, and ease of administration in light of the research aims (Fangmeng, 2016; Fontes, 2007). The self-report questionnaire is widely employed in social sciences to assess workplace performance (Garcia & Gustavson, 1997 as cited in Daumiller et al., 2019) and is considered economical (Daumiller et al., 2019). Anonymity is critical to increase the likelihood of participation and elicit reliable information on the parts of the respondents.

Secondly, institutions and academicians do widely employ students' ratings of teaching to gauge the teaching quality of teachers in the current globalized world, largely as a component of quality assurance (Barth, 2008; Ulker, 2021). This is an important component of how students feel about the teaching-learning process, ultimately informing improvement and supporting students' learning. The student's evaluation of teaching instruments may also be used for numerous purposes, including comparisons among academics and institutions as per the purposes of the study in question. In the current study, students' evaluation of teaching quality (SETQ) instrument encompasses a range of teaching-related aspects or indicators such as interpersonal skills, subject mastery, teaching/instruction, learning resources, organization, assessment, feedback, and learning gains. The items related to these constructs were measured on a five-point scale ranging from always true to never true. This multidimensional scaling approach is seen as more appropriate in literature keeping in view the complex nature of the

teaching process. Spooren et al. (2007) assert that the scaling approach is likely to be more robust against social desirability, vague interpretations, and accidental fluctuations in responses compared to singly-item teaching assessment.

While administering the instrument, students' personal identifying information is not included to increase the probability of honest or genuine responses; as Macklain et al. (2018) state that format that will protect the identity of students should be preferred either online or paper-based. The final version questionnaire was found to be reliable and valid based on 333 responses at the initial stage at this point. The psychometric assessment included item and construct level reliability, convergent validity, and discriminant validity. Item loadings, composite reliabilities, and Cronbach's Alpha values were within acceptable thresholds. Convergent validity results confirmed that indicators extracted the amount of variance deemed enough to explain relevant sub-constructs. Moreover, homogeneity of indicators and strong associations among all constructs pointed towards the assumed one-dimensional structure of higher-order factor titled teaching quality comprising seven teaching aspects. Therefore, a more liberal cut-off point of 0.90 (Hair et al., 2020) was used to assess discriminant validity and results confirmed the discriminant validity through this process (HTMT).

Instruments like these that employ various aspects of teaching may provide feedback on areas that requires improvement leading to teaching excellence (Wilson et al., 1997). More importantly, the feedback is crucial for institutions to engage in the learning process to improve and provide quality provision of teaching (Bowden, 2011). In addition, if a questionnaire like this one is used with peer coaching, experts' consultation and formative feedback or any other relevant assistance are more likely to produce teaching quality and consequently improved learning outcomes and instructional practice (Knol et al., 2013; Knol, et al., 2016; Penny & Coe, 2004; Ulker, 2021). The results yielded from such student evaluations should be used primarily for developmental or formative purposes rather than for summative purposes (Hedges & Webber, 2014; Wolbring & Treischl, 2016), in this way, instructors will be more likely to engage in this feedbacks to inform continuous development.

Implications and Future Recommendations

The study offers several implications for various stakeholders or consumers of research. Firstly, the instrument ARPI may be used to assess university academics' research performance in terms of overall research productivity, research collaborations within the university or country, and collaborations with international researchers and the community. The information may inform the research practices, performance levels, and degree of internationalization of academics' research efforts. The research tool can also be applied to compare academics having foreign PhDs and those with domestic PhDs to ascertain how both groups differ in research dimensions and whether foreign qualifications affect their

transnational research collaborations. This tool is primarily developed to compare foreign returnees' research performance with domestic academics. The comparisons may also be made within the returnees' group to see, for instance, whether returnees from European countries have different research contributions from returnees having doctoral education from Asia or other countries. The resultant information may inform about the functionality of returnees in different domains to produce evidence in the Pakistani context regarding whether scholarships provided to students or faculty members to gain education abroad have any significant effects on their contributions upon return. As the literature indicates, the most influential factor in producing research outcomes is the teachers' higher education and training (Chepkorir, 2018). This achievement is partly conditional on healthy working conditions and an overall support system.

Moreover, the second instrument, SETQ, may also be used for similar purposes in Punjab, Pakistan. The instrument may provide evidence whether the teaching quality of academics having foreign PHDs differs from academics with domestic PhDs. As the instrument is multidimensional, therefore, resultant data will be enriched to compare specific instructional aspects across university status and discipline, in addition to the nature of higher qualifications as perceived by university students. The instrument may also inform university teachers' instructional practice and what areas they need to improve their teaching. Both measures may be applicable across social and natural science disciplines. Based on literature guidelines and a range of indicators included allowed the supposed applicability across these two disciplines. Indicators included in these measures may be considered as shared criteria for both fields in which some indicators could be weighted more in a specific discipline. Therefore, various indicators are included to ensure multidisciplinary applicability (social & natural sciences) and economic administration.

The current study also recommends some research directions in the future based on the limitations. The first instrument, 'APRI,' is only content validated. Therefore, the instrument requires a field test to gauge the ease of administration and respondents' views. Further, largely the focus in this instrument is on assessing the production of documents, participation, associations for journals, and collaboration patterns. Therefore, future studies may include others indicators capturing the impact and quality of the research activity, knowledge, internal and external services of academics, to name a few, as variables in the analysis of academics at cluster or institutional levels. While about the second instrument, the sample is limited to only two public sector universities in Lahore. Thus, results may not be representative of universities located in diverse locations. Therefore, to enhance the generalizability of the instrument, multiple universities situated in diverse locations and a larger number of students may be considered to collect data to confirm or refine the psychometric properties of SETQ.

Moreover, concurrent validity may be assessed of this SETQ instrument with other instruments measuring similar constructs. Finally, to ensure measurement invariance of both

measures across social and natural sciences, studies may confirm whether data confirmed the identical structure in different disciplines. In this way, the generalizability of the measures could be gauged across various disciplines.

Conclusion

The research has developed two instruments, labeled ARPI and SETQ, to assess the academic performance of academics in terms of academic research and teaching quality. Key constructs and relevant indicators were included with the assistance of literature review and experts' suggestions. The ARPI instrument is content validated and comprises 17 items across dimensions of research productivity, domestic research collaboration, and global research collaboration, while SETQ consists of 43 items encompassing seven teaching aspects. Results attested that this instrument has embodied desirable and basic psychometric properties. Taken together, this research underscores the importance of developing instruments about research and teaching performance of academics in the university context and contributes to standard practices of instrument development to assess the academic performance of academics' especially academic returnees (having foreign Ph.D.) in domains of research and teaching in comparison with their domestic counterparts (having domestic Ph.D.). The application and resultant information may additionally contribute to cover research and knowledge gaps that exist in the area of assessment of academics' research and teaching performance in central Punjab, Pakistan context.

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THE APPLICATION OF CIPP MODEL TO EVALUATE ONLINE TEACHING FOR ENGLISH MAJORED PROGRAMS IN VIETNAM DURING THE COVID-19 PANDEMIC

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Abstract

COVID-19 pandemic has had great negative effects on education worldwide. In Vietnam, the teaching situation has been changed a lot due to such impacts. All universities have switched to online teaching to maintain students' learning. The study was conducted to evaluate online teaching activities for English-majored students in universities in Vietnam during COVID 19 pandemic from lecturers' perspectives. In this research, CIPP (Context, Input, Process, product) evaluation model was applied as a framework with the qualitative approach. An in-depth interview was used to collect data with the support of the online course review. The research revealed that universities that educate English-majored students had prepared themselves to react quickly to a sudden change in the teaching context though some issues like online teaching methods and lecturers' ICT skills were, in fact, great challenges for universities to maintain their teaching quality. Teaching online strategies and universities' policies have been proposed as recommendations for better online teaching.

Keywords: evaluation, online teaching, English-majored programs, CIPP model, English-majored program

Introduction

Technology application in education is one of the most important policies of the Ministry of Education and Training (MOET) in Vietnam. Related to this, the year 2009 was chosen to be the "Year of ICT in Education" in Vietnam (Vo, 2019). Training and workshops have been organized to enhance English teachers' ability to integrate technology into education. However, the level of ICT application in language teaching is yet to be desired. According to Pham, Tan, and Lee (2019) and Vo (2019), the ability to use technology to teach the English language is very low among teachers of English in general and English lecturers in particular.

COVID-19 pandemic which has spread widely in the world recently has had impacts on not only the economy but also education. Schools are closed, causing an interruption in teaching and learning. Vietnam has suffered from the two waves of COVID 19. During the first wave in the first quarter of 2020, all school activities stopped for nearly three months and because of the sudden change and the lack of prediction on how long the epidemic would last, not many responses to maintain the teaching and learning were done at that time. Yet, in the second wave of the COVID 19 which began in late July, with better preparation, teaching online has been done widely in Vietnam. However, since the online teaching was implemented in a rush due to sudden disruption, stakeholders would be keen to know about how online teaching was conducted, the challenges faced by the higher education front liners, and whether the method was as effective as the conventional method.

The study focuses on evaluating the online teaching activities during the pandemic in views of lecturers. The research was done at the tertiary level and only for English-majored programs in Vietnamese universities. The research aims at finding answers to the following research questions.
1. What was the new teaching context of the English-majored programs in Vietnam during the COVID-19 pandemic
2. What teaching strategies were used?
3. What difficulties did lecturers face when implementing online teaching?
4. How effective is the process of moving from face-to-face teaching to online teaching from the perspective of lecturers?

The study was conducted with the hope to provide English-majored programs in Vietnam and English lecturers in the university with insights into the implementation of online teaching and suggestions to prepare the programs and their lecturers for better online teaching. It is hoped that the findings will lead to ideas on policies and practices for more effective online teaching not just for the COVID-19 pandemic but also in future disruptive times. Given the uniformity in academic programs in universities in Vietnam, the findings and implications are generalizable to the whole country to a certain extent.

Literature review

Evaluation of educational programs has been a key part of the development of educational programs. All decisions to make any changes in educational programs are based on findings from the evaluation. Many evaluation models such as Tyler's evaluation model (Tyler, 1949),

Countenance evaluation (Stake, 1967), and Context, Input, Process, and Product (CIPP) model (Stufflebeam, 2003) have been formulated for educational improvements. In this study, the CIPP model is selected as a framework because the model has four different dimensions which aim at evaluating various aspects of the implementation of educational programs.

CIPP model

The CIPP evaluation model is "a comprehensive framework for conducting formative and summative evaluations of programs, projects, and evaluation systems" (Stufflebeam, 2003, p. 31). CIPP stands for Context, Input, Process, Product evaluation. This model originated in the late 1960s to "help improve and achieve accountability for federally funded U.S, public school projects, especially those keyed to improving teaching and learning in inner-city school districts." (Stufflebeam, 2014, p. 318). The model was created by Daniel L. Stufflebeam in 1969. It has been further developed throughout the years with revisions in 1971, 1983, and 1985 with the help of Shrinkfield. A lot of researchers like Stufflebeam (1967; 2000), Madaus and Stufflebeam (2000), Stufflebeam and Webster (2000), and Zhang et al., (2011) applied and adapted the CIPP model for evaluation purposes. To guide evaluators in using CIPP, Stufflebeam (2003) developed a detailed checklist for the application of the model. The model is based on "learning by doing" (Stufflebeam, 2014, p.318). It is an ongoing effort to identify and correct mistakes made in evaluation practice, and also a way to invent and test needed new procedures, and remain and incorporate especially effective practices. The focus of the model is to provide the information that will help to regularly assess the program or services and make effective and efficient use of resources, time, and technology to serve beneficiaries appropriately.

As the CIPP's view is that "the most important purpose of the evaluation is not to prove but to improve" (Stufflebeam, 2003, p.31), it is against the views that evaluations should be "inquisitions, on-shot investigations, activities solely conducted by evaluators, or only instruments of accountability for externally funded projects" (Stufflebeam, 2000, p. 283). Yet, the model does not disregard or discount the tendency that some programs or projects, or other services are unworthy of efforts to improve them. The evaluation could stop unneeded or hopelessly flawed programs, projects, or other services. The evaluation also functions as an improvement tool by helping the organization to have better resource allocation towards more worthy efforts. CIPP model has four dimensions: Context, Input, Process, and Product evaluation. Each dimension has its purposes. Although most CIPP evaluation involves the whole CIPP package, each of the Context, Input, Process, and Product dimensions can be evaluated separately.

Context evaluation assesses needs, problems, and opportunities within a defined environment. *Needs* include useful things to fulfill the defensible purpose. *Problems* are "obstacles" that need to be overcome in meeting and continuing to meet targeted needs. *Assets* consist of accessible expertise and services to fulfill the targeted purpose. *Opportunities* include funding programs to support efforts to meet needs and solve associated problems. *Defensible purposes* denote what is yet to be achieved concerning the institution's mission in consideration of ethical and legal standards (Stufflebeam, 2000).

Input evaluation deals with program planning by identifying and assessing alternative approaches and then assessing procedural plans, staffing provisions, and budgets for feasibility, and potential cost-effectiveness to meet targeted needs, and achieve goals. Input evaluation identifies and rates relevant approaches, and helps decision-makers to prepare the selected approach for implementation. Political barriers, financial or legal constraints, and potential resources are what input evaluation is trying to identify. (Stufflebeam, 2000).

Process evaluation is a continuous check on a plan's implementation and documentation of the process. This evaluation type provides feedback on the extent to which staff is carrying out planned activities to a schedule. Process evaluation is also conducted to contrast activities with plans, describe problems, and judge how well the staff has solved them (Stufflebeam, 2000). The purpose of product evaluations is to measure, interpret, and judge outcomes. The main objective of product evaluation is to measure the extent to which the program, services, or organization is evaluated to meet the needs of beneficiaries. Product evaluations also assess intended, unintended and positive, and negative long-term outcomes (Stufflebeam, 2000).

To ensure that this research is manageable in the work volume in the constricted time frame, this research does not consider all the elements of evaluation for each of the dimensions. Instead, as stated in the research questions in the introduction section, the research focuses on only one pertinent question for each of the context, input, process, and product dimensions. Specifically, the context evaluation focuses on the needs of online teaching during the pandemic, the input evaluation focuses on the teaching strategies used by lecturers to cope with the sudden change, the process evaluation focuses on the difficulties faced by lecturers during the implementation of the online teaching, and the product evaluation focuses on whether the online teaching is effective based on the perspective of the lecturers.

English majored programs in Vietnam

English-majored programs in Vietnam are designed according to the framework provided by the Ministry of Education and Training, so they are similar. There are two components of the program: a general knowledge component which involves computer literacy, Physical Education, foreign languages (Korean, Russian, Japanese, etc.), and a professional component which includes English proficiency development, translation and interpretation skill development, English History, Linguistics and so on. The total load for the entire program is approximately 140 credits (Hoang, Pham, & Nguyen, 2018; Vo, 2019). The English-majored programs have been updated continuously to ensure the teaching and learning quality. Integrating technology and applying new teaching strategies such as blended learning and collaborative learning are encouraged in the implementation of the programs (Vo, 2019). Even though with some enhancement in the quality, the programs are found not to keep up with the requirement of the labor market (Hoang et al., 2018).

In addition, according to Vo (2019), English-majored programs in Vietnam have been conducted in a very similar way in most universities in Vietnam. In the programs, developing English proficiency for students is the main focus, so the amount of credits reserved for developing English

proficiency is the largest with approximately one–third of the whole credits. Technology integration is encouraged to use in the implementation of the programs; yet, the level of integration is not as high as expected (Vo, 2019; 2020).

Furthermore, universities in Vietnam are short of high-quality lecturers of English. To solve this issue, the government has organized some fundings to financially support lecturers to get Ph.D. programs not in Vietnam but also English-speaking countries. The policy has gradually helped universities to get rid of the issue of lacking high-quality lecturers of English (Duyen, 2016).

Teaching context during COVID 19 pandemic

In early 2020, COVID-19 began to spread in Vietnam with 16 positive cases. To stop such a pandemic, all universities in Vietnam were closed because the government was afraid that students returning to universities after the Vietnamese traditional New Year holiday may have brought the risks of virus infection during their travel, especially those who came from the North where 16 positive cases were found. As the outbreak happened suddenly when the date of return of teaching and learning to normality was uncertain, universities were not prepared for online teaching and reacted to the changes somewhat slowly. They made use of all that they had at that time to maintain their teaching, which resulted in some effects on the quality of teaching.

Teaching and learning in universities in Vietnam returned to normality in April 2020. Yet, to deal with the sudden change in the mode of teaching (i.e. from face-to-face teaching to online teaching), universities in Vietnam have made lots of preparation regarding facilities, teaching strategies, and ICT skills for lecturers. Unexpectedly, the pandemic occurred again in late July 2020 when all universities were going to begin their new school year. This time, with preparation, universities immediately implemented changes to switch from face-to-face teaching to online teaching. Zoom, MS Teams, Google Meet, and online courses on MOODLE platform have been used to maintain teaching and learning.

Online teaching was applied when the COVID 19 situation was serious and the university quickly returned to normality when COVID 19 cases were reduced. Even though lecturers were better prepared for online teaching, the "on/off" online mode has caused difficulties to the lecturers. First, it was not easy to select a suitable teaching strategy for fully online teaching, especially when lecturers had to deal with online teaching in the middle or at the end of the semester. In addition, lecturers faced lots of difficulties such as a lack of ICT facilities, insufficient ICT skills, and limited knowledge and experience on teaching strategies. Whether online teaching was effective is still a question to be researched through the findings of some recent studies that have addressed the online teaching and learning issues in Vietnam. According to recent research, thoughtful lesson design, constant support, and proactive coping with challenges are what lecturers need to consider for effective online teaching (Nguyen & Nguyen, 2021).

Online teaching

Online education has been a part of all educational systems in the world. Online teaching has become increasingly popular these days during the COVID-19 pandemic. Online learning and

teaching are often perceived as the use of internet-based tools and websites to provide learners with access to materials, interactions with teachers and other students, lessons, and different kinds of online activities like forum discussion, and online assignments or quizzes (Ally, 2008; Krish, 2008).

Asynchronous and synchronous communication modes are often used in online teaching (Craig et al., 2012; Kearns, 2012). Asynchronous mode allows learners to organize their learning at any time convenient to them. This mode often uses emails, chat lists, discussion, forums, blogs, shared documents, and pre-recorded video. Synchronous communication happens at a fixed time and learners need to log in online at the same time. Such interactions are virtual classes or online meetings using Zoom, Google Meet or MS Teams. For complete on-line teaching, the combination of these two modes is commonly applied (Tartavulea et al., 2020).

According to Chickenring and Gamson (1987), the quality of online teaching is associated with seven principles: (1) facilitating interaction between students and faculty academic and non-academic staff; (2) enhancing collaboration among students; (3) encouraging student engagement and active learning; (4) Providing timely and useful feedbacks (5) emphasizing time on task; (6) communicating high expectations and (7) respecting various talents and modes of learning. Comparing these with the context in the Covid-19 pandemic-stricken era, Kennedy and Highman (2021) suggested that the key components for successful online teaching are the needs for social presence, creation of cycles of communication, adaptive learning and learning analytics, the use of learning design, provision of new professional development needs, shifting from traditional to online costing models, and partnership with private providers. The comparison shows a change of needs in line with the shift as a result of the latest technological and economic complexities.

Hung, Chou, Chen, and Own (2010) identified that the quality of online teaching depends on learners' readiness for online learning. The level of learners' readiness for online learning is decided by learners' computer self-efficacy, self-directed learning, learner control, motivation for learning, online communication self-efficacy (Hung et al., 2010). With the sudden change from normal face-to-face teaching and learning to online teaching and learning, it is hard to have a high level of readiness for online learning, especially in developing countries like Vietnam where the living standard and facilities are of great concern (Ergene & Türk Kurtça, 2020; Nguyen, 2015; Rusmiati et al., 2020).

Although Southeast Asia has not been badly affected by the pandemic in 2020 compared to Europe and North America, the higher education sector had made efforts to cope with the impacts of COVID-19 on education. For example, in Malaysia, Azman and Abdullah (2021) found that although online learning policies and practices are considered appropriate, there exists a digital divide that poses challenges to post-COVID-19 teaching and learning. To prepare for the changed scenario for COVID-19 pandemic as well and post-pandemic teaching and learning, they suggested that higher education leaders should take up a new stance in managing institutions, student welfare especially material and psychological needs should be given attention, conventional and online learning should be blended, and flexible approach to academic program structure, curriculum, and assessment should be designed and implemented.

Another study implemented in Sri Lanka showed that its educational setting has very limited resources when the country's facility for online teaching was quite poor. Teachers in Srilanka utilized any kind of resources to maintain their teaching including Zoom, Facebook, or Zalo, resulting in the low efficiency of online teaching (Chandrasinghe et al., 2020). In China where the facility is much better, teachers used both synchronous and asynchronous modes of online teaching to maintain students' learning (Gao & Zhang, 2020).

In Vietnam, Pham and Ho (2020) found that Vietnamese MOET has initiated more support for online learning, and is driving reviews of policies of curriculum and syllabus. They recommended that conventional and online learning be blended to optimize student learning outcomes, and e-learning infrastructure facilities are boosted to support the higher education institutions. A recently published study using the qualitative approach in Vietnam revealed that universities quickly moved from face-to-face teaching to online teaching. Yet, the study focused on administration, school policies, and not much was explored regarding the teaching practice (Nguyen & Nguyen, 2021). Vo (2021) investigated how Vietnamese secondary teachers of English responded to the emergency online teaching. The research which applied the mixed method found that secondary teachers of English utilized various ways from Zalo, emails to tools like Zoom, MS Team, and Google Meet to maintain their teaching. Yet, due to teachers' lack of skills and knowledge, the level of effectiveness of online teaching is low.

Methodology

This study was conducted in a typical university in central Vietnam. The research applied the CIPP model as the framework. The four research questions were designed based on the four CIPP dimensions. Context evaluation is to identify the context of online teaching. Input evaluation is to evaluate strategies used in online teaching. Process evaluation is to recognize challenges lecturers faced when they implemented online teaching. Finally, product evaluation is to evaluate the effectiveness of the online courses. A qualitative approach was selected for the research.

Setting of the research

The research was conducted in Public University (a pseudonym) which educates English-majored students in the center of Vietnam. The total number of students is approximately 2,500. Every year, from 400 to 600 new students are enrolled in the program. When the COVID-19 pandemic broke out in January, the university quickly changed its mode of teaching to online. Yet, due to the lack of preparation, ways to perform online teaching were not consistent. Lecturers chose whatever tools they know for online meetings such as Zoom, Google Meet, and MS Teams. Besides, online courses were used as part of teaching on the university's Learning Management System (LMS). The university's platform has been used for many years to support teaching and learning.

Instruments

In-depth interviews were used in the research because the in-depth interview is useful for collecting deep information. The questions for the interview were prepared in advance. Besides the prepared

questions, additional spontaneous questions had been added during the interview for further information or clarification. To improve the validity of the instrument, a pilot study was conducted with two participants. After the pilot study, the questions of the interview were revised to better serve the study. For triangulation, document analysis was conducted to examine the course plans and online teaching materials in the university LMS.

Research participants

Ten lecturers among whom seven have more than ten years of experience and three have around five years of experience were invited for the interview. They are either Masters or Doctorates in TESOL. Invitation to take part in the research was sent to 15 lecturers. Ten of them agreed to be the research participants.

Data analysis

All the interviews were recorded and transcribed into Word documents. The data was then coded for analysis. Thematic analysis was performed based on the codes generated from the data. To maintain the reliability and validity of the data collection and analysis, member checking was utilized (Merriam, 2009). Specifically, the transcripts were sent to interviewees for checking whether what they expressed in the interview had been accurately transcribed. The codes and themes of the research were also sent to experts and the selected interviewees for checking. Besides, online course plans and teaching materials in the LMS were examined for triangulation.

Findings

A context evaluation

The first component of the CIPP model was applied to identify the new teaching context and problems arising in this new teaching context.

Research question 1: What was the new teaching context of the English major program in Vietnam during the COVID-19 pandemic?

The COVID-19 pandemic began in Vietnam in early January 2020 when the first few cases were found in the north of Vietnam. At that time, all students were preparing to return to universities after the two-week Lunar New Year holiday. On February 3rd, 2020, Public University decided to close its teaching and learning right before the time students needed to come back to the university. However, because this was the first time that the university had to make such a decision and there were no specific guidelines from the Ministry of Education and Training (MOET), the decision on the status of closure of the university was made every two weeks until May 17th.

At the beginning of March, the university realized the need to change its mode of teaching from face-to-face to online teaching. Online classes were organized. Yet, because there was no preparation, both the university and lecturers faced difficulties in implementing online teaching. Lecturers chose to use whatever tool they knew for online meetings like Zoom, Google Meet, MS

Teams. Only more than half of 208 courses were made online in the first two weeks of March 2020 since some lecturers did not have enough ICT skills for their online teaching.

The university, consequently, organized training courses for lecturers to equip them with the necessary skills and knowledge for the implementation of online teaching. Consequently, all courses were promptly created on the university Learning Management System (LMS), and instead of using different kinds of tools for online meetings, MS Teams was selected for all courses' online meetings in Public University.

An input evaluation
Input evaluation was applied to identify strategies used in the online teaching for English-majored students in Vietnam. The teaching strategies or teaching methods play an important role in the success of teaching in both online and face-to-face teaching.

Research question 2: What teaching strategies were used?

Fully-online teaching was first implemented in the English-majored program without preparation. Therefore, the sudden change led to the fact that teaching strategies were not carefully selected by lecturers. Seven out of ten lecturers interviewed admitted that they tried to conduct their online teaching as quickly as possible and they did not have time to think of teaching strategies. They used online meetings for their lectures and created some assignments for their students.

> *"Q: What teaching strategies did you select for your online teaching?*
> *A: Actually, things changed so fast that I just tried to make use of what I know. In my course, I combined online meetings with the online course on LMS.*
> *Q: What tool did you use for your online meeting?*
> *A: In the first two weeks of March, I used Zoom, but after that, I used MS Teams as suggested by our university.*
> *Q: Were there any differences between face-to-face meetings and online ones?*
> *A: A lot of differences. For example, I could not organize group work or pair work. Interactions among students were quite weak.*
> *Q: How about activities on LMS?*
> *A: I created assignments and got students to do them."*
>
> *(Interview with Lecturer 1)*
>
> *"Q: What teaching strategies did you select for your online teaching?*
> *A: Ah, that's a difficult question for me. The quick change from face-to-face teaching to online teaching made me not have enough time for preparation. I followed the university rule to organize online classes using MS Team.*
> *Q: Besides online meetings, have you used any other platforms?*
> *A: LMS, but just to upload documents and assignments...*
>
> *(Interview with Lecturer 5)*

Three other lecturers had specific teaching strategies for their online teaching. Two of them used flipped classrooms for their courses while the third selected project-based learning for the course.

> *"Q: What teaching strategies did you select for your online teaching?*

> *A: I used flipped classroom. You know I uploaded materials for my students to read and they were required to take part in online discussion before online meetings. During online meetings, we had lots of activities to further explore knowledge."*
>
> *(Interview with Lecturer 7)*
>
> *"Q: What teaching strategies did you select for your online teaching?*
> *A: .....flipped classroom is what I use for my class. With this teaching strategy, I have created an interactive online environment for my students with reading and sharing ideas."*
>
> *(Interview with Lecturer 2)*

For the one who applied project-based learning, she used forums for students to share their ideas during projects and received comments from peers.

> *"Q: What teaching strategies did you select for your online teaching?*
> *A: Project-based learning to organize online lessons ."*
> *Q: How did you organize activities?*
> *A: oh, lots of things had been done for the project. I created forums for my students to discuss and share ideas for their projects. Videos and slides were also shared here. "*
>
> *(Interview with Lecturer 4)*

Yet, when the researcher explored this lecturer's online course, the activities on forums were found to be just supplementary activities for face-to-face discussions. The activity cannot be considered a strategy for online teaching. A close look at all online courses created for the online teaching for English majored students revealed that activities on such courses limited themselves to such activities to supplement what cannot be organized in online meetings like discussions and to create a place for students to hand in assignments. All in all, lecturers had switched from normal teaching to urgent online teaching in which online meetings were used to replace face-to-face meetings. Online courses had supplementary activities which cannot be used in online meetings.

A process evaluation

Research question 3: What difficulties were found during the implementation of online teaching?

Process evaluation was used to evaluate the process of implementing online teaching. The research focuses on finding challenges lecturers faced when they had to change their mode of teaching suddenly. Three key themes were identified from the analysis of the interview.

(i)   Pedagogical issues

It is revealed from the data that due to the sudden change, lecturers switched to online teaching by using online meetings on MS Teams and online courses on LMS. Activities like assignments and discussions were created on the LMS course as supplementary activities for what could not be organized in online meetings. Lecturers interviewed encountered difficulties in selecting appropriate teaching strategies. They did not have any experience with online teaching; therefore, they were not confident with their online teaching strategies.

> *"Q: What difficulties did you face when implementing your online teaching?*
> *A: ....Actually, my most concern is how to maintain the quality of teaching. I found it a little difficult when conducting my lessons online. In some of my first lessons, activities like idea sharing were not suitable for online meetings and I did not know how to use my online*

courses to support my online meetings efficiently. If we consider online teaching as online meetings, it is quite easy. But for me, it is more than that"

(Interview with Lecturer 6)

Even the lecturer who has selected a specific teaching method for the online teaching felt that choosing an appropriate technique for online teaching is, in fact, not simple.

"Q: What difficulties did you face when implementing your online teaching?

A: ......I selected project-based learning for my classes and I thought that I would have been successful in conducting my lessons because I have used project-based learning for many years. Yet, differently, it is not easy at all.

Q: Why?

A: Because organizing interactions is very essential in project-based learning, but it is a real challenge in online teaching. Choosing a suitable technique is not easy."

(Interview with Lecturer 4)

As found from the interview, all lecturers shared the concerns of the teaching method for their online teaching. In their view, teaching online requires teachers to have appropriate teaching activities to ensure interaction among students and between students and teachers, student motivation, and to facilitate students' learning.

(ii)   ICT skills

Lack of ICT skills for online teaching emerged as the second challenge in conducting teaching and learning during the pandemic. Five lecturers shared the idea that their limited ICT skills prevented them from organizing effective online teaching. They wanted to have some activities for their lessons but did not know how to create them on online courses and it took them a lot of time to conduct online teaching. Managing a language class of approximately 40 students in online teaching requires much time and effort, especially when teachers are not good at ICT.

"Q: What difficulties did you face when implementing your online teaching?

A: My computer skills are not good, so I find it difficult to conduct my online courses and it is very tiring when I have to spend hours using the computer.

(Interview with Lecturer 10)

"Q: What difficulties did you face when implementing your online teaching?

A: To be honest, I have been anxious when required to use MS team and LMS. I haven't used those tools before, but luckily the university organized some training, so I can use them. Yet, I am not confident in using them......."

(Interview with Lecturer 3)

The other five lecturers are more computationally efficient. They shared that they were able to quickly catch up with new changes and implement their online teaching before the university required the switch from normal teaching to online teaching. Therefore, their students' learning was not interrupted.

"Q: How about ICT skills?

A: It's not the matter with me. I believe that I have enough computer skills to organize online lessons (smile)...I am familiar with tools like Zoom, MS Team and also know how to use Quizlet, Jamboard, or Padlet to make my lessons more interesting and interactive...."

(Interview with Lecturer 4)

> *".....I believe that I have enough ability to implement my online lessons. Before the pandemic, I often spend time equipping myself with ICT skills. I have used LMS courses to support my teaching for years, so I have no difficulties in online teaching"*
>
> *(Interview with Lecturer 2)*

(iii)   Facilities

As the COVID-19 pandemic occurred suddenly, the university just made use of what it had at that time. Fortunately, the university has a strong internet connection, well-equipped computer rooms, and a modern studio. The university supported lecturers by providing them with chances to use the university's equipment for their online teaching. Yet, some lecturers had to be isolated at home because they risked being infected by COVID-19, or their areas were shut down. They could not have enough time to update their facilities at home for online teaching.

> *"Q: What difficulties did you face when implementing your online teaching?*
> *A: ....in addition, my home wifi is weak, so I cannot have well-qualified online meetings. It takes me much time to deal with activities on the LMS course and my online classes are sometimes interrupted due to poor internet connection."*
>
> *(Interview with Lecturer 10)*
>
> *"Q: What difficulties did you face when implementing your online teaching?*
> *A; ....My laptop is old, so I cannot use the camera in my teaching. I have to change my class schedule from morning to night, so I have to use my husband's laptop for my teaching for some time before buying a new one."*
>
> *(Interview with Lecturer 8)*

In sum, the most serious challenge that lecturers encountered was pedagogical issues, followed by a lack of ICT skills. These difficulties were compounded by the lack of ICT facilities.

A Product evaluation

Product evaluation was conducted to find out how effective is the online teaching implemented by the English teaching program.

Research question 4: How effective was the online teaching in the English-majored program in the perception of lecturers from the perspective of the lecturers?

Teaching quality is always the key point of any educational program. When switching from normal teaching to online teaching, lecturers were all concerned about how to maintain their teaching quality.

> *"Q: How effective was your online teaching?*
> *A: I tried to maintain the quality of my course, but to be honest I do not think that I was able to keep it*
> *Q; In comparison with your normal teaching, how much could you keep the quality?*
> *A: Uhm, just around 70-80% of the normal one."*
>
> *(Interview with Lecturer 9)*

Lecturer 10 responded that she did not expect that her course was as effective as usual because she could not get students to be involved in their learning due to constraints of online teaching in

comparison with face-to-face one. She had to omit some of the activities in her lessons, so it was hard for her to stimulate students' learning.

> "Q: How effective was your online teaching?
> A: Due to constraints in online teaching, I cannot have lessons as efficient as I expect. Interactions among students and between students and teachers are limited. I am trying to gradually improve my online teaching by using online tools. But I need time for learning to use new tools."
>
> (Interview with Lecturer 10)

Generally, the level of effectiveness was perceived relatively high by all lecturers interviewed.

Discussion

Teaching context

Due to COVID-19, online teaching was suddenly used to replace face-to-face teaching in English-majored programs in the university. In countries like Saudi Arabia, Indonesia, China, India, Sri Lanka, Romania, and Vietnam which were severely affected by COVID 19, schools and universities reacted quickly to the change, by moving from face-to-face teaching to online teaching (Atmojo & Nugroho, 2020; Chandrasinghe et al., 2020; Gao & Zhang, 2020; Mohamad et al., 2020; Al-Mohair & Alwahaishi, 2020; Tartavulea et al., 2020). In such context, schools and universities did not have sufficient time for preparation, and therefore maintaining the quality of teaching is a great concern.

Teaching strategies

In Vietnamese English-majored programs, teaching methods for online teaching were selected by lecturers based on the available teaching strategies. As revealed from the findings, lecturers did not have sufficient time for their selection of methods for their online teaching practices. LMS was used in Vietnamese English-majored programs as a platform for online courses and MS Teams was a basic tool for virtual classes. Not all lecturers have specific teaching strategies for their classes. A combination between synchronous mode and asynchronous mode of teaching was found in English-majored programs when the COVID-19 outbreak occurred for over two months.

The reality was also seen in other countries where the online teaching environment was fast created. Teachers use different applications and platforms for their online teaching like learning management systems, chat and message, video conference, content maker, video streaming and sharing, online learner provider (Atmojo & Nugroho, 2020; Al-Mohair & Alwahaishi, 2020; Gao & Zhang, 2020 Tartavulea et al., 2020). The teaching mode selected was synchronous. According to Atmojo and Nugroho (2020), activities carried out by teachers are similar to those in face-to-face classes. Teachers simply move from face-to-face class. There is no consideration of the differences between face-to-face teaching and online teaching. In other words, teaching strategies were not suitable for online teaching.

In a recent study in 13 European countries, passive delivery of lessons and reduced interaction were found in online classes. The only method employed is sending class materials, online and video conferencing (Tartavulea et al., 2020). The COVID-19 crisis forced schools and universities to quickly accept some online tools and platforms for an abrupt switch to online teaching. Therefore, teaching strategies are not appropriately considered in the situation. According to Vo (2021), teachers of English in Vietnam lacked pedagogical knowledge for their online teaching, confusing selecting teaching strategies.

Difficulties in implementing online teaching

Pedagogical content decides the success of teaching practice. When conducting online teaching, teachers have challenges in choosing an appropriate teaching method for their lessons. This is especially difficult when the change to online was made very suddenly, and when teachers do not have sufficient time to build up the lesson with suitable pedagogical content (Chandrasinghe et al., 2020; Mohamad et al., 2020).

In addition, the lack of proper training is considered to be a barrier for teachers when conducting online teaching (Pelgrum, 2001). Teachers may find it uncomfortable to teach remotely, especially when they are not trained on time for online teaching. They have to spend more time familiarising themselves with ICT skills not only for their teaching but also for supporting their students to deal with technical issues. The lack of facilities is also identified as an obstacle to remote teaching. Insufficient hardware and software, the low quality of the internet, and the lack of equipment for online teaching are very common factors causing difficulties to teachers when they have online teaching (Atmojo & Nugroho, 2020; Mohamad et al., 2020).

Effectiveness of online teaching

The abrupt switch to online teaching affects the quality of teaching to certain extents. The effectiveness of teaching and learning is based on collaboration and interaction among students, student engagement in the lesson, timely feedback, and diverse learning activities (Chickenring & Gamson, 1987; Gorsky & Blau, 2009). As revealed from recent studies, the overall effectiveness of the online educational experience is lower than in the case of face-to-face teaching because it is difficult to ensure interaction and active learning (Atmojo & Nugroho, 2020; Mohamad et al., 2020; Tartavulea et al., 2020).

According to Tartavulea et al., (2020), the outcome of online teaching is not as good as face-to-face teaching when the readiness of online teaching is insufficient, especially in a developing country like Vietnam where technological availability has low quality. The whole program is not prepared to function towards the intended objectives.

Implications, Recommendations, and Conclusion

It is implied from the research that to ensure the quality of online teaching in English-majored programs in particular, and in education in general, good preparation should be made regarding seven principles to ensure the online teaching quality as stated in Section 2.4 (Chickenring & Gamson, 1987). First of all, program designers should consider making changes to the intended

curriculum so that their activities are appropriate for online teaching. Teaching strategies that are suitable for online teaching should be co-opted in the programs. More specifically, supplementary online courses should be created for all courses so that an effective online learning environment is ready to be used for ensuring collaboration among students, encouraging student engagement, active learning in an online environment (Kenedy & Highman, 2021). Additionally, teaching strategies such as blending conventional and online learning methods should be encouraged to suit various talents and modes of learning (University of Edinburgh, 2020; Pham and Ho, 2014).

Secondly, lecturers need to be equipped with both technological skills and methodological knowledge. Instant training for ICT skills as well as pedagogical content should be provided for lecturers. The level of technology use in teaching among lecturers needs to be enhanced through training courses and workshops. Besides, the university should ensure that sufficient and capable technical staff be made readily available to support lecturers, especially in case they encounter technical issues. In addition, equipment for virtual classes needs to be invested to support lecturers who do not have adequate home conditions and facilities for online teaching. Furthermore, as discussed in Section 2.4, the level of learners' readiness for online learning is not high due to the lack of preparation (Hung et al., 2010). Therefore, lecturers should be provided with training on how to increase learners' motivation and learners' self-directed learning. Lecturers should be ICT literate enough to support learners with technological issues that may arise during lessons.

Additionally, technology integration should be included in the curriculum of future teacher training and education programs so that teachers and lecturers are better prepared for online teaching. One of the professions that the graduates of English–majored students pursue is education. When pre-service teachers have good methodological knowledge and skills for virtual classes, the quality of online teaching can be ensured (Vo, Pang, & Lee, 2020).

Furthermore, with the change in the mode of teaching and learning, assessment policies should be established and practices should be adjusted not only to promote effective assessment as learning and assessment for learning but also to justify the validity of the scores of assessment of learning. To establish this for the university, *Guidelines for Remote Learning Assessment* established by Universiti Utara Malaysia (2020) and *USM Online Assessment Guidelines for Remote Teaching* of Universiti Sains Malaysia (2020) can be used as examples.

To increase the effectiveness of online teaching, better preparations such as program review and evaluation, suitable teaching strategies, ICT skills, and facility issues should be made available for more efficient online teaching. First of all, the evaluation of the implementation of online teaching should be done to find out what should be made for better online teaching and learning. Secondly, lecturers should be given more opportunities for training so that they can acquire better knowledge and skills to use technology in language learning appropriately. Furthermore, English-majored programs need to incorporate more technology integration.

To sum up, the COVID-19 outbreak forced English-majored programs to move their mode of teaching from face-to-face to online. Such an abrupt change brought both universities and lecturers challenges regarding methodological, technical, and facilities issues. As shown from the research, lecturers found it difficult to select appropriate teaching strategies for their online courses. In addition, teaching conditions also impacted the quality of teaching. Due to strict standard operating

procedures caused by COVID-19, the university could not support lecturers as much as it should be.

Limitations of the Research

Due to the time constraints, the study which applied the CIPP model focusing on the evaluation regarding the teaching context for context evaluation, strategies for input evaluation, difficulties during implementation for process evaluation, and effectiveness of the online teaching for product evaluation. Further evaluation studies using the same model can explore elements of context, input, process, and products for a thorough understanding of online teaching in Vietnam.

In addition, the evaluation was conducted at one institution with a limited number of participants using a qualitative method. This may cause an issue with the reliability of the findings. Further multimethod research involving a larger number of participants will provide a comprehensive picture of the context, input, process, and products of online teaching at the tertiary level in Vietnam.

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THE DETERMINANTS OF ENTREPRENEURIAL INTENTION: TEAM LEARNING, TEAM PERFORMANCE, PSYCHOLOGICAL SAFETY AND SELF-REGULATED LEARNING AS MODERATING EFFECT, AND PERCEIVED BEHAVIORAL CONTROL AS MEDIATING EFFECT

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ABSTRACT

Entrepreneurship education is increasingly showing its role in forming entrepreneurs. The current study proposed and tested an integrative multi-perspective framework to identify the entrepreneurial intention amongst undergraduate students of 5 different universities who attending a project-based course of entrepreneurship in Surabaya. The main purpose of this study was to identify the interrelations among psychological safety toward entrepreneurship education process through team learning and team performance perceived behavioral control, self–regulated learning, and entrepreneurial intention using structural equations modeling in which the dimensions of these constructs were disentangled and treated as latent variables that were indirectly inferred from multiple indicators. The sample of the study consisted of 500 undergraduate students attending 5 universities in Surabaya, Indonesia. The results suggest that the entrepreneurship intention components do affect PBC respectively, the antecedent variables are also interrelated with each other. The empirical analysis supports all the hypotheses that the entrepreneurial intention of students is determined and this finding implies that psychological safety and self–regulating learning are moderators of the entrepreneurial intention-action translation. We outline implications for entrepreneurship literature and educators. We encourage educators to nurture the personality traits of students to develop their personality to be more proactive, so they can achieve more progress also emphasize nurturing the entrepreneurial intention of students in a systematic way. For students who felt not good in the project, we considered this as a positive outcome of entrepreneurship education, so they can decide to enter a managerial professional career.

Keywords: Entrepreneurship Education (EE), Team Learning, Team Performance, Psychological Safety, Perceived Behavioral Control (PBC), Self – regulated Learning (SRL), Entrepreneurial intention (EI)

Introduction

Recently the graduates and students must realize they cannot expect that large companies and stable jobs will provide wealth, homes, and health care (Kirby 2004). Therefore, graduates need to be equipped with a broader range of marketable skills in an environment where entrepreneurial ventures are considered as determinants to create innovation and economic growth. General perspective presumes by having well-designed entrepreneurship curricula and experiences, students increase their knowledge and abilities. Rasmussen and Sørheim (2006) stated that universities contribute through the education of aspiring entrepreneurs, directly through the commercialization of research, as well as by becoming a nursery for new ventures. Kolvereid and Moen (1997) found that graduates with a major in entrepreneurship were more likely to start new businesses and had stronger entrepreneurial intentions than other graduates. Research in the field of entrepreneurship has shown that the presence of role models is essential for entrepreneurial aspirations and achievements (Green & Pryde, 1990). University-based enterprise creation is increasingly recognized as an activity that has the potential to be facilitated through special entrepreneurship education.

Being an entrepreneur can mean many things to many people. The general conception according to Gartner (1990) is that entrepreneurship is about individual entrepreneurs who create innovative organizations that foster and create value, both to seek profit or not. Although there is still some question as to whether entrepreneurs are born or made and other uncertainties such as whether entrepreneurship is a set of principles, terms, a set of attributes, or a mindset that make one opportunistic, competitive, proactive, risk-tolerant, autonomous, and innovative (Henry, et al. 2005b; Kirby 2004). Teaching entrepreneurship to students from different fields of study and with different levels of education may be more challenging than teaching students from the same field of study and with the same level of education. Moreover, the impact of entrepreneurship education on a student's entrepreneurial skills and EI might vary considerably, depending on the student's characteristics, including their field of study and educational level (Fayolle and Gailly 2015; Maresch et al.2016).

The objective of this paper is to unfold a new conceptual perspective that emphasizes learning-method through teamwork and involves the psychological side of each individual amongst students and the prospecting of students' aptitude for entrepreneurship career. In this view, entrepreneurship education through team learning and team performance approach in the project-based course of entrepreneurship education somehow enhances students' willingness to become entrepreneurs, then allows students to assess thoroughly whether they should pursue an entrepreneurial career.

Secondly, we examined the contribution of moderation factors from which individual learning or team learning influences the achievement of team performance's outcomes in the project-based

entrepreneurship course to inspire students to run their venture in the future. Then we investigate how one's belief shapes their attitudes and behaviors to improve our understanding of entrepreneurial intention formed, thus determining which dimensions of the antecedent variables should be addressed and enhanced toward fostering the intention to launch a business venture. In addition to assisting educators to develop effective learning strategies and curricula, and lecturers and coaches design effective approaches for their students.

Lastly, we also propose that a deceiving viewpoint to solely focus on start-up propensity. To come to a comprehensive assessment of how entrepreneurship education impacts on entrepreneurial intention of students, the gains from improved matching between students and career paths need to be considered. Giving clear advice and suggestion to non-entrepreneurial individuals that they are not well-suited for start-up activities could be a valuable insight as confirming and strengthening entrepreneurial tendencies in other students who are enthusiasts to set up their venture. We think that this approach is not only appropriate conceptually, it is also ethically the right route to take.

Literature Review and Hypotheses

Psychological Safety

According to Kahn (1990), PS is an individual's ability to express themselves without any concern of the negative impact of personal image, status, or career. He identified extensively four factors to psychological safety: interpersonal relationships, group dynamics, leadership, and organizational norms. Anshori et al. (2019) defined it as a condition where a person's positive emotions that help a person to build psychological, social, and physical resources. Inspired from Edmonson's study in 1999, it is a shared belief that the team is safe for interpersonal risk-taking. In this regard, the authors are interested in exploring the PS impact in project-based courses in entrepreneurship education.

From what we observed in the entrepreneurship education process, the personality trait of students is a strong determinant such as self-expression, risk-taking, and their learning as individuals. How some of them have the great initiative to get involved in the group, in the classroom, and practice sessions. Where they are eager to solve the project in entrepreneurship. We also predict, this proactive trait leads to other personality constructs like emotional stability and being open to new things and experiences. Chan (2006) posited that those with more proactive personalities are less likely to perceive a situation as being psychologically unsafe—even if contextual factors suggest otherwise. In entrepreneurship class, lecturers frequently give students special assignments, such as developing business ideas and making this idea be a student's project in a group context. Weekly they need to report their progress to lecturers as their mentors and sometimes invite external mentors or practitioners.

In the group of entrepreneurship subjects, some students indicated certain traits like they are more open to new ideas and accepting different perspectives of doing their assignment inclined to feel safe in taking risks and exposing their vulnerabilities in a team environment and the classroom. This is in line with Edmondson and Mogelof's findings in 2005, in the work environment context. Campos et al. (2017) explained that a psychology-based personal entrepreneurship teaching model (which teaches a proactive mindset and focuses on entrepreneurial behavior) has been more successful than a traditional entrepreneurship teaching model. He found a statistically significant and positive impact of psychology-based personal entrepreneurship teaching models on the profit of start-ups, compared to traditional entrepreneurship teaching.

Many universities in Surabaya implement project-based entrepreneurship courses, where students have to work in a team begin with idea generation exercises, working on real case studies, the creation of start-ups, feasibility studies, consulting projects with their mentor or lecturers, entrepreneur interviews, guest speakers, pitches, and simulations (Kassean et al. 2015), and targeting their project take–off at the end of the course. From Pittaway et al. (2011), students can deepen their entrepreneurial skills through learning-by-doing and experiential learning, as suggested in several works (e.g.,). Hill et al. (2014) show that the learning process as a team can be more effective than learning by each individual as there are chances to merge a diversity of knowledge, experiences, and perspectives amongst team members. When students make a mistake in their learning orientation in a group, they can take this crucial experience as part of their self–development. A team with good performance in the project-based entrepreneurship course relatively has a big portion of team learning as well as their psychological safety. According to the finding from previous research on groups-based experiential learning in Entrepreneurship class, the authors revealed the relationship between team learning and team performance is higher when psychological safety is high, respectively lower when psychological safety is low. We predict psychological safety able to strengthen the relationship of team learning with team performance. We put forth the following hypothesis:

H1. Psychological safety has positive moderation on the relationship between team learning and team performance

Team Learning and Team Performance on Entrepreneurial Intention

Learning orientation is a stable dispositional construct that has a character on increasing one's competence and new skills development (Dweck, 1986). Kayes et al. (2005) argue that teams that explicitly and systematically address teamwork challenges through TL can improve team performance. The evaluation process in the project-based learning entrepreneurship course is by asking the teams to present and prove the results of their targeting progress. In the learning process within the team, several social processes may keep a team from being effective, such as overdependence on a leader, groupthink, diffusion of responsibility, loafing, and others, that need

to be addressed if a team wants to perform well. Using Fiore's (2019) survey on entrepreneurship courses in Italy. For team learning, we evaluate students' extent to integrate themselves into their team, expressing and sharing their idea with their peers, how they manage the differences of their peer's thoughts, and how well their working with different fields of study could affect their determination and desire to become an entrepreneur. From what they experience in team learning they can figure themselves in the future about their tendency to choose entrepreneur as their career option. When the team learning runs well and they are capable of dealing with those obstacles, students are enthusiastic to pursue a career as an entrepreneur or create a start-up business.

This implies that students are active participants. Students with high initiative would enact change, identify and detect problems, subsequently do problem-solving (Crant, 2000; Seibert, Crant, & Kraimer, 1999). As such, the psychologically unsafe situations would unlikely be gotten through by students with more proactive personalities—even if contextual factors suggest otherwise (Chan, 2006). Several personality traits related to learning, risk-taking, and self-expression have been posited to impact psychological safety.

To what extent are the students able to work with multidisciplinary background peers in their teamwork and collaboration, we predict there is a high possibility for them to run their venture in the future. How far can they exchange ideas, thoughts, opinions in their team and are ready to deal and manage differences and contrasts in problem-solving and teamwork of their project and assignment? Then the step of integrating themselves within the team, how well they immerse themselves as a team member could leverage them to start their own business.

We can define team performance from a concept that a team in entrepreneurial is 'two or more individuals, interacting and interdependent, who have come together to achieve particular objectives regarding commitment to a venture's future and success; whose work is interdependent in the pursuit of common goals and venture success; who are accountable to the entrepreneurial team and for the venture'' (Robbins and Judge, 2008).

On the other hand team performance assessment, we surveyed the participants regarding their performance in running their project and assignment in their entrepreneurship course as a team. This includes how skillful students in creating new products or services would motivate them to create their firm, manage innovation within a team project, the ability to execute integrative marketing plans, build up a professional network, identify new business opportunities and achievements and succeed in their business project-based learning entrepreneurship course to trigger their goals and plan to seriously start their venture. How well they innovate and manage it in their project could lead them to open their own business. The ability to interact with other prospective business partners, external mentors, potential suppliers, and how well they manage these relationships efficiently, would enhance their plan to seriously start a venture.

In the context of an experiential classroom, teams that execute Team Learning processes well should come up with solutions that are both valued highly by teachers and external clients. Second, TL can focus on team processes. This is an inside perspective on TL. Team learning can focus on team processes. This is an inside perspective on TL. When team learning is associated with entrepreneurial intention, we can see that person's future behavior is preceded by intention: the stronger a person's intention to engage in a specific behavior, the more likely it is that the actual behavior will be performed. Furthermore, the intention to perform a given behavior is the result of three cognitive antecedents: (i) attitude toward behavior; (ii) subjective norms; and (iii) perceived behavioral control. we propose the following hypothesis:

H2a. Team Learning has a positive effect on entrepreneurial intention
H2b. Team performance has a positive effect on entrepreneurial intention

The Mediating Effect of PBC on the relationship between TL and entrepreneurial intention and between TP and entrepreneurial intention

Perceived behavioral control is defined by Sun et al. (2017) as beliefs about the control over an entrepreneurial behavior in terms of entrepreneurial skills, knowledge, resources, or opportunity. This factor relates to the perceived capability (i.e., self-efficacy) of an individual to perform the entrepreneurial behaviors. The construct of self-efficacy is an individual's perception of his or her capability to execute a set of actions required to perform the behavior that exists (Bandura, 1986; Swan et al., 2007) with potential situations (Bandura, 1982).

From Ajzen (2002), PBC has two factors: self-efficacy and perceived controllability. Self-efficacy covers the factors of internal control such as knowledge and skills and reflects one's perception about the ease or difficulty of performing certain behavior, as well as one's confidence in his or her ability to commit the behavior. In contrast, perceived controllability involves external control factors, such as opportunities, potential barriers resources, and represents one's perception that the behavior implementation is completely determined by him or her. In this situation, we investigate how perceived behavioral control could intervene in the set of actions of students in executing their team learning activities. We predict that team learning can strengthen one's intention to pursue an entrepreneurship career. Then we also inspect the courses of action in team performance such as creating new products and services, their innovation management, networking, identifying new opportunities in business on their intention to start their venture. The team learning and team performance that encompasses social cognitive approach, skills, and abilities can improve students' perceived behavioral control. According to Bandura (1986), these are fundamental sources of self-efficacy development (self-capability). Across a variety of settings, perceived self-efficacy and affective attitude turned out to have a stronger relationship with intention as compared to perceived controllability (Ajzen, 2002; Armitage & Conner, 2001; Huang & Chen, 2015; Kraft et al., 2005).

From team performance assessment results, we observed that the students need required competencies, abilities, skills, self-efficacy, and resources to overcome the uncertainties and control their entrepreneurial actions to succeed. The higher the perception of one's undertaking behavior in executing the team performance assessment, the higher level that the control is perceived, the more positive evaluation of the entrepreneurial intention will result. Kautonen et al. (2015) then Lüthje and Franke, (2003) had proved that PBC is positively affecting the entrepreneurial intention of students. This brings us to propose H3a and H3b also H5 as follow:

H3a. PBC mediates the effect of team performance on entrepreneurial intention
H3b. PBC mediates the effect of team learning on entrepreneurial intention
H5. PBC has a positive effect on Entrepreneurial Intention

The Moderation Effect of Self-Regulated Learning on the relationship between TL and entrepreneurial intention and between TP and entrepreneurial intention

Self-regulated learning (SRL) is one of the courses from self-regulation and is in tune closely with educational aims (Burman et al. 2015). Broadly speaking, it refers to learning that is guided by *metacognition* (thinking about one's thinking), *strategic action* (planning, monitoring, and evaluating personal progress against a standard), and *motivation to learn* (Perry et al. (2006), Winne et al. (2000), Butler et al. (1995).

According to Zimmerman (1989, p. 329) the definition of self-regulated learning is "students initiat[ing] and direct[ing] their efforts personally to obtain knowledge and skills, instead of relying on . . . agents of instruction". In carrying out 'complex assignment' self-regulated learning enables students to select methods independently (Zimmerman, 2002, p. 69), to prepare them to engage in "long-term creative projects" (p. 66). Educators seeking to inculcate self-regulated learning processes may encourage students to set goals, manage their time effectively, evaluate their learning, seek appropriate assistance, and alter their self-perception toward a sense of self-efficacy (Zimmerman, 2002, p. 64). About the establishing of entrepreneurial intentions amongst students, a lot of studies still have not explored more deeply related to the moderation effect of SRL in the learning process within a team and its performance in completing the project, especially in the project-based learning entrepreneurship course.
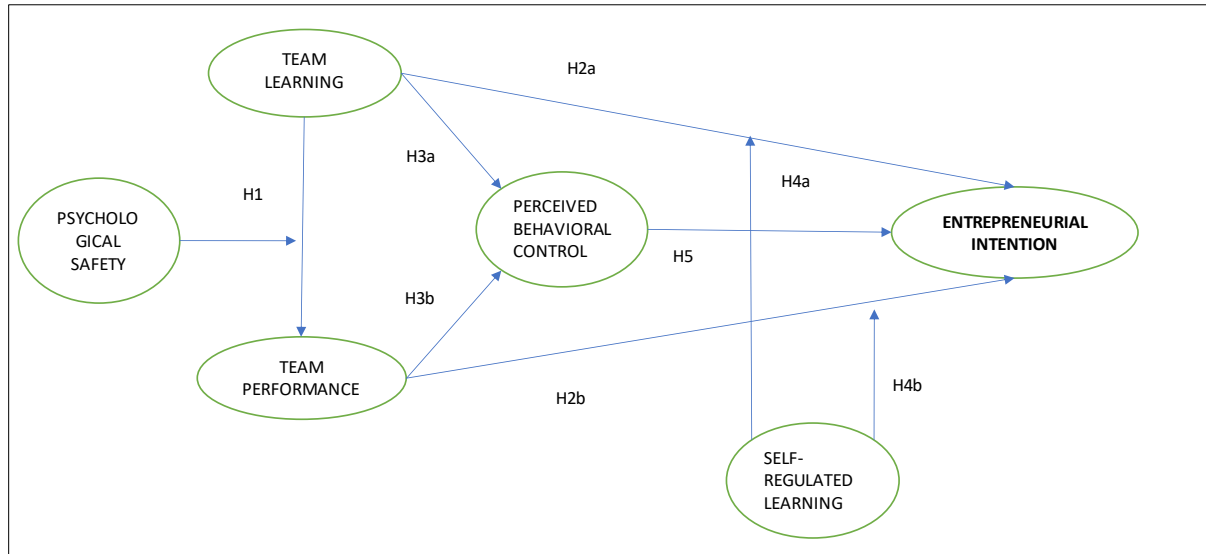
Figure 1: Research Model

Cheng (2011) states that SRL is effective in increasing academic performance. He states "if learners do not have [SRL] abilities, they learn by depending on the guidance and monitoring of others and fail to achieve a high level of learning". Project-based learning entrepreneurship course intended to help students develop their skills and competencies to seize entrepreneurial opportunities. In the process of strategic action in SRL, Laguna (2013), Harm (2014), Brandstätter (2011) identified that self-efficacy in each individual contributes to the team performance as well the success and entrepreneurial creation. There are sequences in the process of learning, initially, learners assess their strengths and weaknesses concerning a specific learning task. Second, learners execute strategic planning and goal setting about mostly self-chosen learning goals. Third, learners implement their learning strategy and continuously monitor its effectiveness. Finally, learners compare the actual final learning outcome with the intended learning outcome. In the context of team performance assessment as follow creating new products and services, their innovation management, networking, identifying new opportunities in business, we assume that SRL has positive moderation on the effect of team learning on entrepreneurial intention of students, as well as in team performance's impact on entrepreneurial intention. So, we propose the following hypotheses:

H4a. Self-regulated learning has positive moderation on the relationship between team performance and students EI (Entrepreneurial Intention)
H4b. Self-regulated learning has positive moderation on the relationship between team learning and students EI (Entrepreneurial Intention)

Method

Sample and data collection

The hypotheses of this cross-sectional study were tested using a convenience sample of 500 undergraduate students attending 5 different universities in Surabaya, Indonesia. Data were collected from the 3rd year and 2nd year students who participated and in the 4th year students who have completed their project-based course of entrepreneurship. The range of age was 17 – 24 years old. Before the analyses were performed, data were checked and cleaned for missing data and out-of-range values or non-permitted values in the instrument. The investigation was utilized with quantitative methods and saturated techniques. Both dependent and independent variables were collected by different methods and at different times, there is little concern for common method bias in this study. This study focuses on strategies that help to avoid CMB (common method bias) in the first place. To reduce testing doubtfulness, we assured that the respondent's answer would be anonymous (Podsakoff et al. 2003)

Measures

The survey questionnaire was prepared based on validated and reliable measurement scales found in the literature. The items of the questionnaire along with their sources and their theoretically designated factors are presented in the Appendix. All items were measured on a 5-point Likert scale ranging from "1 = total disagreement" to "5 = total agreement." A high score on an item indicated a high degree of agreement with the statement; a high score on a factor indicated more of the construct.

Statistical analyses
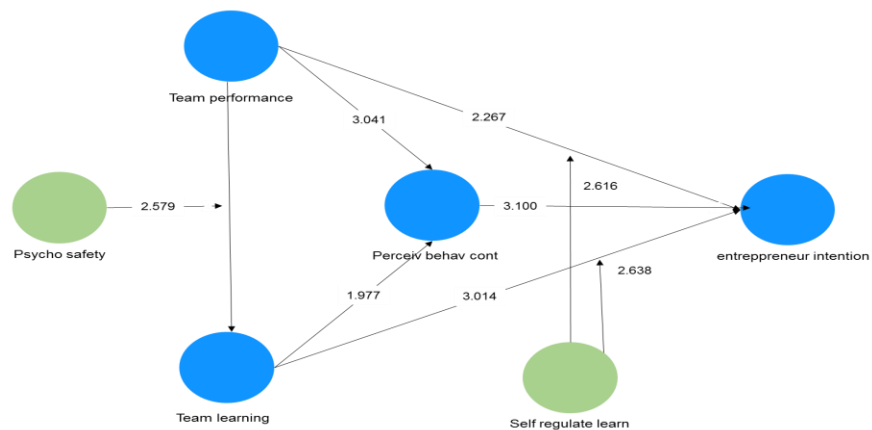
Figure 2: Inner Model

Table 1: Respondent Characteristics

Demographics	Frequency	Percentage
University		
UNAIR	100	100%
ITS	100	100%
UNESA	100	100%
UPN	100	100%
UC	100	100%
Total	**500**	**100%**
Gender		
Male	212	42,4%
Female	288	57,6%
Total	**500**	**100%**
Age		
17 Years	6	1,2%
18 Years	56	11,2%
19 Years	76	15.2%
20 Years	94	18,8%
21 Years	126	25,2%
22 Years	74	14,8%
23 Years	35	7%
24 Years	33	6,6%
Total	**500**	**100%**

The hypotheses of our study were tested employing the partial least squares (PLS) structural equation modeling (SEM) technique with SmartPLS-version. A two-step approach of SEM was adopted for the study. PLS-SEM is a two-step process involving assessment of the measurement and structural model (Anderson and Gerbing, 1988). First, the measurement model should be assessed by examining the internal consistency reliability, convergent validity (CV), and discriminant validity (DV) (Chin, 1998).

Validity and Reliability Test

Ghozali (2016) used convergent validity to measure the validity of an indicator, According to Chin (1998) that in convergent validity: the outer model has fulfilled the convergence validity requirement for reflective construct when loading factor > 0.6 can be said to be valid. The results of this study explain that all constructs on the validity and reliability tests show valid results.

Table 2: Construct Validity Outer Loading Results

	Item	Outer Loading	Data Description
Moderating Effect	Moderating Physio	1.000	Valid
	Moderation self-regulated learning 1	1.000	Valid
	Moderating self-regulated learning 2	1.000	Valid
Psychological Safety	PS1	0.940	Valid
	PS2	0.800	Valid
	PS3	0.886	Valid
	PS4	0.612	Valid
	PS5	0.878	Valid
Team Learning	TL1	0.797	Valid
	TL2	0/626	Valid
	TL3	0.894	Valid
	TL4	0.921	Valid

Team Performance	TP1	0.786	Valid
	TP2	0.879	Valid
	TP3	0.874	Valid
	TP4	0.854	Valid
	TP5	0.830	Valid
	TP6	0.869	Valid
Perceived Behavioral Control	PBC1	0.857	Valid
	PBC2	0.799	Valid
	PBC3	0.906	Valid
	PBC4	0.830	Valid
	PBC5	0.840	Valid
	PBC6	0.832	Valid
	PBC7	0.890	Valid
	PBC8	0.703	Valid
	PBC9	0.798	Valid
Self Regulated Learning	SRL1	0.746	Valid
	SRL2	0.881	Valid
	SRL3	0.799	Valid
	SRL4	0.860	Valid
	SRL5	0.871	Valid
	SRL6	0.807	Valid
Entrepreneurial Intention	EI1	0.911	Valid
	EI2	0.827	Valid
	EI3	0.712	Valid
	EI4	0.921	Valid

The next step is to test discriminant validity. Discriminant validity is a test used to determine whether a variable has an adequate discriminant, namely by comparing the loading value on the intended variable, it must be greater than the loading value of other variables.

Table 3: Discriminant Validity

	Psycho Safety	Team Learning	Team Performance	Perceived Behavioral Control	Self Regulated Learning	Entreprene ur Intention	Moderating Physco	Moderatin self regulated learning 1	Moderating self regulated learning 2
Psycho Safety	0.894								
Team Learning	0.770	0.813							
Team Performance	0.461	0.622	0.833						
Perceived Behavioral Control	0.650	0.656	0.829	0.812					
Self Regulated Learning	0.559	0.542	0.765	0.582	0.876				
Entrepreneur Intention	0.701	0.632	0.673	0.672	0.735	0.868			
Moderating Physco	0.698	0.579	0.525	0.620	0.672	0.689	1.000		
Moderatin self regulated learning 1	0.742	0.768	0.647	0.752	0.741	0.790	0.862	1.000	
Moderating self regulated learning 2	0.661	0.682	0.611	0.593	0.623	0.601	0.761	0.801	1.000

The next step is the measurement of the AVE value can be used to compare each construct with the correlation between other constructs in the model. The AVE value must have a value > 0.5 (Latan and Ghozali, 2014).

Table 4: Construct Validity AVE Results

Variable	AVE	Criteria
Moderating Psycho Safety	1.000	Valid
Moderation self-regulated learning 1	1.000	Valid
Moderating self-regulated learning 2	1.000	Valid
Psycho Safety	0.691	Valid
Team Learning	0.669	Valid
Team Performance	0.721	Valid
Perceived Behavioral Control	0.690	Valid
Entrepreneur Intention	0.717	Valid

The third test, the composite reliability: a construct has reliable data when it meets the reliability criteria of composite reliability. data that has a composite reliability value > 0.7 has high reliability, while Cronbach's alpha value is expected to have a value > 0.6 (Hair, et. al 2014).

Table 5: Reliability Test Results

Variable	Cronbach alpha	Composite reliability
Moderating Psycho Safety	1.000	1.000
Moderation self-regulated learning 1	1.000	1.000
Moderating self-regulated learning 2	1.000	1.000
Physical Safety	0.881	0.916
Team Learning	0.827	0.888
Team Performance	0.922	0.939
Perceived Behavioral Control	0.943	0.952
Entrepreneur Intention	0.865	0.909

The following measurement is the inner model, by testing the relationship between independent variables to dependent variables using R^2. The values 0.19, 0.33, 0.67 of R^2 indicate that the model is weak, moderate, and strong, respectively (Ghozali 2016). The results of the R-Square in this study explain that the team performance variable has a value of 0.220 with weak criteria. this means that all independent variables simultaneously have a 22% influence on team performance while the remaining 78% influence variables outside of this study. Meanwhile, the behavioral control variable has a value of 0.853 with strong criteria, this explains that all variables simultaneously have an influence of 85.3% on perceived behavioral control, while the remaining 14.7% influence outside this study. While the r-square value of the entrepreneurial intention variable has a value of 0.601 with moderate criteria. this means that all variables simultaneously have an effect of 60.1% on the entrepreneurial intention variable, while the remaining 39.9% influence the variables outside this study.

Table 6: R-square Results

Variable	R Square	Criteria
Team Performance	0.220	Weak
Perceived Behavioral Control	0.853	Strong
Entrepreneur Intention	0.601	Moderate

Results

Discussion and Analysis

In this study, the authors use SmartPLS version 3.0 software. In this analysis, we test whether there is an effect between independent variables on the dependent variable, also to test the relationship of mediating effect to the dependent variable, to test the moderating effect between independent variables on dependent variables. The research hypothesis was accepted when the P-Values value was <0.05 or the T-Statistic value is more than 1,968.

Table 7: Hypotheses Test Result

		Original Sample	T statistic	P-Value
H1	Psychological Safety managed to moderate the effect of team learning on team performance	0.090	2.579	0.010
H2a	Team learning has a positive effect on entrepreneurial intention	0.021	2.267	0.000
H2b	Team performance has a positive effect on entrepreneurial intention	0.053	3.014	0.003
H3a	Perceived behavior control is partially mediating the relationship between team performance and entrepreneurial intention	0.405	3.041	0.002
H3b	Perceived behavior control is partially mediating the relationship between team learning and entrepreneurial intention	0.077	1.977	0.001
H4a	Self-regulated learning managed to moderate the relationship between team performance and entrepreneurial intention	0.050	2.616	0.025
H4b	Self-regulated learning managed to moderate the relationship between team learning and entrepreneurial intention	0.048	2.638	0.000
H5	Perceived Behavior Contol – has a positive effect on Entrepreneurial Intention	0.368	3.100	0.002

Table 7 are the results of the hypothesis testing obtained in the study through the inner model. The results of the hypothesis test explain that the variable that has a strong construct, namely Perceived behavior control is partially mediating the relationship between team performance and entrepreneurial intention with a value of 0.405. while the variable that has a weak construct is Team learning has a positive effect on the entrepreneurial intention with a value of 0.021. this is of course supported in the research of Sarstedt, et al., (2017) which explains that the value of path

coefficients is closer to +1, the stronger the relationship between the two constructs. While the relationship that has a value of -1 indicates that the relationship is negative.

For **H1** psychological condition of an individual **is** based on the characteristics of deep-level such as attitudes personality, values, and is sustainable. These traits could shape the tendency of individuals to be more open in learning and willing to experience new challenges. When students in a project-based course of entrepreneurship - are more open to new ideas and more accepting of different perspectives in completing their assignments, they are inclined to feel safe in taking risks and exposing their vulnerabilities in a team environment and the classroom. Our findings support the study from Edmondson and Mogelof's findings in 2005, Kasean et al. (2015), and Campos et al. (2017). The higher these attitudes the stronger the learning orientation of students to perform in entrepreneurship subjects like micro-business projects or running start-ups.

In H3a and H3b, we find PBC is succeeded to intervene in the set of actions of students in executing their team learning activities. That team learning can strengthen students' intention to pursue an entrepreneurship career. PBC in this regard is the viewpoint and perception of students who are taking or already taking entrepreneurship classes to execute some venture project in the entrepreneurship class, whether it would be difficult or easy. PBC not only determines the formation of intentions but also, serving as a proxy for the process and activity in team learning where students can express their notions, exchange ideas, collaborate with their peers, co-op some internal conflict in their entrepreneurship team, solve their disputes over some issues in running their project or start-up business, eventually supports the prediction of actual behavior specifically pursuing entrepreneur career or setting up start-up business. When students have high perceived self-efficacy and affective attitude, they are likely to have stronger intention to become entrepreneurs, this finding supports the previous studies from Ajzen, (2002), Armitage & Conner (2001), and Huang & Chen (2015).

In addition, PBC is mediating the compelling efforts of students in identifying business potential, then start creating new products or services that have the potential to be commercialized in the market. Those endeavors are partially mediated by PBC on the intention of establishing, owning, running a new business as the choice for a career. In line with the literature that suggests that entrepreneurship courses need to be practical-oriented (e.g., Honig 2004; Rasmussen and Sørheim 2006; Pittaway and Cope 2007).

H2a is supported, the majority of respondents would like to get more encouragement to establish their own business than running it as their career choice, they would rather have more time spent on teamwork, presentations, and feedback received during mentorship in their teamwork activities particularly from experts like professors as well professionals in entrepreneurship. Our finding is compatible with a study from Fiore et al. (2019) that the perception of overall students' about their abilities to work in a multidisciplinary team, their entrepreneurial skills, and entrepreneurial intentions increased slightly. If students have high encouragement integrating themselves within the team, how well they immerse as a team member, this could leverage them to start their venture. Similar to team learning, our results show when the students are given by a set of assignments to evaluate their team performance, such as creating new products or services, managing innovation

within a team project, the ability to execute the integrative marketing plan, building up a professional network. Those who managed these entrepreneurship challenges and evaluations well, they likely to have more confidence and satisfaction in their skills and performance to attempt to establish their business and sacrifice some of their risks to make them stay in business as their career. This finding is consistent with Fiore et al (2019), our result supports the **H2b** team performance has a positive effect on entrepreneurial intention.

According to respondents, the process in their team learning in entrepreneurship class is strengthened by planning, self-monitoring, the student's strategic action, and motivation managed in helping students to be motivated in setting up their business and run their business in the future. We find that when students follow the sequences in the process of learning until the evaluation step properly, they can witness that their effort in completing the assignment, learning process, and conquer their challenges to achieve good performance, they feel more attracted to start and open their venture. In this regard, self–regulated learning has moderated positively the relationship between team learning and their entrepreneurial intention. Similar to team learning, performance in entrepreneurship class teams is also positively moderated by self–regulated learning, group learning, and their interaction in the team. Self–regulated learning is effective means as a learning strategy holds for both individual performance and team performance, the finding shows students perceived this as a driving force in increasing their intention to become entrepreneurs. Our finding is consistent with the studies from Laguna (2013), Harm (2014), Brandstätter (2011). Both **H4a** and **H4b** are supported.

When the students possess positive beliefs and high self-efficacy, they are likely to have greater feelings to be able to achieve their desired outcome to be an entrepreneur (Khalil, 2011). This finding posits theory from Bandura (1977) that people are usually inclined to activities where they feel confident and competent. We can see from our result shows that perceived behavioral control has a positive effect on entrepreneurial intention. As well as their behavior is affected along with intention (Ajzen, 2006). Thus, **H5** is supported.

Implications and Recommendations

This study contributes to the literature on behavioral approaches to the entrepreneurial process in the context of group learning methods among students. Providing in-depth insight into the relations of how specific the components of entrepreneurship process within students give impact on the entrepreneurial intention through the mediating role of perceived behavioral control, and the moderating role of their psychological safety in undertaking their assignment and project in several ways.

As it is the general norm in the entrepreneurship class, lecturers and professors frequently give students special assignments, such as developing a business idea and making this idea to be a student's project in a group context. This study also encourages educators to nurture personality traits of students to develop their personality to be more proactive, so they can achieve more progress in the project to enhance their risk-taking, eventually, they feel psychologically safe and engaged in starting a business.

Perceived behavioral control is partially mediating both the relationship between team learning and the intention of students in setting up their business and the relationship of students' performance in a group context with their entrepreneurial intention. This indicates that this research also helps students how they perceive themselves internally and how they sense and scan their external factors to direct them to see their future career options in entrepreneurship. Through a set of the learning process such as interacting, integrating themselves in their group, collaboration, could encourage them to pursue their business establishment plan in the future. Furthermore, we propose a different perspective by pondering a student who has learned and completed the course that he or she may not be a good entrepreneur or will not enjoy being an entrepreneur. Conducting real-world experiments that could be costly to start a venture and fail at assignments, these students can now decide to enter a managerial professional career instead. This should be considered a positive outcome of entrepreneurship education, whereas major literature (and many policymakers) would state it as a fiasco problem.

An elaborative and systematic approach to entrepreneurship teaching is also recommended. This study suggests that emphasizes nurturing the entrepreneurial intention of students in a systematic way.

Conclusion

Although entrepreneurship education has been introduced and promoted in many countries and at many institutions in higher education, there is little known at this point about the impact of these courses, especially project-based learning. In particular, our finding dismantled the largely unknown how the courses impact students' willingness to engage in entrepreneurial activity and what kind of components and processes are responsible for them to get through. Instead, generally, the literature has focused on a simplified "up and down" analysis which studies outcomes, but rarely reflects and reviews the causes or the path of entrepreneurship learning.

In our overall assessment, the results can be read as confirmation for educational policies that view entrepreneurship training as a way of informing students about career options, and of creating learning opportunities for calibrating and refining their assessments of which career is most suitable. We have no means to assess how costly the mistakes of choosing the "wrong" career would be to the students and society at large. Hence, we cannot quantify the true economic and societal impact of entrepreneurship training. But it seems worthwhile to consider that a simple increase in entrepreneurial activity may neither be a good objective, nor the most likely outcome for including entrepreneurship in the curriculum

Study limitations

Even though our study gives some enlightenment in an entrepreneurship course, we realize that our methodology used also presents another limitation. As we sent a questionnaire to students, and some of them answered it voluntarily, we cannot rule out the possibility of a self-selection (or nonresponse) bias. That is, it is conceivable that only students with a high interest in entrepreneurship have answered the questionnaire. Thus, our results may reflect with a moderate

accuracy the way the investigated phenomena were interrelated in the overall target population.

In addition, this study also presented some limitations that should be addressed in future research. In the future we would like to explore more about the attitude towards entrepreneurship, subjective norm also education components, which include 4 different learning variables: know-why, know-who, know-how, and know-what. In addition, we also want to investigate the role of institutional support in this regard university support. And to test and compare the result between male students and female students with the same object regarding gender differences in the levels of attitude, perceived behavioral control, and their intention for an entrepreneurship career option. A forward study could present a better understanding of how EI is established into real action. Second, we made a selection of individual, organizational, and institutional variables that were found to be most influential in predicting EI through our extensive literature review.

Appendix

Questionnaires

Psychological safety
1. Proactive personality (how well students engage (to enact change, detect problems, and subsequently problem- solving) and get involved in teamwork (Crant, 2000; Seibert, Crant, & Kraimer, 1999) could strengthen the effect of team learning on team performance
2. Emotional stability (student's propensity to be calm, relaxed (Costa & McCrae, 1992; Judge, Bono, & Locke, 2000) will strengthen the effect of team learning on team performance in a project-based learning entrepreneurship course
3. Openness to experience (being open to new ideas and different ways of doing things may increase the likelihood that individuals would feel safe taking risks and exposing their vulnerabilities (Edmondson and Mogelof (2005) could intensify the weight of team learning on team performance
4. Learning orientation (when students focus on increasing their competence and new skills development, and self-development (group levels (Wilkens & London, 2006) would strengthen the relationship between team learning and team performance
5. Supportive peer (by having supportive and caring team members (Schepers, de Jong, Wetzels, & de Ruyter, 2008) and (Bstieler & Hemmert, 2010) would escalate the effect of team learning on team performance

Team learning
1. How well I could integrate myself into a new team, entices me to choose entrepreneurship as a career option
2. Share your thoughts with your peers (is there any difficulty to expressing ideas and thought in the group especially in discussion and problem-solving in a project-based learning entrepreneurship course that could leverage me to start my own business)
3. Manage different opinions within a team (how good myself in dealing with various and different thoughts from their peers, impact them to become an entrepreneur)

4. Work with students from different fields of study (to what extent I able go to work with multidisciplinary background members in teamwork and collaboration, affects them to run their venture)

Team Performance
1. Creating new products and services (how skillful students in creating new products or services would motivate me to create their firm)
2. Managing Innovation within a team project (how well their innovation and how to manage it in project-based learning entrepreneurship course, to drive me to open their own business in the future)
3. Commercializing a new idea or development (the ability to execute an integrative marketing plan, to shape my dream, and plan to seriously start a venture
4. Building up a professional network (how skillful their networking and self – branding to get a professional network, encourages them to set up my firm
5. Identifying new business opportunities (the potentiality in identifying and detecting the opportunities of business, motivates me to achieve entrepreneurship profession
6. Successfully managing a business (success in their business project-based learning entrepreneurship course achievement, boosts me to start and run their own business)

Perceived behavioral control
Perceived difficulty
1a. Starting a firm and keeping it viable would be easy for me (Guerrero et al., 2009) would intervene in the relationship of team learning and entrepreneurial intention
1b. Starting a firm and keeping it viable would be easy for me (Guerrero et al. 2009) would intervene in the relationship of team performance and entrepreneurial intention

2a. If I wanted to, I could easily pursue a career as an entrepreneur (Kolvereid, 1996b) would mediate the relationship of team learning and entrepreneurial intention
2b. If I wanted to, I could easily pursue a career as an entrepreneur (Kolvereid, 1996b) would mediate the relationship of team performance and entrepreneurial intention

Perceived confidence
3a. If I tried to start a business, I would have a high chance of being successful (Guerrero et al., 2009) would mediate the relationship between team learning and entrepreneurial intention
3b. If I tried to start a business, I would have a high chance of being successful (Guerrero et al., 2009) would mediate the relationship between team performance and entrepreneurial intention

4a. I have skills and capabilities to succeed as an entrepreneur (Grundstén, 2004; Autio et al., 2001) would intervene in the relationship of team learning and entrepreneurial intention
4b. I have skills and capabilities to succeed as an entrepreneur (Grundstén, 2004; Autio et al., 2001) would intervene in the relationship of team performance and entrepreneurial intention

5a. I am confident that I would succeed if I started my firm, would mediate the relationship of team learning and entrepreneurial intention

5b. I am confident that I would succeed if I started my firm, would mediate the relationship of team performance and entrepreneurial intention

6a. I am certain that I can start a firm and keeping it viable would intervene in the relationship of team learning and entrepreneurial intention.
6b. I am certain that I can start a firm and keeping it viable would intervene in the relationship of team performance and entrepreneurial intention

Perceived controllability
7a. I can control the creation process of a new firm (Liñán and Chen, 2009) would mediate the relationship between team learning and entrepreneurial intention.
7b. I can control the creation process of a new firm (Liñán and Chen, 2009) would mediate the relationship between team performance and entrepreneurial intention.

8a. The number of events outside my control that could prevent me from being an entrepreneur is very few (Kolvereid, 1996b) would intervene in the relationship of team learning and entrepreneurial intention
8b. The number of events outside my control that could prevent me from being an entrepreneur are very few (Kolvereid, 1996b) would intervene in the relationship of team performance and entrepreneurial intention
9a. As an entrepreneur, I would have complete control over the situation, would mediate the relationship of team learning and entrepreneurial intention
9b. As an entrepreneur, I would have complete control over the situation, would mediate the relationship of team performance and entrepreneurial intention

Choice intention
1. I would rather own my own business than earn a higher salary employed
by someone else. Kolvereid and Isaksen (2006)
2. I would rather own my own business than pursue another promising career.
3. I am willing to make significant personal sacrifices to stay in business.
4. I would work somewhere else only long enough to make another attempt to establish my business.

Self -regulated Learning (Toering et al., 2012)
1a. Planning (how well I conduct planning in project-based learning entrepreneurship course would strengthen the effect of team learning on their motivation to start and run my own business)
1b. Planning (how well I conduct planning in project-based learning entrepreneurship course would strengthen the effect of team performance on their motivation to start and run my own business)

2a. Self–monitoring (how well I monitor myself in project-based learning entrepreneurship course would strengthen the effect of team learning on their motivation to start and run my own business)
2b. Self–monitoring (how well I monitor myself in project-based learning entrepreneurship course would strengthen the effect of team performance on their motivation to start and run my own business)

3a. Evaluation (how my strengths and weaknesses assessment about project-based learning entrepreneurship course would strengthen the effect of team learning on my motivation to start and run my own business)

3b. Evaluation (how my strengths and weaknesses assessment about project-based learning entrepreneurship course would strengthen the effect of team performance on my motivation to start and run my own business)

4a. Effort (how big my effort in project-based learning entrepreneurship course would strengthen the effect of team learning on my motivation to start and run my own business)

4b. Effort (how big my effort in project-based learning entrepreneurship course would strengthen the effect of team learning on my motivation to start and run my own business)

5a. Self-efficacy (how my beliefs of ability to complete a particular task in project-based learning entrepreneurship course would strengthen the effect of team learning on my motivation to start and run my own business

5b. Self-efficacy (how my beliefs of ability to complete a particular task in project-based learning entrepreneurship course would strengthen the effect of team performance on my motivation to start and run my own business

6a. Reflection (to compare the actual final learning results with the intended learning goals in project-based learning entrepreneurship course would strengthen the effect of team learning on my motivation to start and run my own business)

6b. Reflection (to compare the actual final learning results with the intended learning goals in project-based learning entrepreneurship course would strengthen the effect of team performance on my motivation to start and run my own business)

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THE ROLE OF HIGHER LEARNING INSTITUTIONS IN DEVELOPING B40 & M40 COMMUNITIES LIVING NEAR HIGHER EDUCATION INSTITUTIONS

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Abstract

Higher learning institutions have often led to community development. The interactions and strategic partnerships of higher learning institutions profoundly affect the social status of the B40 and M40 communities. This study employed a mixed-methods approach involving site observation and a survey questionnaire to investigate the role of higher learning institutions in enhancing the socio-economic status of the local community. This focused on the aspects of improved public transportation and facilities; development in the areas around the campuses; propelling business and services; knowledge building; income generation and employment creation. A stratified sampling technique was used to collect data from four UiTM campuses within Selangor State. The findings indicate that all the aspects were highly attained, given the positioning of the higher learning institutions, which were near the residential areas. The study suggests that collaboration between the local authorities and the state government is needed to improve the ways university-community partnerships can stimulate societal progress.

Introduction

Higher education institutions (HLIs) are often thought to facilitate economic and social development. Modern economic growth theories have acknowledged the positive relationship between human capital and economic development (Agasisti & Bertoletti, 2020). Theories of economic development, whether referring to social or economic development, have often emphasized that resources, human capital development, and innovation are significant development factors for both society and the economy (Ranis & Fei, 1961). Investment in tertiary education and the expansion of higher education opportunities have been among the key regional development policies in most countries, including Malaysia.

Higher learning institutions play a crucial role in producing an educated community, which is vital in the modern context of knowledge-based economics and for developing the regional economy (Bramwell & Wolfe, 2008). The importance of universities can be explained by the rapid increase in their number compared to the early period of Malaysia's independence. This increase explains why the current economy now urgently needs a highly educated community to meet the demand for highly knowledgeable and skilled workers. The country is now driven by a productivity-based economy. Human capital development through education and training has become a critical indicator of the availability of knowledgeable and skilled human resources in a particular place (Kruss et al., 2015). Therefore, as one type of higher education institution, the university plays a vital role in influencing the availability of human capital and the competitive advantage that can be generated in a particular location when a university campus is built.

Goddard and Chatterton (2003) noted that one of the most noteworthy contributions to regional development derives from the capacity of universities to join territorial features, whether this involves transportation, local development, or nearby residents' income. Inside an institution, profitable synergies exist between teaching, science, and community service. There are connections in the area between expertise, creativity, and culture. The essence of a university's contributions to human resource programs is intensely politicized, with power over its courses and purpose relating to its underlying administration framework. However, it is still vital to establish well-positioned universities since they make substantial contributions to their local economies (Arbo & Benneworth, 2007). Therefore, higher learning institutions contribute significantly to improved public transportation and facilities, development in the areas around the campuses, propelling business and services, knowledge building, income generation, and employment creation.

In the case of Malaysia, the development of branch campuses of Universiti Teknologi MARA (UiTM), mainly in peri-urban areas, has been instrumental in developing the lower-income households living in these peri-urban or rural areas, which are classified as the B40 income group

(Abd Rahman et al., 2019). In Malaysia, B40 represents the bottom 40% of income earners while M40 refers to the middle 40%. New higher learning institutions have played a significant role in developing the B40 and M40 communities in Malaysia. Besides providing the best education for students, institutions under the Ministry of Higher Education and other government-linked agencies have supported reskilling and upskilling programs for youths and unemployed workers in their local communities. These initiatives have benefited the communities by raising income levels among the B40 and M40 groups and accelerating Malaysia's economic development.

Even though the link between HLIs and regional economic development has been explored in previous studies (Abd Rahman et al., 2019; Bramwell & Wolfe, 2008), studies in the Malaysian context are limited. This lack of emphasis has hampered the identification of the role HLIs play in developing the socio-economic status of the B40 and M40 communities. Addressing this gap, this paper discusses the role of higher education institutions, specifically UiTM campuses in Selangor (UCS), in developing the B40 and M40 communities. A mixed-methods research approach was used for the study. Data were collected using a survey questionnaire and observation. Descriptive statistics and observation data were used to present the findings and thereafter to discuss the role of UCS in uplifting the economic status of those living in the areas surrounding the campuses.

The remainder of the paper is organized as follows: Section 2 reviews the roles played by HLIs in promoting socio-economic development. Meanwhile, Section 3 presents the methodology used in the study. Then, Section 4 presents the findings and discussion, and the last two sections provide potential policy implications and the conclusion, respectively.

Literature Review

The Bottom 40% and Middle 40% Income Groups

According to the income group classification by the Department of Statistics Malaysia, B40 refers to the bottom 40 percent of all income earners, and M40 refers to the middle 40 percent of all income earners. The last group is the top 20 percent of all income earners, which is referred to as T20. Figure 1.0 shows the threshold for each income group; each of the thresholds is further divided into sub-tiers.

Using aggressive economic development policies, the Malaysian government has undertaken various activities to improve citizens' socio-economic mobility, intending to move households from the B40 income group into the M40 group and move those in the M40 bracket into the T20 group. The purpose of developing UiTM campuses across Malaysia in peri-urban and rural areas was to provide education to the least-privileged and uplift the socio-economic status of the communities living around each campus. As the UiTM campus projects encourage the

development of businesses surrounding the campus and provide entrepreneurial opportunities to the B40 community living in those areas, it can be concluded that the UiTM branch campuses help the economy to grow (Simon, 2012).

Group		Median	Average	Income Range
B40	B1	RM1,929	RM1,849	Less than RM2,500
	B2	RM2,786	RM2,803	RM2,501 – RM3,170
	B3	RM3,556	RM3,561	RM3,171 – RM3,970
	B4	RM4,387	RM4,395	RM3,971 – RM4,850
M40	M1	RM5,336	RM5,346	RM4,851 – RM5,880
	M2	RM6,421	RM6,477	RM5,881 – RM7,100
	M3	RM7,828	RM7,841	RM7,101 – RM8,700
	M4	RM9,695	RM9,730	RM8,701 – RM10,970
T20	T1	RM12,586	RM12,720	RM10,971 – RM15,040
	T2	RM19,781	RM24,293	RM15,041 and above

Figure 1: Malaysia Income Group Classification
Source: Department of Statistics Malaysia

In Malaysia, the differences in household income between and within states are mainly due to two factors, urbanization and human capital (Khazanah, 2018). More urbanized states or areas with highly skilled human capital record higher income levels. UiTM has played an essential role in urbanizing and increasing the human capital skill sets among those living where the campuses are located. Based on Figure 2.0, it is evident that B40 and M40 household incomes experienced vast growth between 1970 and 2016. In 1970, the B40 household group's mean income was 10.3% of the mean household income of the T20 group. The mean household income for the B40 had increased significantly by 2016 compared to the T20 group's mean household income, reaching 17.7%. Similarly, the M20 group showed an impressive increase in mean household income compared to the T20 mean household income from 1970 to 2016, recording 29.4% and 40.4% at the start and end of the period, respectively.
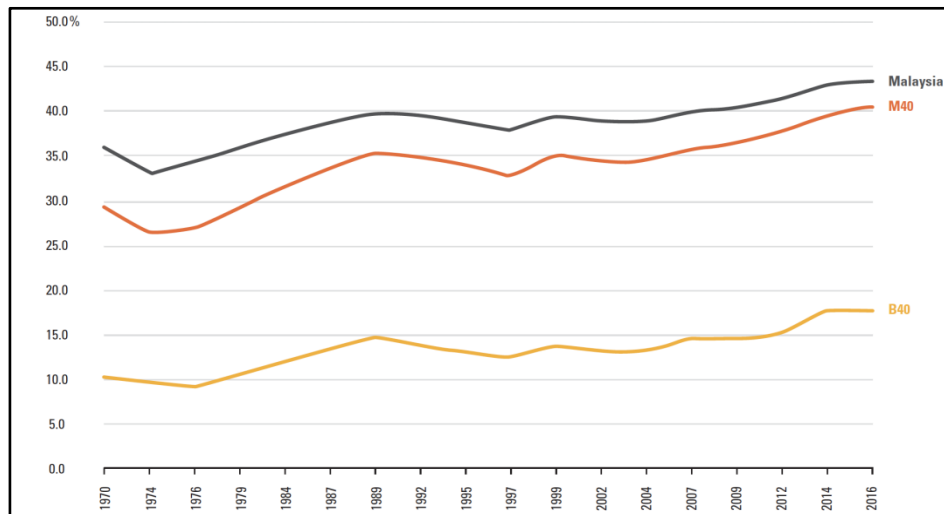
Figure 2: B40 and M40 mean household income as a share of T20 mean income, 1970 – 2016
Source: Adopted from Khazanah (2018)

In 2016, the then Prime Minister Dato Sri' Najib Razak expressed the view that UiTM had contributed to the community and economic development. According to him, UiTM had led to national social mobility and the promotion of social equality. The Malay and Bumiputera, who are primarily part of the B40 community, were able to improve their living standards, which had considerably transformed the Malaysian economic landscape (Bernama, 2016).

In improving the B40 and M40 communities' socio-economic status, higher learning institutions have played a significant role. These institutions have either directly or indirectly promoted various factors (see Figure 3.0) that have contributed to the socio-economic development of the community living near each campus.
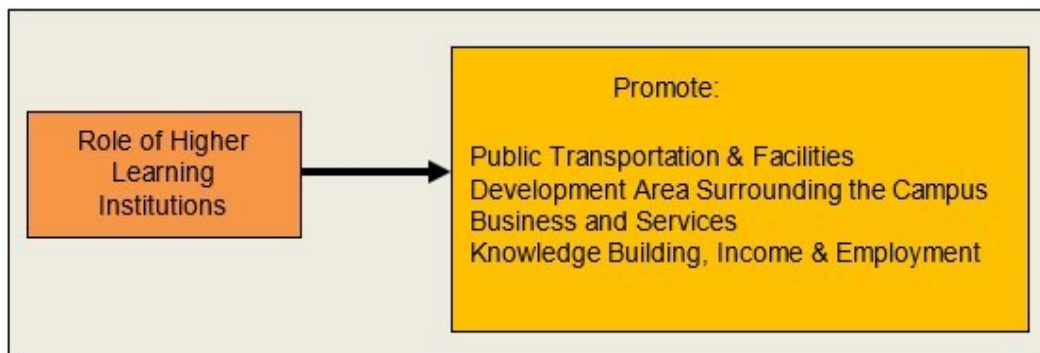
Figure 3: Role of Higher Learning Institutions

Improved Public Transportation & Facilities

Higher Learning Institutions (HLI) play a positive role by offering better transportation and other facilities to their surrounding communities. Improving or creating new strategies to address issues related to these features can be highly valuable to the adjacent surroundings. While universities have long been deemed to have the aptitude to promote local community expansion positively, it is unclear which outlook individual universities (including UiTM) should assume. The landscape surrounding universities is constantly changing. However, colleges, such as the University of Arizona offer diverse transportation incentives to decrease the traffic flow within its neighboring communities (University of Arizona, 2019).

One example of university-community engagement through transportation is the railway system leading to the MetLife Stadium in New York (MetLife Stadium, 2019). For events estimated to attract over 50,000, the Meadowlands Rail service opens up to offer fans the choice to park away from the stadium. However, they still have direct access to the stadium (MetLife Stadium, 2019). This is an alternative mode of transportation that increases the well-being of and reduces the ecological impacts on, the surrounding communities.

The establishment of higher learning institutes and their branch campuses has helped communities increase their access to academic and technical training and utilize various facilities, especially those related to sport, information technology, lecture halls, and others (Grapragasem et al., 2014). Teaching hospitals and dental clinics have been established, which has benefited the university's local community and expanded the students' insights into community health problems through their learning, service, and research in the community, thus improving community health (Atuyambe et al., 2016).

Besides, Roma Tre University has worked on a sustainable mobility plan in collaboration with Rome's Municipality. This has been effective in reducing the usage of private vehicles in favor of collective forms of transportation. The scheme provides sustainable modes of transportation, such as collaborative public transportation. To further embrace low-carbon communities, bicycles, hybrid bikes, as well as carpooling and car-sharing applications, are provided in higher education institutions (Papantoniou et al., 2018).

Development of Areas Surrounding the Campus

According to Mbah (2016), a university's effectiveness cannot be restricted to how effectively it runs its learning and study plan and how this transforms into it becoming a leader of social change within the context of its community accountability and revolutionary purpose. Interconnections across the university's community may expand the institution's capacity to improve local growth. This should be achieved for both aspects of the university, as well as for the broader population.

The prevailing ideology of a university trailing knowledge for its own sake must also focus on people's developmental concerns for their surrounding community. Universities must pursue an academic agenda, be involved in improving local living conditions, and work for the ordinary people living around them (Mbah, 2016). Therefore, universities must consider the urban growth that results from changes to a community's physical, emotional, fiscal, and environmental circumstances (Christenson & Robinson, 1989). Institutions may play a critical role in facilitating democratic development by encouraging a participatory model of democracy, as well as allowing the expression of the needs of the various university stakeholders and enabling various community parties to discuss shared issues (Ostrander, 2004).

Universities and colleges are frequently regarded as vital agents in a city's land development plans (Cortes, 2004). Furthermore, the development of university campuses influences the development of residential areas. University campuses are often strategically located within city centers, which potentially increases rental occupancy rates. Housing developers often scout for factors that enable them to increase house prices. Therefore, developing properties close to university campuses pushes prices higher due to the university-community partnership (Ambrosius et al., 2010). Another reason for residential areas to build a university campus is that they can stimulate business expansion in the surrounding area. This, in return, automatically inflates the property prices and makes the possession of local housing more attractive.

Propelling Business and Services

Once a university campus is established in an area, it automatically contributes to business development. Massive university complexes bring with them the multiple needs of the students and staff, requiring various businesses to cater to their demands. Furthermore, universities have often stimulated growth in high-tech industries and the development of "smart zones", like in Silicon Valley (MIT) and the Research Triangle Park (Duke University) in the United States (Cortes, 2004), while they often improve a city's image (Bromley & Kent, 2006). Barbato et al. (2019) suggested that university research and community engagement stimulate local demand for knowledge-intensive services.

The increased population, especially of students, automatically increases the demand for various products. Businesses are often keen to locate their premises in areas populated by students because the proprietors are confident that they will receive continuous interaction. Students are highly dependent on external parties to fulfill their needs as they are far from home and out of their comfort zone.

Knowledge Building, Income, and Employment

Higher learning institutes play an essential role in the development of skilled and knowledgeable human capital. These institutes can provide education that can accommodate greatly diverse individual qualifications, motivations, expectations, and career aspirations (Jongbloed et al., 2008). The establishment of higher learning institutes has reduced local student migration to overseas institutions and attracted international students to study at local institutions (Garrido-Yserte & Gallo-Rivera, 2010; Grapragasem et al., 2014). Higher learning institution partnerships with communities can develop interventions and programs that embrace both scientific and technological education and local experience (Lewis et al., 2016).

Universities may play a visible role in fostering economic development because schooling has come to be regarded as a personal right, intended to pave the way for other modes of social involvement, as well as offer the advantages of individual choice, appropriate employment, wealth, and social prestige (Spiel et al., 2018). As a result, universities continue to recruit and buy locally, investigate the commercialization of their studies, and participate in the wider community's long-term economic growth strategies. In a university-industry relationship, corporate transactions can be quantified, goals can be established, and social values can be communicated more comfortably to local business representatives and public officials (Dubb et al., 2013).

The development of universities does not just provide employment and entrepreneurial opportunities to the B40 community. University development also plays a vital role as they are the leading producers of scientific knowledge and new technologies. The development of universities can become a source of the ideas and human resources needed to launch a new business (Trifonova et al., 2020). Besides that, the development of universities also leads to better services in the surrounding communities. Government capital is often directed at supporting universities in the ways they serve the local community's needs and educational demands, as well as improving the regional economy and social conditions (Secundo et al., 2017).

The locations of the UiTM campuses are strategically determined so that besides nurturing human capital, they transform underdeveloped areas into advanced townships and cities. UiTM, one of the largest universities in Malaysia, has successfully transformed many rural areas into urban and industrial zones, primarily in Selangor (Azazi *et al.*, 2018). Developing entrepreneurial graduates has always been the core aim of UiTM. This has assisted the growth of new business ventures and knowledge transfer, thus helping to improve the livelihoods of the low-income communities living near the campuses. However, no single study has yet captured the aspect of socio-economic development that UiTM has contributed. Therefore, this study investigated the four aspects of development that HLIs can potentially propagate: (1) Public transportation and facilities (Theme 1), (2) development near the campus areas (Theme 2), (3) propelling business and services (Theme 3), and (4) knowledge building, income generation, and employment creation (Theme 4). These

aspects also align with UiTM's mission to enhance the knowledge and expertise of the Bumiputera (Abdullah et al., 2020).

Methodology

Table 1: Operational Definitions of Variables

Variables	Operational Definitions
Improved Public Transportation & Facilities	The development of the UiTM campus is helping to improve public transportation and other facilities surrounding the campus area.
Development of Area Surrounding the Campus Area	The development of the UiTM campus is an impetus for the development of residential areas surrounding the campus.
Propelling Business and Services	The development of the UiTM campus increases the business activities surrounding the campus
Knowledge Building, Income and Employment	The development of the UiTM campus heightens the knowledge capital, employment opportunities and income surrounding the campus.

A mixed-methods approach was used for the study, whereby a quantitative research technique was used for the descriptive survey research, while a qualitative research technique, primarily site observation, was used to triangulate the quantitative findings. The survey questionnaire used for data collection was adapted from the institution's instrument (UiTM). UiTM has developed a survey questionnaire to assess the impact of the university establishments on the surrounding communities. The operational definitions of the variables are presented in Table 1.0. The study population was the community living around the UiTM Cawangan Selangor (UCS) facilities, consisting of four UiTM branch campuses, namely UiTM Puncak Alam Campus, UiTM Puncak Perdana campus, UiTM Dengkil campus, and UiTM Sg. Buloh campus. Each respondent was the head of the household, that is, a family senior member and the principal earner in the family. The unit of analysis for the study was the head of the household.

For the sample selection, first, the total number of houses within a five-kilometer (population) (N) radius of each UCS campus was manually calculated. Communities living closer to the campuses experienced a more significant trickle-down effect of the expansion and development once the branch campuses were built. Therefore, attention was given only to the houses closest to the campus. The total number of houses was 200 units. Next, a sample size calculator from

SurveyMonkey[1] was used to calculate the sample size. The sample size required was 102 (heads of household) (population size = 200, confidence level = 85% and margin of error = 5%). A random sampling technique was used for data collection. Of the 200 respondents, only 156 respondents returned the survey and the response rate was 78%. After treating the data for missing values, only 112 responses were suitable for analysis.

Table 2: Online Survey Questionnaire Items

No	Items
Theme 1: Improved Public Services	
1.	*The existence of UiTM has a positive impact on the level of public transport services around the campus (buses, taxis, rental cars etc.)*
2.	*The public facilities provided have been enhanced to facilitate the use of the residents here*
Theme 2: Development Surrounding the Campus Area	
1.	*The existence of UiTM, in general, has influenced development around the campus*
Theme 3: Propelling Business and Services	
1.	*More businesses and services are opened to meet the needs of UiTM citizens*
2.	*The growth of business (commercial) companies around residential areas originally depended heavily on the existence of UiTM / ITM*
Theme 4: Knowledge Building, Income and Employment	
1.	*The existence of UiTM has increased the tendency of teenagers/youth in the surrounding area to increase knowledge*
2.	*The existence of UiTM has increased the income of the residents in the surrounding area*
3.	*The existence of UiTM has increased employment opportunities in the surrounding area*

A guided online survey on Google Forms was used for data collection. The hired enumerators engaged with each head of household face-to-face to explain the purpose of the survey. They then shared the survey link with the respondent (via WhatsApp/email) and assisted them to answer the online survey if necessary. The online survey questionnaire consisted of five demographic-related questions and eight items to gauge the impact of the UiTM campuses on the households surrounding the campuses. The nine items were clustered based on 4 themes (see Table 2.0). The four themes are improved public transportation and facilities (Theme 1), development in the areas around the campuses (Theme 2), propelling business and services (Theme 3), as well as knowledge building, income, and employment (Theme 4). Themes 1 and 3 consist of two items each, theme 2 consists of one item, and theme 4 consists of three items. Each item was assessed on a five-point

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[1] Website: https://www.surveymonkey.com/mp/sample-size-calculator/

Likert scale, with 1 referring to strongly disagree and 5 referring to strongly agree. The Cronbach's alpha value obtained for the scale was 0.851, indicating that the scale was reliable.

Data analysis for the study used frequency analysis and descriptive analysis. SPSS software version 26 was used to conduct the analysis. The total mean score was used for the data interpretation. According to Rubin (2004), interpreting a five-point Likert scale necessitates the use of equal-sized categories. Mean scores lower than 2.33 (5-1/3+lowest var (1) were deemed low, scores with the highest value (95)-(5-1/30) were considered to be high, while scores lying between the two were deemed moderate. Mean scores of 1.00-2.33 were regarded as low impact while a range of mean scores between 2.34 and 3.66 was considered to reflect a moderate impact. Lastly, scores of 3.67-5.00 were considered to reflect a high impact.

For observation, each researcher was responsible for one branch campus (a total of four branch campuses were under UCS). The researchers' task was to observe the development that had occurred close to each campus and record the types of businesses operating in these areas. McKechnie (2008) indicated that observation is a meaningful way of collecting data using one's senses which, in the case of this study, involved looking. Before the observation, a list of aspects that required observation was prepared. During the observation, the researchers observed predetermined elements and took field notes.

Results and Discussion

Respondents Demographic Information

The demographic profile of the respondents is presented in Table 3.0. The response rate was 78% (156 /200). From the responses, only 112 responses were suitable for analysis (n = 112). The UiTM Puncak Alam and UiTM Puncak Perdana campuses recorded the highest cumulative response rates. These campuses have more registered students than the other two UCS campuses. Therefore, the responses from the former two campuses contributed substantially to the study, as these campuses are located close to each other, and higher population densities and more businesses surround them than surround the other two. The respondents were 53.6% male and 46.4% female. Among them, 72.3% were married, 25.9% were single, and 1.8% were either divorced or separated. Interestingly, all the respondents had completed their university/college and secondary school education. In total, 82.1% of them had completed their university or college education, and the rest had completed their secondary education. UiTM lecturers might be among the 82.1% of the respondents who had completed university as most of them live near the campuses.

In terms of the income distribution, 43% of the respondents fell under the B40 income group. The highest rates were those in the B1 and B2 sub-tiers, with 17.9% and 16.1%, respectively. The

income range for tier B1 was less than RM2,500, and for tier B2 it was between RM2,501 and RM3,170. The M40 income group, comprised about 37% of the respondents, with those in sub-tiers M1 (10.7%) and M4 (16.1%) being the two largest segments of the group. Sub-tier M1 accounted for those with incomes between RM4,851 and RM5,880 and sub-tier M4 referred to those with incomes between RM8,701 and RM10,970. Lastly, 20.5% of the respondents were from the T20 income group.

Table 3: Respondents' Demographic Information

Demographic	Frequency (n=112)	Percentage (%)
Campus		
Puncak Alam	40	35.7
Puncak Perdana	55	49.1
Dengkil	11	9.8
Sungai Buloh	6	5.4
Gender		
Male	60	53.6
Female	52	46.4
Marital Status		
Married	81	72.3
Single	29	25.9
Divorced/Separated	2	1.8
Education		
University/College	92	82.1
Secondary School	20	17.9
Income Group		
B1	20	17.9
B2	18	16.1
B3	3	2.7
B4	7	6.3
M1	12	10.7
M2	7	6.3
M3	4	3.6
M4	18	16.1
T1	11	9.8
T2	12	10.7

UiTM's role in developing the B40 and M40 Communities

Based on the findings, the first item in the improved public transportation and facilities theme (see table 4.0) exhibited a total mean score of 4.03. The mean score is high, indicating that the existence of UiTM has a positive impact on the level of public transport services around the campuses. This

includes public transportation like buses, taxis, and rental cars. The influx of students and university staff living near the campuses increases the demand for public transport in the local area. Furthermore, this increased demand has also led to improved roads and more efficient public transport services.

The next item under this theme assessed whether the public facilities provided had been enhanced to facilitate residents' use. The mean score for this item was 3.57, which represents a moderate improvement. Besides public transport, other public services, such as healthcare are under construction. Once the UiTM hospital is functional, the UCS community will benefit tremendously since there are no public hospitals near any branch campuses except UiTM Sungai Buloh. The new hospital will cater to the community, especially those living near the UiTM Puncak Alam and Puncak Perdana campuses. Shortly, when the UiTM hospital is fully functional, more investment is expected to flow into the local area. Assessing the second item again in the future may produce a higher score.

Table 4: Improved Public Transportation and Facilities

Response	Frequency (N=112)	Percentage (%)	Skewness	Kurtosis	Mean	Std. Deviation
Item 1: *The existence of UiTM has a positive impact on the level of public transport services around the campus (buses, taxis, rental cars etc.)*						
Strongly Disagree	2	1.8				
Disagree	8	7.1				
Neutral	6	5.4	-1.324	2.149	4.03	.885
Agree	65	58.0				
Strongly Agree	31	27.7				
Item 2: *The public facilities provided have been enhanced to facilitate the use of the residents here*						
Strongly Disagree	5	4.5				
Disagree	15	13.4				
Neutral	23	20.5	-.636	-.215	3.57	1.071
Agree	49	43.8				
Strongly Agree	20	17.9				

Note: The skewness and kurtosis are still within the recommended range of ± 3 (Klien, 2011)

Past studies have emphasized that the development of a university campus leads to an improved transportation system. Transportation is an integral part of campus life for most students at higher education institutions. The Munich Metropolitan Area (MMA) is embarking on becoming a more polycentric urban region due to the development of nearby higher learning institutions. There have been changes in transportation flows around Munich. One of these emerging centers is in the town of Garching, which hosts a large campus attached to Munich's Technical University. This may

indicate that workplaces and the need to attend university are the main driving forces behind Munich's emerging polycentric structure (Bentlage et al., 2020).

The second theme examined was the development of the area around each campus (see Table 5.0). The item in this theme was to determine whether the existence of UiTM has, in general, influenced development around each campus. The mean score for this item was 3.95, which represents high development. Therefore, UCS has had a significant impact on the local development that the community has experienced. Considerable development has been in the real estate sector. Residential property has taken a quantum lead in these areas and local house values are rising. Besides residential property, business parks have also expanded, bringing retail stores closer to the community. There are better facilities like parks, malls, and sports complexes so the community can engage in leisure activities alongside the developments.

Table 5: Development in the areas around the Campuses

Response	Frequency (N=112)	Percentage (%)	Skewness	Kurtosis	Mean	Std. Deviation
Item 1: *The existence of UiTM, in general, has influenced development around the campus*						
Strongly Disagree	1	.9				
Disagree	11	9.8				
Neutral	3	2.7	-1.308	2.020	3.95	.837
Agree	75	67.0				
Strongly Agree	22	19.6				

Note: The skewness and kurtosis are still within the recommended range of ± 3 (Klien, 2011)

The third theme explored how far UCS has propelled business and services in the surrounding communities (see Table 6.0). With a mean score of 3.88, the first item assessed whether more industries and services had opened to meet the needs of those connected to UiTM. From the high score, it is evident that the growth of businesses depends highly on citizens from the campus. UiTM campuses have large pools of students. For UCS specifically, the total number of students registered as of June 2020 was 28,865. Therefore, UCS supports business growth and economic development within the localities. Based on observation, there is massive demand from the students for products and services from the following businesses:

    i.   Maintenance and repair of motor vehicles
    ii.   Mini markets
    iii.   Convenience stores
    iv.   Retail sales of computers, computer equipment, and supplies
    v.   Retail sales of telecommunication equipment
    vi.   Retail sales of household furniture
    vii.   Retail sales of books, newspapers, and stationery

     viii.   Retail sales of sports goods and equipment
      ix.   Restaurants
       x.   Fast-food restaurants, food stalls/hawkers
      xi.   Laundering and dry-cleaning, pressing

The second item under a similar theme assessed whether the growth of commercial businesses around residential areas originally depended heavily on the existence of UiTM / ITM. The mean score for this item was 3.42, which indicates moderate dependence. While UiTM contributes somewhat to the commercial business in the localities, most retail businesses were located in the peri-urban areas due to the lower operational costs. Rental rates and wages are relatively lower in these areas. Even though UCS facilities are not located in urban areas, they are located strategically in regions that connect to major highways, port facilities, commercial business parks, and warehouses. These are the reasons for the business companies to operate there.

Table 6: Propelling Business and Services

Response	Frequency (N=112)	Percentage (%)	Skewness	Kurtosis	Mean	Std. Deviation
Item 1: *More businesses and services are opened to meet the needs of UiTM citizens*						
Strongly Disagree	2	1.8				
Disagree	12	10.7	-1.068	.926	3.88	.941
Neutral	9	8.0				
Agree	64	57.1				
Strongly Agree	25	22.3				
Item 2: *The growth of business (commercial) companies around residential areas originally depended heavily on the existence of UiTM / ITM*						
Strongly Disagree	8	7.1				
Disagree	17	15.2	-.732	-.279	3.42	1.096
Neutral	19	17.0				
Agree	56	50.0				
Strongly Agree	12	10.7				

Note: The skewness and kurtosis are still within the recommended range of ± 3 (Klien, 2011)

The final theme examined the knowledge building, employment creation, and income generation capacity of UCS facilities (see Table 7.0). The first item determined whether the existence of UiTM has increased the tendency of teenagers or youths in the surrounding area to increase their knowledge. The high mean score of 3.79 indicated that UCS has been instrumental in terms of its knowledge-building capacity. UCS has motivated teenagers and youths to increase their knowledge and achieve excellent academic performances to pursue their higher education at university. Higher learning institutes can provide education and qualifications to individuals and raise motivations, expectations, and career aspirations (Jongbloed et al., 2008). UiTM students

actively organize community engagement programs with schools in the areas near the campuses. There is also an extensive industry-community network that each faculty in UiTM manages. The networks are used to engage with various industries so both parties can work with the community, especially the underprivileged.

The next item within the same theme examined whether the existence of UiTM had increased the income levels of residents in the surrounding areas. The mean score of 3.88 strongly indicates that UCS has assisted such households to earn more. Economic development that occurred near the campuses has provided employment and entrepreneurial opportunities to the community. The employment opportunities item connects to the last item in the theme. This item measured whether the existence of UiTM has increased the employment opportunities in the surrounding areas. Based on the mean score of 3.63, its respondents moderately agreed that UCS facilities have created employment opportunities. It is evident that employment creation exists; however, it is still lacking.

Table 7: Knowledge Building, Income, and Employment

Response	Frequency (N=112)	Percentage (%)	Skewness	Kurtosis	Mean	Std. Deviation
Item 1: *The existence of UiTM has increased the tendency of teenagers/youth in the surrounding area to increase knowledge*						
Strongly Disagree	1	.9				
Disagree	6	5.4	-.576	.541	3.79	.821
Neutral	28	25.0				
Agree	58	51.8				
Strongly Agree	19	17.0				
Item 2: *The existence of UiTM has increased the income of the residents in the surrounding area*						
Strongly Disagree	8	7.1				
Disagree	17	15.2	-.865	.923	3.88	.846
Neutral	19	17.0				
Agree	56	50.0				
Strongly Agree	12	10.7				
Item 3: *The existence of UiTM has increased employment opportunities in the surrounding area*						
Strongly Disagree	1	.9				
Disagree	14	12.5	-.516	-.192	3.63	.910
Neutral	26	23.2				
Agree	55	49.1				
Strongly Agree	16	14.3				

Note: The skewness and kurtosis are still within the recommended range of ± 3 (Klien, 2011)

Research implications and recommendations

The development of the university campus has provided the right impetus to developing the B40 and M40 communities. Universities have long-held social responsibilities, which have in some way emphasized their responsibility for educational, cognitive, labor, and environmental impacts

by linking society's needs at different levels and creating activities aiming to achieve high sustainability (Thanasi-Boçe & Kurtishi-Kastrati, 2021). Continuous commitment by the university contributes to improving the quality of life of the local community and society at large. In return, constant development in the surrounding communities assists the universities in re-engineering their existing performance systems and generating an environment of collaboration with industry and government (Secundo et al., 2017), thus creating a symbiotic environment for all parties: the universities, communities, industries, and government.

The synergy between the university and community development is deeply rooted in a university's mission and vision. For example, African higher learning institutions recognize their role in, and contribution to, promoting active community participation, specifically to uplift poor and marginalized communities. The list below details several African higher learning institutions and their missions.

1. Kafrelsheikh University has the mission to provide services to the community, as well as applied research services that enhance the local community's visibility and contribute to constructing the knowledge economy.
2. Alexandria University emphasizes the building of a modern human being and society's cultural rehabilitation.
3. The University of KwaZulu-Natal has the mission to critically participate with society.
4. Covenant University has the mission to create knowledge and restore the dignity of the black man.
5. The University of Nairobi hopes to provide quality university education and training and embody the aspirations of the Kenyan people.

Government legislation has been the prime factor influencing universities to drive the growth and development of society. For example, legislation in Tunisia and Morocco requires universities to bridge the job skills gaps in the community. Responding to the call by the government, the University of Tunis El Manar, Tunisia, provides training and disseminates vital information to the community (Vasudeva & Mogaji, 2020). Based on the input obtained from poverty-stricken countries, it can be concluded that university campus development is vital for community development, especially among the B40 and M40 groups. The development of university campuses can improve public services, increase economic activities and motivate youths to obtain higher education qualifications.

However, to ensure effective community development, it is recommended that the government thoroughly study a location before establishing a new campus. By understanding the geography and community of a place, the government can create suitable facilities and university courses. This would automatically provide better-targeted community development. Advancing the

understanding of community needs and undertaking more applied research to find solutions to local problems would improve the university's role in developing the B40 and M40 communities.

For campuses that are already operational, universities must engage in more community research and translate the research output into practical ideas to develop the community. For instance, the translation of primary research findings can be scaled up into practical action, since communicating the research findings to the surrounding would contribute to boosting the university's image. This would automatically attract more university-industry partnerships, leading to more business development. Furthermore, community-university engagement motivates youths to pursue higher education

In addressing sustainable development goals (SDGs), a higher learning institution could form a cohesive community relations committee with representatives from across campus and the community. They could quickly build a page on a website that explicitly states how groups can reach a higher learning institution and form collaborations. This university-wide change proposal is an inherently complex activity and will involve input and cooperation from relevant stakeholders. Where necessary, higher learning institutions should employ an arbitrage strategy. It is hoped that implementing such a strategy would allow higher learning institutions to implement sustainable and engaging measures that encompass each institution's knowledge ecosystem (Delaney & Horan, 2020). Additionally, such collaborative engagement should allow the sharing of experience; reviews, and the integration of theoretical and practical knowledge; active engagement in ongoing experimentation; and strategic and systemic thinking (Coghlan et al., 2019).

Conclusion

Higher learning institutions can contribute to the knowledge economy and local socio-economic development wherever a university campus is built. Too few studies have examined UiTM's role in developing the B40 and M40 communities living near the branch campuses. To bridge this gap, the current study investigated the role of UiTM Cawangan Selangor (UCS) in developing B40 and M40 households. Using a mixed-methods approach via a survey instrument and observation, this study utilized four sub-themes, namely public transportation and facilities (Theme 1), development in the areas around the campuses (Theme 2), propelling business and services (Theme 3), as well as knowledge building, income generation, and employment creation (Theme 4) to investigate the role of UCS.

The study found that UCS has played several significant roles in assisting the development of B40 and M40 households: first, by improving the public transportation services; and second, by increasing development in the areas around the campuses in terms of residential properties and

avenues for leisure activities like parks, malls, and sports complexes. Next, UiTM citizens provide a considerable demand for goods and services, which has helped businesses flourish. Lastly, UCS has enhanced the knowledge-building capacity among youths and teenagers living near its campuses. Several other factors were found to moderately affect nearby households and lead to, for instance, employment creation, higher household incomes, and improvements in other residential facilities.

Based on the findings, it is evident that UCS plays a critical role in developing the communities living in the areas around the campuses. However, UCS is still considered new and more time is required for the trickle-down effect to become fully apparent throughout the community. The efforts of UCS to increase knowledge among youths and teenagers via community engagement programs must be intensified as these have a positive spillover effect. As UiTM increases its student intake to achieve its 200,000-enrolment target, it will automatically stimulate local demand and allow businesses to reap the benefits. It has been an astute policy to build campuses in peri-urban areas to uplift the socio-economic status of nearby B40 communities. Local governments must cooperate with UiTM branch campuses to provide shared facilities like sports complexes, local libraries, and others that can benefit UiTM students and the surrounding community; this would also indirectly promote knowledge transfer. Future studies might consider expanding the sample size, which is the main limitation of this study. Also, other development indicators could be included to measure the trickle-down effect beyond the five-kilometer radius of each university campus.

Acknowledgments

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21ˢᵗ SEAAIR Conference "Best Paper" Award

INCREASING SCHOLARLY WRITING FROM SOUTH-EAST ASIA: STRATEGIES FOR STRENGTHENING DIVERSITY IN HIGHER EDUCATION

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ABSTRACT

The publication is critical for academic credibility. Yet there is a lack of diversity in scholarly publications, and many scholars struggle to succeed in academic publishing. Publication and citation rates are dominated by particular individuals, institutions, countries, and blocs of countries. But, while methods for success in the "publication game" are known, they are less accessible to all cohorts. The purpose of this research was to develop and promulgate methods for improving publication rates across more diverse academic communities, including, but not limited to, those academic communities associated with this conference. The research used two complementary methods for knowledge development and consolidation often used in the applied social sciences: (1) environmental scanning; and (2) the Delphi technique. Environmental scanning is used when information is scattered widely. We used the Delphi technique to consolidate the knowledge of the authors, all of whom have worked as authors, editors, and reviewers, and who between them have over a thousand publications with over 13,000 citations. We grouped the skills required to increase publication rates into six interrelated categories: (1) writing volume; (2) writing quality; (3) collaborative publications; (4) institutional responsibilities; (5) publication strategies; and (6) diverse authorial voices. Each category was further expanded with tactics that can be adapted for workshops on academic writing. Academic writing requires particular skills and the discipline to practice these skills. The skills for academic writing can and must be made accessible across all cohorts if we are to achieve diversity in academic publications.

Keywords: Academic writing; Delphi technique; Diversity; Environmental scanning; Publishing

Background and literature review

To be successful, the modern academic requires several sets of skills. Being an expert in one's domain, demonstrated through a doctoral thesis, is not enough. A publication record is a must. Publish or perish. Back in 1947, before most of us were born, Alan C. Lloyd (1947) described the phrase "publish or perish" as "that neat little slogan", writing:

> *To college teachers it is a cliché that describes an irksome policy of their institutions: before winning promotion in professorial rank[,] candidates for chairs must demonstrate their ability to contribute to the professional thought of their field.* (p. 21)

Lloyd eloquently captured a common perception of the academic community – that publication is an irksome, bureaucratic, institutional requirement – of little real value or merit. But this belittlement of academic publishing has led to a reluctance to acknowledge explicitly that academic publishing is a critical and sophisticated scholarly skill that must be deliberately nurtured and encouraged if it is to flourish.

We thus see a substantial diversity in publication rates across the world (Figure 1). As is to be expected, countries that: (1) are First World; (2) have English as their primary language; and (3) have a concentration of academic publishing companies have a high number of publications. But two anomalies are worth noting – China and India: less developed countries where English is not the primary language can also succeed.
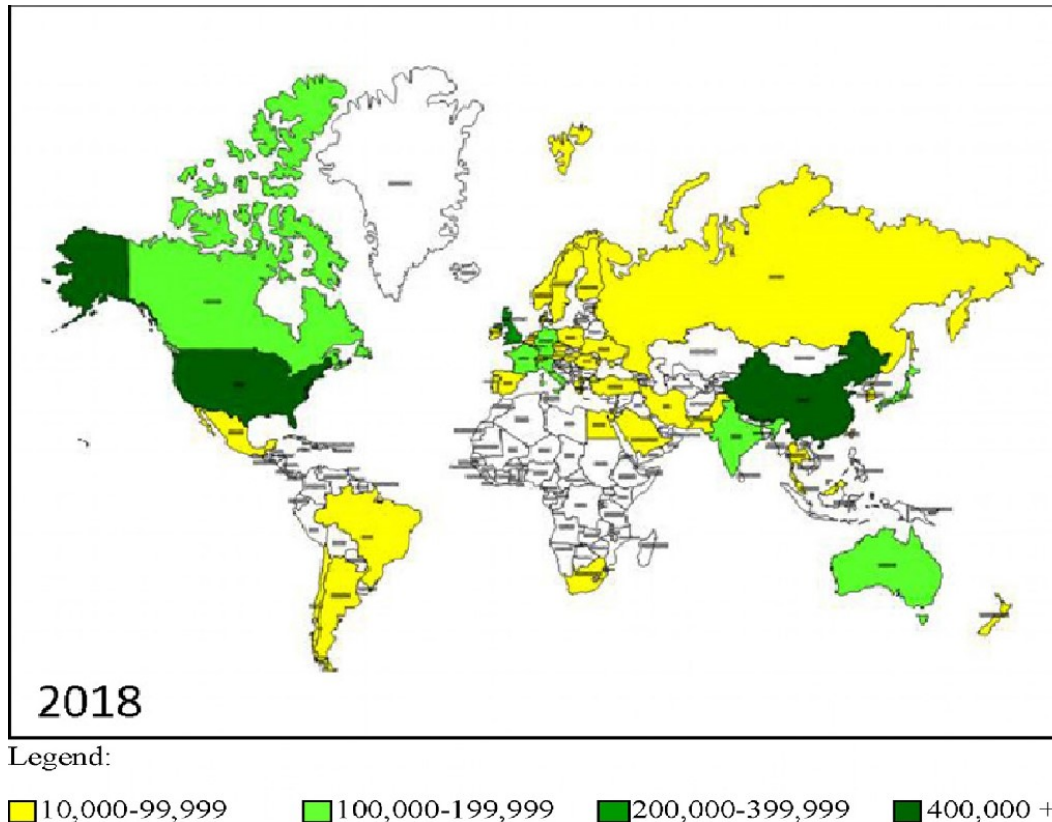
Figure 1: Number of academic publications in 2018 by country. Reproduced from To and Yu (2020, p. 6).

But then, Lloyd (1947), an editor, continued to describe a crucial benefit of academic publishing:

To editors, however, the publish-or-perish admonition has a different meaning: that ideas that are not published soon perish. To them, ideas are the most precious things in the world, and they know them to be the most perishable. Blossoming suddenly, they bloom brilliantly for a moment or a day or a week. And then they fade and perish ignominiously and fruitless unless they are safely planted on paper where, forever and ever, they can resuscitate us and our colleagues and our readers. (p. 21)

Furthermore, as Steven Johnson (2011) wrote in the book *Where Good Ideas Come From*:
Encouragement does not necessarily lead to creativity. Collisions do – the collisions that happen when different fields of expertise converge in some shared physical or intellectual space. That's where the true sparks fly. (p. 163)

If nations want to innovate, not only do they need to foster and capture their ideas, but also ideas need to *collide*. There must be a diversity of ideas. The domination of publications by a few countries not only exacerbates differential progress but also, without a diversity of voices, there are fewer *collisions*. Therefore increasing the publication success of academics in low publishing

countries will not only help to improve innovation in these countries but also enhance the diversity of voices and thereby increase the innovation-producing collisions on a global scale.

More broadly, our understanding of diversity is framed partly by an earlier publication by two of the authors with a different co-author (Bowser, Danaher, & Somasundaram, 2007), where diversity was conceptualized as being interdependent with, rather than as necessarily being oppositional to, commonality. This conceptualization constructs diversity as contextualized, dynamic, and shifting, rather than as essentialized or ossified. From this perspective, diversity represents a richness of highly varied experiences and worldviews that extend our understandings of the world and one another.

Yet that earlier paper (Bowser, Danaher, & Somasundaram, 2007) also noted the continued politicization of diversity that positioned it as being antagonistic, and sometimes as a perceived risk and threat, to commonality. This positioning was theorized in terms of "the [dominant] discourses of neoliberalism, marketization, economic rationalism, and corporate managerialism" (p. 670), and was illustrated concerning Australian higher education:

This application of these dominant discourses aligns easily with a reductionist and homogenized approach to commonality, where sameness and standardization are highly prized and are dramatically disconnected from notions of diversity, where the focus is on celebrating multiplicity and fostering difference. This dynamic tension between commonality and diversity is revealed in ongoing debates around such 'hot topics' in Australian contemporary universities as academic integrity, generic skills, graduate attributes, and information literacy. It is manifested particularly strongly in the teaching and learning of variously marginalized or minority groups who fall outside a homogenized view of university students and who are often positioned 'off the radar' concerning a narrow and reductionist approach to commonality. In short, the diversity of and within these groups renders them problematic about the commonality of a neoliberal and marketized system of higher education. (p. 670)

Elsewhere, the complexity (or perhaps the diversity) of diversity generated the concept of super-diversity (Vertovec, 2007; see also Grzymala-Kazlowska & Phillimore, 2018), in recognition of the increasing range and reach of diversity in multiple forms. Furthermore, diversity can be seen as facilitating a bridge between mainstream society and various forms of otherness and conceptions of "the Other" (Baider & Kopytowska, 2017). By contrast, discourses of diversity can paradoxically work to replicate the otherness of particular minorities by exaggerating their difference from the ideals of the center and the mainstream (Åberg, 2020).

This broader scholarly literature accentuates the complexity and diversity of contemporary understandings of diversity, and also of the contextualized and contested character of different accounts of diversity. Furthermore, diversity emerges from this account as a politicized phenomenon (Gress & Shin, 2020), with varied viewpoints about its relevance and utility as an

analytical lens being aligned with particular positions to the commonality–diversity continuum introduced above (Bowser, Danaher, & Somasundaram, 2007).

Against this backdrop, this research, therefore, sought to promote the diversity of ASEAN academic voices by explicating the skills required to publish academic work. The skills required for successfully publishing academic work are quite complex and demanding. But the science of learning has matured rapidly in the last two decades (Somasundaram, 2018; Somasundaram et al., 2019), and complex skills, even the so-called 'soft skills, can be mastered. We describe three requirements for systematically mastering complex skills. Scholars who wish to explore the science further are welcome to follow the citations provided. The first requirement is to deconstruct the skills systematically into their elementary components. The second requirement is to practice these skills deliberately. The third requirement is persistence. The three requirements are each described in further detail below:

(1) For a complex skill to be systematically and deliberately mastered, the skill must be first broken down into individual elements so that each element can be understood and practiced, first the individual element by itself, and then the integration of that element with other elements (Gobet et al., 2001; Oakley, 2014, 2017; Oakley & Sejnowski, 2014; Sala & Gobet, 2017). For example, one can learn to swim by jumping into the water and thrashing around. But systematic swimming lessons consist of separately learning and practicing arm, feet, and breathing elements and then putting them together. In educational instructional design theory (Dick et al., 2014; Kirschner et al., 2006; Somasundaram et al., 2006), clarifying the scope and depth of what is to be learned is called a curriculum. The primary goal of the research presented by this paper was to develop such a curriculum.

(2) Deliberate practice (Ericsson, 2008; Ericsson et al., 1993) is not simply rote repetition, but rather a process of continuous improvement, of consciously looking for and correcting mistakes. Feedback, whether from a software grammar checker, a reviewer, or a colleague, needs to be actively sought and appreciated. (However, feedback should not be automatically accepted as correct. The authors of academic papers are by no means neophytes and are well on the way to being experts in their own right. The reviewer may well not understand the point being made, and the issue may be simply one of making the writing simpler and easier to understand.)

(3) Developing competence in a complex skill is a long, hard journey. Two tactics to make the journey easier and more pleasant are: (a) to habituate the tasks involved; and (b) to restructure activities so that their results are positive/successful rather than negative/painful (Ariely, 2016; Kim et al., 2016; Wood et al., 2021; Wood & Rünger, 2016).

   a. Habituating tasks can be achieved through activities like having a regular writing schedule and having checklists so that one moves quickly and easily from one task to the next.

b. A common problem faced by writers is writer's block: starting a writing session determined to write a particular number of words, and then finding that words refuse to flow. A reframing tactic is to set the goal as writing for a particular length of time, known as the Pomodoro technique (Gobbo & Vaccari, 2008; Oakley & Sejnowski, 2014). Rewarding oneself with a piece of chocolate will cement the association of writing with pleasure. True, one may not have achieved many words on paper, but one has practiced the skill of writing and associated it with a pleasurable activity. Another common cause of pain is the inevitable rejection letter from reviewers. However, it should be remembered that the reviewer provides valuable feedback, and one still has a complete paper that can be quickly modified and resubmitted to a different journal.

We describe the methodology that we used to develop the curriculum in the next section (Section 2). In Section 3, we present the curriculum in detail. When discussing specific elements of the curriculum, we sometimes also discuss common tips for making the practice of the skills easier and pleasanter. The final section of the paper (Section 4) provides a summary and makes key recommendations.

Research methodology

Most research focuses on a single narrow topic – what Ernst Boyer (1990), in an influential monograph on the academic profession, called the "*scholarship of discovery*" (p. 17). The primary goal of this research was to develop a curriculum, and the development of curricula is a common task in education. Educators typically develop criteria by reviewing comparable curricula and discussions between subject matter experts (both academics and industry practitioners). We used analogous methods employed by researchers in the applied sciences for integrating complex, multidisciplinary issues where practical outcomes are required: environmental scanning (Gordon & Glenn, 2009; Voros, 2003); and the Delphi technique (Vernon, 2009).

Environmental scanning can be compared to the scholarship of integration version of a literature review. While a literature review provides a narrow exploration distilled primarily from peer-reviewed scholarly articles, environmental scanning explores a wide range of resources: workshops, blogs, books, podcasts, and email subscriptions, to name a few. The disciplines scanned are also broad: this paper drew from research into motivation, habituation, and creativity. And, like a good literature review, critical analysis and interpretation are important, perhaps more so because the breadth of material is large. While the scholarship of discovery gains its strength from a narrow, deep foundation, the scholarship of integration gains its strength from a broad and well-connected platform.

The Delphi technique draws knowledge by building consensus from practicing experts. Three authors, each experienced in academic publishing, reviewing, and publishing, collaborated in

writing this paper. Among us, we have over a thousand publications with over 13,000 citations. We each separately identified 30 topics to be covered in a curriculum on academic writing specifically targeting ASEAN authors. The three lists were collated, and collaborative analysis resulted in their being categorized into six groups. The full list and the six categories are reproduced in Table 1. As expected, there were many similarities in the items that the authors identified, and many items fell into more than one category. The authors then wrote composite descriptions of each category, as well as illustrative examples of accompanying strategies (Section 3).

Table 1: Full list of items identified and their associated categories

Author 1	Category	Author 2	Category	Author 3	Category
writing quantity - park at the top of a hill	1	Capacity building	1, 2, 3, 4, 6	Language, non-native English writers/speakers (English as a second language)	1, 2, 5, 6
- snack writing	1	Collaborative capital	1, 2, 3, 4, 6	Inadequate training/workshops	1, 2, 5, 6
- write, not edit	1	Communitarianism	4, 6	Communication skills	1, 2, 5, 6
- Pomodoro technique	1	Communities of practice	1, 2, 3, 4, 6	Argumentative confidence	1, 2, 3, 5, 6
writing quality - audience, easy to read for the reader	2	Cosmopolitanism	4, 6	Peer feedback and assessment	2, 3, 5, 6
- ABT method	2	Discourse communities	2, 3, 4, 6	Need for collective studies	2, 3, 5, 6
- easy to read	2	Diverse forms of knowledge	2, 3, 4, 6	Lexicogrammatical issues	1, 2, 5, 6
vary sentence length	2	Counternarratives	2, 6	Discourse structure	1, 2, 5, 6
Structure paragraph – most remembered idea at end of the paragraph, beginning context	2	Forms of capital	4, 6	Cultural differences	3, 5, 6
connect sentences, warn of changes	2	Ecologies of practice	2, 4, 6	Less rich vocabulary	1, 3, 5, 6
Researchgate	5	Economies of performance	2, 4, 6	Presentation of ideas	1, 2, 3, 5, 6
copyright	4, 5	Ethics of authorship, reviewing and editorship	2, 3, 4, 6	Competent use of English	1, 2, 5, 6
ORCID iD	5	Global English	2, 5	Bilingual educational system	1, 2, 5, 6
Google Scholar	4	Globalisation	3, 4, 5,6	Situation in other parts of the world	3, 4, 5, 6
DOI	4, 5	Indigenous knowledges	2, 3, 6	Conducive environment for research	1, 5, 6
journal ranking	4, 5	Localization	3, 4, 5, 6	Heavy teaching loads	1, 5
racehorse stable	5	Neocolonialism	4, 6	Poorly paid teaching job (needs second job)	1, 5
collaboration	1, 2, 3, 6	Neoliberalism	4, 6	Lack of qualified researchers	2, 5, 6
writing club	1, 2, 3, 6	Networks and partnerships	3, 4, 6	Inadequate flair with the English language	1, 2, 5, 6
offer to peer review, edit	1, 2, 3, 4, 6	Participatory action research	3, 4, 6	Critical analysis and questions	2, 3, 5, 6

constructive criticism	2, 3, 6	Peer feedback	2, 3, 5, 6	Intellectual thumbprint	1, 5, 6
managing citations	1,2,5	Postcolonialism	4, 6	Sociocultural writing practice	1, 3, 5, 6
choosing a journal to publish in	5	Pluralingualism	3, 4, 6	Afraid of being less appealing in global contexts	1, 3, 5, 6
responding to reviewers	2, 5	Researcher self-efficacy	2, 3, 6	Not strictly required for academic job	1, 5, 6
self-cite	5	Scholarly voice	2, 3, 6	Unsatisfactory level of English proficiency for crucial problems	1, 2, 5, 6
self-plagiarism	2	Self-determination theory	3, 6	Use of social media and the internet	4, 5
slice and dice	1	Self-regulated learning	1, 2, 6	Lack of self-promotion	4, 5
how to choose collaborators	1, 2, 3, 6	Southern theory	1, 2, 3, 6	The misconception in identifying gaps in the literature	2, 3, 5
mind-map	1, 2	Writing circles	1, 2, 3, 5, 6	Rarely pose challenges to others' work	2, 3, 5
project manage	1, 2, 3, 6	Writing tribes	1, 2, 3, 5, 6		
process versus project goals	1, 5				
motivation	1				

These are qualitative social science methods. The social sciences recognize that there are differences between people and between communities and that no single tactic works in all circumstances. The purpose of this paper was to assemble a toolbox for academic writers. It is for the readers to decide which tools work best for them in different situations, and to adapt and modify the tools to make them their own.

Analysis and results

The data presented in Figure 1 about publication rates had two weaknesses that the authors wanted to address. Firstly, the data did not focus on ASEAN countries, and secondly, rather than total publications per country, the ratio of publications to population size is a more meaningful indicator of a country's publication success. Such analysis creates very different results (Table 2). No longer are the United States and China leading; rather, the northern European countries lead. In the SEAAIR community, Singapore performs extremely well. With almost 200 countries in the world, just making it onto the list is an accomplishment.

Table 2: The number of articles listed in Scopus per 1000 population (2018). Selected countries. Data sourced from To and Yu (2020) and Population Reference Bureau (2018).

Rank	Country	Papers /1000 pop.	Rank	Country	Papers /1000 pop.
1	Switzerland	5.76	29	Japan	1.06
4	Australia	4.40	30	Malaysia	1.02
7	Singapore	3.97	33	Iran	0.74
9	New Zealand	3.47	34	Russia	0.70
11	United Kingdom	3.24	38	China	0.43
13	Hong Kong	3.11	42	Thailand	0.29
20	United States	2.12	46	Indonesia	0.13
25	South Korea	1.66	47	India	0.13
26	Taiwan	1.57	48	Pakistan	0.10

Writing volume

Academic writing is not only hard work; it is also painful. Academic writing requires the writer to be willing to accept substantial criticism and frequent failure (some journals reject more than 90% of submissions). Furthermore, an article can rarely be completed in a single, marathon session. Writing an article may take several months. It is useful therefore to recognize the writing of a full-length article as one skill and to identify that ensuring that the article is of good quality is a separate, distinct skill.

Once the distinction between writing volume and writing quality is acknowledged, then achieving writing volume becomes much easier. A busy academic needs to find sufficient time to write. Three tactics are often used. "Snack writing" is using short gaps in one's schedule for writing, such as when a student does not show up for a meeting. A second tactic is marathon sessions, such as clearing a weekend for a concerted effort. A third, and perhaps the most reliable, a method is to have a regular, ring-fenced schedule – time set aside in a weekly schedule used exclusively for academic writing. Writing is a skill. Regular practice and habituation make it easier[2]. Whatever method(s) that one uses to allocate time will depend on personal preferences and circumstances, but writers need to monitor that they are productive and to change the methods if they do not work. Having small rewards at the end of every writing activity also helps to reduce the subconscious reluctance to write.

Some individuals find it useful to set outcomes-based targets: targets such as the number of words written in a day or to complete a section by the end of the week. Outcomes-based targets make it

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[2] Completing a thesis substantially improves one's writing skills. But, if not continued, the skill starts to fade. Taking a break after thesis submission is understandable, but the longer that one delays getting back to academic writing, the more of the hard-earned skill that will be lost.

easier to ensure that the desired outcomes are achieved, and targets also motivate. However, targets can also cause anxiety and, when not reached, a sense of failure. Process-based targets, such as working for a particular length of time (Cirillo, 2006, 2007), can also be successful.

Writing requires making and traveling along with connections. It is somewhat similar to getting a stone rolling – effort and physical energy are required to start a movement, but, once some momentum is obtained, then continuous movement is easier. The goal is therefore to sit and start writing some words, even if the words are later discarded[3]. Another tactic for achieving starting momentum is to end each writing session with a note on what should follow – a technique sometimes eloquently described as "parking at the top of a hill". Editing – correcting written work – halts the flow of ideas. Some writers, therefore, separate the writing and editing process – first getting the words down on paper, and without worrying about spelling and grammar, and then editing as a distinct, later process.

There are now many tools that can be used to aid writing. They do, however, require an investment in learning to use the tool properly – an investment that will be richly rewarded the more that one writes. The most important tool is one's word processor. Modern word processors have a lot of useful functionality. One often underused function in word processors is styles. Some tools, such as bibliography managers, are separate software that can integrate with a word processor. Other (academic) writers are a useful source of information about the different tools available.

Writing volume – getting the requisite number of words down – is itself a distinct task, a task that the brain often avoids because it is difficult and is associated with unpleasant events. Recognizing the subconscious barriers to writing helps to develop methods for overcoming the reluctance to write – tactics such as small rewards and parking at the top of the hill. Writing becomes easier the more that one writes.

Writing quality

Humans have two ways of thinking, and writing quality requires using both ways. One way of thinking, sometimes called "focused thinking", is when the brain is concentrating on a particular job. The other type of thinking, sometimes called "diffuse thinking", occurs when the mind is not focused, and quite different thoughts arise from the subconscious. Diffuse thinking is particularly important for creativity. The free, 12-hour, online course "Learning how to learn" (Oakley & Sejnowski, 2014) describes these ways of thinking, and how to use their respective strengths to become more productive.

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[3] This technique is captured by the slogan of a sporting goods company: "Just do it". Maria Gardiner, an academic coach, called it "Assuming the position" – sitting in front of the computer with the document open.

Writing quality can be separated into two elements: scholarly quality; and communication quality. Scholarly quality is the value of the research, in terms of both the originality of the information being presented (the novelty) and the rigor with which the information was constructed (the methodology). Both the novelty[4] and the methodology should be clearly described in the paper.

Poor communication quality is a common reason for a paper being rejected. Good communication quality requires the material being: (a) easy to read; and (b) engaging for the reader. Humans did not evolve to read – reading is an artificial and difficult activity that we have learned to do automatically through decades of practice. Reading requires the brain to follow a mental train of thought created through processing individual letters into words and sentences. The reader's brain is working hard. Understanding how the brain works give many clues about how to write so that the material is easy to read (Douglas, 2015).

(a) Easy to read

Ease of reading can be addressed at four structural levels: (1) the whole paper; (2) sections and paragraphs; (3) sentences and phrases; and (4) words and punctuation.

(1) A clear structure is a backbone for communicating a clear flow of ideas, and initially outlining a detailed structure is useful to clarify the flow and speed of the writing. Almost invariably, the structure of the abstract should align with the structure of the full paper.

(2) Sections and paragraphs group the paper into related sets of ideas. While the reader is usually expected to read a paper from the beginning to the end, the writer need not write from beginning to end. Some writers find it more effective to write whatever section of the paper appears clearest and easiest at that time. However, to write discontinuous sections requires a detailed outline to have been completed – otherwise, the writer ends up with a jigsaw puzzle of sections to put together. Working on different sections at the same time helps to utilize the diffuse thinking capability of the brain. The diffuse thinking capacity of the brain is subconsciously working through the issues in the different sections. When it reaches a clear resolution, writing down that resolution clears that issue, and allows the brain to work on other issues. The purpose of the section or paragraph should be made clear at the beginning, in the first sentence or two. It is the end that is most remembered. Therefore effort should be put into ensuring that the end communicates what the writer wants the reader to remember.

(3) Sentences and phrases communicate ideas and their relationships. The main object of a sentence should be introduced early in the sentence. For example, "Running after the ball, I tripped and fell" is harder to understand than "I tripped and fell while running after the ball". The importance of the relationship between ideas – the narrative, the flow – is often under-appreciated by writers.

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[4] An important part of a literature review is to provide information about novelty.

(4) Words capture the ideas, while words and punctuation communicate the relationships between ideas. Numbering ideas improves clarity. Terms such as "however", "but" and "by contrast" are especially valuable since they prepare the reader for a conflicting idea. Another issue is to use the same words when discussing an item – for example, using the word "country" in one sentence and "nation" in another reduces clarity. Words like "it" and "they" can confuse – especially if the subject to which they are referring were introduced two or more sentences earlier.

(b) Interesting to read

Making a paper easy to read can help to make it more interesting, but an article that is too easy to read can lead to boredom. The trick is to get the balance right. For example, shorter sentences and paragraphs make the paper easy to read. So mixing short sentences and paragraphs with longer, well-structured sentences and paragraphs helps to provide variety and interest.

We like stories and narratives, and the academic writing book *Houston, we have a narrative* (Olson, 2015), by a professor of marine biology turned Hollywood screenwriter, promoted a writing technique called "the And-But-Therefore (ABT) sequence" for creating both flow and interest. First, the writer establishes context (This *and* that). Then the writer creates tension – a problem - *but*. The final step is to release the tension with a solution – the climax – *therefore*. ABT is the structure of a research paper – a context, a problem, and a solution. But the same structure works for individual paragraphs. For writers grappling with how to structure their paragraphs, the ABT sequence provides an easy style that maintains readers' interest.

Unfortunately, some of the writing elements that create interest have restricted opportunities in academic writing. Academic writing is often expected to be dry and stilted. But colorful phrases and similes can liven up an article. And using memorable analogies to make points help these points to stick in the reader's memory. We become emotionally engaged when the narrative is about people, but using the pronouns "I" and "we" to describe the research as a journey by the authors is frowned upon in some disciplines. Humour, another useful writer's tool, is also frowned upon in academic writing. The use of graphics and color creates difficulty in print publishing (see Figure 2).

Collaborative publications

Several of the topics to be included in an academic writing curriculum for ASEAN authors were related to collaborative publications. While acknowledging that disciplinary norms vary considerably about whether publications are generally written individually or in teams, our own experience, both within our scholarly team and in our respective academic groups, is that publication collaborations can be highly motivational and productive, as well as effective in helping to build research skills and researcher efficacy alike.

Separately, we generated several topics that clustered around the category of collaborative publications. These topics included "collaboration" and the "collaborative capital" presumed to develop from such collaboration. "How to choose collaborators" was considered a crucial issue, given the importance of identifying co-authors with whom one could develop deep understandings of the shared subject matter, and also given that sometimes co-authors become close colleagues and even friends. Two specific strategies for facilitating collaborative publications were "Communities of practice" and "writing club". "Sociocultural writing practice" signified a recognition that academic writing environments that align directly with the social and cultural dimensions of such practice are more likely to enhance the attitudes and attributes needed for publication collaborations to thrive. Finally, "Communitarianism" highlighted the importance of the underlying ethos of such collaborations, which are more sustainable if the underpinning values are experienced as being empathetic, reciprocal, and trusting, rather than reflecting competitive individualism and wholly pragmatic and provisional alliances.

Institutional responsibilities

High publication rates by staff have a substantial impact on a university's reputation. One reason that Australia ranks fourth in publications (see Table 2) is that the Australian government both measures and rewards universities for publications. Universities and faculties in turn provide incentives and training courses to boost publications. Research students are a very valuable resource, and Australian universities and supervisors are good at working with students to boost publication rates. Most Australian research students will complete their doctorates with several publications, sometimes written in collaboration with their supervisors. The students achieve credibility for their thesis and a publication record to kick-start their future careers.

Academic institutions are unusual organizations in that they have a highly educated workforce. Furthermore, individuals have a relatively high degree of autonomy compared to other organizations. Academics can themselves (see Figure 2) organize writing clubs (Cahusac de Caux et al., 2017), writing workshops and seminars, or in-house publications. Organizing publications, either books or journal articles, is an excellent way of boosting both local skills and publication outputs. Editing and reviewing articles also improve my skills. It is important, though, for editors to ensure that chapters and articles are picked

This Means You!

Figure 2: Academics can take personal responsibility for improving academic writing within their academic community. Adapted from Flagg (1916)

up in academic search engines[5], as well as to ensure that each chapter or article has a digital object identifier (DOI) (Chandrakar, 2006). Reputable publishers have even created DOI entries for their older articles, written before the DOI system was established.

Publication strategies

There is a wide range of opportunities for academic publishing. Conference proceedings, journals, book reviews, book chapters, textbooks, and books for the public are just some examples. There is a ranking among these, and, with journals, in particular, some are more prestigious than others. A widely accepted measure of an academic publication is its citation rate (the number of times that a publication is cited by other researchers). Choosing where one is published makes a difference to its citation rate: being published in a journal that is widely read increases the likelihood of being cited. To ensure that one's articles and citations are all picked up, authors should maintain a consistent spelling of their names in their publications. Creating and using an ORCID iD are more recent tactics for maintaining a consistent identity. Many journals and book chapters require payments[6]and providing a copy of one's work with open access increases reader access[7]. Writing an article is hard work, and a little effort paid to ensure that it is read and cited is worthwhile.

There are many stages in writing an article: having an idea, growing that idea through reading and thinking, undertaking a literature review, undertaking any necessary physical research, writing, selecting a publisher, sending the paper off for peer review, and waiting for a response, making required changes and even after acceptance – waiting for publication. Productive writers have several articles on which they are working concurrently, from ideas being allowed to mature to work waiting to be published. When one article hits a delay, they have another article on which they can spend time. They are like a racehorse stable manager, with several horses in the stable at various stages of readiness to race. And, just as not all racehorses are suited to all races, the writer selects the journal with care. Not all articles can or will make the top international journals. But every article contributes to both publication output and the development of one's skill.

Diverse authorial voices

We contend that the strategies for increasing scholarly writing from South-East Asia being canvassed in this paper are likely to have the concomitant benefit of strengthening diversity in higher education, in that region specifically and also globally. This is because writing of all kinds, including academic writing, invariably reflects the writers' experiences and perspectives, and there is a considerable variety of such experiences and perspectives both among and within South-East

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[5] Academics can themselves ensure that their works appear in Google Scholar searches by creating profiles for themselves in Google Scholar and entering the article details.
[6] Publishers often copyright the work, but may permit authors to publish earlier versions of the publication.
[7] Authors can establish a profile in the academic repository Researchgate, and upload documents to it.

Asian countries. Furthermore, we assert that that variety is crucial for widening the range of authorial voices, and thereby for enhancing the exchange of scholarly ideas in and across disciplines of knowledge.

A number of the topics that we generated separately referred to the existence and importance of diverse authorial voices from multiple angles. For instance, there was a recognition of "Cultural differences" among academics from different backgrounds, and also of the specific worldviews associated with "Indigenous knowledge" that in turn contributed to a broader phenomenon of "Diverse forms of knowledge". Strategically, we affirmed the "Need for collective studies" that would focus explicitly on varied points of view about a particular research subject, and we considered that developing "Argumentative confidence" is an effective writing technique for maximizing academic authors' conviction of the strength of their scholarly voices while also being attentive to the voices of other writers. Philosophically, "Cosmopolitanism" highlights the broader and global scholarly community to which individual academic voices are contributing, while "Plurilingualism" celebrates the distinctive intellectual capacities of scholars who can switch between languages, and hence share the respective insights of each language. Finally, "Counternarratives" emphasize the politicized character of promoting diverse scholarly voices, which can sometimes be applied to challenging and even transforming otherwise dominant modes of thinking and understandings of the world.

Creating diverse authorial voices requires collaborations that demand superior interpersonal (Patterson, 2012) and project management (Office of Government Commerce, 2002, 2017) skills. These skills can be developed using the same techniques used to develop writing skills: establishing a curriculum, deliberate practice, and persistence.

Summary and Recommendations

Publishing regularly is essential for academics who want to build their reputation. Research and its dissemination are also vital for the intellectual, social, and economic growth of a country. In this paper, we described academic writing as consisting of six broad sets of skills. Academic writers are like master builders, skilled in bricklaying, carpentry, plastering, painting, plumbing, and landscaping. This paper has provided selected toolboxes or sets of tools. It is up to the individual writer to choose the right tool for each task, to practice using each tool, and to add new tools to her or his current toolbox. If we do not use a tool, our ability to use the tool becomes rusty. We are all capable of becoming master builders. Complex skills can be mastered by deliberate practice (practice with identifying weaknesses and improving on them) and persistence (structuring the environment so that activities are habituated and pleasurable).

Our analysis found that diversity (diverse authorial voices) is an important category in its own right, and inter-connects with many of the other categories. Building diversity is like blending metals to create superior alloys: it requires understanding the strengths and weaknesses of the

different elements, and superior skills to bind the components together successfully. Individuals *are t*he institutions to which they belong, and individuals can act to improve the institutional promotion of diversity. Specific recommendations to promote ASEAN voices being heard are:

1. Use ORCID iDs in local publications. ORCID iDs demonstrate awareness of the international best practice and improve citation rates.
2. Establish Digital Object Identifiers (DOIs) for all journal articles, book chapters, and conference proceedings. DOIs also demonstrate awareness of the international best practice and improve citation rates. The more highly cited journals have even gone back and created DOIs for older articles published before DOIs became the norm.
3. Include citations from ASEAN journals. Including citations of local literature demonstrates to the editor and reviewers that the authors have engaged with the journal's and other local literature and have conducted a comprehensive literature review.
4. Improve interpersonal skills. Though traditionally considered soft skills, interpersonal skills can be learned by the same process of breaking them down into elements, deliberate practice, and persistence.
5. Improve project management skills.

Academic writing is a difficult skill. Achieving writing expertise is not a destination, but a journey that can be enjoyed for its sheer pleasure. For the individual, academic writing also provides a permanent legacy. Our work may not be the work of a giant like Aristotle or Einstein, but each published piece is at least a small contribution that will live forever and help to build the future. This century is the century of Asia, and ASEAN academics have the opportunity to give voice to the deep and rich diversity that is Asia.

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DEVELOPMENT OF COMPETENCY ASSESSMENT TOOL FOR STUDENT-NURSES READINESS

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ABSTRACT

Preparing students for the real world of work is a vital responsibility of higher education institutions. To determine their preparedness, assessment tools are necessary to verify whether students have attained certain levels of expected competencies. The institution does extremely feel the absence of an assessment tool to evaluate the nursing students' readiness for the world of work in the caring profession. This study developed a competency assessment tool fitted to Philippine nursing practice as a benchmark for student nurses to prepare them for expected competencies in the actual nursing practice. The study was anchored on the theory of Patricia Benner and the NCCS of 2012. Mixed methods exploratory design was utilized in the study. Fourteen expert nurses in the field of nursing practice were given open-ended questions based on the 11 key areas of responsibility. Thematic analysis and drawing of core ideas were employed that underwent content validity from another set of fourteen experts from the academe, clinical practice, and Commission on Higher Education. The final content validity was done through Lawshe Content validity ratio. More than 500 nurses answered the initial instrument after which exploratory factor analysis was conducted to identify the item indicators for each main construct of the proposed competency tool. There were 11 major themes and 141 performance indicators. Three major competencies are labeled as Client Care, Management and Leadership, and Research. The final tool which has undergone appropriate scientific processes will be used to assess the student nurses' competencies as to their readiness to the world of work.

Keywords: *Competency indicators, Client Care, Leadership, Research in health care*

Introduction

Care is an essential human need and is a requisite for any health care practitioner to possess the ability to care. One of the most important core values in the nursing profession is the value of caring, it is a character that requires the affective side of being human and the science of nurturing. The nurse assumes a caring role in the promotion of health, prevention of diseases, rehabilitation, and assists towards a peaceful death if recovery is not possible (CMO 14, Series of 2009). Nurses being at the forefront in the art of caring, are expected that when they work in the hospital, they possess the necessary beginning competencies to enable them to meet the ever-changing demands of the clinical environment. A solid and resilient nursing workforce is vital in every health organization because nurses serve as among the significant pillars in every health institution (International Council of Nurses, 2016). With this vital nursing role, the Department of Health conducts its yearly quality assurance inspection to ensure that not only are the number of nurses adequate but also to determine whether the nurses hired in hospitals are equipped with the proficiencies expected of a licensed nurse.

Given this scenario, the nursing profession has also undertaken various endeavors to meet the global demands in the delivery of quality health care and service. The Board of Nursing (BON) in collaboration with the Commission on Higher Education (CHED) issued CMO 14, Series of 2009, stipulating the 11 key areas of responsibilities for the nursing profession, to serve as a guide for the academe and hospitals in ensuring that these competencies are integrated into all modes of teaching, as well as in educational sessions and forums. Moreover, for the nursing profession to be at par with its ASEAN counterparts and also to be aligned with the profession in the context of the outcomes-based model, BON and CHED issued CMO 15, Series of 2017. The directive specifically defined the Policies, Standards, and Guidelines in implementing the shift from competency-based to outcomes-based stipulating the core competencies of Bachelor of Science in nursing graduates.

While it is very clear in the mandate that the stipulated competencies be covered in the curriculum, sadly, the actual experiences of nursing students while in practicum do not afford such opportunity. For reasons like institutional interruptions of supposed student hospital exposure, limited areas of exposure, the ample amount of mentoring from clinical instructor/staff nurses, and the necessary resources available in hospitals which are vital components for the development of such competencies. If students are not provided or will lack the opportunity to ample exposure to basic nursing skills, they may gain insufficient experience for even minimal competence (Bradshaw and Merriman, 2008; Pijl-Zieber et al, 2013)

The academe utilizes assessment tools in the form of a procedural checklist to measure skill competency as well as rubrics to evaluate each competency expected of student nurses to develop.

Assessments and evaluations are conducted along the continuum from the students' first year in the curriculum up to graduation. The purpose is to ensure that the nursing graduate must have developed the vital competencies ready for entry-level employment. CHED emphasized the importance of such evaluation tools and are deemed to be very necessary, in that such competency assessment should continue up to employment. The present tools utilized vary from one institution to another, most hospitals use assessment tools for quality assurance, but for quality improvement per se, assessment tools are utilized but may be obsolete or have not undergone content validation. Bridging the gap from the academe to the clinical setting might be difficult considering that the curriculum is ever-changing (the shift from competency-based to outcomes-based). Therefore, there is a need for schools and health care institutions to work together in ensuring that competency assessments are standardized and are aligned with the Standards of Professional Nursing Practice in the Philippines as mandated by the Philippine Board of Nursing, CHED, ASEAN Qualification Framework, and International Council of Nurses (ICN).

Fukada (2018) states that Nursing competency includes core abilities that are required for fulfilling one's role as a nurse, moreover Fukada described competence as an ability acquired through experience and learning. The concept of competence is two-fold: 1) potential abilities that may work effectively under certain circumstances and 2) motivation to show one's usefulness using those abilities.

Nurses in a caring environment are accountable for their actions and the care they give to their clients. It is a continuing challenge for nursing leaders to address concerns that bear on authority and responsibility of nurses given their role in the health care setting. The competency of nurses is in question especially when acts of negligence and not being able to act according to the scope of nursing practice leading to patient injury or acts that may cause harm are observed within the field of practice (Jacoby & Scruth, 2017). It is, therefore, necessary for the nurses who are in the administrative position in hospitals, with the span of control, to continuously monitor the performance of nurses and review institutional performance assessments and compare with competency standards. Nurse Managers need to assess constantly the competencies of clinical nurses to ensure that services of qualified workforce and safe patient care are delivered. Monitoring performances may always require competency tools. Several studies have confirmed that the use of scales for competence self-assessment encourages practice improvement and continuing education (Buchan, 1997; Tosin, Bonaldi, Biban, et al., 2017).

Nursing practice in the Philippines is guided by the National Core competency standards, which can be used as a guide to formulate assessment tools to monitor nurses' competency. However, hospitals do not have the necessary validated tools developed which are tailor-fitted to the Filipino nurse in actual practice, to check whether essential competencies are transferred, to link and bridge the gap from academe to the clinical practice.

A study by Tosin et.al. (2017) cited that several studies have been conducted in Finland and Spain on competency assessments, these studies agreed on a common conclusion that "the formulated instruments are not based on explicit and validated measurement scales weighted for the specificity of the clinical setting" (Meretoja et al., 2004; Batalden et al., 2002; Finotto et al., 2009). Therefore, the need for validation of competency assessment tools is an appropriate measure to tailor-fit according to what is needed to be assessed in a specific health care setting.

In this light, this study hopes to validate the overall factor structure of the nursing core competencies and its indicators through scale item analysis. The results of this study hope to contribute to the dearth of studies on scale development of nursing competencies fitted to the culture and work environment of the Filipino nurse. Given the scale, this can be used to determine the strength and weaknesses of the current practice which can be the basis for curriculum improvement and formulation of standardized assessment tools for health care institutions geared towards the improvement of quality nursing care.

Framework

The assumptions of this study are anchored on the following theories: Patricia Benner's "The Primacy Caring Model" (from novice to expert nursing model); the National Nursing Core Competency Standards of 2012 as stipulated under CMO 15 series of 2017.

The theme of this study concentrated on the nursing competencies, considering that the primacy of the nurses' role is the capacity to effectively and efficiently perform her duties and responsibilities, which greatly impact patient care outcomes and quality care delivery in health care organizations. Competency models serve as standards in formulating tools for assessment. A study on the Development of a Nursing Competency Framework using thematic qualitative content analysis showed that providing a competency-based model, and expanding and standardization of competency concepts in different dimensions of the nursing profession is a necessity (Ahmadi, Yazdani, & Mohammad-Pour, 2017).

Patricia Benner's (1984) Model of Professional Nurse Development as cited by Lawson in 2017, described the progression of nurses through stages as they gain experience in nursing practice. Benner's (2004) work is heavily founded on the Dreyfus model of skill acquisition. She specified the model as situational "rather than being a trait or talent model because the focus is on actual performance and outcomes in particular situations". It is also identified as developmental because alterations in a performance in selected situations can be compared over time; though, there is no recognition of the talents or traits that are possessed by a person that causes a skillful performance.

There are five stages outlined in Benner's (1984; 2004) model: novice, advanced beginner, competent, proficient, and expert. The following statements provide a brief description of each stage:

Stage 1, novice, the beginner is about to begin her journey in her professional career.
This is the entry-level where the nurse is guided by rules and regulations. Her practice heavily relies on idealism in complying with defined roles and job descriptions. The level of experience in this stage is during the first year of the nurse's clinical practice.

Stage 2, advanced beginner, the nurse in this stage now demonstrates a performance level that requires minimal to moderate supervision. The nurse has gained an acceptable amount of experience that allows her to make sound decision-making in situations that call for her prompt attention. There is still a reliance on rules, and support is necessary for priority setting and assistance in meeting the patients' needs for care. Benner indicates that the new graduate typically functions close to the level of a beginning staff nurse. As the beginning nurse gains ample amount of experience, her competence in terms of skill, knowledge, and development of desirable behavior and attitudes follows.

Stage 3, *Competent,* the nurse in this stage has established working environment familiarity; one can manage patient care activities and work roles and can formulate goals that are vital for quality patient outcomes. The nurse can identify measures and develop critical thinking abilities in ensuring that when sentinel events happen solutions are at hand and attempts to prevent problems from happening. Certainty is not ensured, and thus, one does not act expediently or flexibly (Dillon, 2002). The nurse has developed a moral compass in her practice, distinguishing good from bad practice, and has a sense of self-awareness; knowing what areas in her role needs improvement and what needs to be honed for mastery. Benner (1982; 1984) comments that a nurse at this level has generally 2-3 years of experience in the same position. However, in a later publication (2004), Benner indicates that competence may occur after 1-2 years in practice, but emphasizes that the speed at which one acquires competence has to do with experiential learning and the patient population in terms of its variety and complexity. Exposure to the same complexity and number of clients served widens the horizon of the nurse to become proficient in her practice.

Stage 4, *Proficient,* the nurse relies on perceptions that are based on experiences and events. The nurse knows what is "typical" for a given situation and knows how to plan and make modifications when necessary. The nurse can see the entire situation instead of viewing different aspects and attributes. Performance, though, is still guided by maxims. Decision-making is improved, less-labored, and problems are more easily and accurately identified through an understanding of "early warning signals" (Benner, 2004). A nurse deemed proficient generally has been working with a similar patient population for 3-5 years.

Stage 5, *Expert,* the nurse exhibits a wealth of experience from which one can have an "intuitive grasp of each situation and zeroes in on the accurate region of the problem without wasteful consideration of a large range of unfruitful, alternative diagnoses and solutions" (Benner, 2004) The nurse in this stage have developed a "clinical eye" where prioritizations of tasks come easy, the wisdom the nurse gained from years of experience gave her the ability to be a critical sentient being that perception and astute recognition of the clinical scenarios is noted without much difficulty; thus, less dependence on procedures and methods is noted but not deviating from ethical standards. Benner notes that expert "practice is a way of knowing through experiential learning and embodied know-how" ((Benner, 2004).

The stages specified by Benner that years of experience is a requirement for each stage, but the progression of the nurses' competency solely depends on the capability, confidence, motivation, and other factors that will affect the professional growth of the nurse in clinical practice. Benner's theory is relevant to this proposed study because it served as a roadmap for nurses as they go through each stage and transition from an inexperienced nurse to an expert nurse. Each stage is translated by Benner that provides a vivid description of what nurses are like for each stage while performing their duties and responsibilities. Such responsibilities are then translated into the provision of nursing care following the ethical-moral standards of the profession. The day-to-day encounters of the nurse with clients, families, colleagues, and members of the health team provided the opportunity of honing their knowledge, skills, and attitudes, allowing personal and professional growth, giving the nurse the confidence to carry out and carry on with their roles, this competency is cultivated up until the nurse becomes an expert in the field of nursing practice. Moreover, Benner's framework is aligned with the objective of the study in assessing the level of competence of nurses as they transition from the entry-level of employment up until they gain significant experience making them experts in the field. Therefore, nurses must see themselves grow in their chosen field of career and the provision of safe and quality nursing care through continuous audits and appraisals through performance assessments.

The 2012 National Nursing Core Competency Standards (NCCS) is a collaborative effort of experts in the field of nursing namely: Philippine Board of Nursing (PRBON) with Commission on Higher Education (CHED) Technical Committee in Nursing education, Association of Deans of Philippine Colleges of Nursing (ADPCN), Philippine Nurses Association (PNA), Association of Nursing Service Administrators of the Philippines (ANSAP), University of the Philippines - College of Nursing (UP-CON) as World Health Organization (WHO) collaborating center for nursing development. Such collaborative effort is aimed towards aligning the nursing profession with global demands and international standards and will serve as a guide and blueprint for hospitals and schools in formulating any related evaluation tools in various practice settings in the Philippines. The standard describes Core competencies defined into three (3) major roles that are deemed to be possessed by every nurse practitioner as they begin to venture into their chosen field

of work s healthcare providers. The roles are the following: *Beginning Nurses Role in Client Care, Beginning Nurses Role in Leadership and Management and Beginning Nurses Role in Research.*

Roles, according to the NCCS (2012) set the expected patterns of professional behavior for professional nurses in society performed within clearly established and universally accepted processes - the nursing process. The Core Competencies are then explicitly provided with responsibilities composed of performance indicators where Skills, Knowledge, and attitudes that a Filipino nurse ought to possess are reflected (NCCS, 2012). The following are the expected beginning nurses' roles:

- o *Beginning Nurse's Role in Client Care.* In this role are five (5) responsibilities, namely: Responsibility 1: Practices per legal principles and the code of ethics in making a personal and professional judgment; Responsibility 2: Utilizes the nursing Process in the interdisciplinary care of clients that empowers the clients and promotes safe quality care; Responsibility 3: Maintains complete and up to date recording and reporting system; Responsibility 4: Establishes a collaborative relationship with colleagues and other members of the team to enhance nursing and other health care services, and Responsibility 5: Promotes professional and personal growth and development.
- o *Beginning Nurse's Role in Management and Leadership.* This role stipulates six (6) responsibilities, which include: Responsibility 1: Demonstrates management and leadership skills to provide safe and quality care; Responsibility 2: Demonstrates accountability for safe nursing practice; Responsibility 3: Demonstrates management and leadership skills to deliver health programs and services effectively to specific client groups in the community setting; Responsibility 4: Manages a community/village-based health facility/component of the health program or nursing service; Responsibility 5: Demonstrates ability to lead and supervise nursing support staff; Responsibility 6: Utilizes appropriate mechanisms for networking, linkage, building, and referrals.
- o *Beginning Nurse's Role on Research.* Research is another activity expected of a beginning nurse and there are three (3) defined responsibilities Responsibility 1: Engages in nursing or health-related research with or under the supervision of an experienced researcher; Responsibility 2: Evaluates research study/report utilizing guidelines in the conduct of a written research critique; Responsibility 3: Applies the research process in improving client care in partnership with a quality improvement/quality assurance/nursing audit team.

Another source of expected nurse competencies is the CMO 14 series of 2009, which was superseded by the NCCS of 2012. It elaborated the identified eleven (11) key areas of responsibilities as follows: Safe and Quality Care, Management of Environment and Resources,

Health Education, Legal Responsibility, Ethico-moral Responsibility, Personal and Professional Development, Quality Improvement, Research, Record Management, Communication, as well as Collaboration and Teamwork (ADPCN, 2006).

The NCCS of 2012 therefore, serves as a unifying structure for nursing education and practice, a guide for the basic nursing education program, development of a framework for the competency-based nursing licensure exam, and any related evaluation tools in various practice settings in the Philippines (International Labour Organization, 2014).

This study observed the process flow as reflected in Figure 1 to complete this dissertation. The *Context* which is the *Nursing Core Competencies* is a multi-dimensional construct comprised of three dimensions described as roles: Beginning Nurses Role on Client Care; Beginning Nurses Role in Leadership and Management; Beginning Nurses Role on Research. The core competencies are significant in determining the constructs for the competency Indicators which is the *Input* of the process. The derived item scale is labeled as *Competency Indicators*, which is the result that will undergo testing, or the *Process* which is the *Factor Analysis*. The succeeding outcomes of the statistical method will now be the Validated Indicators of the Constructs.

Context

Nurses' Core Competencies

Nurses Roles:

1. Beginning Nurses Role on Client Care

2. Beginning Nurses Role in Management in Leadership

3. Beginning Nurse Role of Research

Input

Factor Analysis

Process

Competency Indicators

(Client Care, Management in Leadership, Research)

Product

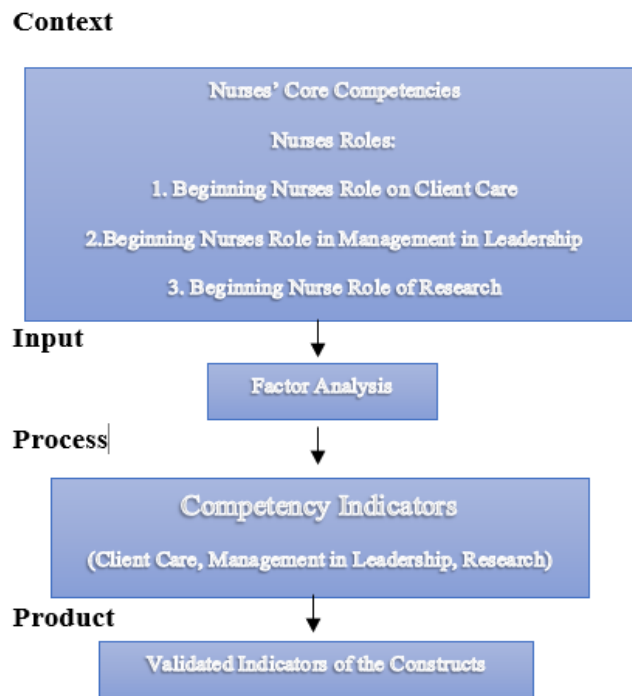Validated Indicators of the Constructs

Figure 1. Process Flow of the Study

Objectives

The study hopes to validate the overall factor structure of the nursing core competencies and their indicators through scale item analysis

The specific aims of the study were to:

1. Construct a validated instrument for the Nurses' Core Competencies
2. Provide results and findings to contribute as a guide to enhance curricula and ensure continuity of regulations for safe nursing practice.
3. Adequately describe for the nursing service, areas that need improvement, where formulation or development of nursing operation manuals may be done to allow for a conducive working environment meanwhile empowering and enabling nurses to provide efficient and effective care that espouses professional growth where nurses may optimally hone their knowledge, skills, and attitudes.

These addresses the following research questions in a group of professional nurses in hospitals and healthcare institutions:

1. What are the major competencies of nurses' in the beginning role in:
    1.1. Client care;
    1.2. Management & Leadership;
    1.3. Research?
2. What are the relevant key indicators for nurses' competency tools?
3. What are the main constructs of the competency tool?

Methodology

The study used the mixed method. A mixed methods research design is a procedure for collecting, analyzing, and "mixing" both quantitative and qualitative data in a single study to understand a research problem (Creswell, 2007). Specifically, it used the exploratory design where qualitative data was gathered first before the study. The sequence to data collection involved collecting qualitative data followed by quantitative data. The quantitative data was used to develop or explain the initial qualitative findings. After which, the quantitative data became the basis for scale development.

Respondent and Sampling Procedure

Stage 1. The first batch is chief nurses from various hospitals in Cagayan De Oro and Bukidnon who are the chosen respondents for the qualitative approach of the study. An open-ended questionnaire was floated to the 14 chief nurses from private and government hospitals. These experts are purposively selected considering that they have the supervisory and top-level

management skills as chief nurses and supervisors, making them fit to assess the necessary competencies and evaluate nurses' performance in clinical practice.

Upon retrieval of the open-ended questionnaire, the items were consolidated and grouped into themes. Items that fit as "performance indicators" for a beginning nurse in practice were retained, while items that are supervisory and managerial were not included. As soon as the analysis of the items was completed, the survey tool was distributed to another set of experts, chief nurses from 8 hospitals, 5 experts from nursing schools, and 1 from Commission on Higher Education, Region 10. This set of experts scrutinized the items in terms of essentiality, appropriateness, and whether the items are within the standards of nursing practice. There are items deleted and recommendations from the experts were followed and included in the tool. After the critiquing, items were finalized and underwent another round of scrutiny from a mentor who has been a clinician, academician, and researcher, to ensure the validity of the items included in the survey tool.

Stage 2. The population selected in the study were the staff nurses employed in private and government hospitals in Cagayan De Oro City and Bukidnon. Purposive sampling was employed in the selection of the respondents for each hospital. In theory and practice, to analyze the factors, a large number of samples were needed to specify the size of the sampling group. Wongwanich and Wiratchai (2003) suggested the way to specify the number of samples for factor analysis. A proportion defines 5 samples per 1 variable. If the study will have 100 variables; therefore, several samples were at least 500 nurses. In the study, out of the 700 questionnaires floated to the respondents, 524 copies were retrieved.

Research Instrumentation

The study underwent two phases in terms of obtaining data for analysis.

Phase1. Employed qualitative data collection. Researcher-made open-ended questions which are based on the 11 key areas of responsibilities as stipulated in CMO 15 series of 2012 were answered by the 14 chief nurses from private and government hospitals located in Cagayan de Oro and Bukidnon. The answers derived from the answered open-ended questions and interviews underwent coding and thematic analysis. The researcher performed critical selection and listing of items to be set as performance indicators. The set items went through critiquing and review in terms of appropriateness and importance by another set of 14 experts in the field of nursing practice. The experts chosen have valuable experience in administration and policy making in nursing practice both hospital practice and academe.

Initial content validity was performed by another expert who is also a researcher, academician, and clinician for more than 15 years and possessed the qualities of an expert in the field of nursing practice. For the final content validation of the tool, a commonly used content validity

measurement developed by Lawshe (1975) was also employed. It involved a panel of 14 subject matter experts, rating the items into one of three categories: "essential," "useful, but not essential," or "not necessary." Items deemed "essential" by a critical number of panel members are then included within the final instrument, with items failing to achieve this critical level discarded (Ayre and Scally, 2014). Results of the study suggested that items with a CVI of 0. 60 or higher for three or more experts can be considered evidence of good content validity. The results of the final content analysis were the basis in selecting the indicators or scale items reflected in the tool that was floated and subjected to factor analysis.

Phase 2. The tool reflected the major themes and the listed nurses' performance indicators or scale items. The items were assigned seven rating scales as to Level of Importance. The following scoring procedure is employed: 1 – not at all important; 2 –low importance; 3 – slightly important; 4 –neutral; 5 – moderately important; 6 –very important; 7 – extremely important.

Data Gathering Procedures

Upon approval to proceed with the study, a letter of permission was sent to the chief of hospitals requesting consent that the questionnaires will be distributed purposively to the expert respondent for the qualitative phase and to the nurses for the quantitative phase. Informed consent was obtained from the participants and the following were considered according to the standards of the American Psychologist Association (APA).

The data gathering consisted of two (2) phases:

Phase 1. The first phase of the study was qualitative which led to the second phase. An open-ended questionnaire was given to the experts, where the questions were drawn and structured from the 11 key areas of responsibilities, namely: Safe and Quality Care, Management of Environment and Resources, Health Education, Legal Responsibility, Ethico-moral Responsibility, Personal and Professional Development, Quality Improvement, Research, Record Management, Communication, and Collaboration and Teamwork (ADPCN, 2006).

The questionnaire was floated to the fourteen (14) nursing experts assigned to major hospitals (private and government) located in Cagayan De Oro and Bukidnon. Qualitative data were elicited from Chief Nurses, with Masters' and Doctoral degrees and have been in the nursing practice for 15 – 20 years. All the responses of the participants were encoded verbatim. The diverse answers were content analyzed and coded individually, before determining the final thematic categories for the responses to each of the research questions. Listings of the items (performance indicators) were derived from the statements that were content analyzed and coded. To ensure that the content

of the tool followed the practice standards-setting in the Philippines, the listed items were closely compared to standards,

Using the guidelines of Heppner and Heppner (2004) the responses were analyzed into core ideas and were categorized as general, typical and variant. In "general" responses, almost all the participants indicated the response. "Typical" responses were stated at least by a fourth to half of the respondents. While responses indicated as "variant" were mentioned by only one or two participants. After categorizing and formulating the thematic analysis, the items that were supervisory or managerial, such as hiring and selection of staff or formulating the hospital's 5-year development plan and the like were not included in the final items. The selected items were then structured into statement items, classified as "performance indicators" as reflected in the survey tool.

Content validity was initially done through the Delphi approach where the items were scrutinized and agreed upon by the experts. The first round of content analysis and verification of categories and core ideas or performance indicators underwent scrutiny from a set of fourteen (14) experts (Chief Nurses, Supervisors, Deans, and CHEDRO 10 Education Specialist) who consented when requested by the researcher through a letter of request. These experts are well versed with the dimensions of the competencies in nursing practice making them fit to perform content validation of the items. Using the guidelines of the Nursing Core Competency Standards of 2012, the responses were analyzed by the experts in terms of appropriateness of the listed item for each major theme.

Redundant items were deleted and some items were transferred to another major theme where it was appropriate, such as items that were listed in Safety and Quality, were transferred to Quality Improvement. The core ideas depended on the outcomes of the thematic analysis. Since the themes were already pre-identified using the constructs of Nursing Core Competencies, the core ideas were fitted into each of the major themes: safe and quality nursing care, management of resources and environment, health education, legal responsibility, ethical-moral responsibility, personal and professional development, quality improvement, research, record management, communication, and collaboration and teamwork.

Phase 2. The second stage of this study was quantitative which was the onset of scale development for each major theme termed as Performance Indicator queues. The listed item indicators were based on the first stage responses. To further confirm the appropriateness of the performance indicator queues another round of content validation was reemployed by consulting another expert who has been a nurse clinician, academician, researcher, nursing service director, and president of one of the major hospitals in Bukidnon. After establishing the content validity scientifically, discussed earlier in the instrumentation, the survey tool was ready for data gathering for further validation using the reduction method in exploratory factor analysis.

Finally, the survey tool was floated to 700 staff nurses of four major hospitals in Cagayan de Oro and Bukidnon. Out of the 700 questionnaires, 524 were retrieved and subjected to statistical analysis, specifically the Exploratory Factor Analysis.

Statistical Treatment

Statistical treatments are utilized in the conduct of the study are the following:
Factor Analysis. Exploratory Factor analysis (EFA) was utilized recognizing it as a significant process in the development, refinement, and evaluation of tests, scales, and measures (Williams, Brown, et al. 2010). It is the most appropriate statistical to use since the objective of the study attempted to establish whether the items in the predetermined themes were unidimensional through the reduction method. EFA is frequently used to develop questionnaires: to measure ability or trait and to ensure that the questions asked to relate to the constructs that the study intended to measure. Factor analysis can cluster data generated by many statements into five or more groups. Objectives of Exploratory Factor Analysis (Pett Lackey et al. 2003; Thompson 2004) are reduction of several factors (variables); assessment of multi-collinearity among factors which are correlated; unidimensionality of constructs evaluation and detection; evaluation of construct validity in a survey; examination of factors (variables) relationship or structure; development of theoretical constructs; and prove proposed theories.

Varied measures are involved in EFA, namely, reliability indices, Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy, Bartlett's Test of Sphericity, Eigenvalues, and rotation.
- Reliability Indices. Cronbach's alpha is the most common measure of internal consistency (reliability). It is commonly used when you have multiple Likert questions in a survey/questionnaire that form a scale and the researcher wishes to determine if the scale is reliable. George and Mallery (2003), as cited by Gliem, J. and Gliem R. (2003), provide the following rules of thumb: "above 0.9 – 0.81 Good, 0.80 – 0.71 – Acceptable, 0.70 – 0.61 – Questionable, 0.60 – 0.50 – Poor, and below 0.50 – Unacceptable". While increasing the value of alpha is partially dependent upon the number of items on the scale, it should be noted that this has diminishing returns. It should also be noted that an alpha of 0.8 is probably a reasonable goal.
- Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy. Kaiser, (as cited by Field, 2005) recommends accepting greater values than 0.5 as acceptable (values below should lead the researcher to either collect more data or rethink which variables to include). Furthermore, values between 0.5 and 0.7 are mediocre, values between 0.7 and 0.8 are good, values between 0.8 and 0.9 are great values, and values above 0.9 are superb.
- Barlett's Test of Sphericity. This is used to test the null hypothesis that the original correlations matrix is an identity matrix. For the factor analysis to work, we need some relationships between variables and if the R-matrix were an identity matrix then all

correlations coefficients would be zero. A significant test tells us the R-Matrix is not an identity matrix. The test is significant and if the value is less than 0.5 and highly significant if it is less than 0.001. The factor analysis is appropriate if the test is significant (Field, 2005).

o Eigenvalues. As cited by Field (2005), Kaisers' recommendation of eigenvalues must be over 1 to retain the number of factors to continue with the analysis.

o Rotation. The interpretability of factors can be improved through rotation. It maximizes the loading of each variable on one of the extracted factors while minimizing the loading on all other factors. Rotation works by changing the absolute values of the variables while keeping the differential values constant.

o Varimax, quartimax, and equamax are orthogonal rotations. The exact choice of rotation depends on whether or not you think that the underlying factors should be related. If you expect the factors to be independent then you should choose the orthogonal rotation. Field (2005), recommends varimax for orthogonal rotation. Comrey rated orthogonal factor loadings as follows: 0.75-Excellent; 0.63-Very Good; 0.55-Good; 0.45-Fair; and 0.32-Poor. A factor loading of 0.5 is a very suitable item for evaluating a factor.

Table 1. Exploratory Mixed Method Design

EXPLORATORY MIXED METHOD DESIGN (CRESWELL, 2011)	
First Phase	Second Phase
Qualitative Data from fourteen (14) experts	Development of scales for each subsystem with 524 nurses in Private and Government Hospitals in Region 10
Listing of Competencies (142 scale items)	Cronbach's Alpha for Reliability
Content Validity from another set of fifteen (15) experts	Kaiser-Meyer-Olkin (KMO) for sampling adequacy
Lawshe's Content Validity Ratio	Barlett's Test of Sphericity
	Exploratory Factor Analysis (Principal Axis Factor with varimax Rotation of Likert scale questionnaire)

Results and Discussion

Using the guidelines of Heppner and Heppner (2004) the responses were analyzed into core ideas and were categorized as general, typical and variant. In "general" responses, almost all the participants indicated the response. "Typical" responses were stated at least by a fourth to half of the respondents. While responses indicated as "variant" were mentioned by only one or two participants.

The results of the Exploratory Factor Analysis yielded the subcategorization of the 12 major themes to their corresponding major competency as seen in Table 2 below:

Table 2. Categorization of Major Themes and Competencies

Nurses' Beginning Role in:		
Client Care	*Management in Leadership*	*Research*
Communication	Safe & Quality Nursing Care	Research
Collaboration & Teamwork	Management of Resources	Continuing Education
Quality Improvement	Health Education	
Ethico-Moral Responsibility	Personal Professional Development	
Records Management	Legal Responsibility	

The responses based on Hepper and Heppner's (2004) guidelines elicited no "variant" responses, "typical" responses to be: Quality Improvement, Ethico-moral Responsibility, Records Management, Safe & Quality Care, Health Education, Personal & Professional Development, Legal Responsibility, and Research. "General" responses were, namely: Communication, Collaboration & Teamwork, and Management of Resources. The relevant key indicators were determined using the whole set of answered 142 item-indicators with the EFA and confirmed by parallel analysis (PA) using the Monte Carlo principal component analysis (PCA). The process resulted in three (3) factor loading components corresponding to the three (3) major competencies sought in this study.

Table 3 shows the Cronbach's alpha of .994 which means that the instrument is reliable since it is greater than the standard value of 0.700. Likewise, Table 4 shows the Principal Component Analysis with Varimax (Rotation) given the Kaiser Normalization of the 142 Likert scale questions from the Nurses' Competency Assessment Tool. Further examination of the Kaiser-Meyer Olkin measure of sampling adequacy suggested that the sample was Factorable (KMO =.965), which further implies that there is a sufficient sample for the process.

To confirm the number of factor loadings, the parallel analysis using Monte Carlo PCA for PA was utilized. Three (3) factors with eigenvalues higher than 1 were found that explained the following percentages of the total variance: 77.926% (first factor), 6.627% (second factor), and more than 6% (third factor). This means that a total of more than 63.909% of the variance was explained by this set of factors, which suggests that the specificity of each item, and the multidimensional character of the construct, even when there is a common part shared by all items. The percentages of variance also revealed the importance of the three factors as the necessary characteristic of the nurses' role in client care, management in leadership, and research.

Table 3. Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.994	.994	142

Table 4. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.965
Bartlett's Test of Sphericity	Approx. Chi-Square	113931.176
	df	10011
	Sig.	.000

Table 5 shows the factor loadings for rotated 142 survey items. Sixty-nine (69) items were loaded into *factor one* called Client Care. There were 57 items loaded to *factor 2* which loaded for Management in leadership would mean the subsumed competencies within the functions of management, and 16 items loaded to *factor 3* which are descriptions of the nurses' significant role in engaging in research and continuing education.

Table 5. Factor Loadings of 142 Scale Items

Major Construct	Items	Factor Loadings
Client Care	69 items	0.449-0.809
Management in Leadership	57 items	0.440-0.7302
Research	16 items	0.464-0.806

Exploratory Factor Analysis of the 3 Major Constructs

Client Care which came out as Factor 1 from the 142 item indicators in the overall parallel analysis, was further subjected to the EFA and five (5) factors came out from this reduction processes which also corresponded to the five aspects of client care: *communication, ethical-moral responsibility, quality improvement, collaboration, and teamwork and records management.* These five (5) factors have eigenvalues higher than 1, explained the following percentages of the total variance: 64.770 % (first factor), 3.245% (second factor), 2.517 % (third Factor), 2.259 (fourth factor), and 2.094 (fifth factor); that is, a total of more than 74.884 of the variances was explained by this set of factors, which suggests that the specificity of each item, and the multidimensional character of the construct, even when there were common parts shared by all items. It should be recalled that Field (2005) cited Kaisers' recommendation of eigenvalues must be over 1 to retain the number of factors to continue with the analysis.

Table 7 shows the Cronbach's alpha of .992 which means that the instrument is reliable since it is greater than the standard value of 0.700. Table 8 likewise shows the PCA through Varimax (Rotation) with Kaiser Normalization of the 69 Likert scale questions from the Nurses'

Competency Assessment Tool. Further examination of the Kaiser-Meyer Olkin and Barlett's test measure of sampling adequacy suggested that the sample was Factorable (KMO =.974). To confirm the number of factor loadings, the parallel analysis used the Monte Carlo PCA for PA was utilized. The percentages of variance also revealed the importance of the five factors as the necessary characteristic of the nurses' role in client care. The items identified perceptible features of nurses in their ability to establish a harmonious relationship, provide effective and efficient care to clients and maintain good working relationships with colleagues.

Table 6 presents the factor loadings for a rotated component of *client care* competency that factored five (5) components correspondingly.

Table 6. Factor Loading for Five (5) Components for Client Care

Major Themes	No. of Items	Factor Loadings
Communication	17 items	0.556 – 0.684
Ethico-moral Responsibility	18 items	0.414 – 0.802
Quality Improvement	15 items	0.454 – 0.737
Collaboration and Teamwork	12 items	0.437 – 0.699
Records Management	7 items	0.512 – 0.683

Table 7. Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.992	.992	69

Table 8. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.974
Bartlett's Test of Sphericity	Approx. Chi-Square	51520.777
	df	2346
	Sig.	.000

The Factor 2 of the overall EFA, generated four (4) components, corresponding to the four (4) dimensions of Management in Leadership which are as follows: *safe and quality care, management of resources, personal & professional development with legal responsibility, and health education*, as seen in Table 9. *Factor Loading for Four (4) Components for Management In Leadership*

Table 9. Factor Loading for Four (4) Components for Management in Leadership

Major Theme	Items	Factor Loadings
Safety and Quality Care	18 items	0.487 – 0.746
Management of Resources	16 items	0.5637 – 0.737
Personal and Professional Development	14 items	0.448 – 0.736
Health Education	9 items	0.456 – 0.664

Table 9 further shows the factor loadings for rotated for 57 survey items. Eighteen (18) items loaded into factor one called safety and quality care. Under this factor are items identified as perceptible features of nurses in their ability to provide effective, efficient and safe, and quality care to clients. 16 items loaded to factor 2 labeled as management of resources, which provided descriptions of the nurses' significant role in ensuring that the use of resources is cost-efficient and cost-effective. On the other hand, 13 items loaded to factor 3 which described the nurses' personal and professional development as well as legal responsibility, while 10 items loaded in factor 4 labeled as health education.

Table 10 shows the internal consistency of the items, given Cronbach's alpha = .986, implying the reliability of the instrument. Also, Table 11 displays the PCA through Varimax (Rotation) with Kaiser Normalization of the 57 Likert scale questions from the Nurses' Competency Assessment Tool. The Kaiser-Meyer Olkin measure of sampling adequacy suggested that the sample was factorable (KMO =.967). The parallel analysis using Monte Carlo PCA for PA was utilized, to confirm the number of factor loadings. Four (4) factors with eigenvalues higher than 1 were found that explained the following percentages of the total variance: 56.654 % (first factor), 5.022% (second factor), 3.573 % (third Factor), and 2.404 % (fourth factor); that is, a total of more than 67.653% of the variance is explained by this set of factors. This data implies the specificity of each item, and the multidimensional character of the construct, even when there were common parts shared by all items. The percentages of variance also revealed the importance of the four (4) factors/ and or components as the necessary characteristic of the nurses' role in management in leadership.

Table 10. Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.986	.986	57

Table 11. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.966
Bartlett's Test of Sphericity	Approx. Chi-Square	34378.153
	df	1596
	Sig.	.000

The third identified competency is Research and Table 12 shows that the items in this competency are reliable as shown by the Cronbach's alpha of .963, while Table 13 shows the PCA with Varimax (Rotation) with Kaiser Normalization of the 16 Likert scale questions from the Nurses' Competency Assessment Tool with KMO =.94, the measure of sampling adequacy suggested that the sample was factorable. To confirm the number of factor loadings, the PCA was utilized. Two (2) factors with eigenvalues higher than 1 were found that explained the following percentages of the total variance: 65.267 % (first factor), and 9.595 % (second factor; that is, a total of more than 74.863 of the variance was explained by this set of factors, which suggests that the specificity of each item, and the multidimensional character of the construct, even when there is a common part shared by all items. The percentages of variance also revealed the importance of the two factors as the necessary characteristic of the nurses' role in research. Table 14 shows the factor loadings for the rotated 16 survey items. Twelve items loaded into *factor 1* or component categorized as Research. The items validated the importance and involvement of nurses in research and these items include the following:

Table 12. Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.963	.963	16

Table 13. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.941
Bartlett's Test of Sphericity	Approx. Chi-Square	9404.283
	df	120
	Sig.	.000

Table 14. Factor Loading for Two (2) Components for Research

Major Theme	Items	Factor Loadings
Research	12 items	$0.604 - 0.876$
Continuing Education	4 items	$0.757 - 0.840$

Tables 15, 16, and 17 hence present the main constructs of the competency tool.

Table 15. Main constructs for Client Care – Construct 1

Construct 1	Major Theme	Competency Indicators
Client care	Communication	17 items
	Ethico-moral Responsibility	18 scale items
	Quality Improvement	15 scale items
	Collaboration and Teamwork	12 scale items
	Records Management	7 scale items

Table 16. Main Constructs for Management & Leadership – Construct 2

Construct 2	Major Themes	Competency Indicators
Management & Leadership	Safety and Quality Care	18 scale items
	Management of Resources	16 scale items
	Personal and Professional development	14 scale items
	Health Education	9 scale items

Table 17. Main Constructs for Research – Construct 3

Construct 3	Major Themes	Competency Indicators
Research	Research	12 scale items
	Continuing Education	4 scale items

The commonalities of the items for each component significantly agreed with the indicators described in the NCCS of 2012, for this reason, the researcher retained the ten (10) pre-determined

major themes labeled to each component to wit: Communication, Collaboration and Teamwork, Records Management, Quality Improvement, Ethico-moral Responsibility, Safe and Quality Care, Personal and Professional Development, Legal Responsibilities, Management of Resources and Research, while items under the major theme Research is labeled Research and Continuing Education.

Conclusions

The primary aim of the study was to develop a scale responsive to the current nursing practice that is aligned with the set standards. Having found evidence for its validity and reliability, the strength of this tool lies in the fact that these statements were generated by those who are in actual practice.

The core ideas generated and competency indicators provided the information that nurses in these major hospitals in Cagayan de Oro and Bukidnon are familiar with the competency standards set by the authorities. The study also confirmed that the use of the NCCS of 2012 can also become the basis for formulating assessment tools. The item indicators for each dimension of every major construct are adequate and present a major initial step towards formulating the final tool, based on the appropriate scientific processes observed in the whole study.

Finally, several studies on competency assessment are found in the literature, but there is no single tool that would ultimately ensure the overall performance of nurses. This study, therefore, concludes that competency assessment is dependent on the environment, culture, and practices of a particular health institution in the context of a standard set by an authorized body.

Recommendations

Based on the findings and conclusion presented in the study, the following recommendations are offered:

- *For the BON; CHED: PRC*: It is highly recommended that the findings of this study may further be subjected to a more thorough view. That the item indicators of each dimension and their corresponding competency construct may be finally considered for formulating an assessment tool. The result of formulated assessment tool may be used for regular monitoring among nursing schools and also encourage schools to use the assessment tools especially those used in the assessment of the performance of students in the clinical be subjected to validation measures.

- *Future Researchers*: That researchers will take interest in competency assessment studies to further confirm the constructs and indicators from the tool formulated in this study and may be used to measure competencies about other variables such as those dimensions of the nurses' holistic work roles (task or technical competencies, contingency management competencies, task management competencies and

environment role competencies) as described by the World Health Organization (WHO).

- *For the Nursing Administrators*: It is further suggested for nursing administrators to update assessment tools with current practice, comparing with the standards and if the institution affords it, conduct research studied concerning Nurses' Performance, covering the measurement of the nurses' holistic work roles.

- *Academic Institutions:* The results of the study may provide nursing schools an insight towards the development to use in assessing student performance.

- *Bukidnon State University:* The results of the study may be utilized by the nursing school in assessing its graduates in their performance as beginning nurses in the field of nursing practice.

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THE INFLUENCE OF PERCEIVED EASE OF USE, PERCEIVED USEFULNESS, SOCIAL INFLUENCE, AND PERCEIVED ENJOYMENT TOWARDS CONTINUANCE INTENTION IN USING A GAMIFIED E-QUIZ MOBILE APPLICATION

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ABSTRACT

Gamification has a huge influence on students' learning and is becoming a growing trend in education. Empirical evidence of recent studies proved the success of digital games in education, which has sought to validate the effects of gamification in support of its potential to improve academic performance. This paper aims to show the influence of perceived ease of use, perceived usefulness, social influence, and perceived enjoyment towards continuance intention in using a gamified e-quiz mobile application among Higher Education students. A total of 140 users registered as users of the technological product, named Kingdom Quizzes (KQ), covers the first-year students from the Diploma of Information Technology program. These students were randomly selected from one of the universities in southern Malaysia. Alpha Cronbach value for the reliability test indicated that perceived ease of use was 0.76, perceived usefulness was 0.818, social influence was 0.643, perceived enjoyment was 0.756, and continuance intention was 0.776. Pearson Correlation Analysis showed that there is a positive relationship between perceived ease of use (rs =.593** $p > 0.05$), perceived usefulness (rs =.694** $p > 0.05$), social influence (rs =.720** $p > 0.05$) and perceived enjoyment (rs =.700** $p > 0.05$) with continuance intention. Further analysis shows that social influence and perceived enjoyment influence the continuance intention using Kingdom Quizzes among the students, with a contribution of 59.8%. These findings indicated that effective gamification elements embedded in a mobile educational application and usage influence from the educators and peers exert highly significant strength towards retaining the students' interest in an educational product.

Keywords: gamification, Kingdom Quizzes, mobile learning, formative assessment

Introduction

Gamification is referred to as using game design elements within non-game contexts. The main idea is to take the 'building blocks of games and implement these in real-world situations, to motivate specific behaviors within the gamified situation (Deterding et al., 2011). Many studies have highlighted gamification as a promising concept applied within various contexts (Werbach & Hunter, 2012, Zichermann & Cunningham, 2011, Zichermann & Linder, 2013). Hunicke et al. (2004) and Mora et al. (2017) split gamified solutions into three elements as follows; (i) rules (mechanics), (ii) system (dynamics), and (iii) fun (aesthetics), which represent as the MDA framework. The MDA framework acts as a formal structuralist approach to understanding games to bring design, development, criticism, and technical game research closer. Gamification in education is an approach that proposes dynamics in association with game design within the educational environment to stimulate direct interaction with students, allowing them to significantly develop their social, curricular, and cognitive competencies (Alsawaier, 2018). It has been taken seriously as an educational approach that can facilitate learning, encourage motivation and engagement, improve learner participation and lesson interactivity, and stimulate learners to expand their knowledge (Göksün & Gürsoy, 2019). Through effective implementation, gamification can increase intrinsic motivation and engagement and serves as a strong tool for educators (Jurgelaitis et al., 2019; Kuo & Chuang, 2016). Hamari et al. (2016) stated that gamification offers an advantage. It makes learning fun through challenges, rewards, and friendly competitions, thus making it an attractive means to encourage students' engagement in learning. Moreover, it helps learners develop critical thinking and multi-tasking skills (Ding et al., 2018). Gamification in education incorporated several techniques or 'items' as external motivators to learners, such as points-scoring, leader boards, and awards of badges as rewards for completing levels of learning tasks (Goehle, 2013; Poondej & Lerdpornkulrat, 2016).

The application of game mechanics to non-game environments towards any tool or software is known as a gamification platform (Zainuddin et al., 2020). Many educational gamification studies have illustrated the integration of gamification, for example, the application of Web 2.0 tools which provide valuable functions for MOOCs in Udacity, Coursera, and edX (Chang & Wei, 2016; Aparicio et al., 2019), moodle platforms (Kyewski & Kramer, 2018; Ortiz-Rojas et al., 2019; Jurgelaitis et al., 2019; Huang & Hew, 2018; Huang et al., 2019; Barata et al., 2017; Lo & Hew, 2018), wiki platforms (Wikispaces.com; Özdener, 2018). Several studies have developed their gamification platforms to prioritize user-centric needs and help provide an impactful online experience for a diverse range of users. These platforms and applications aimed to promote students' learning performance and engagement (Sung & Hwang, 2013; Roslan et al., 2019; Kuo & Chuang, 2016), participation in online discussions using the gamified tool 'gEchoLu' (Ding et al., 2018; Ding, 2019) and their involvement in online post-lecture questions (Bouchrika et al., 2019). Meanwhile, several existing platforms and applications have been used in educational

gamification research, for instance, ClassDojo and ClassBadges (da Rocha Seixas et al., 2016), Ribbonhero of Microsoft (De-Marcos et al., 2016), Rain classroom (Ge, 2018), Quizbot (Garcia-Sanjuan et al., 2018), Duolingo (Rachels & Rockinson-Szapkiw, 2018), Kahoot and Quizizz (Baydas & Cicek, 2019; Göksün & Gürsoy, 2019), Math Widgets (Jagušt et al., 2018), Google + Communities (van Roy & Zaman, 2018), iSpring Learn LMS (Zainuddin, 2018) and Quizzes (Zainuddin et al., 2020; Kanah et al., 2021).

In education, assessment is a critical phase that supports teaching and learning success, used to monitor the students' learning progress mathematically (Pitoyo et al., 2019). Various types of assessments can be done depending on the academic task given to the students, such as individual assignments, group assignments, midterms, quizzes, and final examinations. Incorporating quizzes and games may encourage long-term retention of material (Vinney et al., 2016), motivate self and peer assessment (Nadeem & Falig, 2020; Raes et al., 2020) as well as increase students' interest (Lim & Md Yunus, 2021). Formative assessment based on multiple-choice questions (MCQs) can aid students with different learning styles and prepare them for high-stakes exams (Finig, 2013). Moreover, completing gamified MCQs allows the learners to practice summative assessments in an engaging and motivational approach (Douglas & Ennis, 2012). With vast selections of existing gamified e-quizzes platforms and applications, educators are left with an important decision to select the best tool that suits their students and the teaching and learning requirement. Often, an educational institution will come up with its educational products to accommodate the needs of its students, educators, academic administrators, and management (Troussas et al., 2020; Pechenkina et al., 2017; Zakaria et al., 2020).

Although user acceptance of the new technological product is a challenge, it is more strenuous to keep the existing users interested in using the accepted or adopted product for a long time. In 2008, Bhattacherjee et al. pointed out that the sustenance and success of a technology-enabled service are dependent on suppliers' or developers' ability to attract new users while retaining older ones. Hence, it becomes essential for a technological product to be evaluated from the users' perception. It will determine their intention towards its use which eventually affects the decision-makers on the necessity of maintenance and future upgrade of their 'in-house developed product. Research associated with continuance intention on product usage of e-learning (e.g., Lin, 2011; Chang, 2013; Muqtadiroh et al., 2019), massive open online course (MOOC) (e.g., Daneji et al., 2018; Dai et al., 2020), learning management system (LMS) (e.g., Cheng & Yuen, 2018; Ashrafi et al., 2020) and mobile learning application (e.g., Huang et al., 2014; Hu & Zhang, 2016; Tam et al., 2020) had been made. However, research on continuance intention specifically for a gamified e-quiz mobile application has not been explored much. Therefore, this study aims to investigate the factors related to an individual continuance intention to use a gamified e-quiz mobile application named Kingdom Quizzes (KQ), which are essential to any technology implementation, and to understand the reasons technologies discontinuance. Kingdom Quizzes is an android gamified e-quiz mobile application that incorporates a reward ranking system combined with a strategy game.

It was developed by one of the local universities in southern Malaysia, Universiti Tun Hussein Onn Malaysia (UTHM). Kingdom Quizzes applied the 'leaderboard' mechanism in the quiz module to encourage self and peer assessment and contribute 'virtual reward' to the players that can later be utilized in the next game module (strategy game).

A study by Premkumar and Bhattacherjee (2008) stated that perceived usefulness is the predictor of intention in the Technology Acceptance Model (TAM), and it is a reliable predictor of continuance intention compared to satisfaction in the combination of TAM with Expectation-Confirmation Theory (ECT). Bhattacherjee (2001) reported that an individual continuance usage happened when such use was perceived as valuable. Although in Kim & Nam's (2019) study involving factors influencing satisfaction and continuance intention of recommendation algorithms through structural equation modeling (SEM), perceived usefulness was found to have no significant direct effect on continuance intention in the newsgroup, a significant indirect effect was displayed via satisfaction. However, perceived ease of use in Kim & Nam's (2019) study appeared to impact continuance intention and perceived usefulness positively. Meanwhile, TAM also proved perceived ease of use improves users' continuance usage (Davis, 1989; Venkatesh et al., 2003). Other studies had also found perceived ease of use and perceived usefulness reflected by effort expectancy and performance expectancy, respectively, are amongst the drivers for continuance usage intention (Tam et al., 2020; Singh 2020; Daneji et al., 2018; Almazroa & Gulliver, 2018; Gefen et al., 2003). Tam et al. (2020) addressed two theoretical models, ECM and the extended unified theory of acceptance and use of technology (UTAUT2), in the quest to find the factors influencing continuance intention for mobile application. Meanwhile, Singh's (2020) study, similar to Tam et al. (2020), had also included perceived security and trust in the combination of ECM and UTAUT2. On the other hand, Daneji et al., (2018) research on the usage of PutraMOOC by students of University Putra Malaysia (UPM) had applied perceived ease of use, usefulness, and time spent as the investigating factors. Other studies are, Almazroa & Gulliver (2018), which was related to the continuance usage of Near Field Communication (NFC) m-payments, and lastly, Gefen et al., (2003) findings which revealed that experienced consumers intentions to transact with the last e-vendor from whom they purchased depends on trust, perceived usefulness and perceived ease of use.

While Cheng et al. (2020) agreed that perceived ease of use has a strong significance towards continuance intention to use Chinas' social media platform (Weibo), perceived usefulness impact, on the other hand, was insignificant. Their study also concluded that social influence impacts continuance intention positively and significantly. This agrees with the notion from previous studies implying that opinions and recommendations of those important and influential people will draw motivation to use the technological product (Kim, 2011; Cheng et al., 2020). Earlier research, such as Shen et al. (2011) and Zhou and Li (2014), proved that social influence affects the desire for continuance usage. Meanwhile, the research of Kim (2011) reported that users' continuance usage intention for social-networking services could be predicted by perceived usefulness and

enjoyment. This is based on the motivation theory mentioned in Deci (1971), which are the two main constructs of motivation, (i) intrinsic and (ii) extrinsic. Intrinsic motivation refers to the perceptions of pleasure or joy from performing a behavior, while extrinsic motivation refers to the performance of a goal-driven activity to achieve various rewards. Information system (IS) literature explained that extrinsic motivation is captured by perceived usefulness, whereas intrinsic motivation is captured by perceived enjoyment. Ashraf et al. (2020) investigated perceived usefulness, social influence (subjective norm) as well as perceived enjoyment which then revealed that the impact of perceived usefulness was far higher than perceived enjoyment and social influence on the students' continuance intention towards a Learning Management System (LMS). Based on the supported studies discussed, factors that will be investigated in this study comprise; (i) perceived ease of use, (ii) perceived usefulness, (iii) social influence, and (iv) perceived enjoyment.

Objective of the study

The study aimed to explore the influence of students' perceived ease of use, usefulness, enjoyment, and social influence on students' continuance intention in using a gamified e-quiz mobile application.

Literature review

To gain an ample understanding of this study's problem, a literature review of gamification elements based on the MDA framework (Mechanics, Dynamics and Aesthetic) and research constructs will be presented in this section. van Elderen and van der Stappen (2020) revealed an enormous potential impact in using gamification for improving the acceptance and continuance intention of technologies in education. They studied the gamification items representation of each of the MDA framework elements illustrated in Table 1 and later identified studies that relate the gamification items with technology acceptance constructs.

Table 1: Gamification Items Based on The MDA Framework Elements

Mechanics	Dynamics	Aesthetics/Emotions
Points	Increasing Task/Level & Mission	Avatars
Badges	Difficulty/Challenges & Quests	Personalized Image
Leaderboards	Social Games & Teamwork	Meaningful Stories
Performance Graphs/List		
Virtual Gifts & Items		

Based on that reference, we identified literature reviews associated with Kingdom Quizzes mobile application gamification items in Table 2. In table 2, each of this research independent variables,

Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Social Influence (SI), Perceived Enjoyment (PENJ), are aligned with literature reviews on gamification item of Mechanics (M), Dynamics (D) and Aesthetics (A) stated in aforementioned Table 1. Each independent research variable is further discussed, highlighting the relevance of the technological product, which is the Kingdom Quizzes application, and the gamification items embedded in the product.

Table 2: Relations between Kingdom Quizzes Gamification Items and Research Construct Based on Literature Reviews

	PU	PEOU	SI	PENJ
Points (M)	Attali & Arieli-Attali, (2015); Hamari (2013); Robson et al., (2016); Sailer et al., (2017)		Sjöblom et al., (2017)	Aparicio et al., (2012); Doherty et al., (2017); Mekler et al. (2017); Pappas, (2015); Przybylski et al., (2010); Robson et al., (2016)
Leaderboards (M)	Landers et al., (2017); Sailer et al., (2017); van Roy & Zaman, (2018)		Baabdullah, (2018); Depura & Garg (2012); Jia et al., (2017)	Burguillo, (2010); Landers et al., (2018); Pappas (2015); Ruhi, (2015); Song et al., (2013)
Virtual Gifts (M)	Domínguez et al., (2013).			Snyder & Hartig, (2013)
Performance List (M)	Cardador et al., (2017); Sailer et al., (2017); Ling et al., (2005).			Doherty et al., (2017)
Level, Challenges (D)	Dong et. al., (2012); Robson et al., (2016); Toda et al., (2018)	Landers et al., (2017)		Aparicio et al., (2012); Banfield & Wilkerson, (2014); Dong et. al., (2012); Li et al., (2012); Seaborn & Fels, (2015); Van Roy & Zaman (2018)
Personalized Image (A)	Annetta, (2010)		Annetta, (2010)	Annetta, (2010)

Perceived Usefulness (PU)

Perceived usefulness refers to the degree to which a person believes that using a particular system would enhance their job performance (Davis, 1989). Perceived usefulness in Kingdom Quizzes usage is defined as the belief of the students in the usefulness of the gamified e-quiz, Kingdom Quizzes to successfully function as an online quiz medium that can (i) display questions provided by the educators, (ii) capture the answer given by the students, (iii) review or compare the answers given with the actual answer set up by educators, (iii) calculate the scores for the corrected answer, (iv) displaying ranking on the leaderboard and (v) assigning the virtual gift/reward based on the ranking of the students. Many had pointed out the PU aspect related to gamification elements in educational technology products. For mechanics elements such as Points, Badges and Performance Graphs and Virtual Gifts, many studies revealed that rewarding and showing progress increases the expectancy of the learner on the educational applications' values (Attali & Arieli-Attali, 2015; Hamari, 2013; Cardador et al., (2017); Landers et al., 2017; Ling et al., 2005; Robson et al., 2016; Sailer et al., 2017). Points represent rewards for successful accomplishments of specific activities in the game, reflecting the player's progress (Attali & Arieli-Attali, 2015). Leaderboards, performance graphs, and badges positively affect task meaningfulness (Sailer et al., 2017).

Meanwhile, virtual gifts are significant due to their influence in making players feel that they are performing well (Domínguez et al., 2013). Mechanics elements with items such as performance graph or list provide a continuous and direct feedback mechanism that links directly to PU (Attali & Arieli-Attali, 2015; Cardador et al., 2017; Sailer et al., 2017), and this visualization of competence development, managed in enhancing the feeling of value (Hamari, 2013) and the task meaningfulness (Sailer et al., 2017). Furthermore, Dynamics and Aesthetics elements also have a potential impact on PU. For example, the interaction between students can achieve cross-learning and affect the PU of a game (Toda et al., 2018), such as demonstrated by Dong et al. (2012, which proved that gamified puzzle helps the participants to learn how to use computer software, and the experience was evaluated to be effective, fun, unique and engaging. Meanwhile, Robson et al. (2016) reported that new levels, tasks, or players are needed to inspire continuously. Lastly, personalized images or avatar offers the players freedom of choice and autonomy and increase decision freedom and task meaningfulness (Annetta, 2010).

Perceived Ease of Use (PEOU)

Venkatesh et al. (2003) defined perceived ease of use (PEOU) as the degree of ease associated with the help of the system. PEOU, in this study, investigates higher education institution students' ease of use during their Kingdom Quizzes usage. For instance, users do not have any problem understanding how to use the product, and the terms used in the product are easy to understand. The button's position and process of executing quizzes using Kingdom Quizzes can work quickly and smoothly. This also refers to ease related to interaction with the product and the degree of ease

in learning to use the product. There are literature reviews of PEOU for mechanics element through item social games and teamwork and the aesthetics element for item meaningful stories. However, those items or features are not present in the technological product of this study (Kingdom Quizzes). Hence, only the dynamics element through the level, mission, challenges, and quests by Landers et al. (2017) is listed in Table 2. Landers (2017) discovered that goal setting is generally for simple tasks because it is easier for a person to see the connection between the effort and the goals achieved.

Perceived Enjoyment (PENJ)

Perceived enjoyment (PENJ) is a fundamental intrinsic motivation that specifies the extent to which fun can be derived from using IT or an IS (Chao, 2019). In this study, perceived enjoyment refers to how fun can be derived from using the Kingdom Quizzes application and providing an enjoyable experience. Several studies have indicated that enjoyment is a potent predictor of usage decisions for technologies such as the telephone (O'Keefe & Sulanowski, 1995), online shopping (Childers et al., 2001), websites (Van der Heijden, 2003), Facebook (Quan-Haase & Young, 2010; Praveena, 2018), mass media (Nabi & Krcmar, 2004; Ledbetter et al., 2016), Sina Weibo (Wang et al., 2016), social networking sites (Chuang et al., 2017) and mobile video call (Zhou & Feng, 2017). As the technological product, Kingdom Quizzes contains a strategy game embedded in it and incorporates gamification elements for the whole product (quiz module and game module). Hence this study included the PENJ factor to investigate the leisure context. Nowadays, many mobile applications incorporate gamification and games as an added value to grab the users' interest and eventually retention (Roslan et al., 2021; Areed et al., 2021; Roslan et al., 2018). In recent years, the construct PENJ has been added to most research models, especially for a gamification-based or game-based product. It is the most crucial determinant of mobile games adoption (Lee & Quan, 2013; Nysveen et al., 2005). Another reason is based on the notion that enjoyment and fun experience can increase learning motivation (Zirawaga et al., 2017), hence motivating the educational products' usage.

Most educational studies relate PENJ construct with the gamification items Points and Leaderboards. Interactivity and feedback positively impact PENJ (Hsu & Lu, 2004; Lin et al., 2012; Wang & Wang, 2008). Meanwhile, Pappas (2015) discovered from a survey that 89% of the students stated that the point system would increase their engagement. However, several studies propose conditions before gamification elements can positively affect PENJ. For example, Aparicio et al. (2012) found that positive effects only occur when mechanics elements are presented in a non-controlling and voluntary setting. Points only increase intrinsic motivation when the reward is the outcome of an achievement (Doherty et al., 2017).

On the other hand, Mekler et al. (2017) found that in a controlled experiment, points and badges did not affect intrinsic motivation significantly. Meanwhile, element Levels, Missions, Challenges,

and Quests are closely related to the motivational aspect of mastery, and several studies stated that increasing the task difficulty does increase engagement and enjoyment (Banfield & Wilkerson, 2014; Li et al., 2012; Seaborn and Fels, 2015). However, not all potential impact is positive. For example, van Roy and Zaman (2018) found challenges to only be effective for those students who we already motivated to do well from the very start.

Social Influence (SI)

Venkatesh et al. (2003) stated that social influence is how an individual perceives that important people such as relatives, peers, and subordinates believe that they should use the new system. Social influence defined the users' decision to use the gamified e-quiz mobile application, Kingdom Quizzes if they believe that the people who are important to them are already using it or will support them in using it. These important people are; (i) educator/lecturer, (ii) colleagues/peers, (iii) parents/family members and (iv) organization/institution. When facing new situations, people often seek suggestions and consultation from others to reduce potential uncertainty and anxiety (Karahanna et al., 1999). This means that their decisions are affected via word-of-mouth from those people around them. Studies from Shen et al. (2011), Zhou and Li (2014), Cheng et al. (2020), and Vanduhe et al. (2020) reported that social influence impacts continuance intention positively and significantly. This agrees with the notion from previous studies implying that opinions and recommendations of those important and influential people will draw motivation to use the technological product (Kim, 2011; Cheng et al., 2020).

Social gaming affects experiences of social relatedness (Molinillo et al., 2018). For example, students can 'play' in groups and conveniently share their results and high scores on (external) social networking platforms (Baabdullah, 2018). Social gamification elements can trigger the feeling of being 'left out' (van Roy & Zaman, 2018). Mechanics elements also have a potential impact on social influence. For example, individuals are more likely to engage in behaviors that they presume engaged by others as well (Sjöblom et al., 2017), which can further be triggered through leaderboards and badges. Players are 'ranked' according to their relative success, measured against chosen success criteria. As it shows which of the players performs best, it encouraged competitiveness. This competition can positively influence the people at the top of the list but can negatively affect the players at the bottom of the list (Jia et al., 2017). Landers (2017) stated that positive effects are triggered if the 'competitors' have approximately the same level. Aesthetics elements can also have an impact on social influence. A meaningful shared goal can foster experiences of social relatedness (Sailer et al., 2017). In cooperative games, avatars or personalized images can help become part of a community (Annetta, 2010).

Methodology

This study implemented a correlational, cross-sectional research design to predict factors influencing continuance intention in using gamified e-quiz mobile application among higher education institution students, represented by the first-year students from the Diploma of Information Technology program, CeDS, UTHM. This study collected data among 140 students at one specific point conducted at the end of their study semester. These students are already registered users of the technological product named Kingdom Quizzes. The students used Kingdom Quizzes for one semester as their online learning. Data was gathered using an online questionnaire (Google Form) which appears to be the most appropriate way to collect data for this study amid the pandemic Covid19. The quizzes were executed using their own mobile devices starting from the 2nd week of the semester and mostly performed outside of the campus environment due to the Movement Control Order (MCO). In the 12th week of the semester, the students were given the Google Form link for the questionnaire in which they were required to fill in during the virtual class session using Google Meet.

For the study, the researchers developed an instrument to collect the data. The questions were divided into two sections: Section A: Demography and Section B: Close Ended Questions. There are five variables in this study: four independent variables (perceived usefulness, perceived ease of use, perceived enjoyment, and social influence) and a dependent variable (continuance intention). Eight items of perceived ease of use construct were adapted from Davis (1989), Sánches and Huerous (2010), and Venkatesh et al. (2012). Meanwhile, eight items were used to measure the perceived usefulness construct adapted from Davis(1989), Sánchez and Hueros (2010), Bhattacherjee (2001), and Venkatesh et al. (2012). The next factor, social influences, consists of seven items adapted from Venkatesh et al., (2003, 2012) scales. The last element, perceived enjoyment, has six items, adapted from Thong et al. (2006) and Venkatesh et al. (2012) scales. Lastly, continuance intention, which will assess students voluntarily pursuing or continuing using Kingdom Quizzes, has seven items adapted from Bhattacherjee (2001) and Roca et al. (2006) scales.

All the dependent and independent variables were reliable instruments in measuring all the variables studied based on the Alpha Cronbach analysis. Values for the reliability test resulted as follows, perceived ease of use (0.76,) perceived usefulness (0.818), social influence (0.643), perceived enjoyment (0.756), and lastly, continuance intention (0.776). SPSS Statistics software was used in the analysis process, which involved all the 140 pieces of data or feedbacks received. The responses were free from missing or invalid data. The instrument was carefully prepared using the Google Form, which enforced the validation (compulsory input restriction) and selection from a drop-down list (scale) to avoid 'garbage' input data. Analyses done were based on descriptive analysis (mean and standard deviation) for all the variables involved, inferential statistics

(Pearson's correlation) to find relationships between all independent variables towards the dependent variable, regression and also multiple regression to find the level of contribution of all independent variable as predictors for continuance usage intention for Kingdom Quizzes application.

Findings

The analysis of the study will begin with the descriptive analysis for all variables studied (refer to Table 3). The overall mean for the perceived usefulness using Kingdom Quizzes is 3.88 (SD = .504) shows that students have a positive perception that using Kingdom Quizzes would improve their academic task performance. The mean value of Kingdom Quizzes is 4.02 (SD = .584) for perceived ease of use, which is considered very high. This indicated that the students did not face any problems using Kingdom Quizzes, and they felt that it was easy to use. Meanwhile, the mean value for social influences using Kingdom Quizzes is 3.70 (SD = .503), showing that their peers and lecturers persuaded them to use Kingdom Quizzes during their study period. For perceived enjoyment using Kingdom Quizzes, the mean value is 4.40 (SD = .654). The mean value is very high, which indicates the students' perception that participating in Kingdom Quizzes is fun. Overall, the mean for continuance intention using Kingdom Quizzes is 3.72 (SD = .540), exhibiting that the respondents have the intention to continue using Kingdom Quizzes in the future.

Table 3: Mean and Standard Deviation for Variables Studied

Variable	Mean	Standard Deviation
Perceived Usefulness	3.88	.504
Perceived Ease of Use	4.02	.584
Perceived Enjoyment	4.40	.654
Social Influence	3.70	.503
Continuance Intention	3.72	.540

The next analysis will determine the relationships between the four factors with continuance factor studied and continuance intention using Kingdom Quizzes. There was a positive correlation between perceived ease of use (r = .593; p < .001), perceived usefulness (r = .694; p < .001), social influence (r = .720, p < .001) and perceived enjoyment (r = .700; p < .001) with students' continuance intention using Kingdom Quizzes.

Table 4: Correlation Coefficients Between Perceived Ease of Use, Perceived Usefulness, Social Influence and Perceived Enjoyment Towards Students' Continuance Intention Using Kingdom Quizzes

	Perceived Ease of Use	Perceived Usefulness	Social Influence	Perceived Enjoyment
Continuance Intention	.593**	.694**	.720**	.700**

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

Afterward, a regression analysis was also conducted to test the study objective and identify the different factors influencing the students' intention to use Kingdom Quizzes. Table 5 shows the multiple correlation coefficients was 0.610, indicating approximately 61% of the variance of the students' continuance intention using Kingdom Quizzes accounted for by perceived ease of use, perceived usefulness, perceived enjoyment, and social influence.

Table 5: Model Summary

Model	R	R Square	Adjusted R Square
1	.781	.610	.598

a Predictors: (Constant), Enjoyment, Ease of use, Social influence, Usefulness

Table 6 indicated the influencing factors were statistically significant at 0.05 level of significance ($F_{(4,139)}$ = 52.76, p = .000). This showed that any factor listed could significantly predict the continuance intention using Kingdom Quizzes.

Table 6: ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig
Regression	34.77	4	8.693	52.76	.000
Residual	22.24	135	.165		
Total	57.01	139			

a Dependent Variable: Continuance Intention
b Predictors: (Constant), Enjoyment, Ease of use, Social influence, Usefulness

As Table 7 illustrates, the results of the multiple regression analysis indicated social influence and perceived enjoyment influenced students' continuance intention in using Kingdom Quizzes. The relative order of preference of the predictive factors of students' continuance intention using Kingdom Quizzes was based on beta values (β) which are summarized as follows: social influence (β = .351), and perceived enjoyment (β = .319). In other words, social influence contributed 35.1% of the variance, and perceived enjoyment explained 31.9% in students' continuance intention using Kingdom Quizzes.

Table 7: Model Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig
	B	Std. Error	Beta		
Constant	.237	.292		-.809	.420
Perceived Ease of Use	.101	.098	.079	1.022	.308
Perceived Usefulness	.137	.111	.125	1.233	.220
Social Influence	.344	.091	.351	3.774	.000
Perceived Enjoyment	.407	.108	.319	3.793	.000

a Dependent Variable: Continuance Intention

Discussion

The results showed that users' continuance usage intention towards a gamified e-quiz mobile application is predicted by social influence and perceived enjoyment with beta values (β) 0.351 and 0.319, respectively. Although all four factors studied appeared to have positive relationships towards continuance intention, significance values in Table 7 confirmed that two out of the four factors were more than 0.05. Thus, only social influence and perceived enjoyment (p= .000) were defined as the predictors. In contrast to previous research (Tam et al., 2020; Singh 2020; Daneji et al., 2018; Almazroa & Gulliver, 2018; Gefen et al., 2003), which gave high regards on perceived usefulness and perceived ease of use factors towards influencing the continuance intention of a technological product. Aside from acquiring the information regarding relationship and level of contribution of predictors, the means of each factor were also analyzed, resulting in perceived enjoyment having the highest mean of 4.40 (SD=.654), followed by perceived ease of use (mean=4.02, SD= .0584), perceived usefulness with the mean value of 3.88 (SD= .504), continuance intention mean value of 3.72 (SD= .540) and lastly, social influence mean value of 3.7 (SD= .503). The respondents, in general, have a high level of agreement on all factors. At the same time, the standard deviation (SD) values represent the estimation of the scatter of values around the sample was close and not spread out away from the mean. Also, from the descriptive analysis, the student's intention to continue using Kingdom Quizzes was highly positive (mean= 3.72, SD= .540).

The strengths of those positive relationships between perceived ease of use, perceived usefulness, social influence, and perceived enjoyment with continuance intention were analyzed based on the rule of thumb Guilford & Fruchter (1973). The result of r for perceived ease of use (r = .593; p < .001) indicated moderate relationship with continuance intention. Meanwhile, perceived usefulness (r = .694; p < .001) also showed a moderate relationship. However, social influence and perceived enjoyment showed high relationships with continuance intention based on r= .720 and r = .700, respectively. The findings in this research highlighted perceived enjoyment as a strong factor based on having the highest mean value, high relationship towards continuance intention. They contributed 31.9% as a predictor for Kingdom Quizzes usage continuance intention. Meanwhile, social influence accounted for 35.1% of the variance, the highest contributor. These factors explained a considerable 61% variance of continuous intention to use Kingdom Quizzes.

The result revealed that an individuals' intention to continue using a gamified e-quiz mobile application is affected by the variables of perceived enjoyment and social influence. However, when comparing the results of this study with those of previous continuance intention studies, it differs in terms of perceived usefulness and ease of use being significant predictors for continuance intention of a technological product. Firstly, to explain the inconsistency result of perceived usefulness and perceived ease of use, it may be because the second-semester students already have

experienced other educational platforms (e-Learning) such as LMS, MOOC, and mobile applications products (M-learning) in their first semester of study, which means that they are already used to those products performing significant academic tasks successfully with ease, hence it has become somewhat of a norm for them, that a product will manage to fulfill its purpose effortlessly. Secondly, to explain the reason of perceived enjoyment appealed more in this study's finding, using an educational gamified mobile application product seemed to offer the students a new experience, perspective, and expectation. A gamified mobile application considers the theory of gamification in educational settings to provide content in an attractive mode to gain a higher level of attention from learners.

Contrary to the conventional educational product, for instance, mobile application or learning management system (LMS) that do not incorporate any gamification elements, the gamified mobile application was initially constructed to entice and motivate learners to perform academic tasks wherever they are. Thirdly, regarding the highest contributed factor for continuance intention, which is the social influence (35.1%), this result indicated that gamified e-quiz mobile application users were managed to be coerced, persuaded, and pressured into using the educational product whether from their circle of friends, family, peers, educator or even the institution itself. The feeling of being influenced will naturally affect their behavior. This notion has also been approved in previous research, such as in Lee's (2010) and Chen et al.'s (2012) studies.

Conclusion

Based on the results of this study, factors perceived enjoyment and social influence were proven to have strong influences toward continuance usage intention. This indicated that creating fun, interactive, and engaging educational content in a mobile application that helps connect educators, students, and their peers, is a helpful activity for users' continuance intention. The gamification items that correspond to these significant predictors also indicate that the utilization also had a significant effect. This shows that the construction of attractive and engaging gamification items will secure the effectiveness of the gamification-based, educational technological product. This should be taken rather seriously by the education institutions' management as it also determines the future direction of the painstakingly developed product, which should also be a worthy investment in the quest to populate their institutions' online learning resources. It can be summarized that constructing educational content through gamification techniques would be an impetus to students' continuance intention (Hassan et al., 2019; Shi et al., 2019). Therefore, the developers or researchers should produce a tool improvement plan document based on the findings for restructuring or upgrading the products' gamification items accordingly. This will act as a clear guideline for the technical team in conducting the product maintenance and as a reference document for the stakeholders in making decisions.

Although this study offers some insightful contributions, it suffered from limitations that must be addressed in future studies. Due to performing cross-sectional research, there is a lack of complete understanding of the dynamics among individuals' perceptions. Hence, it is recommended that such research take a longitudinal perspective into account, enabling researchers better to grasp the dynamics of the constructs over time. Next, the sample studied in this research was limited to one single program in one university (Diploma of IT program from UTHM), which did not consider other programs or institutions. It may seem to exist biases in this study in terms of the selection of sample or respondents due to the background of Diploma of IT students already being IT literate, as aforementioned, all the students are required to use the institutions' e-learning and m-learning resources related to their studies since their first semester, meaning that if this research was to be performed on students from other programs, the level of IT literacy or experiences will still be the same. However, suppose the study was to be conducted on the first semester of the first-year students. In that case, it is recommended to include respondents from other programs as well, so that comparison could be made between students from different programs, resulting in an in-depth analysis. Further research is needed to support the generalizability of the findings in this study by considering larger populations from several programs and universities. Lastly, the observed 39% portion of the unexplained variance indicates that other factors beyond the scope of this study could improve explanations of gamified e-quiz mobile application continuous usage intention whether as direct contributors or that serves as mediators, for instance, trust, satisfaction, or confirmation of expectation.

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