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Editorial

The JIRSEA-UPM Special Issue April 2024 Vol. 22, Issue 1, is a special collaboration between SEAAIR (South East Asia Association for Institutional Research and UPM (*Universiti Putra Malaysia*, Selangor, Malaysia). Regardless of this special issue collaboration, JIRSEA has maintained its stringent two-step review process of the Preliminary Review and the Double-Blind Review. This has consistently resulted in 26% of papers withdrawals 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, though these papers are based on the UPM's Faculty of Educational Studies, some of the more current topics like cyberbullying, moral education, social use applications, counseling in addition to the normal educational or Institutional research issues were covered.

The first three papers looked at the more attitudinal aspects of moral education, the relationship between life satisfaction, self-esteem, Fear of Missing Out, and social media addiction among university students, and the grit effects on the Higher education student's academic performance. The fourth paper covered the skills areas of students as the flipped classroom deployment affects students' calculus performance and Mathematical Creative Thinking Skills, with the fifth paper focusing on people with disability (PWD) through employers' feedback from a survey to obtain their insights on employability skills traits necessary for today's job market. The sixth and seventh papers focused more on the curriculum developmental aspects of integrating scenarios and resources for designing an online scenario-based learning module named the e-SBL FOIM-ATG for front-office courses in a Community College utilizing the Fuzzy Delphi technique, STEM-based modeling instruments revealed great item-content validity and scale validity for assessing sub-competency in pre-service teachers. The eighth to tenth papers that focused more on the students' perceptions, training, and mental health explore postgraduate students' perceptions of the role and influence of assessment rubrics in their learning experience, discovering the experiences of young university student-athletes towards psycho-physical training, physical training and psychological training throughout their athlete career and the relationship between mental health and career planning—career optimism, career adaptability, career knowledge, college and career readiness self-efficacy and self-efficacy planning—among current Malaysian pre-university student-athletes. The eleventh to thirteenth papers are more on the social media and technology applications that investigate the influence of social media, counseling attitudes, and cyberbullying engagement among young adults in Selangor by exploring how social media platforms influence the prevalence and impact of cyberbullying incidents in the local community, influence of technology and data use on a teacher's self-efficacy in relation to their profession, influence of technology and data use on a teacher's self-efficacy in relation to their profession, and influence of technology and data use on a teacher's self-efficacy in relation to their profession. The whole Issue closed with the fourteenth paper looking at the connection between upper secondary students' self-efficacy and career exploration.

The key synopses of these nine papers are as follows:

- **Article 1 – Noor Zulina S De Asildo** of *Ministry of Education, Putrajaya, Selangor, Malaysia,* **Maizura Yasin, Marzni Mohamed Mokhtar, and Mohd Mursyid Arshad,**

all from the *Faculty of Educational Studies, Universiti Putra Malaysia,* explores the learning experiences of former Moral Education (ME) students in one of Sabah's districts on the East Coast. This study employed a qualitative research design with a phenomenological approach to understand the experiences of former ME students in learning the subject at school. The study revealed three main themes, which are (i) Relating values to situations, (ii) Memorizing, and (iii) Conforming to syllabus and policy that have influenced the success or failure of ME's goal, which is to produce virtuous human beings rather than academic achievement.

- **Article 2 – Muhammad Asyraf Che Amat, Nurhanisah Tugiman, and Alia Sarah Asri,** all from the *Faculty of Educational Studies, Universiti Putra Malaysia, Selangor, Malaysia*, conducted a study to identify the relationship between life satisfaction, self-esteem, Fear of Missing Out, and social media addiction among university students in Malaysia. This quantitative study used four instruments: the Satisfaction with Life, Rosenberg Self-Esteem Scale, Fear of Missing Out Scale, and Social Media Addiction Scale-Student Form. The study found a significant relationship between all the independent variables in this study with social media addiction that can be used as a guide for authorities at the university or interested parties.

- **Article 3 – Liu Yanling** *of ChuXiong Normal University, China*, **Rose Manisah Sulong, Nor Aniza Ahmad, and Li Ruihua,** all from *the Faculty of Educational Studies, Universiti Putra Malaysia, Selangor, Malaysia*, explore how grit affects the student's academic performance in the context of higher education. The paper presents a comprehensive, systematic review of 13 studies between 2018 and 2023 from two databases, Scopus and Web of Science. It finds that grit has a great influence on academic success, and the two main grit aspects of perseverance of effort (POE) and consistency of interest (COI), which are two aspects of grit, seem to have different effects on academic performance.

- **Article 4 – Mohd Shahridwan Ramli and Ahmad Fauzi Mohd** *Ayub of the Institute for Mathematical Research,* together with **Fazilah Razali and Norliza Ghazali**, all from the Faculty of Educational Studies, Universiti Putra Malaysia, Malaysia, investigate how flipped classroom deployment affects students' calculus performance and mathematical creative thinking skills. The analysis revealed a significant difference in the post-test and delayed post-test regarding the calculus performance of the students. Additionally, the results demonstrated that students who utilized flipped classrooms had significantly better scores in mathematical creative thinking skills in the post-test and delayed post-test. This study also showed that, performance and creative thinking skills, using a flipped classroom to teach mathematics to students in higher education was more effective than the conventional approach. However, the fluency domain in creative thinking skills indicated no significant difference between the groups in the post-test and delayed post-test.

- **Articles 5 – Muhd Khaizer Omar, Mohd Hazwan Mohd Puad, Mohamad Yaakub, Gui Qing** attached to the *Faculty of Educational Studies,* and **Marlinah Muslim** from *Student Affairs Division, all from Universiti Putra Malaysia, Serdang, Malaysia,* conducted a study of people with disability (PWD) through employers' feedback from a survey to obtain their insights on employability skills traits necessary for today's job market. A skill intervention program was designed and conducted by employing a reskilling and upskilling module that was aligned to employers' job requirements among selected PWDs using a single case study semi-structured interview session was then conducted with the PWDs after the program to gather their personal experiences. A focus group discussion (FGD) found that PWDs do well in employment, highlighting the importance of reviewing the plethora of skeptical beliefs given the fact that employability skills are intrinsic values that involve non-technical and less physical functions.

- **Article 6 – Quah Wei Boon, Tajularipin Sulaiman, and Fazilah Razali** from the *Faculty of Educational Studies, Universiti Putra Malaysia, 43400 UPM Serdang, Malaysia,* aims to identify the essential elements necessary to integrate scenarios and resources for designing an online scenario-based learning module named the e-SBL FOIM-ATG for front-office courses in a Community College utilizing the Fuzzy Delphi technique. The study consensus confirms the importance of identified elements in developing the Front Office Instructional Module – Advise the Guest at the Community College in promoting the adoption of scenario-based active learning as a transformative educational approach.

- **Article 7 – Riyan Hidayat** of *the Faculty of Educational Studies and Institute for Mathematical Research, Universiti Putra Malaysia, aims to develop the instrument consisting of sub-competency, simplifying, mathematizing, computing, interpreting, and validating through a cross-sectional* survey research design. The development of STEM-based modeling instruments revealed great item-content validity and scale validity for assessing sub-competency in pre-service teachers. At the same time, EFA revealed that STEM-based modeling instruments had five sub-components: simplifying, mathematizing, computing, interpreting, and validating. The results showed that the STEM-based modeling instrument's reliability was good. Creating and verifying the STEM-focused modeling tool designed for pre-service teachers is essential in mathematics education and research. It offers a valuable means to evaluate and improve the essential skillset related to mathematical modeling, benefiting educators and STEM students alike.

- **Article 8 – Liang Jing Teh, Su Luan Wong, Mas Nida Md. Khambari** of *the Faculty of Educational Studies, Rahmita Wirza O.K Rahmat of the Faculty of Computer Science and Information Technology, and Sai Hong Tang of the Faculty of Engineering, all from Universiti Putra Malaysia, Malaysia,* explore postgraduate students' perceptions towards the role and influence of assessment rubrics in their learning experience. The findings revealed that the explicit criteria in rubrics provided postgraduate students with clarity on

the instructor's expectations, enabling them to set specific academic goals and approach their tasks purposefully, which eventually reduced their anxiety and increased their motivation and confidence in completing the assignments. The study also found that students perceived rubrics to have a positive influence on their learning strategies and knowledge gained. The students used rubrics as a tool to facilitate academic goal setting and self-assess their learning progress. Consequently, their knowledge retention and academic achievement improved. The findings imply that tertiary-level educational stakeholders should contemplate rubric-reference assessments.

- **Article 9 – Kai Yan Wong, Tajularipin Sulaiman** *of Sports Academy and* **Wan Marzuki Wan Jaafar** all from the *Faculty of Educational Studies*, **Muhammad Nazrul Hakim Abdullah** *of the Faculty of Medicine and Health Sciences are from Universiti Putra Malaysia*, and **Saeid Motevalli** of the *Faculty of Social Sciences & Liberal Arts, UCSI University, Malaysia*, explore the experiences of young university student-athletes towards the psycho-physical training, physical training and psychological training throughout their athlete's career. The idea, factors, and components of each training should not be overlooked, especially in the populations of young university athletes, as they are exposed to more psychological risks associated with the nature of their career, such as stressful and tense competitive circumstances, monotonous training, academic work, and interpersonal conflict factors. Three (3) themes were concluded from each training in exploring the ideas, components they found, and factors in improving for each training.

- **Article 10 – Kai Yan Wong, Tajularipin Sulaiman** *of Sports Academy and* **Wan Marzuki Wan Jaafar, Asmah Ismail, Roxana Dev Omar Dev** all attached to the *Faculty of Educational Studies*, and **Muhammad Nazrul Hakim Abdullah** *of Faculty of Medicine and Health Sciences, are from Universiti Putra Malaysia*, investigate the relationship between mental health and career planning—career optimism, career adaptability, career knowledge, college and career readiness self-efficacy and self-efficacy planning—among current Malaysian pre-university student-athletes. This study utilized the Mental Health Continuum-Short Form (MHC-SF) and Career and Tertiary Education Readiness Inventory (CaTERI). Results revealed that student-athletes' mental health positively correlated with career planning.

- **Article 11 – Teh Jayee and Muhammad Asyraf Che Amat** of *the Faculty of Educational Studies, Universiti Putra Malaysia, Selangor, Malaysia*, investigate the influence of social media, counseling attitudes, and cyberbullying engagement among young adults in Selangor by exploring how social media platforms influence the prevalence and impact of cyberbullying incidents in the local community. It also investigates the role of counseling help-seeking attitudes in mitigating the adverse effects resulting from cyberbullying. The result revealed that there is no significant direct effect of social media usage on cyberbullying perpetration. However, there are statistically negative relationships between social media usage and counseling attitudes on

cyberbullying victimization. Counseling attitude is significantly and negatively associated with cyberbullying perpetration, reflecting its role in potentially minimizing the risks of young adults being exposed to cyberbullying.

- **Article 12 – Samsu Hilmy Abdullah, Mohd Hazwan Mohd Puad, Masrah Azrifah Azmi Murad, and Erzam Marlisah** of the *Faculty of Educational Studies, Universiti Putra Malaysia, Selangor, Malaysia*, explores the influence of technology and data use on a teacher's self-efficacy in relation to their profession. The results indicated that teacher professional self-efficacy, technology use, and data use are at a moderate level and have a favorable correlation among the constructs. However, the connections are not influenced by factors such as age, gender, or school location.

- **Article 13 – Alia Sarah Asri, Zaida Nor Zainudin, Siti Aishah Hassan, Nor Aniza Ahmad, and Yusni Mohamad Yusop** of the *Faculty of Educational Studies, Universiti Putra Malaysia, 43400 UPM Serdang, Malaysia*, identify the influence of e-counseling skills, ethics, and limitations on counseling self-efficacy among e-counselors in Malaysia. The correlational study design reported a positive correlation between e-counseling skills and counseling self-efficacy, as well as between e-counseling ethics and counseling self-efficacy. E-counseling limitations reported a negative correlation with counseling self-efficacy. A multiple regression analysis was also conducted, and e-counseling skills were found to be the best predictor of counseling self-efficacy, followed by e-counseling limitations.

- **Lee Wei Rong of** *Universiti Tunku Abdul Rahman, Perak, Malaysia*; **Zaida Nor Zainudin, Engku Mardiah Engku Kamarudin, and Alia Sarah Asri,** all from the *Faculty of Educational Studies, Universiti Putra Malaysia, Selangor, Malaysia,* investigate the connection between upper secondary students' self-efficacy and career exploration. The difference between school grades and career exploration was also examined. The quantitative-correlational research showed a positive correlation between self-efficacy and career exploration. Meanwhile, linear regression analysis reported that self-efficacy significantly predicted career exploration. Lastly, the ANOVA result showed a significant difference in the career exploration behaviors among all school grades. Among the respondents, Form 4 students had higher career exploration behaviors than Form 3 and Form 5 students. The results of this study indicated that self-efficacy plays a significant role in predicting career exploration.

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FORMER STUDENTS' PERSPECTIVES ON MORAL EDUCATION LEARNING

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ABSTRACT

This study explores the learning experiences of former Moral Education (ME) students in one of Sabah's districts on the East Coast. Since the introduction of ME subjects is tailored to the students' diverse religious backgrounds and beliefs, the student's background in the Sabah East Coast district, where the majority are Christians, might portray an alternate narrative of the aspects of the ME learning experience among the students. This study employed the qualitative research design with a phenomenological approach to understand the experiences of former ME students in learning the subject at school. Data were gathered through semi-structured interviews and supplemented written documents, which were then analyzed using thematic analysis, revealing three main themes, which are: (i) Relating values to situations; (ii) Memorizing; and (iii) Conforming to syllabus and policy. They have influenced the success or failure of ME's goal, which is to produce virtuous human beings rather than academic achievement. Implications were discussed, emphasizing the role of educators and policymakers in ensuring that ME teachers understand the fundamental goal of the subject to allow for its implementation to be successful in nurturing virtuous human beings as desired continuously until higher education level.

Keywords: Moral Education (ME), student, virtuous human beings, Sabah

1. Introduction

Moral Education (ME) is one example of a character-based education program that seeks to mould an individual's character (Suissa, 2015; Taylor et al., 2018; Walker et al., 2015). Previous research found that the terms ME, Character Education, Ethics Education, Values Education, Civic and Citizenship Education, and Religious Education were synonymous and interchangeably used in most countries (Bourke et al., 2020; Haydon, 2004; Splitter, 2011; Thornberg & Oğuz, 2016). Furthermore, the introduction to the ME course at any level, including higher education, is deemed relevant due to its importance in assisting ongoing personal and social development in daily life (Balakrishnan, 2017a; Febriani et al., 2022; Wong, 2023), including the ability to remain positive in difficult situations (D. Ganub et al., 2019). In Malaysia, efforts to shape students' characters are carried out through the ME subject, which was introduced in 1983 in response to a growing awareness of the importance of addressing social problems among adolescents (Balakrishnan, 2010; Bambang et al., 2012; Hafizhah et al., 2018). However, it is only taught to non-Muslim students of various religious backgrounds, beliefs, races, and cultures. ME was also introduced in Malaysia to bridge the learning gap between Muslim and non-Muslim students when Muslim students are simultaneously studying Islamic Education subjects that focus solely on Islamic teachings. Furthermore, teachers who teach ME subjects may also be Muslim (Balakrishnan, 2017b).

At the outset of the ME subject's introduction, its curriculum emphasizes applying moral values as a principle that helps students make decisions and solve issues and moral problems to form virtuous human beings as the desired character. The primary goal of the ME subject is to produce students who can apply the moral values they have learned in their daily lives. The ability of students to put the values they have learned through ME into practice is critical to the effectiveness (Bourke et al., 2020; Mohamad Khairi, 2016) in achieving the goals of ME, which is to form a virtuous human being (Kalaiselvi, 2017; Nachiappan et al., 2017; Noor Zulina et al., 2022). This goal is consistent with the goals of the National Education Philosophy (NEP), which is then continued in several national education policies such as the Malaysia Ministry of Education (MOE) Interim Strategic Plan and the Malaysia Educational Blueprint (MEB) 2013-2025 (MOE, 2015, 2017). Figure 1 depicts a virtuous human being who wishes to be produced through ME subject in Malaysia:
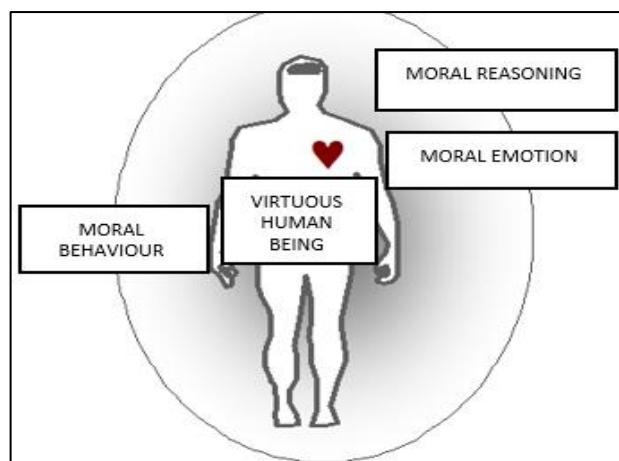
Figure 1: The goal of Moral Education subject

The teaching and learning practice in ME emphasizes the effort to produce virtuous human beings with comprehensive moral development in the domains of moral reasoning, emotions, and behavior, following NEP's desire. Therefore, ME teachers should have basic knowledge related to moral principles that contribute to an understanding of the concept of virtuous human beings, along with specific pedagogy to form a virtuous human being as a desired character formation. However, there are issues with ME's effectiveness in achieving the desired goal of character formation due to the lack of specific and formal training in moral pedagogy and a shortage of specialized teachers (Balakrishnan, 2017; Chang, 2010; Ettikan et al., 2015; Klug et al., 2018; Nachiappan et al., 2017).

Furthermore, the issue of moral teacher professionalism is associated with the problem of the teacher training programme itself, which is incapable of producing effective moral educators (Gleeson & O'Flaherty, 2016; Revell & Arthur, 2007). Hence, teachers are inadequately prepared to teach ME even though they have received training in pedagogy and moral principles (Bourke et al., 2020; Revell & Arthur, 2007). These issues highlighted the importance of investigating whether the problem occurs in the context of ME classes, particularly from the perspective of former ME students' experiences. If the participants describe their experiences with these issues, it depicts that teacher preparation at the higher education level also requires attention.

Meanwhile, a shortage of specialized teachers and a lack of formal training in moral pedagogy has led to the use of rote learning and examination-oriented approaches by ME teachers (Abd. Rahman, 1984; Abdul Rahman, 2014; Azrina, 2004; Bleazby, 2019; Lapsley & Woodbury, 2016), rather than producing students with comprehensive moral development in all three moral domains: moral reasoning, emotions, and behavior (Abd. Shatar, 2007). Studies have reported a discrepancy between teachers' understanding of the moral concept and their practice of teaching

and learning, whether among trained moral teachers, non-trained moral teachers, experienced or novice teachers (Abd. Shatar, 2007; Chang, 2010; Kalaiselvi, 2017; Nachiappan et al., 2017; Rahimah, 1998; Tan, 2008). Besides, Mohamad Ridhuan et al. (2021) argued that cognition is a critical domain for ME students to develop to enable them to make decisions by evaluating and acting morally in real-life situations. Nevertheless, the focus on the development of the cognitive domain has resulted in a greater emphasis on the delivery of moral knowledge, where it is believed that teachers focus more on exam orientation and have a one-way teaching style (Solumuthu & Thambu, 2022). Consequently, it is claimed that ME is less effective in nurturing virtuous human beings, leading to the debate that ME is also ineffective at the higher education level (Wong, 2023).

Previous studies have focused on improving and diversifying teachers' teaching approaches to address issues pertaining to the ineffectiveness of ME in schools (Balakrishnan & Nadarajan, 2017; Balakrishnan & Narvaez, 2016; Limbasan et al., 2018; Zulkifli et al., 2018). These studies aimed to reduce teacher-centered, indoctrination, and examination-oriented strategies in the teaching and learning process of ME. While issues on ME have been extensively debated among academics, with teachers and secondary school students being involved as participants (Abd. Shatar, 2007; Johnson et al., 2017; Midgette et al., 2018; Ülger et al., 2014), the experiences of former ME students have largely been ignored. In this regard, former ME students' experiences are essential to explore as the success of ME is highly dependent on their comprehension, valuation, and application of ME principles (Balakrishnan & Claiborne, 2012; Wong, 2023) since primary school, and they are also bringing their understanding of learning ME in school into their higher education lives. Such uncertainty illustrates the fundamental problem with the effectiveness of character-based education, such as ME, which requires further and in-depth exploration.

1.1. The Study's Fundamental Framework

As mentioned earlier, no single factor determines the effectiveness of ME in Malaysia. Individuals' social environments are made up of moral agents (Bowers, 2012; Bullough, 2011) who communicate moral values in a variety of methods (Berkowitz, 2011), both formally and informally (Wubbels, 2012). Family members, particularly parents, teachers, and friends, are the closest moral agents to individuals (Avgar, Bronfenbrenner, & Henderson, 1977; Berns, 2010), and they have different perspectives on moral values (LePage et al., 2011). Moreover, Roest, Dubas, and Gerris (2010) argued that socialization agents, especially parents, significantly influence transferring values to individuals, particularly children. Children's understanding of moral values is said to be influenced by the main values that parents perceive as good and those described as good in the mass media. However, there may

be differences in perceptions of good moral values among socialization agents. As multiple factors can influence ME goal achievement, a framework that can explain this phenomenon from a social-ecological system perspective is essential.

According to Bronfenbrenner's theory, the social-ecological system provides an overview of the diversity of ecological systems that can influence individual development (Cross, 2017; Yang, 2021). The five basic structures of social-ecological theory aid in the understanding of an individual's development in the context of family, school, and community as a dynamic and constantly evolving system, influenced by social changes (chronosystem) such as economics, politics, and technology (Berns, 2010). The microsystem environment includes relationships within the family, whereas the mesosystem environment includes neighbors, schools and higher education institutions, housing estates, and places of worship. Furthermore, the exosystem environment consists of social support for the family involving parent and guardian workplaces, health centers, and the police, while the macrosystem environment pertains to ideology, social policy, and government (Cross, 2017; Wilder & Lillvist, 2018). Those environmental structures offer different interpretations of moral values and might influence students' understanding and acceptance of moral values (Roest et al., 2010; Vinik et al., 2013) from various perspectives and teachers' practices in ME teaching and learning.

Since the goal of introducing ME subjects in schools is to make them universal for students from various religious, believers, racial, and cultural backgrounds in Malaysia (Noor Zulina & Maizura, 2021), previous research has often focused on dealing with such diversity to achieve the ME goal of producing virtuous human beings. Most preservice teachers lack a systematic knowledge base in multicultural teaching, frequently ignore the cultural diversity of their students, and are not culturally responsive in their instruction (Wen et al., 2022). However, studies on the perspectives of students studying ME subjects in classes with students from the same religious and ethnic background have yet to be discovered. An understanding based on the theory of Social-Ecological Systems can be used as a framework to further describe the variety of factors that influence the effectiveness of achieving ME goals (Wilder & Lillvist, 2018), particularly from the perspective of former students who studied ME in school. It can also provide an in-depth understanding of how ME may require a different approach to achieve its goal, considering its surroundings and geographical areas (Cross, 2017; Schachner, 2019), including in the context of higher education.

Therefore, conducting an exploratory study is crucial to help gain a deeper understanding of the phenomenon under inquiry. In exploratory studies, research aims and objectives may need to be flexible and more open-ended. In these studies, researchers typically investigate a topic about which limited is known. As such, we may want to keep our initial research aims and objectives relatively non-specific or

general or perhaps include an option to change our original research objectives if the project uncovers unexpected information. This approach is especially prevalent in qualitative research. Even if research objectives are finalized and written down, they can be modified later or even completely changed (Thomas & Hodges, 2010). Hence, this study will explore the learning experiences of former ME students who shared the same religious background in their ME classes. The research questions are as follows:

(i)   How do former ME students perceive the ME learning process in school?

(ii)   How does the ME learning process, as experienced by former ME students in school, influence their real lives?

2. Methodology

2.1. Research Design and Sampling Method

This study employs a qualitative approach and a phenomenological design to explore and describe the lived learning experience (Merriam & Tisdell, 2016; Nikiforos & Karakitsou, 2020; Strand, 2019) of former ME students in a district on the East Coast of Sabah. Sabah was chosen as it has a demography that is different from that of Peninsular Malaysia. In this light, the majority of non-Muslim residents practice Christianity compared to the Buddhist majority in the peninsular (Noor Zulina, 2022). There are no predetermined criteria for locating and selecting research participants in phenomenological research. Age, race, religion, ethnicity, and culture are all general considerations. The research participants' experience, intense interest in understanding its nature and meanings, willingness to participate in a lengthy interview and have the data recorded, and publication of the data in any publications are all essential criteria (Moustakas, 1994).

The following criteria have been determined in advance for the selection of study participants: (i) Former ME students who are Christian; (ii) Former ME students who have experience studying in a class consisting of students from the same religious background; and (iii) Former ME students who have experience being taught by Muslim and non-Muslim teachers. The researcher used the results of pre-interviews with ME teachers in Sabah to choose a location in a district on the East Coast of Sabah that meets the inclusive criteria. The purpose of determining inclusive criteria is to provide a more detailed and unique picture of the phenomenon to be studied.

The key participants were identified using the purposive snowball sampling technique through the *WhatsApp* application, which their teachers recommended as they met the inclusion criteria determined by the researcher. The key participant then suggested other participants who met the inclusion criteria (Hennink et al., 2019;

Low, 2019; Patton, 2015). Merriam and Tisdell (2016) pointed out that the number of participants is determined by four factors: the questions asked, the data collected, the data analysis, and the materials available to support the study. They also mentioned that the number of participants will be determined by sampling adequacy, location, or activity to answer the research question. Meanwhile, Guba and Lincoln (2008) propose the term saturation point as the point at which no new data can be obtained from the other participant.

This study has adopted these two recommendations: (i) the number of participants is determined based on the saturation point of information, and (ii) the sufficiency of the number of participants involved after believing that the information obtained could answer the research questions thoroughly. Three former ME students were involved as participants, which was sufficient since phenomenological design typically involves a small sample of fewer than ten people (Creswell & Poth, 2018; Hussen, 2022; Moustakas, 1994). In contrast to quantitative research, qualitative research tends not to generalize from the sample to the population; instead, the reader determines whether a study can be applied to the same situation in a different location, representing a group of individuals in that location (Merriam & Tisdell, 2016). As the primary instrument, the researcher determines the appropriate procedures and methods for obtaining data that will assist the researcher in understanding the perception of ME learning among participants.

2.2. Data Collection Procedures

Data were collected through multiple methods, including in-depth interviews and documents, which is an appropriate method to understand an individual's life experiences (Castillo-Montoya, 2016; Merriam & Tisdell, 2016), specifically students' attitude towards learning (Putit et al., 2022). The findings presented and discussed in this paper were mainly obtained from interviews, supplemented with the perspectives they shared through written reflections, and were also obtained from the subject materials and policy documents. In a qualitative study, participants should be fully involved in the data collection process and willing to cooperate voluntarily (Bogdan & Biklen, 2007). Therefore, the researcher ensured that the number and timing of the interviews with the participants were based on their preferences to avoid pressures (Jacob & Furgerson, 2012; Merriam & Tisdell, 2016). Each participant was interviewed for one to two hours on average, and written questions were asked to elicit additional information from the interviews. The document analysis method was then used to analyze the written responses until data saturation was reached.

Each interview was transcribed and independently coded before being sent to the participants for verification to ensure that every transcript and code produced reflected the actual views of the participants (Creswell & Poth, 2018; Elliott, 2018;

Glesne, 2011; Stake, 2010) and the data were manually analyzed using a codebook created by the researcher (Hennink et al., 2019). Thematic analysis is used in this study as it is appropriate for analyzing text, such as interview transcripts and documents, by using open coding and categorization to find the pattern in the data analyzed (Merriam & Tisdell, 2016). The generated codes are then used to create categories that ultimately represent themes (Low, 2019) of participants' perceptions based on their Moral Education learning experiences. Field experts were also consulted to validate the themes developed to ensure they met the purpose of this study.

2.3. Participants

The researcher initially aimed to identify at least 10 to 12 participants who met the inclusion criteria. However, after several interviews with the proposed study participants, only three were able to voluntarily participate in the study, as the other study participants were forced to withdraw due to unavoidable constraints. This is due to the limitations of distance and time to conduct face-to-face interviews, which were mutually agreed upon since most participants continued their studies at various higher education institutions. This situation also considered the reality that the data collection process at that moment was not conducted online as the researcher wished to spend adequate and prolonged time with the participants. Spending adequate and prolonged time with the participants is essential in phenomenological studies, where researchers must gather rich, in-depth information and data from participants' experiences.

All three participants voluntarily participated in this study. They were between the ages of 19 and 20 and came from various family backgrounds. They were given an appropriate pseudonym to protect their confidentiality and to comply with research ethics principles. Misha, 20 years old, is the eldest of three siblings and is currently enrolled in an internship program as part of her Diploma degree. Her mother is a housewife, and her father is a secondary school teacher. Jon, the second participant, is also 20 years old and the eldest of three siblings. His parents are both employed, with his mother working as a clerk and his father as an electrical engineer in a palm oil plantation company. He is currently pursuing a diploma at one of the local public universities.

Serin, the third participant, is 19 years old. Serin is the younger of two brothers. Serin differs from the other two participants in that his parents died when he was a child. His mother died when he was six, while his father died when he was eight. Raised by his unemployed grandparents, he survived on his parents' insurance and the support of other family members. He was unable to continue his studies after leaving secondary school due to financial constraints, so he now works and lives with his

aunt and uncle. The backgrounds of the three participants in this study met the requirements of the study, which can represent the experiences of former ME students who are currently studying or have not continued their studies at any higher education institution. This diversity can also provide a more in-depth and comprehensive understanding of the effectiveness of ME subject implementation in schools as a continuation of its importance at the level of higher education institutions and students' daily lives.

3. Findings

This section delves deeper into each of the themes that emerged from the data analysis and will be discussed in accordance with the research questions posed in this study, which are as follows: (i) How do former ME students perceive the ME learning process in school? (ii) How does the ME learning process, as experienced by former ME students in school, influence their real lives? At the initial phase of the reading process on the existing literature review, the focus of this study is to answer these research questions. Since the findings of a qualitative study rely significantly on the narratives of the research participants, the objective of this study was subsequently modified, as stated before, to ensure the narrative of the study findings reflected the true views of participants in the research (Thomas & Hodges, 2010). This is significant in avoiding biases in the context of phenomenological studies, which demonstrate research participants' perspectives on their ME learning experiences.

The analysis was carried out by paying attention to the following characteristics: a focus on the world of life, an openness to experience with the subject studied, an accurate description, the delay of preliminary or preconceived knowledge, and the search for the essence in the description. According to interpretive phenomenology, gaining direct access to a person's life requires exploring their own experiences (Suryadarsah, 2013). Moustakas (1994) pointed out that the data analysis identified five major stages in the phenomenological data analysis, which are: First, making a list of expressions from the participant's answers or responses while suspending the researcher's preconceptions (bracketing) to allow the expressions to be seen as they are. Each aspect of the participant's life experience is treated equally (horizontalisation). Second, the reduction and elimination of the expression refers to the question of whether the expression is the essence of the participant's experience and whether the expressions can be grouped and labeled as themes. Unclear expressions, repetitions, and overlaps are reduced or eliminated. Then, meaningful expressions are assigned labels and themes.

Third is creating a cluster and writing a theme based on expressions that are consistent, unchanged, and similar. The participants' lived experience revolves around the clustering and labeling of these expressions. Fourth, validating the expressions and labeling the expressions and themes by (i) whether the expressions

are explicit in the interview transcripts or the participant's written documents and (ii) when the expressions are not explicit, do the expressions "work together without conflict or compatible"? Expressions are discarded if they are incompatible and explicit with the participant's life experience. Finally, creating an Individual Textural Description (ITD). ITD is created by displaying validated expressions in accordance with the themes, which are supplemented by verbatim quotes from interviews and/or participants' daily notes. In this study, we consider Moustakas' views to produce the final data presented through the writing.

3.1. Theme 1: Relating Values to Situations

The universal values in the context of ME in Malaysia are one of the standards of conduct that must be adhered to by every student as a manifestation of virtuous behavior. Therefore, the participants described that their teacher implement the teaching of values in the ME curriculum by relating them to a variety of daily situations. Jon, for instance, confessed that learning values in ME class is easier if the teacher uses examples from daily situations. This perception stems from the teachers' teaching method, in which they typically provide an example of a situation based on values. Misha's teacher, for example, told them a close-to-real-life example about their responsibility to help their mother with house chores and relating values to a situation in which a student assists in bringing a teacher's book. Serin also said that learning ME is beneficial as it teaches students about values that are relevant to their daily lives, which Misha and Jon also mentioned.

However, Jon had a different experience in primary and secondary school when it came to the process of learning Moral Education by relating values to situations. When he was in primary school, he had a difficult time learning values in Moral Education. His teacher teaches them by giving them a situation from the textbook that they must relate to the values they have learned. As Jon explained:

> *"They give you a situation number one, like this. Situation number two, situation number three...What is the appropriate value in it? So, in primary school, I do not get it. I really had no understanding of what those values mean. Since I do not understand the meaning of the values, the situation is not entirely clear to me. It is because the definition is quite lengthy."* (Jon)

Since the definition of values is lengthy and difficult to understand, Jon found it difficult to relate the situation discussed to the values learned. He only realized that values can be related to situations when he was in upper secondary school since his teacher always gave examples of values that are sometimes related to his real-life situations. It was around this time that Jon began to notice that the values he had

learned in ME were becoming easier to understand, and this prompted him to apply what he had learned in class to his daily life situations. Furthermore, in his responses to written questions, Jon emphasized the importance of having a good understanding of ME because it drives them to practice what they learned without realizing it. However, he has found it difficult to consistently apply the values he learned through ME since he started his studies at a higher education institution, saying, "Until now, I'm still doing it, but since I entered University, it's a little difficult..."

Misha, on the other hand, believes that if morals are taught to them, they can apply them in everyday life by doing what they have learned. Misha also proposed that students should be presented with a situation and asked to answer based on what they had learned. The answers are then evaluated as an examination result. However, in her analyzed written document, she also mentioned that only when they are in a dreadful situation will they be able to adapt morals in their daily lives. This is in line with her statement in the interview that relating values in real-life situations requires a lengthy process rather than simply learning them. Serin also understood ME through his daily life experience, as the subject of ME teaches them how to respect the elderly, how to care for the environment, and how to care for others.

In conclusion, an individual's environment plays an important role in achieving the goal of nurturing virtuous human beings through ME. Indeed, using examples of dilemmas and situations that are similar to or match the actual social background of students (Haidi & Mohd Khairuddin, 2019; Mohamad Khairi, 2016) will have a positive impact on an individual character (Balakrishnan & Narvaez, 2016; Balakrishnan & Thambu, 2017; Kurniawati et al., 2022). Although they do not mention situations directly related to their religious background, we can conclude that their social environment plays a significant role in the effectiveness of ME in their daily lives.

3.2. Theme 2: Memorizing

Memorization is one of the students' key learning experiences in ME. According to Jon, Serin and Misha, as part of the ME learning process, they must memorize the values along with their definitions and the facts given in the textbook. In order to make it easier for them to answer exam questions, Jon and Serin, for instance, claimed that their teacher placed a strong emphasis on memorization of the moral values and facts covered in the ME curriculum. Moreover, when sharing her experience at a Chinese primary school, Misha mentioned how the teacher was overly strict in emphasizing memorization of the learning syllabus and that they were beaten if they did not memorize what they had learned. Misha said:

> *"The teacher was too strict during my time. He is ok in terms of teaching but*

strict that he even hit us when we did not memorize this and that. He keeps telling us to memorize. He will hit us if we do not. He would hit us if we did not know the answer. So, in that sense, it is not instilling in the heart that you must be a moral person, but it is instilling in the brain that you must study, you have to learn this, you have to memorize. So, even if you are not in school, go wherever you want, it is not in the heart. It is in the brain. Have to memorize. That is it." (Misha)

Misha's explanation of how she learned through memorizing demonstrates that her learning experience focuses solely on cognitive development rather than emotional development and has no impact on her behavior outside of school. Nonetheless, despite stating that memorizing does not affect her actions outside of school, the facts she learned in ME do have an impact on her work experience. The impact, however, is only on her ability to remember acts related to her job, not on her moral behavior. Misha said:

"There are also acts in our textbooks that we should memorise. It must be remembered. I only became aware of the significance when I began working (internship). Aaa...workers act, it is in Morals as well. So, when I go to training, he asks if there is an act related to your company? What does your company do? What is the policy? As a result of learning Moral, I now understand the fundamentals. There are employees, child policies, and a dress code. There is the attire policy...everything is there." (Misha)

This finding is consistent with previous studies regarding the subject of ME, where it was discovered that teachers placed a strong emphasis on memorizing values and information learned according to the curriculum (Abd. Shatar, 2007). In some character-based subjects, such as those taught in Indonesia, the memorization method is also used (Adnyana, 2020). Al-Ghazali argued that memorization, while claimed to have a negative impact on students' learning experiences, is crucial to the learning process as it is a basic step of knowledge appreciation (Nur Hanani et al., 2013).

3.3. Theme 3: Conforming to syllabus and policy

The findings also reveal that teachers tend to focus on syllabus completion, which leads to textbooks and workbooks being the primary resources used in teaching ME. Misha and Jon have had a learning experience in which the teacher is concerned with completing the syllabus by referring constantly to textbooks and workbooks. Serin, on the other hand, claims that his teacher assigned them exercises based on the values they had learned to assess their progress in learning ME and their ability to answer exam questions. That also persuaded Serin that he needed to learn ME and achieve high grades to demonstrate his commitment to the subject. Besides, when Misha was

in Chinese primary school, for example, they used textbooks and had to buy many workbooks despite spending a lot of money on school. Therefore, Misha suggested in her written answer that Morals should not be just in a book, exercise, and examination. She was so adamant that the ME subject should not be taught solely through textbooks and workbooks that she even capitalized the word "JUST" to demonstrate her firm belief in this. Jon's experience was when he was in primary school as he said:

> *"To practise, we used textbook. The answer must then adhere to the textbook. Because we are in primary school, the answer in the textbook is extremely difficult. We have little or no prior experience. So, future teachers, please simplify to help us understand the values by using more convenient examples, as the example in the textbook was a little difficult for me to understand in primary school. We were too busy playing as kids in primary school to open up books."* (Jon)

Thus, Jon claimed that he found ME to be boring as he was forced to attend ME classes during his school days. Jon also claims that he took ME because it was part of their school's curriculum; if he had other options, he might not have taken it. Misha shares this viewpoint when asked why they need to study ME subjects, saying, "...If the school introduced Bible Knowledge subjects, right...I would take the Bible Knowledge. If the Bible is to differentiate, the Bible's teaching will strengthen our faith-based beliefs...spiritually, yes.

Furthermore, Moral, yes because you are dealing with these creatures. The same goes for Islamic Education." Due to her Christian religious background, the introduction of the Bible Knowledge subject at the Malaysian Certificate of Education (MCE) level influenced her standpoint on learning ME. Jon and Misha further admit that ME is only important during the upper secondary level because it is required in the public examination known as the MCE.

On the other hand, in her written response, Misha shared her belief that what they learned was not a guideline but rather a decision made for them to follow. Serin also claims that he learned ME because it is required and that he is simply doing what has been predetermined for them because the Islamic Education content is inappropriate for them as non-Muslims, saying: "First, I'm a Christian. Christians, for example, do not understand what is written in Arabic. As Christians, we have no idea what it means. Second, it requires you to memorize a language or an unfamiliar pronunciation (referring to the Islamic Education subject contents). Third, it is compulsory for us. It is not forced. We accept it willingly because it is required. Follow what is set."

ME is perceived as a required subject because it is already mandated for non-Muslim students. Participants also argued that what they learned in ME was predetermined and that they were required to adhere to the content of ME subjects. This finding is consistent with the influence of the microsystem and the macrosystem on individuals, which includes the school, social and government policies (Cross, 2017; Wilder & Lillvist, 2018). Furthermore, conformity to syllabus and policy causes participants to learn through one-way learning in the ME learning process, contrary to the belief that teachers who use a variety of teaching approaches and engage students in the learning process can help students achieve learning objectives (Lilian & Amollo, 2020).

4. Discussions

This study explored and examined the learning experiences of former ME students who shared the same religious background in their ME classes. Their social backgrounds differed in terms of family, socioeconomic status, and neighborhood compound. Besides, they have had different schooling experiences in terms of the type of school they attended as well as the teachers. Hence, the participants' diverse backgrounds create a distinct but profound narrative to the questions posed in this study. ME is a religiously dependent subject in contrast to Islamic Education, which is taken by Muslim students, even though both subjects are taught concurrently and will be examined.

Due to the nature of a pluralistic ME classroom with students from various religious backgrounds, the ultimate goal is to create a virtuous human being based on values learned rather than referring to one specific religious belief. However, all participants in this study shared the same religious beliefs. Therefore, they specifically mentioned that they learned ME because they are Christians rather than saying that it is required for non-Muslims. This situation shows that environmental factors, particularly their socio-ecological system, are significant in shaping their educational experiences and development (Kitchen et al., 2019), specifically when considering the ME learning needs at school. Besides, the narrative suggests that their ME teachers lack or may not focus on the concept of comprehensive moral development and the application of moral values in the teaching and learning process of ME. This situation demands further research on the syllabus and ME teacher preparation programs, particularly at higher education institutions.

Furthermore, all responses indicated that the reason they have been studying ME is because it has been made a requirement and is going to be examined. For that reason, teachers are found to apply a teacher-centered approach (Tondeur et al., 2017) when teaching ME in the classroom, focusing on preparing students for examinations (Zulkifli et al., 2018). The learning process of ME is also found to emphasize completing the syllabus, causing one-way teaching among teachers and lessening

students' motivation to learn (Hamzah et al., 2022). These are evident in the teachers' teaching materials when the use of textbooks and workbooks is still prevalent.

Additionally, the use of the memorization method of teaching shows that students are drilled for exams because of the exam-oriented culture in the Malaysian educational system (Balakrishnan, 2017). Excessive focus on exam preparation causes ME teachers to be unaware of ME's goal of producing virtuous human beings. This situation is consistent with previous research findings indicating that teacher preparation programs at the higher education level are incapable of producing effective moral educators, even after they have received the necessary training (Bourke et al., 2020; Gleeson & O'Flaherty, 2016; Revell & Arthur, 2007). Thus, the teacher preparation program at the higher education level requires further enhancement to effectively produce moral teachers who understand the philosophy underlying the introduction of ME and implement the teaching and learning process following that philosophy.

The shortage of specialized teachers and formal moral pedagogy training may also contribute to the use of an exam-oriented approach by ME teachers (Abd. Rahman, 1984; Abdul Rahman, 2014; Azrina Jonit, 2004; Bleazby, 2019; Lapsley & Woodbury, 2016). The emphasis given on completing the syllabus may arise due to teachers' confusion in the context of needs and goals that need to be considered in the teaching and learning of character formation-based subjects and have specific curriculum content to follow (Balakrishnan, 2010; Christina et al., 2015; Sporre, 2018). Besides, participants were also found to have the same confusion when they compared the ME subject equally to the Islamic Education subject for Muslims. They perceived ME as an exam-based subject as it is taught concurrently with Islamic Education, despite realizing its importance to be adapted in daily life situations. Hence, participants chose to learn a religious-based subject that is also offered in the education system compared to ME if they were given options.

5. Implications

Students' negative school experiences in learning ME appear to involve memorization and drilling based on textbooks and workbooks, yet this is unavoidable given the culture of exam-oriented systems implemented in the context of the Malaysian education system. Thus, preparing teachers for the specific pedagogy of ME teaching and learning is crucial in increasing the subject's effectiveness and usefulness in students' real lives. Higher education institutions that offer teacher preparation and training programs are responsible for this situation. Besides, when teachers relate values to situations in the classroom, students realize how important it is to apply the ME subject content in real-life situations. Implementing this approach in ME teaching can help produce virtuous human beings, as students can apply what they have learned in class to real-life situations. It can also help them to

be more consistent in applying moral values learned in any situation, even when they enroll in a higher education institution (Wong, 2023). Hence, ME teacher preparation programs, particularly those at the higher education level, may need to revise their curriculum to produce teachers who are significantly qualified to teach ME in schools.

Furthermore, Hamzah et al. (2022) pointed out that young adult learners' intrinsic and extrinsic motivation and engagement can influence their learning outcomes. The school environment, the classroom, and the teacher, which also include the teachers' teaching methods, are among the extrinsic motivations that are important in character education subjects such as ME (Berkowitz & Bier, 2007; Gan et al., 2021). Moreover, the environment demonstrates how the social-ecological system influences ME's goal of producing virtuous human beings. The quality of teaching has a direct impact on students' learning outcomes (Creemers & Reezigt, 1996), where the ability of students to relate the values they have learned through ME into practice can contribute to the effectiveness (Bourke et al., 2020; Mohamad Khairi, 2016) in achieving the goals of ME in nurturing a virtuous human being (Kalaiselvi, 2017; Nachiappan et al., 2017). ME teachers should not be based on activities like repetitive memorization and rigid drills or rely solely on textbook and workbook answers for exams. Besides, if ME is introduced at the higher education level as well (Wong, 2023), every factor found in the social-ecological system must be considered to ensure its implementation can promote a continuous development of human character to produce students who are virtuous human beings.

As evidenced by the students' learning experiences in this study, teachers have employed a variety of teaching methods that have an impact on the students' learning outcomes (Bilqolam et al., 2022). At the same time, students should be given more autonomy in expressing their opinions on a topic discussed in class, guided by the moral values of the local community. When students are actively involved in the teaching and learning process, they can develop in a balanced manner through the three targeted moral domains: (i) reasoning, (ii) emotions and moral behavior. The development of these three domains will help students become more responsible citizens as they pursue higher education institutions. Balakrishnan and Claiborne (2012) suggested using real-life dilemmas in discussing moral issues, which is one of the teaching methods in this study that involves relating values to situations. For instance, students can discuss real-life problems in the classroom and apply the values they have learned in their real-life situations based on scenarios similar to those they have encountered in their daily lives.

However, as stated by the participants, teachers must consider students' maturity and ability to understand and relate to the situation discussed with the values learned. Using the examples from the textbook could make it difficult to understand values. Developing primary school students' critical thinking and moral reasoning abilities

can help them think more clearly and make better decisions, but primary school students are still in their playful stage (Bodrova et al., 2013). Since the student's ability and maturity level must be considered, the questions asked, and the situations discussed must be appropriate. Thus, the discussion of ethical dilemmas at the higher education level must also correspond to the maturity level of the students at the higher education institution.

6. Conclusion

This qualitative study explores former ME students' learning experiences in a secondary school. They were interviewed and supplemented by written documents, indicating that the teaching and learning ME is focused on rote learning and relatively exam-oriented. The findings of this study add to the body of knowledge needed to comprehend the phenomenon of ME learning. The implementation of the ME subject in Malaysia's plural and multiracial society requires a thorough understanding of its goals in the development of virtuous human beings. Malaysian diverse society generates a wide range of standards, values, and beliefs about the role of ME in real life. In this regard, the Malaysian exam-oriented education system should not be a hindrance to ensuring the effectiveness of the implementation of the ME subject. It is up to teachers' wisdom and flexibility to address the diversity of students in the classroom during the ME teaching and learning process. As there is concern that the exam-oriented approach in teaching ME in schools is ineffective in nurturing students with noble characters, such issues should be addressed in the teaching of ME in higher education institutions. Finally, given the limitations of this study's samples, which only included former ME students, future research may concentrate on the alignment of teachers' and students' understanding of the fundamental goal of the ME subject. Exploring teachers' and students' understanding of the fundamental goals of ME subject implementation can be one of the contributing factors that improve the subject's effectiveness in constantly achieving its goals up to a higher level of education.

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THE RELATIONSHIP BETWEEN LIFE SATISFACTION, SELF-ESTEEM, FEAR OF MISSING OUT (FOMO) AND SOCIAL MEDIA ADDICTION AMONG UNIVERSITY STUDENTS IN MALAYSIA

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ABSTRACT

The regular use of social media carries both benefits and harmful effects on individuals, especially the youth. Post-COVID-19, the use of the Internet and social media has become the new norm to build a social network, find information more conveniently, or simply stay updated with recent events and information. This study was conducted to identify the relationship between life satisfaction, self-esteem, Fear of Missing Out, and social media addiction among university students in Malaysia. This quantitative study was conducted at five research universities in Malaysia. Four instruments were used, namely the Satisfaction with Life, Rosenberg Self-Esteem Scale, Fear of Missing Out Scale and Social Media Addiction Scale-Student Form. The research data were analyzed based on descriptive and inferential statistics. The sampling used in this research was stratified random sampling and simple random sampling. Based on the results, this study found a significant relationship between all the independent variables in this study with social media addiction. The findings can be used as a guide for authorities at university or interested parties, and it is suggested that further studies can be carried out so that the issue of social media addiction can be examined and discussed more comprehensively.

Keywords: addiction, Internet users, public university, self-satisfaction, social media use

1. Introduction

The current rate of technological advancement allows for the creation of a world without borders. Information technology facilities can be accessed and utilized by all strata, regardless of age, gender, occupation and more. The development of technology has made the use of the internet an important part of human life today (Sevinc & Tas, 2020). Based on a survey conducted by We Are Social (2022), internet users in Malaysia in January 2022 increased by 1.3% compared to 2021. There were a total of 29.55 million Malaysians using the internet at the beginning of January 2022. The convenience of the internet makes searching for information and carrying out daily activities such as communication, entertainment, work, finance, and meetings easier. Not only that, through the same study, it was found that there are a total of 30.25 million active users of social media recorded and this figure has increased by 2.3 million users, which is 8% compared to 2021. The use of social media was the second highest activity among internet users in Malaysia at the beginning of January in the year 2022, as much as 93.3%.

Among the social media applications that are often used by Malaysians are Facebook, YouTube, Instagram and Tiktok (We Are Social, 2022). Nowadays, most users can easily access social media through smartphones or tablets. Undoubtedly, social media is a platform to keep in touch with family, friends, or loved ones more easily, thus displaying its necessity in the current era. Further, Qahtan's study in 2020 stated that the use of social media demonstrates a relationship with human psychology. Individuals who use social media are more likely to be happy. This, in turn, leads to the use of social media to achieve life satisfaction for an individual. The study also stated that life satisfaction and self-esteem were determining factors for internet addiction. Despite individuals reporting satisfaction from using social media, the tendency to rely solely on social media for happiness should be explored further to confirm that the findings are genuine and not superficial or biased.

The regular use of social media is one way to deal with stress, anxiety, and depression (Cargill, 2019). With the broad knowledge and information that the Internet offers, individuals keep themselves informed about what is necessary through the latest updates, which can be both beneficial and damaging. While social media is convenient and less costly for individuals to seek information, it can also increase the sense of worry and anxiety among users, causing them to constantly update their activities on social media. According to We Are Social's (2022) survey, Malaysians spend an average of 9 hours and 10 minutes using the internet and an average of 3 hours and 2 minutes on social media. This shows that the use of the internet among Malaysians has increased significantly. Furthermore, Muhammad Rusdi et al.'s (2021) study found that students at the Malaysian Institute of Teacher Education (IPG) spend a lot of their time online, causing them to overlook important matters. This leads to Fear of Missing Out (FOMO), in which individuals have beneficial

experiences in one's absence, and is characterized by the desire to stay in touch with what others are doing (Przybylski et al., 2013).

Despite the convenience that the social media offers, concerns have been raised on the consequences of overusing or misusing it. Evident in the past studies, youths were reported to be the main users of the internet in Malaysia (Mohd Sobhi et al., 2016). The youth, according to the Selangor State Legislative Assembly (2019) in Malaysia, represents individuals between the ages of 15 to 30 years. As a significant part of future generation leaders, it is crucial for the youth to strive to become responsible and competent individuals with good inter- and intrapersonal skills. They must be smart and resourceful in utilizing the internet and social media to their advantage instead of being victims to cyber misuse. However, frequent use of social media has a serious negative impact on the new young generation, especially among university students, such as lack of communication skills, wasting time, exposure to cyberbullying, and so on (Jamiah et al., 2016). The main goal of the university, which is to educate and provide learning opportunities, networking and exposure to adult students, should also reflect its role to mitigate any consequences of social media addiction among its students who represent the youth. This study's aim therefore was to identify how life satisfaction, self-esteem and FOMO are linked with social media addiction to respond to the consistent research efforts that are needed to identify the factors associating with social media addiction. This will be important so that interventions can be designed and implemented towards improving the lifestyle and well-being of future generations.

2. Literature Review

2.1. Social media addiction

Social media is a group of internet-based applications that is designed using the Web 2.0 technology and has various categories (Kaplan & Haenlein, 2010). There are six types of social media according to Kaplan and Haenlein: collaborative projects, blogs, content communities, social networking sites, virtual game worlds, and virtual social worlds. The researchers further explained that social media sites are applications that allow users to connect via email and messages. Social media is also defined by Boyd and Ellison (2008) as web-based services that enable individuals to build their profiles and traverse connections to multiple other users. Facebook is a common example of a social media site as provided in both studies.

A study in Malaysia by Mohd Sobhi et al. (2016) investigated the use of social media among the youth. Technology has nowadays progressed rapidly, which observes a digital space without borders for its youth users to improve the outreach of social media. The study shows that the youth are active users of this platform, with females being more active compared to males. WhatsApp was also reported as the application

that most users spent their time using, which was more than five hours, surpassing Facebook's use. The youth from this study also reported using social media to communicate with family members and friends, share photos and videos, get latest news and updates, and form new relationships. Social media is thus an important tool to socialize and communicate more easily among its users, however, excessive use and time spent on social media may become a concern that is worth exploring.

Addiction is defined as a desire to do, use or indulge in something repeatedly (Abdul Rashid et al., 2021; Merriam-Webster, 2022). Excessive use of social media can lead to either positive or negative consequences, meaning that social media addiction is the act of using social media continuously and repeatedly. Filiyntiana et al. (2020) discussed the factors causing social media addiction towards the lifestyle of UniKL-MFI youth, with findings reporting that faster internet usage leads to improved accessibility to social media among the youth, resulting in excessive use and addiction. On the contrary, slow internet connection causes youth to feel anxious, thus exhibiting an addicted behavior toward social media use.

Abdul Rashid et al.'s (2021) study described the implications of social media addiction on young adolescents' mental health during the COVID-19 pandemic. Findings from systematic literature review suggest that the excessive use of social media can cause negative implications for the mental health of teenagers such as increased aggressive behavior, suicide, depression, and anxiety. The study, however, lacked evidence about social media's addiction in the context of Malaysian young adolescents. Sahin's (2018) study developed the "Social Media Addiction Scale-Student Form (SMAS-SF) to measure social media addiction among school and university students from various social backgrounds and academic majors in Turkey. The scale was designed after conducting a literature review, obtaining field experts' opinions, establishing validity and reliability, and administering the instrument to 998 randomly selected respondents comprising students from various schools in a city in Turkey and university students from various departments in a university in Turkey. The results of this survey reported that the scale is reliable, valid and acceptable for the targeted sample group, and allows replication of this scale in a different sample group. Further studies in the Malaysian context using this scale was deemed appropriate to provide more culturally accurate findings that focused on Malaysian university students.

2.2. Life satisfaction

Life satisfaction is an important element in human life in terms of physical and mental well-being (Adel & Ali, 2021). It is observed from individuals' evaluation of their lives in a positive manner based on their personal needs (Ibrahim & Murat, 2018). In essence, life satisfaction is a subjective assessment of a person's quality of life and has a large cognitive component. Sousa and Lyubomirsky's (2001) study found that

life satisfaction is influenced by personality and environmental factors. Personality includes genetics, while the environment refers to life circumstances and events. Individuals who felt satisfied with themselves were more likely to also feel satisfied in several aspects of their lives. Life satisfaction thus may be linked with other aspects of individuals' lives.

2.2.1.   Relationship between life satisfaction and social media addiction

A study by Syed Ali et al. (2019) among Pakistani university students majoring in business discussed the factors that mediate the relationship between social media usage and life satisfaction. The most used social media platform reported among the respondents was Facebook. Findings from the structural equation modelling analysis showed that there was no direct association between social media usage and life satisfaction; however, factors such as social benefit and social overload mediated the relationship between the variables, indicating that there was an indirect relationship. Social media usage was also closely associated with social enhancement and development of interpersonal relationship, implying that students were motivated to use social media for social purposes. Thus, with the absence of social components, usage behaviors toward social media usage was not linked to life satisfaction among university students.

Similar findings were found in Marttilla et al.'s (2021) 15-month study in Finland. The quantitative study tested hypothesized a relationship between problematic social media use, loneliness, and life satisfaction. The study reported that problematic social media use was significantly associated with decreased life satisfaction among the respondents. Loneliness was also indirectly correlated to problematic social media use and life satisfaction. These findings implied that increased problematic use of social media increased loneliness and therefore decreased life satisfaction. Excessive time spent on social media was problematic and was associated with negative consequences to its users.

Sahin's (2017) study conducted at a university in Turkey examined the level of social media addiction to life satisfaction among 612 students, reporting that the more time students spend on social media, the less satisfied they felt with their lives. Adel and Ali (2021) supported this finding, further noting that non-addicts reported higher life satisfaction compared to students categorized as addicts who scored higher on the addiction scale. On the contrary, Yap & Amat (2021) study measured the level of life satisfaction with social media addiction at the time of the COVID-19 epidemic that hit Malaysia in 2021, suggesting a positive link between life satisfaction and social media usage. The results of the study found that the pandemic caused university students to use social media as a medium to connect with friends, and lecturers, find information more easily, and so on. Resorting to social media use was satisfactory for students especially if they felt that they were able to fulfill their needs through

this medium. However, problematic and excessive use of social media was linked to decreased life satisfaction, as suggested in the previous studies. As most studies reporting these findings were outside of the Malaysian context, the scope of this study will be beneficial to provide an alternative perspective to the correlation between social media addiction and life satisfaction from the Malaysian context. Thus, this study will test the following hypothesized relationship:

H_1: There is a significant relationship between life satisfaction and social media addiction among university students.

2.3. Self-esteem

Rosenberg (1965) describes and demonstrates self-esteem as individuals making a positive or negative evaluation of themselves. Individuals having self-worth and self-respect who consider themselves worthy and have meaning were more likely to have a higher self-esteem. Jamaludin Ramli (n.d) posited that self-concept is a positive or negative judgement of or an evaluation toward oneself, which was also developed from accepting others' evaluations toward themselves. Additionally, according to Abdel-Khalek (2016), individuals with high self-esteem are more happy, optimistic and highly motivated. They have lower levels of depression, anxiety, and negative moods. This is in contrary to individuals with lower self-esteem. Self-esteem describes ones' own value and worth of self, either positively or negatively (Feshbach et al., 1996). The behaviors that one shows in a day-to-day basis reflects and is a result of one's evaluation of his or herself (Mohd Fairuz & Shahizan. 2016). The extent to which individuals identify and value themselves is an important aspect of self-esteem.

2.3.1. Relationship between self-esteem and social media addiction

Some studies have found that the use of social media contributes to low levels of self-esteem. This is because when an individual spends more time on social media, they will compare themselves with others regularly and at the same time make themselves feel inferior and unprivileged (Muqaddas et al., 2017). Most teenagers spend time and update their activities on social media. They also keep updated with the latest developments simply because they do not want to miss out and further satisfy their hearts (Shazli Ezzat, 2021). Social media use has evolved into a means for individuals to stay informed and updated. On the contrary, however, the social, economic, or physical disparities that are displayed online can make people feel dissatisfied with their lives, which reduces their self-esteem and makes them desire for a life that may not be authentic or realistic.

A study by Helen et al. (2021) among 211 medical students in Indonesia discussed the relationship between narcissism, self-esteem, and social media addiction. The Rosenberg Self-Esteem Scale (RSES) was translated to the Indonesian language and

used to measure self-esteem. The findings reported that there was a significant relationship between self-esteem and social media addiction and that respondents who spent more than four hours on social media were more likely to experience social media addiction. Individuals who had lower self-esteem experienced behavioral and communication-related issues and desired to avoid social relations. Social media became a place for them to hide and avoid interacting directly with others. The anonymity element of social media may also allow individuals to build a positive identity and give them confidence to build relationships more comfortably compared to the physical setting.

Contrary to these studies, Marengo et al. (2021) challenges the link between self-esteem and social media addition, highlighting the relationship between active Facebook use, received likes, self-esteem, and happiness. The sociometer theory proposed by Valkenburg et al. (2006) was utilized in this study to look at how positive acceptance from others can increase self-esteem and happiness among active Italian users of Facebook. Findings from this study reported that received likes from Facebook increased self-esteem, which in turn made the users feel happier. As a result of these benefits, users would feel encouraged to return to use social media applications such as Facebook, which reflects the link between increased dependence or addiction to social media use and self-esteem. Thus, this study will test the following hypothesized relationship between the two variables:

H_2: There is a significant relationship between self-esteem and social media addiction among university students.

2.4. Fear of missing out (FOMO)

Fear of missing out, or FOMO, is characterized by a pervasive concern that others may have beneficial experiences in one's absence and a desire to keep in touch with what others are doing (Przybylski et al., 2013). Introduced in 2004, FOMO is a term related to the social networking sites phenomenon, as applications emerged from the Internet.

Internet use is driven by impulsive actions that involve feelings of restlessness or anxiety, causing a strong urge to be online (Rafiza et al., 2019). This describes FOMO, in which individuals experience anxiety when not using the internet for fear of not being up-to-date. Rafiza et al.'s (2019) pilot study among university members in a Malaysian private university similarly suggested that FOMO involved feeling anxious and worry when not using the internet. The possible negative consequences of FOMO include inappropriate use of social media applications such as Facebook, WhatsApp, Twitter, and Instagram, which disrupts working, sleeping, eating, and leisure hours. The study also reported that 20% of the respondents were likely to demonstrate characteristics of FOMO, with the scale used through items such as "I feel uneasy when I do not know what my friend's plans are" and "When I have an

interesting experience, it is important that I share it with others" (after translation). The scale that was designed and used in the study was in the Malay language.

FOMO is characterized by the tendency to keep in touch with what other people are doing. Failing to do so may induce anxiety as they feel a sense of social exclusion. This is according to a review study by Gupta and Sharma (2021), who explored the negatives consequences of FOMO behaviors toward day-to-day productivity and overall psychological and physical health. The study discussed that FOMO is a global phenomenon that coincides with the rapid growth of technology in the last two decades. Although FOMO may begin with distorted perspectives where individuals do not wish to be left out of rewarding experiences, it is reinforced by constant and compulsive checking and responsiveness to social networking sites. The temporary rewarding feelings experienced by engaging in social media establishes a vicious cycle of constantly checking social media, which may further lead to excessive use.

2.4.1. Relationship between FOMO and social media addiction

It is suggested that constant use and checking of social media due to fear of being socially excluded fuels excessive use or addiction to social media. A study among university students in China by Li et al. (2022) investigated FOMO, smartphone addiction, and social networking sites use and found that there were positive associations between these variables. The study used network analysis to test this relationship. It was inferred by the authors that social media sites had become a significant part of the university students' daily life to facilitate interpersonal relationships, entertainment use, and for work- or study-related matters. Nonetheless, increased dependence and use of social media may lead to FOMO as individuals grew concerned and feared that they may be missing out of crucial information or communication with others. The increased time spent using smartphone and social networking sites (e.g., QQ, WeChat, and Weibo) may cause difficulties in abstaining impulsive thoughts and behaviors, causing negative consequences such as reduced academic and work productivity and compromised interpersonal relationships.

Tandon et al. (2021) discussed the negative implications of FOMO in terms of social media use. The public UK survey study targeting young adults aged between 18 to 25 years reported positive associations between FOMO, social fatigue, online social comparison and media, or passive online stalkers. Social media users who demonstrated FOMO behaviors were found to be more likely to spend their time online and thus were more susceptible to feeling overwhelmed by media information, social comparison, and envy. They constantly checked and tracked updates of their social media connections, causing more pressures to keep up with what is new, thus increasing their engagement with social media and causing unhealthy behaviors and

life habits. Individuals who demonstrated FOMO behaviors spent time on social media often excessively, which caused issues such as social anxiety, poor sleep habits, reduced attention span for work and study, and a sedentary lifestyle (Gupta and Sharma (2021). Despite these negative consequences, however, a vicious cycle of anxiety from being socially excluded and continuous social media checking to reduce the said feelings often persisted, which exacerbates FOMO and addiction to social media use. These findings thus warrant a localized study to test the extent of this relationship among university students who often benefit from using the social media on a daily basis. The following hypothesized relationship was thus tested in this study:

H₃: There is a significant relationship between life satisfaction and social media addiction among university students.

2.5. Problem statement and research objective

Given the increasing reliance on Artifical Intelligence (AI) and Information and Technology (IT) for daily tasks, it is critical to regularly raise awareness and implement interventions to reduce the risk of problematic social media use, particularly among university students who are active users of social media applications and who will ultimately go on to become future leaders. Previous research has reported a connection between social media addiction, life satisfaction, self-esteem, and FOMO; however, a localized study exploring this relationship among the young generation group is still scarce. Thus, this study aims to further explore this relationship in the Malaysian context.

The general objective of the study is to determine the relationship between life satisfaction, self-esteem, fear of missing out (FOMO), and social media addiction. The specific objectives of this study are as follows:

1. To identify the relationship between life satisfaction and social media addiction among university students.

2. To identify the relationship between self-esteem and social media addiction among university students.

3. To identify the relationship between fear of missing out (FOMO) and social media addiction among university students.

Hence, the study will solve the following research questions:

1. Is there a relationship between life satisfaction and social media addiction among university students?

2. Is there a relationship between self-esteem and social media addiction among university students?

3. Is there a relationship between fear of missing out (FOMO) and social media addiction among university students?

3. Methodology

3.1. Research framework

Figure 1 shows the research framework linking all the variables in this study. The relationships between the independent variables (life satisfaction and self-esteem) and the dependent variable (social media addiction) were explored using the correlation test to determine whether the relationship was significant as well as the direction of the relationship.
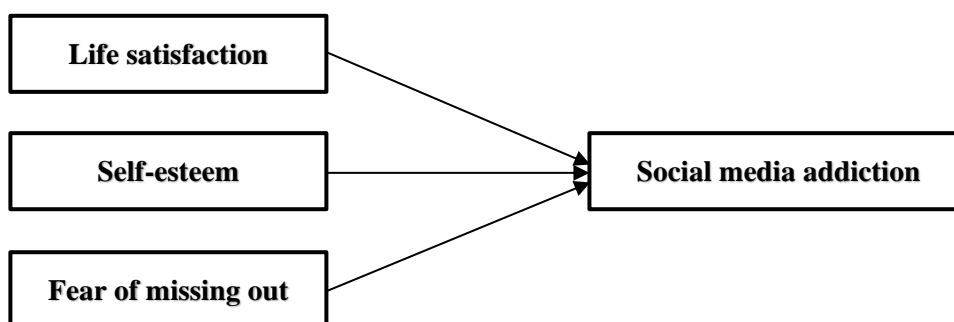
Figure 1: Research framework linking tested variables

3.2. Research Design

The research study employed a quantitative approach using the correlational method. This study was in line with the purpose to test the correlation between four variables, namely life satisfaction, self-esteem, FOMO, and social media addiction among students at selected Malaysian research universities: Universiti Malaya (UM), Universiti Putra Malaysia (UPM), Universiti Kebangsaan Malaysia (UKM), Universiti Sains Malaysia (USM) and University of Technology Malaysia (UTM). Descriptive and inferential analyses were applied to test the data.

3.3. Population and Sampling

The population of this study was 97,733 students at five research universities in Malaysia. These universities were chosen to participate in the sample selection based on the available facilities and resources that they could provide for the convenience of their students' learning and lifestyle. Given the focus of the current study to investigate social media addictions among university students, it is reasonable for the researchers to choose universities that provide adequate tools applicable for the students in obtaining information, participating in virtual classroom activities, and maintaining communication and social network.

The stratified random sampling was used to select the respondents, in which 383 students participated in the study. The Cochran sampling formula (1977) was used to determine the sample size based on the targeted population, while the Yamane's formula (1967) was used to determine the appropriate number of respondents for each university, or stratum. Table 1 presents the sample size required for each strata.

Table 1: Sample size required from each research university (strata)

University (strata)	Total number of students	Sample size required
Universiti Malaya (UM)	18,297	72
Universiti Putra Malaysia (UPM)	17,233	68
Universiti Kebangsaan Malaysian (UKM)	18,661	73
Universiti Sains Malaysia (USM)	22,623	88
Universiti Teknologi Malaysia (UTM)	20,919	82
Total	97,733	383

A simple random sampling technique was carried out to select respondents from each university, allowing each respondent an equal chance to be selected.

3.4. Research Instrument

Questionnaires were distributed to the respondents, which consisted of five parts. Part A of the questionnaire contained the demographic information, inquiring respondents' gender, age, year of study, and university. Part B consisted of items related to the life satisfaction scale, Part C consisted of items related to self-esteem, Part D was on FOMO, and Part E consisted of items related to social media addiction.

3.4.1. The Satisfaction with Life Scale (SwLS)

The Satisfaction with Life Scale (SwLS) was developed by Diener et al. in 1985. The Yap & Amat (2021) study among Malaysian university students reported high Cronbach Alpha value (0.81). This scale was adapted to improve its relevance with the current sample group, thus, it was translated into the Malay language from English. This scale was used to measure the level of satisfaction with an individual's life and contained five (5) items based on a 7-point Likert scale. Respondents needed to rate from a scale of 1 (strongly disagree) to 7 (strongly agree). Life satisfaction was measured through the total score obtained from the 5 items specified. Scoring for the level of life satisfaction was classified into seven categories from "very dissatisfied", "dissatisfied", "a little dissatisfied", "neutral", "a little satisfied", "satisfied", and "very satisfied".

3.4.2. Rosenberg Self-Esteem Scale (RSES)

The RSES instrument was used to measure self-esteem among the respondents. This instrument was introduced by Morris Rosenberg in 1965 and contains 10 items. This scale has been widely used in studies related to self-esteem, and was translated into various languages such as Bengali (Akhter & Ferdous, 2019). The RSES has high validity in examining self-esteem (Hagborg, 1993). In this study, the researcher used the Rosenberg Self-Esteem Scale-Malay Version, which had been previously used for a sample of public university students (Ferlis & Mohd Mizan, 2017). The respondents rated themselves from a scale of 1 (strongly disagree) to 5 (strongly agree). The scale included six positive items and four negative items with a higher score indicating a higher level of self-esteem. The score was classified into three categories: low, moderate and high.

3.4.3. Fear of Missing Out Scale (FoMOS)

The Fear of Missing Out Scale (FoMOS) was used in this study from Rafiza et al. (2019), with the purpose of identifying the fear and anxiety experienced by respondents as a result of their involvement with the use of social media. This instrument was previously used within the Malaysian sample group of private university students by Rafiza et al., thus making it appropriate for use in this study. It contained 10 items and was measured using a 5-point Likert scale ranging from 1 (not at all true of me) to 5 (very true of me). The combined score of all items were categorized into two levels: low and high. A higher score indicated a high level of FOMO.

3.4.4. Social Media Addiction Scale – Student Form (SMAS-SF)

The level of social media addiction among students was measured using the Social Media Addiction Scale (SMAS) by Sahin (2018). It was developed specifically to identify social media addiction among university students. The scale was translated from English to Malay language using the back-to-back translation procedure and validation by two counseling experts. This was to ensure that the scale could be used and allowed students to answer more accurately. The SMAS-SF consisted of 29 items and used a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). All items in the scale were positive items and were evaluated using a scale of "1=strongly disagree", "2=disagree", "3=neither agree nor agree", "4=agree" and "5=strongly agree". The highest score was 145 and the lowest score was 29, with higher scores indicating higher levels of addiction to social media.

3.4.5. Reliability of the instruments

Reliability was used to show internal stability and consistency by measuring the Cronbach's alpha value. Values that exceed .60 are often used to measure and confirm the reliability of an instrument, while an instrument that has a value of less than .60 is considered low in its reliability to measure the tested constructs. The reliability of the SwLS instrument was .87 after 2 months of retesting (test-retest) (Diener et al., 1985). Similarly, the reliability of RSES showed a high value (Ferlis & Mohd Mizan, 2017). As for the SMAS-SF instrument, it showed high reliability through Peer Correlation, Sperman-Brown Formula, Guttmann Split-Half reliability coefficient, and Cronbach's alpha reliability formula (Sahin, 2018). Lastly, FoMOS reported a Cronbach's alpha value of .90. Additionally, Yap Jing and Muhammad Asyraf's (2021) study conducted for three months among 30 respondents showed Cronbach's alpha values of .78, .811, and 0.96 for SwLS, RSES, and SMAS-SF respectively. All four instruments thus showed high reliability.

3.5. Data Collection Procedure and Analysis

Questionnaires were used to obtain information and research data from the respondents. They were distributed via Google Form to respondents who were undergraduate students at the five selected Malaysian research universities. Prior to data collection, an application for permission to conduct research in each university was made. The contact information of the undergraduate students in each university were obtained. The researchers distributed the Google Form link to all students who fit the study's criterion through phone applications such as WhatsApp and Telegram and via students' emails. The data obtained from the distribution of the questionnaire was transferred for the data analysis process using the Statistical Package for the Social Science (SPSS) version 25.0 software. Descriptive and inferential analysis were carried out respectively to find out the frequency, mean, standard deviation and percentage and identify the relationship between the study variables using the Pearson correlation test.

4. Findings

4.1. Demographic of respondents and descriptive findings

The descriptive analysis revealed the distribution of the respondents based on gender, age, years of study, and university (Table 2). A total of 383 respondents successfully participated in the study, in which the majority were females (62.1%) and 145 respondents who were male (37.9%). They involved mostly those aged between 22 and 24 years (52.5%), followed by 35.7% aged between 19 until 21 years, and 45 (11.6%) aged between 25 and 28 years old. In terms of year of study, most were third-

year students (26.4%), followed by second-year students (24.5%), fourth-year students (22.5%), first-year students (20.1%) and fifth-year students (6.5%). Finally, with respect to the university, the respondents were distributed almost evenly between their universities of origin, with 23% of respondents from Universiti Sains Malaysia (USM), followed by 21.4% from Universiti Teknologi Malaysia (UTM), 19.1% from Universiti Kebangsaan Malaysia (UKM), 18.8% from Universiti Malaya (UM), and 17.8% Universiti Putra Malaysia (UPM).

Table 2: Distribution of Respondents Based on Gender, Age, Years of Study and University

Category	Frequency	Percentage (%)
Gender		
Male	145	37.9
Female	238	62.1
Age		
19 – 21 years old	137	35.7
22 – 24 years old	201	52.5
25 – 28 years old	45	11.8
Year of Study		
Year 1	77	20.1
Year 2	94	24.5
Year 3	101	26.4
Year 4	86	22.5
Year 5	25	6.5
University		
Universiti Kebangsaan Malaysia (UKM)	73	19.1
Universiti Malaya (UM)	72	18.8
Universiti Putra Malaysia (UPM)	68	17.8
Universiti Sains Malaysia (USM)	88	23.0
Universiti Teknologi Malaysia (UTM)	82	21.4

Table 3 shows the results of the study using descriptive analysis that reported the levels of social media addiction, life satisfaction, self-esteem and FOMO among the students at research universities in Malaysia. Most respondents reported high social media addiction, satisfied life, moderate self-esteem level, and high anxiety or FOMO. These findings indicated that the majority of the respondents were addicted to the use of social media. They reported that they felt satisfied with their lives, but their self-esteem level was at most moderate with more than one third having low self-esteem. They also had high fears or concern and anxiety about missing out on trends and what their peers perceived as trendy.

Table 3: Level of social media addiction, life satisfaction, self-esteem and fear of missing out (FOMO)

Variable	Level	Frequency	Percentage (%)
Social Media Addiction			
	Low	8	2.1
	Moderate	67	17.5
	High	184	48.0
	Very high	124	32.4
Life Satisfaction			
	Very dissatisfied	4	1.0
	Dissatisfied	8	2.1
	A little dissatisfied	12	3.1
	Neutral	6	1.6
	A little satisfied	55	14.4
	Satisfied	217	56.7
	Very satisfied	81	21.1
Self-Esteem			
	Low	149	38.9
	Moderate	209	53.6
	High	23	6.0
Fear of Missing Out			
	Low	75	19.6
	High	308	80.4

4.2. Relationship between life satisfaction, self-esteem, fear of missing out (FOMO) and social media addiction

The Pearson correlation analysis showed that all variables showed a significant relationship with social media addiction among university students in Malaysia (Table 4), indicating that hypotheses 1 through 3 were accepted. There was a positive relationship between life satisfaction and social media addiction (r = 0.539, $p < 0.05$), indicating that students who had high life satisfaction tended to demonstrate higher levels of social media addiction and vice versa. Self-esteem reported a significant negative relationship with social media addiction (r = -0.515, $p < 0.05$), showing that high self-esteem among students was associated with low social media addiction and vice versa. Finally, FOMO reported a significant and positive relationship with social media addiction (r = 0.633, $p < 0.05$), which implied that students who had FOMO tended to have higher levels of social media addiction and vice versa.

Table 4: Correlation coefficient between life satisfaction, self-esteem, fear of missing out (FOMO) and social media addiction

Independent variables	Social media addiction		
	r	**Sig**	**Correlation interpretation**
Life satisfaction	.539**	.000	Significant and positive relationship that is moderate
Self-esteem	-.515**	.000	Significant and negative relationship that is moderate
Fear of Missing Out (FOMO)	.633**	.000	Significant and positive relationship that is moderate

Note: r = correlation coefficient

5. Discussion

This study showed that life satisfaction, self-esteem and FOMO correlated significantly with social media addiction among the university students in Malaysia. The majority of the students also indicated that they were satisfied with their lives, but reported high levels of social media addiction, moderate self-esteem level, and a significant fear or concern of missing out. Based on the demographic distribution, the students were at most 28 years old, with most aged between 22 and 24 years old, demonstrating that the internet and social media use are prevalent among the younger generation and that social media habits have a substantial link with their self-esteem, life satisfaction, and psychological state. The high levels of social media addiction reported indicated longer than average time spent on social media among university students, which was possible due to the growing reliance toward social media that may have inadvertently increased the likelihood for frequent and problematic use.

5.1. Relationship between Life Satisfaction and Social Media Addiction

The positive and significant relationship between life satisfaction and social media addiction reported indicated that higher life satisfaction among the students in the participated research universities was linked to higher levels of social media addiction. Although this contradicts Sahin's (2017) and Adel and Ali's (2021) study that reported negative associations between these variables, it supports Yap & Amat (2021) post COVID-19 study, suggesting that social media use increases with more time spent indoors and the satisfaction felt from being able to socialize. When reflecting on Marziah et al.'s (2018) description of life satisfaction, it involves one's evaluation of life, which includes appreciation, confidence, gratitude and recognition;

if these are fulfilled, one will continue to be in a positive state. Essentially, when students' basic needs, health, and social relationships are met, they achieve self-satisfaction (Rogowska et al., 2021). The positive use of social media to facilitate maintaining interpersonal relationships, meet new friends, and expand students' social environment suggest that students' needs are met, which further improved their satisfaction towards life. It seemed that among the youth, satisfaction towards life was associated with increased use of social media as its use had become necessary as a medium to build relationships, find social support, enjoy entertainment, and find information in a manner that is more effective and convenient (Ali Raza et al., 2020; Filyntiana et al., 2020).

This finding, however, raises questionable issues, as despite using social media above than the average time spent, students found that they were highly satisfied with their lives and on the contrary, decreased use led them to feel unsatisfied. Hence, it is a valid argument as to whether the students felt truly happy and satisfied with their life overall with the higher social media use or whether it involved only a part of their life. If one puts high values in social life and entertainment, it is not surprising that frequent use of social media fulfilled their social needs. Being away from the social media, however, would invite negative feelings and discomfort; they may feel dissatisfied with life because their social needs are not met, which can cause emotional issues such as depression and anxiety.

5.2. Relationship between Self-Esteem and Social Media Addiction

The significant relationship between self-esteem and social media addiction shows that students with high self-esteem have low social media addiction and vice versa. Often, via social media, individuals flaunt their wealth or seemingly perfect lifestyle for others to see. Individuals who access social media may witness social comparisons and disparity, making them feel inferior and resort to comparing themselves to privilege that they observed others as having (Muqaddas et al., 2017). This continues if one spends more time online or on social media, which will be detrimental to the development of their self-esteem. The use of social media as a hiding place from direct social interaction is also a result of low self-esteem, which affects the behavior of an individual (Helen et al., 2021).

This finding supports Helen et al. (2021) through the RSES scale, who noted a negative relationship between self-esteem and social media addiction among university students pursuing the medical profession. The anonymity element of the social media setting may encourage higher use and reliance toward social media among lower self-esteem individuals. Nonetheless, Marengo et al. (2021) contradicted this finding and suggested that active Facebook use and more likes received from Facebook improved self-esteem, further suggesting that the social media features provided some benefits for individuals looking to form a social

identity and relationships.

5.3. Relationship between Fear of Missing Out and Social Media Addiction

The reported positive relationship between FOMO and addiction to social media became evident as social media use is prevalent and contributes significantly to the lifestyle of the young generation. Individuals who suffer from FOMO constantly monitored what others are doing and in turn, this caused them to use social media regularly. This was evident as the use of social media was convenient to get the latest information and meet ones' social needs. One can easily feel inferior if they feel left out of something, which can be particularly true for the youth who are still seeking to identify their place in the society. This finding supports Li et al.'s (2022) study which found a positive association between FOMO and social media addiction, inferring that social media has become a crucial part of the university students' life for social, entertainment, work and academic purposes.

While social media is beneficial for individuals to acquire knowledge, excessive and unnecessary social media use can cause students to easily feel overwhelmed with the information provided to them, which may lead to adverse effect such as anxiety. These findings raise questions on whether constant social media use causes negative consequences, thus permitting future studies to further investigate the influence of social media use on the general well-being and life satisfaction of the young generation. Nonetheless, it should be highlighted that the current study utilized sample among only selected research university students in Malaysia and sub-groups such as the students' study specializations and social backgrounds were not included in the study's analysis. This permits replication of future studies using more group-specific samples, which is discussed further in the limitation section.

6. Implications of the Study

Despite the rising discussion on how social media can be problematic, it is a fair argument that the use of technology is convenient and has grown more significant in our daily lives. However, it is important to know what threats the internet and social media can bring by understanding the variables linked to problematic social media use. In an effort to adjust to the advancement of technology applications in aspects of the human's life and improve the general lifestyle, it is suggested that the physical and online setting must be in balance. For example, the hybrid mode of classroom activities is a good strategy to respond to the growth and increased dependence toward technology use in academic and work-related matters. This calls for the attention of lecturers, instructors and university program providers to continue improving the design of classroom activities so that they fully utilize the benefits of digital applications without sacrificing the crucial role of physical classroom

activities and meetings in building social togetherness and interdependencies.

The findings of this study implicate the need for the university management and counselling unit to acknowledge the importance of social involvement and life happiness among university students. Improved and continued intervention strategies are necessary for university students, with the target to control and manage screen time, increase awareness about consequences of excessive social media use, and encourage better lifestyle. Interventions must be designed to provide an alternative method of using social media to socialize and for university students to achieve life satisfaction while managing reasonable social media use.

Gupta and Sharma (2021) suggested that individuals with certain personality traits, for instance, individuals with social anxiety and low self-confidence, are more susceptible to FOMO and social media addiction. The satisfaction that these individuals feel from their time spent online often encourages them to use social media even more, as current findings reported. The vicious cycle from feeling satisfied and increased social media use may lead to problematic behaviors, addiction, and an impaired lifestyle. Hence, proactive actions from authoritative parties at students' respective faculty or university residential colleagues are necessary when implementing intervention plans for students' psychological wellness. Awareness programs should be organized consistently with the goal to educate and provide exposure to students on healthy social media use, better time management, and positive self-esteem. Psychological screening is also suggested to detect students who struggle with self-esteem that is related to various life aspects such as social, family, financial and physical. Maintaining a good psychological health is vital so that students can focus on striving in their academics and adjust well in the workforce.

Additionally, through all courses taken by university students, it is important that positive social, emotional, and physical values are addressed. It is suggested that the university provides an education program specially designed to mitigate problematic social media use and make it mandatory for university students at the beginning of the semester. By designing an interactive course or workshop, focus may be directed to increasing awareness of social media issues and introducing students to the community and university resources available for them to seek professional help and support. This could be an effective strategy to curb and screen for psychological and social media addiction issues early during the students' academic years. The counseling and guidance division can also play a crucial role in leading this program.

Overall, a change in the society as a whole is possible if these strategies are standardized among the universities in Malaysia. The role of the Ministry of

Education Malaysian is also crucial for this matter. The young generation are gems that need to be carefully polished and guided with opportunities and space for them to grow as competent, resourceful, and healthy adults. A gap in the strategies and efforts spent to curb social media addiction issues may hamper the goal of developing an advanced future generation that values traditional values while also responding proactively to advancement.

7. Conclusion

As is known, social media is a convenient tool to seek information quickly. Consequently, this causes university students, which makes up the young generation today, to show a high dependence on social media. This quantitative study found that life satisfaction, self-esteem, and FOMO are significantly linked to social media addiction among university students at five selected research universities in Malaysia. Pearson's correlation analysis reported positive correlations between the independence variables—life satisfaction and FOMO—and social media addiction. Self-esteem correlated negatively with social media addiction. Improper control or excessive use of social media may cause university students to exhibit addictive behaviors. The inability to limit the use of social media will further cause them to use social media excessively; thus, there is a possibility that they will experience life dissatisfaction, making them feel socially excluded and affecting their self-esteem. This study discussed the implication of these findings toward various parties and stakeholders, including the university counselling unit and university course and training providers. The limitations of this study were discussed, which include suggesting more group-specific sample studies and utilizing the regression analysis.

8. Limitations of Study and Recommendations for Future Study

While this study identified the demography of the students, the data was not tested to identify how social backgrounds such as gender, age, and ethnicity differed in their life satisfaction, self-esteem, FOMO, and social media addiction levels. Future studies should explore whether students' social media addiction and the associating variables differ significantly according to these demographic backgrounds. Such findings will facilitate in designing more gender-, age- or ethnic-specific interventions for the culturally diverse university students. It is also suggested that the replication of the study consider how university students' social background and the amount of time they spend on social media could potentially moderate the relationships between the variables. Although the current study has provided ample evidence to support the relationship between the variables, the extent to which the independent variables—life satisfaction, self-esteem, and FOMO—contribute to social media addiction among the university students warrants future investigations. This will be beneficial to improve understanding of the relationship linking these

variables.

Additionally, despite providing significant and reliable findings, the sampling frame of the current study includes randomly selected university students from five Malaysian research universities, regardless of their academic levels and specializations. Hence, suggestions are provided for future researchers to narrow the scope of the sample study to the respective sub-groups, encouraging more group-specific sample studies to minimize bias and improve the generalizability of the research findings. This will be vital in facilitating the development of intervention strategies that are more group-specific. A qualitative approach using focus-group interviews will also be useful for a more in-depth investigation on the link between the variables and to identify additional factors that may contribute to social media addiction among the university students.

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GRIT RELATES TO ACADEMIC PERFORMANCE AMONG COLLEGE STUDENTS: A FIVE-YEAR SYSTEMATIC LITERATURE REVIEW

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ABSTRACT

In recent years, many scholars have studied the influence of non-cognitive factors on academic success, including grit. However, few studies comprehensively analyze the connection between grit and academic outcomes with university learners. Therefore, the research aims to explore how grit affects their academic performance in the context of higher education. This paper presents a comprehensive, systematic review of 13 studies between 2018 and 2023 from two databases: Scopus and Web of Science. The selection criteria focus on empirical research, including the impact of grit on academic achievement. This review finds that grit has a great influence on academic success. It is worth mentioning that perseverance of effort (POE) and consistency of interest (COI), which are two aspects of grit, seem to have different effects on academic performance. In addition, further study on the correlation of grit and other factors with college learners' academic performance can be considered to provide alternative and new ideas for improving students' academic performance.

Keywords: academic success, consistency of interests, higher education, perseverance of efforts

1. Introduction

1.1. Background and Rationale

The importance of intelligence and cognitive ability for academic outcomes has been demonstrated across many different examinations. However, Bazelais et al. (2016) pointed out that intellectual skills are considered to be an inadequate and tentative predictor of completing college entrance courses. In fact, when considering higher education students, many cognitive and non-cognitive elements come into play and have been found to have a significant influence on academic outcomes (Al-Sheeb et al., 2019). In recent years, the role of grit, which is attributed to the non-cognitive factor, in academic performance has attracted the attention of researchers, while different studies have given different results on the influence of grit on academic outcomes.

Academic success is one of the main objectives of education. There is no denying the connection between a person's quality of life, future career, and academic achievement (Moyano et al., 2020). It is more than just a measure of a person's success or failure (Chen et al., 2013). Besides, it can also evaluate the whole education system (including projects and teachers) (Sukhsarwala et al., 2015). In other words, academic performance is a crucial source for evaluating the education system, teaching quality, and students' academic changes (Lei et al., 2015). In the academic environment, academic performance (AP) has attracted the attention of many researchers and educators, and many studies have been carried out on it. It refers to the performance of learners in learning (academic and educational), and the results of exams or tests are used as evaluation means. Many factors may affect learners' academic performance, such as cognitive factors, learners' motivation, or personal characteristics (Sánchez-Álvarez et al., 2020; Howard et al., 2021). Kim and Seo (2015) emphasized that the main academic performance indicators in the world are test scores, course scores, and average grades (e.g., GPA, Richardson et al., 2012; CGPA, Hasan et al., 2017). Although some studies have investigated specific academic fields, such as mathematics or language literacy (e.g., Zhou & Ee, 2012; Bierman et al., 2008), there are other studies that study academic performance as a universal academic performance (Trentacosta & Izard, 2007; Denham et al., 2014). For undergraduates, academic scores are very important. This is because they are not only objective indicators of learning outcomes (Stockinger et al., 2021), but can also predict academic and future career development, as well as play a key role in cultivating high-quality graduates (Respondek et al., 2017). Therefore, when it comes to education or learners' pursuit of studies, performance is an important and inevitable topic (Boylan et al., 2023).

Many studies have proved that grit is an important trait (Gonzalez et al., 2019). Grit refers to the ability to make persistent efforts to complete challenging tasks (Lufi,

1987). It consists of two aspects: on the one hand, perseverance of effort (POE) towards long-term goals, and on the other hand, consistency of interest (COI, Duckworth et al. 2007). Generally speaking, it is closely related to positive academic behavior and achievements. No matter how big the challenge is, people with high grit will continue to work hard and keep the desire to achieve their goals (Duckworth & Quinn, 2009). In other words, when there are unsatisfactory situations (such as disappointment or boredom) in the learning process, persistent students usually regard their studies as a long marathon, so they are more likely to choose to persist and make more efforts to achieve their goals, so as to realize their ideals. Relatively speaking, individuals with a low level of grit may choose to avoid difficulties and ultimately find it difficult to complete tasks (Duckworth et al., 2007; Duckworth & Quinn, 2009). This topic has attracted the attention of personality psychologists because research shows that grit can positively predict achievements in education and other fields besides talent or opportunity (Duckworth et al., 2007). Although grit is relatively stable and needs years of development, it may be more plastic than intelligence or other cognitive abilities (Duckworth & Gross, 2014; Eskreis-Winkler et al., 2014) and interact with other personal characteristics. Psychological factors, such as resilience, responsibility, self-control, and perseverance, are necessary for academic success (Bashant, 2014).

However, the evidence on the impact of grit on learners' educational success is mixed so far (Strayhorn, 2014). Especially in higher education, the relationship between grit and academic performance seems to be full of contradictions, and there is no definite conclusion (Sunbul, 2019). On the one hand, there have been many studies that have attempted to prove the unique role of grit in achieving positive academic success. In a college setting, more successful students may have long-term effort or perseverance that sustains their motivation (Bronk et al., 2010). Grit with the pursuit of long-range achievement will manifest itself in excellent academic performance in universities, thus causing them to seek higher education for a better life (Wei et al., 2012). On the other hand, some studies cannot fully determine the influence of grit on college learners' academic performance. Steinmayr et al. (2018) mentioned that grit is not suitable for short-term goals, while it may be beneficial to achieve long-term targets beyond school performance, such as winning the national spelling competition or maintaining a stable marriage. On the contrary, school performance is a relatively short-term target, so it is more useful to maintain rationality, have confidence in one's ability, and actively participate in learning activities to promote academic success. Sheridan et al. (2018) found that, unlike American college students, the grit index of some excellent Irish students has little effect on their academic performance. This is probably related to the fact that they already have grit. In addition, the validity of the grit structure has also been questioned because some research results show that there are differences in the

ability of POE and COI to predict academic performance in two aspects of grit (Credé et al., 2017; Mason, 2018; Tyumeneva et al., 2021). Therefore, the relationship between grit and college students' academic performance and how grit affects academic performance need to be further explored.

1.2. Purpose of Study

According to the previous introduction, students at college are a unique group, and they are faced with the need to overcome the inadaptability following the transfer from high school to university. In addition, college academic performance is of great significance to future work and personal development. In the process of university growth, as "perseverance and enthusiasm for long-range objectives" (Duckworth et al., 2007), grit is one of the necessary qualities to overcome difficulties and persist for a long time. However, at present, there is almost no systematic review of how grit affects academic performance in the context of higher education. Therefore, this study aims to explore the connection between academic achievement and grit in higher education (undergraduate courses) in the past five years (2018-2023). In other words, this study explores how grit affects college students' academic performance using these research questions:

(1) Do grit and two dimensions of grit (perseverance of efforts (POE) and consistency of interest (COI)) affect academic performance to the same extent?

(2) Does grit directly affect academic performance?

The research results will further help us to understand the connection between grit and academic performance in higher education, so as to provide an effective way to encourage college students to improve their academic performance.

Additionally, in recent years, although many scholars have systematically studied the relationship between grit and educational success (such as Direito & Mitchell, 2018; Chisholm-Burns et al., 2021), only Lam et al. (2019) have systematically studied the relationship between students' grit and academic performance in the context of K-12 and higher education. The differences between this study and Lam et al. (2019) are as follows: (1) Time; and (2) Review target. The purpose of this systematic literature review is to investigate the connection between academic success and grit in the recent five years (2018-2023), while Lam et al. (2019) focused on 2007-2018. This study also only focuses on examining learners in the context of higher education, specifically undergraduates, while Lam et al. (2019) covered K-12 and higher education. Thus, in this study, we also consider whether other variables will work together with grit on academic performance.

2. Method

This study was conducted according to the method of systematic literature review (SLR) in order to ensure that researchers can reproduce the findings of SLR in the future. The purpose of our literature review is to solve the research problem. The qualified documents were collected from databases and subsequently sorted and analyzed. Paul et al. (2021) pointed out that Web of Science (WOS) and Scopus are the most well-known quality rankings of publications because they go beyond the subject field. On the one hand, WOS has high-standard indexing conditions. In other words, WOS can guarantee the standards of selected journals because of its strict screening standards. Scopus, on the other hand, has a wide range of subject areas and categories. This allows scholars to better find the journal domain based on the most relevant fields. These two databases (WOS and Scopus) were chosen for the search process of journal articles. A systematic literature review study was conducted in accordance with the Preferred Reporting Project for Systematic Reviews and Meta-Analyses (PRISMA) statement. PRISMA is an efficient way to provide a systematic review of previous research and follows the standardized inclusion and exclusion procedures (Kadam et al., 2020). The publications eligible for research are obtained through four strict steps: identification, screening, eligibility, and inclusion, as shown in Figure 1.

Identification of studies via databases and registers

Identification	
Records identified from: Scopus, Web of science Databases (n =373)	Records removed *before screening*: Duplicate records removed (n =65)

Screening	
Records screened (n = 308)	Records excluded 1.Published not from 1 January 2018 to 31 December 2023 2.Non-English (n =105)
Reports sought for retrieval (n =203)	Reports not retrieved based on abstract,tittle,key words (n =112)
Reports assessed for eligibility (n =91)	Reports excluded: ReasonReason:no empirical studies (n =40) Reason: not in higher education context (n =15) Reason:non peer-reviewed (n =23)

Included	
Reports of included studies (n =13)	

Figure 1: PRISMA flowchart

2.1. Identification

This literature search was conducted in October 2023. Scopus and Web of Science (WOS) were the two databases used, in which peer-reviewed articles were collected from January 1, 2018 to 2023. This research was conducted to discuss the impact of university learners' grit on academic outcomes. Different keywords were used: (1) "grit," substitution terms ("perseverance of effort" and "consistency of interest"); (2) "academic performance," substitution terms ("academic achievement," "academic success," "academic outcome," "school success," and "educational success"); and (3) "higher education," substitution terms ("post-secondary education," "university," and "college"). The keywords were matched by Boolean operators AND/OR. The two databases use strings, as in Table 1, where 373 articles were identified.

Table 1: Search strings

Search Builder	Search String
Grit	"grit" OR "perseverance of effort" OR "consistency of interest"
Academic performance	"academic performance" OR "academic achievement" OR "academic success" OR "academic outcome" OR "school success" OR "educational success"
Context	"higher education" OR "post-secondary education" OR "university" OR "college"

2.2. Screening

In order to find answers to the research questions, relevant inclusion and exclusion criteria were established. In this way, the research could find comprehensive knowledge of the grit and academic outcomes of students. For a paper to be reviewed, it must first match the relevant criteria in Table 2.

1) Only the samples of college students in higher education are included (the demographic characteristics of participants, such as gender and grade, are not limited), and learners at other levels are excluded.

2) This collection is limited to empirical research and does not include other forms of research.

3) In order to popularize the research and facilitate reading, this study only contains articles written in English.

4) In order to ensure the reliability of the sources of articles, only articles that have been peer-reviewed are included in this study.

At this stage, all the titles and key parts of journals should have been thoroughly reviewed to meet the inclusion requirements of this study. If the purpose is to examine how college students' grit affects their academic transcripts, then these articles are eligible for examination. Firstly, a total of 373 articles were obtained from the two e-databases. Secondly, 308 articles were listed in endnote 21, and 65

duplicate articles were deleted. Thirdly, according to the time (2018-2023) and the conditions of English writing, 105 articles were deleted and 203 articles remained. Fourthly, the researchers screened the articles by meeting the qualification criteria based on title, abstract, and keywords, deleting 112 articles. Fifthly, after a full evaluation by several authors, combined with the inclusion and exclusion criteria, the controversial pieces were discussed.

Table 2: Inclusion and exclusion criteria

Inclusion Criteria	Exclusion Criteria
College students sample group	Preschool children, primary, secondary, or high school students, special education, teachers, and other adult learners sample group
Empirical studies	Literature review, commentaries, meta-analysis, essays, letters, or anecdotal articles
Written in English	Written in other languages
Peer-reviewed	Non peer-reviewed

2.3. Article Extraction

After a rigorous screening procedure, 13 articles published in the past five years were selected and met the inclusion criteria. These articles provided effective empirical research data, so they qualified for this systematic evaluation.

3. Result

In all 13 journals, perseverance is related to academic achievements. Next, the research results are analyzed from several aspects.

3.1. Information of research results

All 13 selected articles are quantitative studies. To help readers understand, the authors reviewed selected publications based on year, location, journal, research objectives, and key findings. The outcomes of higher education students' grit and academic performance are shown in Table 3.

Table 3: Reported relationships between grit and academic performance

Nu.	Authors (Year)	Country	Title	Aim(s)	Participant	Variables and Instrument Used	Main Findings
1	Abubakar et al. (2021)	Malaysia	Association between grit and academic achievement among undergraduate pharmacy students in Malaysia	To explore the effect of grit on college learners' educational success as Malaysian medical undergraduates.	247 college students	Grit (IV): Adopted from the Short Grit (Grit-S) scale (Duckworth in 2009) with 7 items. Academic achievement (DV): GPA in the last semester and CGPA	Academic achievement is predicted by consistency of interest (CGPA ≥ 3.50), while CGPA has no association with perseverance of effort scores.
2	Whipple & Dimitrova-Grajzl (2021)	America	Grit, fit, gender, and academic achievement among first-year college students	To investigate whether grit affects academic success and whether there are gender differences.	186 first-year students	Grit (IV): Short Grit Scale (Duckworth & Quinn, 2009) with 8 items. Gender (MOD). Academic achievement (DV): GPA of first-year college	Grit positively affects the academic performance of male students but not female students. Gender plays a moderating role between grit and GPA.
3	Pleace & Nicholls (2022)	South Africa	Grit, motivation, and university grades	To explore how grit and intrinsic motivation affect academic achievement.	432 college students	Grit(IV): Grit-S survey (Duckworth & Quinn, 2009). Motivation (IV): open-ended questions. Academic achievement (DV): Grades	It is grit, not intrinsic motivation, that can significantly predict academic success. Grit is positively produced by intrinsic motivation.
4	Sunbul (2019)	Turkey	How grit mediates the relations between personality and GPA in university students?	To study the connection between character, grit, and academic success of higher education learners.	406 undergraduates	Personality (IV): Turkish adaptation of The Big Five inventory (Sumer and Sumer, 2005) with 44 items. Grit(MED): Turkish adaptation of Grit-S (Saricam, Celik and Oguz, 2016) with 8 items. Academic performance (DV): GPA	There is only an indirect relationship between grit and academic performance; that is, grit needs to affect academic performance through the intermediary role of consciousness.
5	Alqarni (2022)	Saudi Arabia	Investigating the Relationship between Emotional Well-being and Grit as Predictors of Saudi EFL Female Students' Foreign Language Achievement	To explore what role happiness and courage play in Saudi Arabian women's academic success in foreign language learning.	84 female college students	Emotional well-being (IV): PERMA-Profiler scale includes 23 items(Butler and Kern, 2016). Grit (IV): Grit scale with 12 items from Duckworth et al. (2007). Academic success (DV): English scores	Grit and happiness are both significant predictors of academic success.
6	Hernández et al. (2020)	Portugal	Passion or Perseverance? The Effect of Perceived Autonomy Support and Grit on Academic Performance in College Students	To explore the correlation with the satisfaction of basic psychological needs, motivation, grit, and independent support from teachers and academic success.	474 college students	Autonomy support (IV): Autonomy support scale with 12 items (Moreno-Murcia et al.,2019). Basic psychological needs satisfaction (IV): Portuguese version of Exercise Scale (Cid et al.,2016) with 15 items. Intrinsic motivation (IV): Academic Motivation Scale with 4 items (Vallerand et al.,1989). Grit (MED): Grit Scale short version with 8 items (Raykov,1997). Academic grades(DV):GPA	Perseverance not only significantly affects college grades but also mediates between other variables (perceived autonomous support) and academic success.
7	Akos et al. (2022)	America	The Promise of Noncognitive Factors for Underrepresented College Students	For underrepresented college students, testing non-cognitive variables (including grit) can predict the possibility of academic success.	1436 college students	Resilience (IV): Connor-Davidson Resilience Scale (Conner & Davidson, 2003) with 10 items. Grit (IV): short grit scale (Duckworth & Quinn, 2009) with 8 items. Growth mindset (IV): Growth mindset assessment (Dweck, 2009) includes 3 items. Academic performance (DV): GPA and credit hours completed	Original growth mindset and grit can predict academic success, while the change of resilience in a year can positively predict the total number of total credit hours.
8	Guo et al. (2023)	China	Purpose in life and academic performance: Grit mediation among Chinese college students	To explore whether life goals affect academic performance through grit.	439 undergraduates	Purpose in life (IV): Claremont Purpose Scale (Bronk et al ., 2018) including 12-items. Grit (MED): Short Grit Scale (Duckworth & Quinn, 2009) consisting of 8 items. Academic performance (DV): A single-item scale adapted from Leung and Xu (2013)	Grit and its two dimensions positively affect academic performance. Grit (especially perseverance of effort) acts as a mediator between life purpose (especially target orientation and beyond-the-self) and academic achievement, promoting academic success.

9	Luthans et al. (2019)	America	Refining Grit in Academic Performance: The Mediational Role of Psychological Capital	To explore whether grit mediates the correlation of educational success through psychological capital.	176 business students	Grit (IV):8-item Short Grit Scale (Duckworth & Quinn, 2009) Psychological capital (MED): 24-item PsyCap Questionnaire adapted by Luthans et al., (2016) Academic performance (DV): GPA	Grit is positively correlated with GPA. To a great extent, the relationship between them is mediated by psychological capital.
10	Hu et al. (2022)	China	Relationship Between Growth Mindset and English Language Performance Among Chinese EFL University Students: The Mediating Roles of Grit and Foreign Language Enjoyment	To explore the relationship between grit and foreign language performance and the mediating role of grit between English performance and other variables.	383 university students	Growth mindset (IV): Language Mindsets Inventory (Lou and Noels, 2017) with 18 items Grit (MED) :L2 Grit Scale (Teimouri et al., 2020) with 8 items Foreign language Enjoyment (MED): English Classroom Enjoyment Scale adopted by (Jin and Zhang, 2019) with 15 items English language performance (DV): College English Test-Band 4 scores	Grit is positively correlated with learners' English performance. Both grit and foreign language enjoyment are partly mediating growth mindsets and English scores.
11	Hodge et al. (2018)	Australia	The Role of Grit in Determining Engagement and Academic Outcomes for University Students	To explore the mediating role of engagement between grit and educational success.	395 college students	Grit (IV): 8 items grit scale (Duckworth 2009) Engagement (MED): Utrecht work engagement scale for schools (UWES-9 (S); Schaufeli 2003) with 9 items Academic outcomes (DV): job demands-resources scale (Bakker 2014a) with 3 items to assess the students' beliefs about their academic performance	There was no gender difference in grit, and engagement mediates between grit and academic achievement.
12	Casali & Meneghetti (2023)	Italy	Soft Skills and Study-Related Factors: Direct and Indirect Associations with Academic Achievement and General Distress in University Students	To explore how five soft skills (including grit) influence academic success and general distress through the mediating role of learn-related factors.	606 students	Soft skills (IV): Questionnaires measuring 5 soft skills (epistemic curiosity, creativity, critical thinking, perseverance, and social awareness) Study-related factors (MED): Questionnaires measuring 4 study-related elements (achievement emotions, self-regulated learning strategies, motivational beliefs, and study resilience) Academic achievement (DV): Grades General distress (DV): 21 items Depression, Anxiety, and Stress Scales-21 (Bottesi,2015)	Soft skills (including persistence) indirectly affect the performance of higher education through the intermediary of other learning-related factors.
13	Sulla et al. (2022)	Italy	University Students' Online Learning During COVID-19: The Role of Grit in Academic Performance	To investigate whether the psychological distress caused by the virus lockdown would moderate the mediation of self-efficacy between grit and academic performance.	176 college students	Girt (IV): Grit-s scale (Italian version by Sulla et al., 2018) with 8 items Self-efficacy (MED): Perceived self-efficacy in the management of complex problems scale (Farnese et al., 2007) with 24 items Psychological distress (MOD): Symptom Checklist 6 (Rosen et al., 2000) with 6 items Academic performance(DV):Scores	Grit affects students' final exam results. Self-efficacy in the management of complex problems had a mediation effect on grades, while psychological distress moderated the first part of the mediation process.

Note: IV = Independent Variable; MED = Mediator Variable; MOD = Moderator Variable; DV = Dependent Variable

3.2. Research Status of Grit and Academic Achievement

Some features were identified from the collected 13 documents. On the one hand, by observing the number of articles published in different years, we discovered the changes in people's attention to grit and academic performance. On the other hand, from the geographical distribution of the articles, we found which regional researchers pay attention to grit and academic success.

3.2.1. Number of Publications by Year

As shown in Figure 2, the publication years of 13 documents are as follows: one in 2018, 2020, and 2022, and two in 2019, 2021, and 2023. Most journal articles mainly focus on the last three years, and this shows that researchers are paying increasing attention to the effect of grit on college learners' educational success.
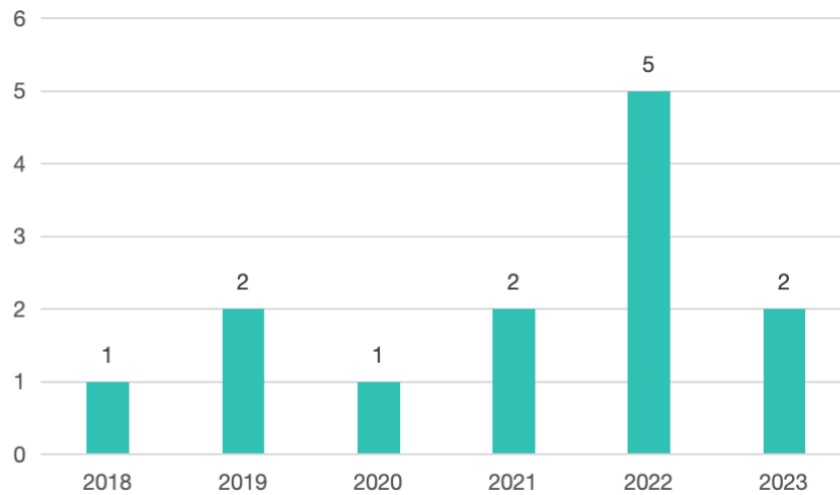
Figure 2: Number of publications by year

3.2.2. Geographical Distribution of Articles

These 13 articles have been presented in 12 different journals, including one article each in 11 journals and two articles in one journal, namely Frontiers in Psychology. As shown in Figure 3, researchers from nine countries explored the influence of grit on academic outcomes among university learners, with the number of publications in descending order from the United States (three articles), Italy and China (two articles), and South Africa, Turkey, Saudi Arabia, Portugal, Malaysia, and Australia (one article). As can be seen from the figure, the impact of grit on the educational success of higher education learners has attracted the attention of researchers in many countries, but attention to this issue needs to be further increased worldwide.
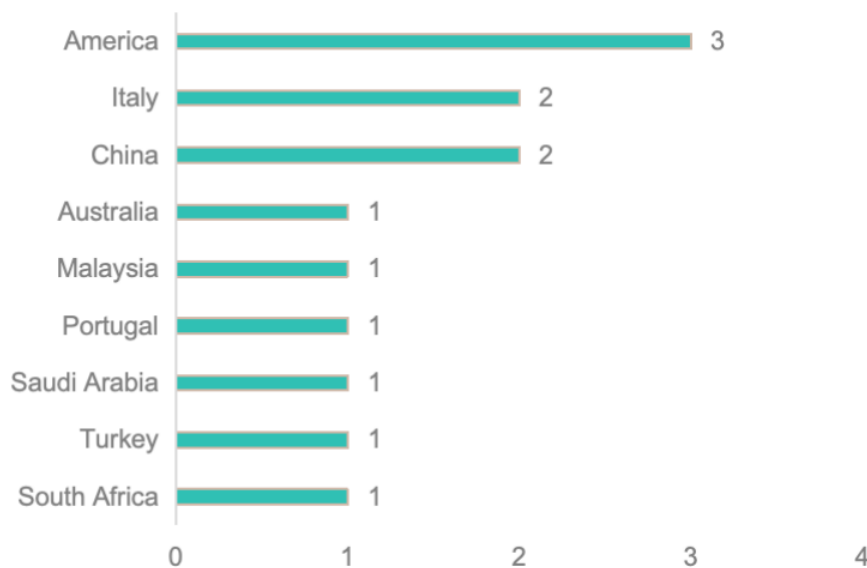
Figure 3: Geographical distribution of articles

3.3. The Role of POE and COI in College Academic Performance

In all 13 journals, grit is related to academic performance. However, the two dimensions of grit, POE and COI, have different results.

3.3.1. Both POE and COI Predict Academic Performance

In a study of African-American freshmen, Akos et al. (2022) found that the initial grit score can effectively predict the academic performance (GPA) of learners. They believe that for African-American students, it is very important to cultivate non-cognitive elements in the key first year of study for academic success, and relevant background factors should be considered. Pleace and Nicholls (2022) pointed out that grit can predict the performance of learners majoring in economics and management science, and there is a positive correlation between them. In addition, they also studied the influence of motivation and grit, where the higher the intrinsic motivation, the higher the grit. This study mentioned that in the context of a South African university, intervention measures that take into account moldable personality traits are conducive to narrowing the achievement gap between different classes and are of great significance to helping disadvantaged groups improve their academic performance. In English learning, there are similar findings. Alqarni (2022) found in a cross-sectional study of the English learning of female students in Saudi Arabia that grit is significantly related to English achievement. Another new discovery of this study is that the age of learners significantly affects two aspects of grit (POE and COI); that is, the older learners are, the higher their grit is. In addition, although the results show that grit is related to emotional health, happiness is only positively related to grit and unremitting efforts and has nothing to do with the consistency of interests. In the cross-sectional study of the English learning environment in China, Hu et al. (2022) not only emphasized the significant correlation between grit (POE and COI) and College English Test-Band 4 (CET-4), but also proposed that grit played a mediated role between growth mindset and achievement. This also highlights the role grit plays in encouraging foreign language learning achievement. In the face of difficulties, learners with a higher level of grit are more inclined to make more efforts and persist in learning to improve their academic performance.

3.3.2 POE and COI Play Different Roles

In some studies, researchers have shown that the two aspects of grit (POE and COI) do not function in a similar way. On the one hand, some studies describe that POE seems to have a stronger relationship with academic performance than COI. In the cross-sectional study of college students from all over Australia, Hodge et al. (2018) believed that although grit is a contributor to academic success, perseverance in efforts contributes more to achievements than consistency of interest. They emphasize that learners are more likely to improve their academic performance and perform better by persisting in completing tasks, while maintaining interest seems to

have little effect. They also said that the first generation of higher education learners has a higher perseverance of efforts index (POE) than their peers. There are variations in the number between male and female learners, but male and female learners show the same degree of grit (women account for the majority of the sample). Hernández et al. (2020) also believed that the two dimensions of grit have not played the same role. That is, POE in grit is the main factor in forecasting the academic performance of Portuguese college learners. Whipple and Dimitrova-Grajzl (2021) hold that the study is essentially longitudinal by evaluating the level of grit before entering the university and the academic performance (GPA) at the end of the freshman year, and point out that grit can affect the academic performance of military academy students. In addition, POE can predict academic performance better than COI. It should be noted that grit can positively predict the GPA of male freshmen, but the academic performance of female students has no significant impact. The researchers believed that this was related to the specialty particularity (military academy background) and the fact that there are more men than women. The reason is because female learners who choose to enter the military academy are estimated to have many characteristics related to grit. That is, compared with men, grit is a necessary quality for women to join military academies. Therefore, grit has little effect on promoting female learners to improve their academic performance.

On the other hand, there are also different voices stating that COI is more closely related to academic success. For example, in Abubakar et al.'s (2021) study, after a cross-sectional investigation including pharmacy students of a university in Malaysia, a noteworthy correlation was shown between grit and academic achievement (CGPA) rather than the GPA of the previous semester. Although learners' scores on POE are higher than those on COI, consistency of interest has a greater relationship with academic performance (CGPA). This shows that pharmaceutical students can persist in their efforts regardless of their grades. However, students with high grades generally have more sustained interest. In other words, it can help students improve their academic performance by increasing their interest in the course. In addition, grit has no significant difference in demographic characteristics and study years. They also pointed out that different cultural groups seem to have different views on the size of gravel; the grit scores of college students in the study are lower than those of American medical students, but they are consistent with those of Thai medical students.

3.3.3. Grit, Academic Performance, and Other Variables

At present, many studies have not only studied grit and academic performance but also discussed their relationship with other psychological factors. For example, a horizontal study shows that grit and academic achievement (GPA) are significantly positively correlated for business learners, but it is largely because academic psychological capital plays a regulatory role. Researchers believe that psychological

capital (HERO: hope, efficacy, resilience, and optimality) can guide courageous business learners to achieve their goals. In other words, grit may not directly affect academic performance, but if learners can combine grit with other positive academic psychological resources, it will effectively promote academic success (Luthans et al., 2019). In an ongoing investigation on the shift from traditional classroom instruction to virtual learning caused by COVID-19, Sulla et al. (2022) pointed out that grit will affect the final grades of Italian college students. In addition, strict blockade rules may lead to low-level psychological distress. Therefore, self-efficacy plays a mediating role in the connection between grit and college students' academic performance. The researchers also mentioned that even for students with a high level of grit, stress will hinder them from pursuing their goals. In other words, students and educators need to pay attention to psychological pressure and learners' mental health during special periods, so that the grit level will not decrease and grit will play a role in academic outcomes. In a cross-sectional study of Italian college students, there is a slight but significant negative correlation between five soft skills and average grades. Furthermore, soft skills alone are not enough to promote academic success, and they must consider other factors related to their studies in the learning process. As there are many factors affecting learners' personal conditions and academic success, their relationship is very complicated. Only when soft skills are beneficial to learners will they attract learners' attention. Grit, as one of the five soft skills, can affect academic success through the mediation of learning-related variables such as achievement, emotion, and self-regulation (Casali & Meneghetti, 2023). Hernández et al. (2020) posited that although perseverance is important to academic performance, learners' perceptions of demand support will affect their belief system. Moreover, in the study of undergraduates majoring in physical education in Portugal, they found that grit (mainly perseverance) not only predicts academic success, but also plays an intermediary role between teachers' independent support and students' performance. That is to say, if learners can get more autonomous support in their studies, they will show a more positive state and make more efforts to complete their academic tasks with high quality.

According to one study, grit must be mediated by other factors in order to have an impact on academic achievement because it is not directly associated with it. For example, in the cross-sectional study of three Turkish universities, although grit is considered a predictor of academic achievement (GPA), it can only affect GPA on the premise that consciousness plays an intermediary role. That is, there is only an indirect relationship between grit and academic performance, but there is no direct relationship (Sunbul, 2019). The mediated role of grit is the subject of other publications. Guo et al. (2023) pointed out that although both dimensions of grit are positively related to academic performance, it is perseverance of efforts, not the other side of grit, that plays an intermediary role between life goals (including goal

orientation and self-transcendence) and academic success. Researchers believed that this is because, under the cultural background of China, Asian students often choose to keep working hard for a long time to improve their academic performance in order to meet the external expectations of improving their academic performance (such as parents or social culture). This starting point may not be related to their real interests. The researcher suggests that learners with different cultural backgrounds can be selected from future studies to verify the connection between the factors in this study.

4. Discussion

Based on 13 articles published in two databases in the past five years (2018-2023), this study investigates how grit affects college students' academic performance. We are particularly concerned about two aspects: (1) Although both grit and grit are related to academic performance, their influence is different; and (2) Grit affects academic performance directly or indirectly. In addition, we also discussed the concept and research methods of grit because all these will affect the relationship between grit and academic performance. These findings are very meaningful, as they not only show that grit really affects the academic performance of undergraduates, but also provide a direction for further exploring the future significance of grit in higher education.

First of all, grit is a whole structure, and all 13 articles show that grit is related to academic performance. However, some studies show that the two dimensions of grit have different functions. Specifically, compared with the consistency of interest, the efforts of grit are more closely related to academic performance (Hernández et al., 2020; Guo et al., 2023; Casali & Meneghetti, 2023).That is to say, POE (perseverance of efforts) can better predict academic performance (Hernández et al., 2020). Researchers believe that what makes learners progress is their determination to persist in completing their academic tasks, not their ability to maintain interest (Hodge et al., 2018). Moreover, learners who have no higher education background (first generation college students) show a higher degree of effort. Lam et al. (2019) explained this from the perspective of learning motivation. Although learners' interest in learning belongs to intrinsic motivation (Deci & Ryan, 2013), learners with strong intrinsic motivation usually make persistent efforts and get better academic performance (Goodman et al., 2011). At the same time, students with high grades usually have more lasting academic interests (Abubakar et al., 2021). It should be pointed out that the relationship between POE and COI and educational performance is still controversial, so it is necessary to examine their functions with objective and sufficient evidence in the future instead of arbitrarily denying any dimension (Zhao & Wang, 2023).

Secondly, although the research shows that there is a relationship between grit and academic performance, grit affects academic performance in various ways, including

direct influence (Hodge et al., 2018; Abubakar et al., 2021; Whipple & Dimitrova-Grajzl, 2021; Pleace & Nicholls, 2022; Alqarni, 2022; Hernández et al., 2020; Akos et al., 2022; Sulla et., 2022; Hu et al., 2022; Casali & Meneghetti et al., 2023; Guo et al., 2023) and indirect effects (Sunbul, 2019; Luthans et al., 2019), as well as indirectly affecting academic performance through the intermediary role of personality or psychological capital. There is a complicated relationship between individuals and learners, which is influenced by many factors (Akos et al., 2022). This is reflected in the literature: among the 13 selected articles in journals, 12 articles not only explored the relationship between grit and academic performance, but also combined with other psychological factors (e.g., psychological capital, engagement, and growth mindset) to explore the relationship between grit and academic performance and the role of grit in academic grades and other variables from multiple angles, so as to tap the potential of grit in promoting college students' academic performance as much as possible. However, it should be noted that a study shows that five soft skills (including grit) are negatively correlated with academic performance (Casali & Meneghetti, 2022). This is different from other positive correlation results. Although the negative correlation is small, it still needs attention. The reason is worth further exploring.

Further, despite grit emphasizing not giving up, overcoming obstacles, and pursuing goals for a long time (Duckworth et al., 2009), we found that there are a few studies that provide clear meanings of "specific obstacles" and "long-term goals." In other words, researchers need to improve the concept of grit (Zhao & Wang, 2023) because the important premise of research is reliable conceptual structure and tools (Elahi Shirvan et al., 2024). In addition, learners from different cultural backgrounds may have different understandings of the concept of grit and pay different attention to COI and POE. Therefore, it may affect the relationship between grit and academic performance. For example, in short-term culture, people pay more attention to the present and attach importance to current interests (Hofstede, 2011). However, for Chinese students in a long-term culture, academic success cannot be their long-term goal but a temporary one (Guo et al., 2023). In other words, the importance of grit for academic performance may be different due to different cultural backgrounds. Similarly, Hodge et al. (2018) also mentioned that potential cultural prejudice poses certain challenges to grit and academic performance. The research results show that, compared with students whose parents have received higher education, the first generation of college students (whose parents have not participated in higher education) show greater efforts and perform as well as others (Marks, 2007). Therefore, in the follow-up research, the concept of grit should be defined more accurately and expressed more strictly, so that grit can be better understood by learners with different cultural backgrounds and play its due role. In addition, considering the differences between different types of schools and grades (Pleace &

Nicholls, 2022), it is also helpful to understand the influence of non-cognitive factors (grit) on academic performance by expanding multiple grades (Akos et al., 2022).

Finally, the differences in research methods can explain the differences in the relationship between grit and academic achievement, such as using different self-report scales and different standards to measure academic success. In these 13 articles, most of them (11 articles) are based on objective test scores in the form of GPA, CGPA, or other examination scores (e.g., Sunbul, 2019; Abubakar et al., 2021; Whipple & Dimitrova-Grajzl, 2021; Hu et al., 2022), and two articles also contain subjective measurement forms (such as Hodge et al., 2018; Guo et al., 2023). Subjective measurement of academic performance has been proven to be acceptable (Watson et al., 2021). Therefore, future research can try to measure academic performance in a more comprehensive way, such as by combining objective scores with subjective scales to better understand learners' real learning situations. In addition, most articles use quantitative and cross-sectional research methods, and internal research is insufficient (e.g., qualitative or mixed research). It is very important to understand the predictability and persistence of cognitive and behavioral outcomes (Hernández et al., 2020). Since grit will develop with time (Duckworth, 2007), the plasticity of grit on academic performance needs to be further explored (Alamer, 2021). Therefore, it is very necessary to do longitudinal research over different time lengths. In this way, people can understand the development and changes of grit and academic performance (for example, how grit affects academic performance and how it affects academic performance over time) and their causal relationship.

5. Implications of the Study

This study examines the influence of grit on educational success in the past five years, and systematically shows how grit affects college students' academic performance. These empirical results are very meaningful because they provide a direction for further study on how grit affects college students' academic performance. Therefore, four understandings can be drawn from the reviewed journals. First, there are many articles supporting the claim that POE is more effective than COI, but we do not ignore the objective fact that COI promotes academic performance. Therefore, more objective and sufficient evidence is needed in future research to examine the influence of two dimensions of grit (POE and COI) on academic performance, and it is not easy to decide to deny either dimension. Second, there is not a single model between learners and learning, and the relationship between them is complicated. Therefore, we should actively explore the interaction and influence among grit, academic performance, and other related psychological factors, so as to explore the positive influence of grit on academic performance from a new angle or way. Thirdly, the concept of grit needs to be further improved and concretized to be suitable for learners with different cultural

backgrounds and learning situations. Finally, the number of research methods in this field is unbalanced, and qualitative research, mixed method, or longitudinal research should be added in future research to further understand learners' real thoughts and explore the cause and effect and development of the relationship between grit and academic performance.

6. Conclusion

This study discussed how grit affects the academic performance of college students under the background of higher education and selected 13 articles from Scopus and Web of Science by means of a systematic literature review. In every article, grit is related to academic success. Grit and grit's two dimensions (POE and COI) affect the academic performance of college learners. However, the influence of two dimensions of grit (POE and COI) on academic performance is still controversial and needs further discussion. Most studies show that grit can directly affect academic performance. In addition, grit can mediate between academic performance and other variables. By reviewing the literature in the past five years (2018-2023), this paper also found that other cognitive and non-cognitive variables are related to grit and academic performance, and they jointly affect academic performance through different structural frameworks. This can not only fully tap the potential of grit in promoting college students' academic performance, but also provide new methods and directions for studying grit and academic success with college learners in the future. In addition, educators can help college students strengthen grit in a planned and purposeful way to promote academic success.

7. Limitations and Recommendations for Future Studies

Like many studies, this one also has some limitations. On the one hand, the limitation of this study lies in the limited databases, including Scopus and Web of Science (WOS). Although they are the most well-known high-quality journal lists (Paul et al., 2021), this may lead to the reduction of qualified literature. In other words, if studies from more databases are included, the analysis results will be more comprehensive. On the other hand, this research focused on the study of university learners' grit and academic achievement in the recent five years (2018-2023). Even though this means keeping abreast of the latest research trends, it may also limit the understanding of the historical context of the development of grit and academic achievement research. In addition, this study only paid attention to English language journals and omitted other documents such as books, chapters, and reports. This limited other discoveries to some extent. Therefore, future researchers can appropriately increase the database, extend the research period, or modify the screening criteria so as to get more comprehensive and unique results.

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EFFECTS OF FLIPPED CLASSROOM ON CALCULUS PERFORMANCE AND MATHEMATICAL CREATIVE THINKING SKILLS OF HIGHER INSTITUTION STUDENTS

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ABSTRACT

This study investigates how flipped classroom deployment affects students' calculus performance and mathematical creative thinking skills. In this study, a pretest-posttest quasi-experimental format with a control group was employed. Forty-nine students from a higher institution participated in this study. Pre-test, post-test, and delayed post-test were used to assess students' performance and mathematical creative thinking skills. The treatment group of 25 students employed a flipped classroom, whereas the control group of 24 participants used the conventional approach. The covariance analysis revealed a significant difference in the post-test and delayed post-test regarding the calculus performance of the students. Additionally, the results demonstrated that students who utilised flipped classrooms had significantly better scores in mathematical creative thinking skills in the post-test and delayed post-test. This study showed that, in terms of performance and creative thinking skills, using a flipped classroom to teach mathematics to students in higher education was more effective than the conventional approach. However, the fluency domain in creative thinking skills indicated no significant difference between the groups in the post-test and delayed post-test. This study showed that educators must allocate more time for students to participate in active discussions and develop more ideas and solutions. Therefore, it is recommended that this instruction approach be used continuously in teaching and learning in the future.

Keywords: 21st century learning approach, cognitive skills, experimental study, higher education, mathematic performance

1. Introduction

The dismal Trends in International Mathematics and Science Study (TIMSS) and Programme for International Student Assessment (PISA) scores demonstrate how poorly Malaysian students continue to do in mathematics. This is corroborated by a study conducted by Shin et al. (2019), which reveals that student performance in mathematics has declined significantly despite considerable financial investments to improve education in Malaysia. According to a needs analysis of students at higher education institutions, students continue to face difficulties in mathematics, especially in calculus (Hoban, 2019). Numerous research have revealed that calculus is a difficult subject for students (Carnell et al., 2018; Çekmez, 2020). Integration and derivatives have been identified as the two most difficult calculus topics (Tatar & Zengin, 2016). Meanwhile, Carnell et al. (2018) provided an explanation for why students perceive calculus to be complex, citing insufficient prior knowledge as a contributing reason. The teacher's role is extremely important during the transition period, such as at the higher institution stage, in understanding and stressing the importance of fundamental mathematical concepts particularly in calculus that students must understand in order to learn the subject at the next level (Kouvela et al., 2018). For students to grasp calculus, in particular, more deeply, lecturers need to get more involved in the classroom.

According to a Research Institute of National Higher Education study, many graduates have outstanding grades but cannot find jobs matching their qualifications (Heong et al., 2020). Many employers have expressed concern about certain graduates' knowledge, skills, and attitudes (Puad & Nawe, 2021). Creative thinking skills are among the skills graduates fail to acquire (Yusof & Jamaluddin, 2017). According to Hanapi et al. (2017), a new study shows a significant gap between thinking skills and employability, particularly regarding graduates' creative thinking and leadership capacity. Furthermore, Nirmala and Kumar (2018) stress that graduates' creative ability is a prerequisite for employment. This issue has been carried over to higher education, where students struggle to develop their capacity for creative thinking (Sari et al., 2017). Consequently, to fulfill the demands of modern society, students must equip themselves with creative thinking skills. Classroom learning and assessment may enhance students' ability to think creatively (Widana, 2018). Therefore, to generate students who can satisfy the demands of future employers, lecturers should play a crucial role in helping these students develop their creative thinking skills in the early semester of entrance.

At higher education institutions, it is the lecturer's responsibility to help students reach their full potential. Previous studies show that university students' cognitive learning performance and creative thinking skills correlate positively (Siburian et al., 2019; Susanti, 2019). Nonetheless, Kassim and Zakaria (2015) note that several lecturers' lack of variety in their teaching approaches makes them less able to incorporate thinking

skills into their classrooms. Furthermore, a study demonstrates that educators have the bare minimum of information about understanding and utilising thinking skills in school (Rasyid et al., 2021). The teaching strategy is essential to interest students in mathematics (Acharya, 2017). Few students participate in classroom activities due to a conventional approach largely reliant on lecture explanations of class material and home assignments at all educational levels (Afrasiabifar & Asadolah, 2019). Within this framework, conventional lectures are delivered by the lecturer in front of the class utilising a teacher-centred approach. According to Hadibarata and Rubiyatno (2019), activities in the classroom appear to follow the same routine, with the lecturer providing full supervision and the students just having to sit and listen to the explanation. It disregards how students have developed cognitively, particularly in thinking skills. According to Hong et al. (2017), mathematics instruction still retains a conventional approach that focuses more on the classroom than on allowing students to use creativity and apply what they have learned to real-world scenarios. To help students reach their full potential, lecturers must adopt a student-centred approach and modify their method of instruction.

Assessments conducted in a classroom or through centralized assessment systems are typically used to quantify mathematical achievements. Malaysia's PISA score in mathematics is one indicator of mathematical proficiency worldwide; the country joined PISA in 2009. According to PISA, Malaysia is 47th of 78 nations (Malaysian Ministry of Education, 2019), indicating that Malaysia still ranks in the middle of participating countries. Malaysia has also taken part in the worldwide TIMSS evaluation. Between 1999 and 2019, Singapore and Malaysia participated in TIMSS, with Singapore having the highest average score. Malaysia lagged behind Singapore by a large margin using average scores in mathematics as a comparison (Yee et al., 2018), and this was the case from 1999 to 2019. This indicates that mathematics achievement as measured by TIMSS and PISA is still lacking in Malaysia and needs to be improved. Most students in these cohorts are already furthering their studies at higher education institutions. Various stakeholders, such as lecturers, administrators, and curriculum drafters, have varied perspectives on student achievements in higher learning institutions. These stakeholders frequently believe that student achievement is determined by how well students do on standardized assessments (Bressoud et al., 2016). As a result, authorities such as lecturers have to be heavily involved in elevating mathematical achievement at higher education institutions.

One of the six goals of the Malaysian Education Blueprint (2013–2025) is the development of thinking skills, which are now considered essential to education in the country (Malaysian Ministry of Education, 2013). Higher-order thinking skills (HOTS) and lower-order thinking skills (LOTS) are the two categories of thinking skills (Krathwohl, 2002). National education aims to use HOTS to create a generation of

students who can compete globally (Hock et al., 2015; Letchumanan et al., 2023). HOTS also contain creative thinking skills (Ahmad et al., 2017; Ibrahim et. al, 2019). Globally, the curriculum for mathematics education has made developing creative thinking skills a primary priority (Butera et al., 2014). The capacity to process and generate original and ingenious ideas is known as creative thinking skills (Jakpar, 2015). According to Krupiah and Kannadasan (2021), creative thinking skill is the capacity to generate something novel and worthwhile by thinking outside the box and utilising one's imagination naturally. Fluency, flexibility, originality, and elaboration are the four categories into which Torrance (1990) splits creative thinking skills. Leung and Silver (1997), in the meanwhile, identified a way to use problem-solving and problem-posing as an indication of students' creative thinking (fluency, flexibility, and novelty). Fluency and flexibility are the two aspects of mathematical creative thinking skills that are evaluated in this study. This is based on a study by Rahayuningsih et al. (2021) that exclusively uses open-ended mathematical problems to examine the two domains according to rubric specifically in mathematics. Most of the previous researchers only included the domains of fluency and flexibility in mathematics subjects above their suitability compared to other domains that can be tested in other subjects, such as in studies by Hästö et al. (2019), Bye et al. (2022) and Shaw et al. (2020). Fluency is indicated when the student fluently produces different ideas which are appropriate to the question task (Siswono, 2011). Perhaps, fluency is also defined as the ability to give more than one mathematically correct answer (De-La-Peña et al., 2021). Meanwhile, flexibility refers to a student's ability to solve a problem using many different methods or ways (Siswono, 2011). In short, flexibility is based on the ability to show more than one correct mathematical solution (De-La-Peña et al., 2021). Thus, encouraging students to think creatively is a component of the endeavour to help them become better thinkers.

According to Mursyid and Kurniawati (2019), thinking skills have become vital in today's world, because they allow students to address problems. According to data from the National Association of Colleges and Employers on the relevance of thinking skills for employment today, thinking skills may also be essential in many other professions (Fajari, 2020). According to some experts, students' academic success and ability to think creatively are interrelated (Mursyid & Kurniawati, 2019). Numerous studies have been done in recognition of the importance of thinking skills, particularly creative thinking skills. Several research studies have shown that developing students' creative thinking capacity can improve their mathematics performance (Chukwuyenum, 2013). Consequently, for students to develop these skills and their academic performance, educators have an essential role in fostering HOTS, particularly creative thinking skills, in the classroom.

One pedagogy that is becoming more popular in education is the flipped classroom. Flipped classroom is described by Alsowat (2016) as a teaching strategy that focuses LOTS achieved outside the classroom and maximizes class time for concept discussion sessions and focuses more on HOTS questions inside the classroom. Simultaneously, the flipped classroom is described as an emerging 21st-century learning approach in which students learn outside the classroom and then apply the knowledge inside the classroom (Kutty, 2019). According to Strayer (2007), there are three primary phases that students go through in a flipped classroom: before instruction, during instruction, and after education. In actuality, students will participate in activities inside the classroom to enhance their learning and obtain their knowledge and experiences outside of it (Kutty, 2019). Afterward, following their interaction period, students will complete post-learning tasks via online activities. The benefits of flipped classrooms for teaching and learning have been demonstrated in several research. According to Masri and Mahamod (2020), flipped classrooms can allow students to engage with materials before the actual class period begins. As a result, activities involving peers and teachers that aren't as important in conventional learning might take up more time in the classroom. Furthermore, according to Zainuddin et al. (2019), the flipped classroom positively influences learning activities, promotes student involvement, and supports student-centred learning. Recent research have also demonstrated how the flipped classroom positively impacts creative thinking skills in mathematics (Ariani et al., 2022; Sya'Roni et al., 2020; Tabieh & Hamzeh, 2022). Meanwhile, Tsai et al. (2020) found that flipped classrooms may assist engineering students in strengthening their creative thinking skills while improving mathematics performance and motivation. In summary, implementing a flipped classroom as an intervention approach in experimental study can provide advantages for students and support educators in facilitating more successful teaching and learning inside the classroom.

2. Research Objectives and Hypotheses

This study sought to investigate the effect of flipped classroom on students' performance in learning calculus at higher education institutions. Eight hypotheses were generated after three research objectives were established to accomplish the following objectives:

1. Compare the effects of the flipped classroom and conventional approach on higher institution students' performances (post-test and delayed post-test) in calculus.

2. Compare the effects of the flipped classroom and conventional approach on higher institution students' mathematical creative thinking skills (post-test and delayed post-test) in calculus.

3. Compare the effects of the flipped classroom and conventional approach on domains in students' mathematical creative thinking skills (fluency and flexibility) among higher institution students (post-test and delayed post-test) in calculus.

Research hypotheses are as follows:

H_{01}: There is no significant difference in the means of the student's performance test scores (post-test) between the flipped classroom and conventional approach while controlling pre-test scores in calculus.

H_{02}: There is no significant difference in the means of the student's performance test scores (delayed post-test) between the flipped classroom and conventional approach while controlling pre-test scores in calculus.

H_{03}: There is no significant difference in the means of the student's mathematical creative thinking skills (post-test) between the flipped classroom and conventional approach while controlling pre-test scores in calculus.

H_{04}: There is no significant difference in the means of the student's mathematical creative thinking skills (delayed post-test) between the flipped classroom and conventional approach while controlling pre-test scores in calculus.

H_{05}: There is no significant difference in the means of the student's fluency (post-test) between the flipped classroom and conventional approach while controlling pre-test scores in calculus.

H_{06}: There is no significant difference in the means of the student's fluency (delayed post-test) between the flipped classroom and conventional approach while controlling pre-test scores in calculus.

H_{07}: There is no significant difference in the means of the student's flexibility (post-test) between the flipped classroom and conventional approach while controlling pre-test scores in calculus.

H_{08}: There is no significant difference in the means of the student's flexibility (delayed post-test) between the flipped classroom and conventional approach while controlling pre-test scores in calculus.

In addition, the conceptual framework of the study is shown in Figure 1. From this framework, there were two groups tested and conducted pre-tests on before the experiment commenced. Following the intervention, post-tests and delayed post-tests were conducted to observe the intervention's effects on calculus performance and creative thinking skills, encompassing fluency and flexibility domains.
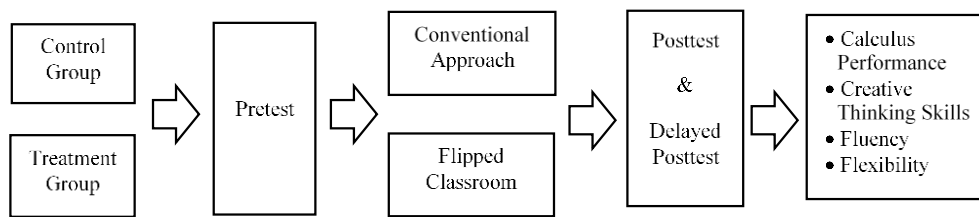
Figure 1: Conceptual framework

3. Methodology

This research employs a pretest-posttest quasi-experimental methodology with a control group, using first-year student tutorial groups as the treatment group and another as the control group. The treatment group utilises the flipped classroom, while the control group employs the conventional approach. The choice of having a quasi-experimental design is because this study is looking into the cause and effect of implementing flipped classrooms in teaching and learning calculus. Researchers have to use intact groups in this study. Participants' availability or the environment's proscription against forming artificial groups might be the reason (Klassen et al., 2012). Learning in the classroom will be hampered by randomly allocating students to control and treatment groups. Even so, because this study's statistical analysis is based on inferential analysis, a randomized procedure is conducted by randomly choosing two groups at one higher institution in the east coast of peninsular Malaysia. There are 90 tutorial groups and two tutorial groups are chosen randomly. The selection is made by first taking two lecture groups randomly from the nine available lecture groups. Each lecture group has 10 tutorial groups, and one tutorial group is randomly selected from each of the two previously selected lecture groups. The research design model employed in this study is depicted in Table 1. Purposive sampling is used to choose the study sample. A total of two classes are randomly selected into a control group of 24 students and a treatment group of 25 students. Every tutorial commonly consists of 23 to 25 students per class. Three performance tests including pre-tests, post-tests, and delayed post-tests, are given to the students to assess their performance with six-item questions for each test. Additionally, a creative thinking skill rubric adapted from Firdaus (2016) is used to assess the students' mathematical creative thinking skills during the intervention as in Appendix. Firdaus (2016) adapted the domains in the Torrance instrument by developing a rubric from a scale of 1 to 4 specific for the respondent's mathematics performance test script. In mathematical creative thinking skills, fluency and flexibility are the two domains that are measured in line with the study by Rahayuningsih et al. (2021). The rubric is used in scoring mathematical creative thinking skills through student scripts on the post-test and delayed post-test. There are three items to measure the fluency and flexibility domains for creative thinking skills and rubrics for domains of fluency and flexibility

are assessed separately. The creative thinking skill score is calculated from the total score of both domains. Each respondent's script is marked using an adapted rubric and a score value will be given for each item tested from a scale of 0 to 4. For this rubric score, the lowest possible score is 0, and the highest is 4. This rubric is suitable for assessment in the Malaysian context because Malaysia has started using the band 1 to 6 method in classroom assessment recently. However, since this study adapts a rubric instrument from a previous study that used a score of 0 to 4, the researcher maintained the score or band from a previous study carried out by Firdaus (2016) to facilitate marking the script. A pilot study was conducted earlier, and all the tests have been carried out. For the pre-test, the reliability was 0.80; for the post-test, it was 0.75; and for the post-delayed test, it was 0.75. Meanwhile, the post-test reliability for the creative thinking skill rubric is 0.73, and the delayed post-test reliability is 0.72. A panel of experts validated the reliability and validity of the instruments. The improvement was updated in light of the feedback.

Table 1: Quasi-experiment Pre-test, Post-test and Delayed Post-test

Group	Pre-test		Post-test	Delayed Post-test
Conventional	O_1	X_1	O_2	O_4
			O_3	O_5
Treatment	O_1	X_2	O_2	O_4
			O_3	O_5

X_1: Conventional approach
X_2: Treatment group (Flipped classroom)
O_1: Pre-test
O_2: Post-test
O_3: Creative thinking skill (post-test)
O_4: Delayed post-test
O_5: Creative thinking skill (delayed post-test)

Before the experiment begins, pre-test was given to both groups. A pre-test was administered to each group to determine the primary difference between the treatment and control groups. The pre-test served as a baseline for the variables under consideration and as a way of deciding whether or not the means of the two groups differed significantly. Consequently, the pre-test was incorporated as the covariate in the study. While the control group followed the conventional approach, the treatment group employed a flipped classroom adapted from the O-PIRTAS model developed by Guo (2019) as in Figure 2.
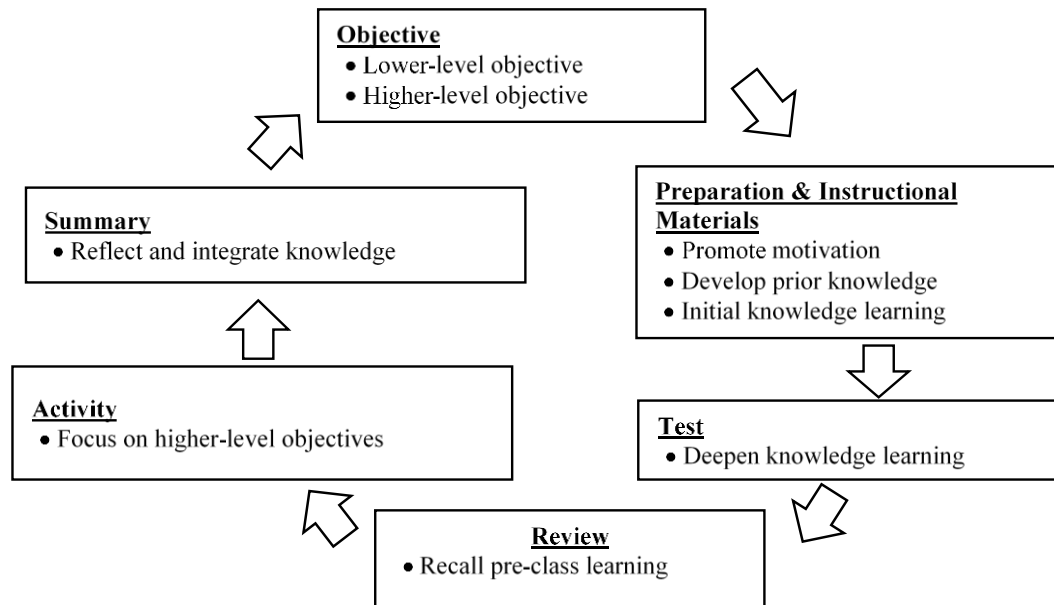
Figure 2: O-PIRTAS model

Both groups were given the same questions and notes during the experiment. The control group employed the conventional approach, using teacher-centred approach. Meanwhile, the treatment group utilised flipped classroom via pre-class learning before the class began. Pre-class learning included brief notes, pre-questions that students needed to complete before the class began, along with solution videos, and an online pre-quiz to help the instructor to identify which parts the students still did not understand well, and which students still did not grasp the topic taught. In-class activities for the treatment group would focus on group discussions for more challenging questions, including open-ended and non-routine problems, compared to the control group, which leaned more towards a teacher-centred approach. During group discussions, students in the treatment group were encouraged to present and defend a variety of answers and solution forms obtained to enhance mastery in the domains of fluency and flexibility. The experimental study for both groups was carried out simultaneously beginning pre-test to delayed post-test.

The post-test assessed the students' performance after a six-week long experimental study after pre-test. Two weeks following the post-test, the researchers administered a delayed post-test. The study procedure's duration in a quasi-experimental study depends on the intervention type. According to Hua (2016), an experimental study requires a long time and energy to obtain results. This is important because too short a study period may result in the effect of treatment not being fully visible. Salam et al. (2015) in their study did a quasi-experimental study for six weeks, which is in line with the duration of this study. Preliminary analysis, descriptive statistics, and inferential analysis are the

three stages of data analysis. Descriptive statistics and exploratory data analysis (EDA) are preliminary data analysis methods. The exploratory data analysis of both groups indicated that the performance test score is normally distributed by using skewness and kurtosis. The value of skewness and kurtosis was set between -2 and +2 as according to Hair (2009). Descriptive statistics were employed to describe the distribution of participants among treatment groups and control groups on mean and standard deviation. However, inferential statistics including ANCOVA and MANCOVA addressed the study issues. The first to fourth hypotheses were analysed using ANCOVA since pre-test was used as covariate and did not involve any domain in calculus performance, while the fifth to eighth hypotheses were answered using MANCOVA since pre-test was used as covariate and involved two domains in creative thinking skills.

4. Results and Analysis

This section discusses the findings of the study's research objectives and the evaluation of the flipped classroom approach in the actual study. The performance test of mean and standard deviation (SD) for both groups at the higher institution is shown in Table 2. At the post-test, the treatment group's performance score (M = 46.36, SD = 15.830) was higher than the control group (M = 35.13, SD = 17.984). In the delayed post-test, the treatment group (M = 46.06, SD = 17.045) also performed better than the control group (M = 35.50, SD = 15.131).

Table 2: Descriptive data for post-test and delayed post-test

Tests	Group	Mean	Std. Deviation	N
Post-test	Control	35.13	17.984	24
	Treatment	46.36	15.830	25
Delayed post-test	Control	35.50	17.045	24
	Treatment	46.06	15.131	25

Levene's test was used to investigate the equality of variances in this study (see Table 3). The post-test Levene's test results [F (1,47) =.241, p =.626 >.05] were not significant, indicating that the homogeneity of variance assumption was not violated. Additionally, the delayed post-test results of Levene's test [F (1,47) =.067, p =.797 >.05] did not show statistical significance, indicating that the homogeneity of variance assumption was also not violated.

Table 3: Levene's test of equality of error variances of post-test and post-delayed test

Test	F	df1	df2	Sig.
Post-test	.241	1	47	.626
Delayed post-test	.067	1	47	.797

Table 4 indicates that there was a significant difference in the mean post-test scores between the treatment and control groups [F $(1,46)$ = 7.785, p =.008 <.05] after adjusting for the pre-test mean scores. Additionally, there was a statistically significant difference in the delayed post-test results between the two groups at the performance test [F $(1,46)$ = 7.729, p =.008 <.05]. According to these findings, students in the treatment group outperformed those in the control group by a significant difference in post-test and delayed post-test. Therefore, H_{o1} and H_{o2} were rejected. Then, there were significant differences in the means of the student's performance test scores at post-test and delayed post-test between the treatment and conventional groups while controlling pre-test scores in calculus.

Table 4: Tests of between-subject effects of post-test and post-delayed test scores

Test	Source	Type III Sum of Squares	df	Mean squares	F	Sig.	Partial Eta Squared
Post-test	GROUP	1672.193	1	1672.193	7.785	.008	.145
Delayed post-test	GROUP	1476.145	1	1476.145	7.729	.008	.144

Table 5 displays the mean and standard deviation of the two groups of higher institution students' mathematical creative thinking skills. The treatment group (M = 9.40, SD = 3.082) outperformed the control group (M = 6.38, SD = 2.810) in mathematical creative thinking at the post-test. Furthermore, the treatment group (M = 8.92, SD = 2.482) exceeded the control group (M = 6.25, SD = 2.847) in the delayed post-test, demonstrating greater mathematical creative thinking skills.

Table 5: Descriptive data for creative thinking skills at post-test and delayed post-test

Tests	Group	Mean	Std. Deviation	N
Creative thinking skills (post-test)	Control	6.38	2.810	24
	Treatment	9.40	3.082	25
Creative thinking skills (delayed post-test)	Control	6.25	2.847	24
	Treatment	8.92	2.482	25

The equality of variances in this study was examined using Levene's test (see Table 6). The findings of Levene's test showed that the mathematical creative thinking skills at the post-test [F (1,47) =.165, p =.687 >.05] were not significant, proving that the homogeneity of variance assumption was not violated. Furthermore, there was no statistically significant difference in the delayed post-test results of Levene's test for mathematical creative thinking skills [F (1,47) =.131, p =.719 >.05], suggesting that the homogeneity of variance assumption was also not violated.

Table 6: Levene's test of equality of error variances of creative thinking skills at post-test and post-delayed test

Test	F	df1	df2	Sig.
Creative thinking skills (post-test)	.165	1	47	.687
Creative thinking skills (delayed post-test)	.131	1	47	.719

After controlling for the pre-test mean scores, Table 7 shows that there was a significant difference in the mean of mathematical creative thinking skills between the treatment and control groups in post-test scores [F (1,46) = 12.679, p =.001 <.05]. In addition, the findings of the delayed post-test for mathematical creative thinking skills showed a statistically significant difference between the two groups [F (1,46) = 90.351, p =.000 <.05]. These results indicate that students in the treatment group significantly outperformed those in the control group for mathematical creative thinking skills in the post-test and delayed post-test. Therefore, H_{o3} and H_{o4} were rejected. There were also significant differences in the means of the students' mathematical creative thinking skills at the post-test and delayed post-test between the treatment and conventional groups while controlling pre-test scores in calculus.

Table 7: Tests of between-subject effects of creative thinking skills at post-test and post-delayed test scores

Test	Source	Type III Sum of Squares	df	Mean squares	F	Sig.	Partial Eta Squared
Creative thinking skills (post-test)	GROUP	112.582	1	112.582	12.679	.001	.216
Creative thinking skills (delayed post-test)	GROUP	90.351	1	90.351	14.055	.000	.234

The mean and standard deviation for the two groups' domains of fluency and flexibility abilities are shown in Table 8. At the post-test, the treatment group's fluency score (M = 3.32, SD = 2.056) was higher than that of the control group (M = 2.38, SD = 1.861). In the post-test, the treatment group (M = 6.08, SD = 1.470) achieved better flexibility than the control group (M = 4.00, SD = 1.888). Additionally, in the delayed post-test, the treatment group (M = 3.28, SD = 1.860) surpassed the control group (M = 2.33, SD = 1.834), indicating higher fluency. In the delayed post-test, the treatment group (M = 5.64, SD = 1.150) outscored the control group (M = 3.92, SD = 1.613), indicating greater flexibility.

Table 8: Descriptive data for fluency and flexibility at post-test and delayed post-test

Tests	Group	Mean	Std. Deviation	N
Fluency (post-test)	Control	2.38	1.861	24
	Treatment	3.32	2.056	25
Flexibility (post-test)	Control	4.00	1.888	24
	Treatment	6.08	1.470	25
Fluency (delayed post-test)	Control	2.33	1.834	24
	Treatment	3.28	1.860	25
Flexibility (delayed post-test)	Control	3.92	1.613	24
	Treatment	5.64	1.150	25

Levene's test assessed the equality of variances in this investigation (Table 9). The results of Levene's test demonstrated that the homogeneity of variance assumption hadn't been violated and that the fluency at post-test [F (1,47) =.477, p =.493 >.05] was not significant. The homogeneity of variance assumption was not violated, as evidenced by Levene's test results, which revealed that the flexibility at post-test [F (1,47) =1.751, p =.192 >.05] was not significant. Furthermore, there was no statistically significant difference in the delayed post-test results of Levene's test for fluency [F (1,47) =.477, p =.493 >.05], suggesting that the homogeneity of variance assumption was also not violated. There was no statistically significant difference in the delayed post-test results of Levene's test for flexibility [F (1,47) =1.751, p =.192 >.05], suggesting that the homogeneity of variance assumption was also not violated.

Table 9: Levene's test of equality of error variances of fluency and flexibility at post-test and post-delayed test

Test	F	df1	df2	Sig.
Fluency (post-test)	.006	1	47	.941
Flexibility (post-test)	1.741	1	47	.193
Fluency (delayed post-test)	.477	1	47	.493
Flexibility (delayed post-test)	1.751	1	47	.192

Table 10 indicates that there was no significant difference in the mean fluency between the treatment and control groups at the post-test [F $(1,46)$ = 2.759, p =.104 >.05] after controlling for the pre-test mean scores, which implies that H_{o5} failed to be rejected. Nonetheless, the results indicate that in the post-test, the treatment and control groups' means of flexibility differed significantly [F $(1,46)$ = 18.729, p =.000 <.05]. Therefore, H_{o7} had to be rejected. There was a significant difference as well in the means of the students' flexibility (post-test) between the treatment group and conventional group while controlling pre-test scores in calculus. Likewise, no statistically significant difference was observed between the two groups in the results at the delayed post-test for fluency (F $(1,46)$ = 11.593, p =.064 >.05), and H_{o6} failed to be rejected. At the delayed post-test, the mean flexibility between the treatment and control groups differed significantly, according to the results [F $(1,46)$ = 20.316, p =.000 <.05], and H_{08} was rejected. There was a significant difference in the means of the students' flexibility (delayed post-test) between the treatment group and conventional group while controlling pre-test scores in calculus. According to these findings, students in the treatment group significantly outperformed those in the control group in the post-test and delayed post-test, but only in flexibility.

Table 10: Tests of between-subject effects of fluency and flexibility at post-test and post-delayed test scores

Test	Source	Type III Sum of Squares	df	Mean squares	F	Sig.	Partial Eta Squared
Fluency (post-test)	GROUP	10.848	1	10.848	2.759	.104	.057
Flexibility (post-test)	GROUP	53.535	1	53.535	18.729	.000	.289
Fluency (delayed post-test)	GROUP	11.593	1	11.593	3.602	.064	.073
Flexibility (delayed post-test)	GROUP	37.215	1	37.215	20.316	.000	.306

5. Discussion

According to Syah Muhibbin (2017), each learner can accomplish a particular level. However, it is frequently said that educators are in charge of helping students to reach their full potential, which encompasses cognitive, emotional, and psychomotor domains (Nurmalia et al., 2021). Therefore, improving learning performance and developing thinking skills in the classroom was one of the goals of using the flipped classroom approach. This study examined how students in higher institutions used the conventional approach and the flipped classroom. The post-test and delayed post-test results demonstrated that students in the treatment group significantly outperformed those in the control group. According to the results, the flipped classroom improves students' mathematical performance (Albalawi, 2018; Atwa et al., 2022; Wei et al., 2020). At the same time, recent studies also show that flipped classrooms can significantly increase calculus achievement (Cablas, 2023; Collins, 2019; Harmini et al., 2022; Jafar et al., 2020; Mustofa, 2022) although it is a difficult subject for students of higher education institutes (Arnellis & Amalita, 2019; Samsudin et al., 2020). According to Zhang et al. (2016), the flipped classroom helps prepare students for more engagement in active discussions during class activities. They claim that due to the flipped classroom, students are enthusiastic and prepared for class, which motivates them to participate in the activities.

Additionally, because they are already familiar with the basic concepts, it makes it easier for students to absorb the material throughout the learning activity (Osman et al., 2023). To further aid in their understanding of the subject, students can also often review the notes and video solutions supplied at their speed, any time, and anywhere (Mangan, 2013; Seo et al., 2018; Tomas et al., 2019). The results also demonstrate a significant difference between the two groups during the delayed post-test. This indicates that flipped classrooms can enhance students' retention and long-term memory impacts. Day (2018) found that one of its benefits is influencing the flipped classroom's long-term impact on student performance.

The findings also show that the group of students who used the flipped classroom indicated significantly better scores in mathematical creative thinking skills compared to the control group in the post-test and delayed post-test. The findings of previous studies show that the use of a flipped classroom can enhance creative thinking skills compared to conventional learning (Rahayu et al., 2022; Rodríguez et al., 2019; Wannapiroon & Petsangsri, 2020) and specifically in mathematics (Ariani et al., 2022; Sya'Roni et al., 2020; Tabieh & Hamzeh, 2022). A flipped classroom can allow students to explore and learn the content they will cover in class beforehand (Milman, 2012). Students learn topics more quickly in school, which enables them to actively participate in discussions before presenting and contrasting different types of answers and solutions

(Libre, 2021). According to this study, flipped classrooms can help students become more engaged in learning and provide an environment where they can use their creativity to develop various answers and solutions. Through active discussions within groups, students will present a variety of correct answers and solution forms and defend them with clear evidence and arguments. This is achieved by mastering the basics through pre-class learning and active group discussions.

The findings show no difference between the two groups for the fluency domain in the post-test and delayed post-test. This study contradicts the findings from experimental studies by Sya'Roni et al. (2020), Kiran and Farooq (2022), Tabieh and Hamzeh (2022), and Sari et al. (2022), who showed that flipped classrooms can increase fluency in mathematics learning. However, several studies showed no significant difference between students who use the flipped classroom and the conventional approach in fluency (Jiang et al., 2023; Sheikhipour et al., 2021). For the advanced calculus level studied by higher institution students, it is quite difficult for students to give multiple possible answers due to time constraints. However, the findings still show in a descriptive analysis that the treatment group achieved a higher mean score than the conventional group. This can be seen through the comparison of student scripts from both groups for the fluency domain in Figure 3. Students in the treatment group (a) achieved higher scores for the fluency domain by showing two correct answers compared to students in the control group (b) who did not show any correct answer. Future studies may need to allocate more time to student discussion activities so that an increase in ideas can occur to improve the fluency domain.

(a) Treatment group   (b) Treatment group

Figure 3: Comparison of respondents' scripts for fluency

The findings regarding the flexibility domain show that the treatment group obtained a more significant score than the control group for the post-test and delayed post-test.

This can be seen through the comparison of student scripts from both groups for the flexibility domain in Figure 4. Students in the treatment group (a) achieved higher scores for the flexibility domain by showing two correct solutions compared to students in the control group (b) who only showed one correct solution. These findings show that flipped classroom successfully increases flexibility in mathematics. The findings of this study are in line with the findings of previous studies that show flipped classrooms can increase the domain of flexibility in creative thinking skills (Al-Zahrani, 2015; Kiran & Farooq, 2022; Sya'Roni et al., 2020; Tabieh & Hamzeh, 2022). The use of a flipped classroom that utilises the exploration of materials before class allows students to be more prepared (Milman, 2012) and participate more in the discussion to provide various possible solutions representing domain of flexibility (Libre, 2021).
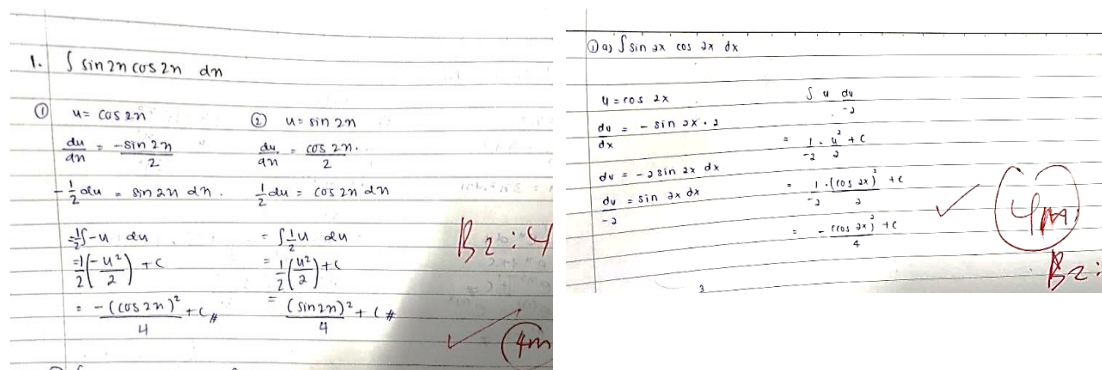
(a) Treatment group   (b) Treatment group

Figure 4: Comparison of respondents' scripts for flexibility

6. Recommendation for future studies

This study used a quasi-experimental design to examine the effectiveness of flipped classrooms. The study was carried out on a small scale using a control group and a pre- and post-test design. Consequently, the researchers suggest that this study be carried out again with a few modifications. The first recommendation for further research relates to various fields of mathematics, including statistics and algebra. Additional research might yield different findings and viewpoints.

The second recommendation is to employ alternative intervention strategies in future studies. For this study, flipped classroom was used. Different constructivist approaches, such as project-based learning, differentiated learning, or mastery learning, might be used to conduct further studies. Additionally, previous studies indicate that these strategies help to improve students' achievement in mathematics. Given the issues associated with current learning, the two suggestions for more study need to be considered as well as put into practice.

7. Implication of the study

There are several implications to this study. Implication for teaching and learning has been identified as the first implication. Lecturers should choose effective strategies to improve students' understanding of a certain topic that is being studied. Choosing an effective strategy has a big impact on students. This study shows that flipped classroom is able to increase achievement in calculus. In addition, lecturers can prepare students to be more independent, responsible, and ready in their own learning. Through this study, lecturers can see the effect of flipped classroom more specifically in calculus and consider the use of this approach in teaching delivery.

In addition, the adoption of the flipped classroom model carries a theoretical implication that can impact educational practices. Flipped classroom aligns with constructivist theories of learning, emphasizing active engagement and participation. By placing the responsibility for initial content acquisition on students outside the classroom, the model supports active learning during in-person sessions, fostering a deeper understanding of concepts through collaborative activities and discussions.

8. Conclusion

According to the findings and discussion, flipped classroom can be regarded as an alternate teaching technique. The findings of this study add to the body of knowledge for assessment of students' creative thinking skills in mathematics learning at higher education institutions through the use of empirical evidence, which is important given the significance of mathematical performance and creative thinking skills in producing a generation with thinking capability. This study discovered that the flipped classroom enhances students' performance in mathematics and their capacity for creative thinking skills, particularly flexibility. Although the results for domain fluency among students exposed to the flipped classroom were not statistically significant, students should be given enough time to adjust to this new approach to learning mathematics. To accomplish the aims of national education, educators must adapt and shift their paradigm while using the flipped classroom in mathematics instruction. Changes must be undertaken carefully to provide students with the opportunity and support they require to master mathematics by the time they graduate.

Appendix

Appendix: Creative Thinking Skill Rubric

The Creative Thinking Skills Evaluation

Measured aspects	Students' responses to questions	Score
Fluency	No answer	0
	Giving incorrect answer	1
	Giving correct answer	2
	Give more than one correct answer but find no answer pattern	3
	Give more than one correct answer and find the answer pattern	4
Flexibility	Not answering	0
	Find a solution strategy but give the wrong answer	1
	Find a solution strategy with calculation processes and correct answer	2
	Finding more than one solution strategy but one of them is incorrect because there is a mistake in the calculation process	3
	Discover more than one solution strategy and calculation process and true answers	4

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EMPOWERING THE EMPLOYABILITY OF PEOPLE WITH DISABILITY (PWD) THROUGH A SKILLS INTERVENTION PROGRAM

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ABSTRACT

People with disability (PWD) are a unique group who possess special virtuosity. Through employers' feedback from a survey that was conducted, a skill intervention program was designed and conducted by employing a reskilling and upskilling module that was aligned to employers' job requirements among selected PWDs at the Putra Future Classroom (PFC), Universiti Putra Malaysia. Prior to the program, an ethical approval form was sent and approved by the ethics board of the university, and selected employers were asked to respond to a quantitative survey to obtain their insights on employability skills traits necessary for today's job market. In the program, the group of PWDs spent three days with employability skill trainers and certified image consultants. A single case study semi-structured interview session was then conducted with the PWDs after the program to gather their personal experiences. In addition, a focus group discussion (FGD) was conducted with 30 students who were selected through purposive sampling. This was done through validated and established open-ended questions that were asked asynchronously via the WhatsApp instant messaging application as physical interview sessions were not feasible due to the COVID-19 pandemic. The text and audio responses were recorded and transcribed using the Atlas.ti software. Constant comparative analysis was employed through the use of the color-coded technique to develop the themes. The process of triangulation involved module, fieldnotes, and observation prior, during, and after the project completion. Based on the findings, it was found that PWDs do well in employment, highlighting the importance of reviewing the plethora of skeptical beliefs given the fact that employability skills are intrinsic values that involve non-technical and less physical functions. The process of integrating PWDs in the workforce is thus crucial to ensure that no one is left behind and that the country's wealth and prosperity are not compromised.

Keywords: Employability skills, People with Disability, Intrinsic values

1.   Introduction

Today, blatant treatment is given to People with Disability (PWDs); as a result, relatively, many PWDs fall into poverty and are isolated from the public (Fox & Marini, 2012). In many cases, PWDs are neglected by the community due to skeptical beliefs, which often lead to learned helplessness. Consequently, some governments have initiated plans to ensure the welfare of PWDs (Hauben et al., 2012). One of this is to ensure that the opportunity to join the workforce is possible for PWDs. However, combating the issue of unemployment among PWDs is complicated. Although the government has implemented various policies on unemployment among PWDs, it is often implemented ineffectively.

A considerable amount of literature has been published on PWDs employment. In particular, the negative connotation of hiring PWDs into employment has been noted. However, contrary to the skepticism that exist among the public, there are numerous benefits to employ PWDs. For example, hiring PWDs can lead to improvements in profitability (i.e, profits and cost-effectiveness, turnover and retention, reliability and punctuality, employee loyalty, company image), competitive advantage (i.e., diverse customers, customer loyalty and satisfaction, innovation, productivity, work ethic, safety), inclusive work culture, and ability awareness (Lindsay et al., 2018). In addition, the livelihoods of PWDs can be improved based on a steady income, enhanced self-confidence, expanded social network, and a sense of community. Hemphill and Kulik (2016) claimed that when PWDs experience greater contact with employers, positive interactions and rapport can prosper. This condition ultimately encourages PWDs to strive harder and appreciate their occupation more. In responding to the need for improved employability for PWDs, this research seeks to explore the employability skills that were acquired after an intervention training offered to PWDs.

2.   Literature Review

2.1. Global Issues of PWDs' Employability

The struggle of PWDs can be observed worldwide. PWDs are inundated with judgmental views regarding their capacity and ability to work. They also struggle to place themselves in specific jobs. According to Bonaccio et al. (2019), around 40.7% of PWDs are underrepresented in 16 out of 20 rapidly growing occupations that include both management and technical jobs even though they make up 20% of the world's population (Hemphill & Kulik, 2016). In one study, one in 12 Australians with some form of disability were found to perceive numerous forms of discrimination and unfair treatment due to their condition (Hemphill & Kulik, 2016). Many of them suffer from unequal benefits and salary increments compared to their

non-disabled colleagues and experience dismissive treatment among other employees. Hence, to support PWDs' employment, it is imperative to provide work-based experience, vocational training, accessibility to higher education institutions, career exploration, effective support services for employment, and post-employment services (Jang, Wang, & Lin, 2014) among others.

From a global perspective, the employment rates for PWDs are disheartening; for instance, in the United States, Canada, and the United Kingdom, the range is between 9% and 28%. The rates of unemployed PWDs are disheartening as studies have shown that an overwhelming majority of unemployed PWDs indicated that they preferred to work (Bureau of National Affairs, 2000; Houtenville & Kalargyrou, 2012; Sofer, Tal-Katz & Rimmerman, 2011; Duvdevany, Or-Chen, & Fine, 2016).

Negative connotations and prejudices have produced adverse effects for PWDs in their enjoyment of life. To make matters worse, PWDs have been disregarded for their opportunity to gain employment (Erickson, Lee, & Von Schrader, 2017; Moore, McDonald, &, Bartlett, 2018; Vornholt et al., 2018), hence, many PWDs suffer from poverty and struggle to lead their lives. Inequality in receiving equal treatment in getting job opportunities is also evident, with the opportunities available being severely limited. Employers, in addition, have also developed pessimistic perceptions of PWDs.

2.2. Global Action for PWDs' Employment

The empowerment and employability of PWDs has claimed the attention of the United Nations members through the worldwide sustainability agenda. In the Sustainable Development Goals indicator, disabilities are specifically mentioned in Goal 4, 8, 10, 11, and 17, where Goals 8 and 10 relate to employment for those with disabilities (United Nations, n.d). However, the theme during the Autism Awareness Day 2021 proved that employability for PWDs is still an existing issue.

In Malaysia, the government has introduced the National Social Policy in 2003 that emphasizes equality, rights, and the participation of PWDs in society. The policy was revised in circular no. 3 in 2008-2009 with the implementation of the 1% percent policy of job placement among PWDs in the government sector. This policy is a huge leap on execution to advocate PWD's employment from the typical welfare and social services policy that is granted to marginalized and isolated PWDs in Malaysia. As Islam (2015) mentioned, the optimistic efforts by having such policy and ruling were to ensure that PWDs enjoy equal rights and can fully participate within the Malaysian society. Overall, the objectives of the national welfare program were projected to secure and stabilize society to live harmoniously without jeopardizing human rights that include PWDs.

2.3. Unemployment Among PWDs

There exist numerous issues related to unemployment among PWDs. As a result, the stability of PWDs' lives and care of the society is often discouraging. Upon entering employment, PWDs often suffer from a myriad of prejudices and maltreatment from employers. Often, they are neglected and do not receive fair treatment due to their deficiency. Hence, initiatives and measures have been strategized by the government to solve issues of unemployment among PWDs. This marginalized group endures a vicissitude of judgmental perceptions, isolation, and ill-treatment due to their deficiencies, which calls for the need for further study of PWDs' employment to obtain a clearer picture of the situation.

PWDs often struggle to place themselves in jobs as employers have negative perceptions on their capacity and capabilities to fulfill specific responsibilities. Job applicants among PWDs encounter less interest among employers, even though some may have had relevant work experience (Ameri et al., 2018). PWDs have been reported to make proactive attempts to secure themselves in employment by engaging in job preparation and job-seeking activities despite discerned discriminations as they feel motivated to confront the barriers (Sundar et al., 2018). Yet, despite their ongoing efforts to place themselves in employment, they are frequently marginalized due to their shortcomings. Most of them are also less likely to enter the workforce as they perceived less interest and a negative first impression among employers.

On top of the belligerent attitudes towards PWDs, research has reported that employers also neglect PWDs who possess significant work experiences (Ameri et al., 2018). The finding was a refutation to the strategies and initiatives of the government and training institutions to empower PWDs with the necessary qualifications and skills to facilitate successful labor market placement. Ameri et al. (2018) expounded upon employers' concerns that hiring PWDs would risk their organization due to assumed absenteeism, productivity, health, insurance costs, or customer or coworker reactions towards PWDs.

With regard to the privilege to possess a job, PWDs often encounter persistent barriers at work (Raymond et al., 2019). In addition, successful PWDs who have stable careers are also not exempt from encountering contentious experiences in socializing with their colleagues. This calls for an imperative need to integrate PWDs with the workforce ecosystem and to treat them as normal human beings. This notion was supported by Sundar et al. (2018) who posited that efforts to improve work-related self-efficacy and confidence among PWDs are necessary, with focus needing to be given primarily on coping mechanisms with the job environment. This is because the motivation to remain in the workforce is also a major challenge to some PWDs (Zyskowski et al., 2015).

A large number of demotivated PWDs end in poverty. Zyskowski et al. (2015) established that crowd work, which is a job that practices more collaborative effort, could encourage the generation of opportunities for PWDs that promise job flexibility and strong support systems. Once PWDs earn these benefits, they would then appreciate their association with the job and the responsibilities they have. Other concerns related to the flexibility of employment among PWDs have also been discussed in past research. For example, Pagán-Rodríguez (2009) believed that self-employment opportunities offer flexibility and better adjustment for those with a disability status and working life. Moreover, the levels of satisfaction with the job, type of job, and working conditions of self-employed disabled people are higher than those reported by disabled people who are wage and salary earners. Hence, policymakers could encourage self-employment to increase the employment and secure the wellbeing of PWDs.

Past research have reported that the barriers to employment among PWDs can vary. Gewurtz, Langan, and Shand (2016), for instance, listed seven factors related to the paucity of PWDs employment: 1) regulations versus practice, 2) stigma, 3) disclosure, 4) accommodations, 5) relationship building and use of disability organizations, 6) information and support to employers, and 7) hiring practices that invite people with disabilities. Hogan et al. (2012) concurred that the workplace accommodation for PWDs is disheartening, as appropriate facilities and infrastructures for PWDs should be in place to accommodate their needs and assist them to work effectively. All the aforementioned issues are still occurring, therefore, continuous efforts must be made such as round table discussions, research, and policymaking to support the employment of PWDs.

Research on the employment of PWDs have often highlighted issues of equity and equality within employment rather than delve into the specific skills needed by employers. Some research has indicated that the problem with PWDs' unemployment is not just their incapacity to work due to technological difficulties and unfavorable employer attitudes, but also the requirement for them to integrate employability skills that are highly valued in an organization (Guichard, 2018). However, scholars have not yet come to a consensus on how to define employability skills and soft skills.

In this study, employability skills are defined as the fundamental values, beliefs, qualities, and behaviors that are relevant to the labor market (Robles, 2012). In addition to the necessity to develop employability skills, PWDs can make a significant contribution that can be strengthened through the development of soft skills, which will increase their employability as well as their inclusion within the workforce and society.

Past studies have highlighted several distinct and essential employability skills that

PWDs require. While some employability skills traits—like communication, managerial and leadership, critical thinking, and analytical skills—are highly valued in today's workforce, other skills—like self-care, resilience, and tolerance, as well as adaptability and flexibility to the demands of the workforce—will increase the likelihood that people with disabilities (PWDs) will be employed.

2.5. Justification and Potential of PWDs Employment Through Employability Skills Development

Numerous reports and research findings have proven that developing PWDs for employment is worth studying. Likewise, employability skills have been set in past research as premises in applying for jobs across numerous sectors, including for PWDs. Employability skills are defined as transferable skills that are developed through the process of education from training institutions, innate talents, or through the influence of life experience. Employability skills have also evolved within the ever-changing job landscape. Leadership, teamwork, negotiation, communication, thinking are some examples of employability skills, however, this list is not exhaustive (Omar, Bakar, & Rashid, 2012).

In reflecting on the need for employability skills as necessary traits to warrant employment, PWDs are often deprived as they lack the exposure to this type of training. Ju, Zhang, and Pacha (2012) highlighted the importance of upskilling and training of employability skills as pillars to increase the likelihood of employment for PWDs. There is a consensus among researchers that personal integrity/honesty in work, ability to follow instructions, ability to show respect for others, ability to be on time, and ability to show high regard for safety procedures are crucial employability skills (Ju, Zhang, & Pacha, 2012), which has also been reported in other studies on ideal employability skills for PWDs (Ju, Pacha, Moore, & Zhang, 2014). Hence, employability skills have become the premise in hiring not only employees who are non-disabled individuals, but also PWDs.

Prior to this study, intervention programs to upskill and reskill PWDs have focused on employability skills that are valued by both educators and employers for individuals with and without disabilities. Past studies have also attempted to examine the discrepancies that occur in job markets. For example, Abd Halim, Muda, and Izam (2019) examined the employability skills among students with disabilities to uncover trends in the existing workforce environment. The study reported pivotal findings where students with some form of disability lack thinking skills, computer skills, and technology skills. This underscores the importance of the current workforce, whose skills are critical due to digitalization competitiveness in the market and new technologies (IMD, 2020).

Government agencies have admitted their frustrations in their attempt to empower the opportunity of employment among PWDs. As soon as employers devise a

proactive actions to assist PWDs to obtain employment, issues abound. The necessary skills that are often reported to be absent among PWDs include technical and soft skills. Most notably, the element of employability skills is often missing among PWDs. Employability skills encompass technical and soft skills that are required to survive in the workforce. Technical skills can be defined as the ability to perform specific practical or hands-on tasks, while soft skills are skills that are performed to get hired, retain employment and progress in one's career development (Omar, Bakar, & Rashid, 2012). Surprisingly, some studies have reported that potential employees who may considered for employment often struggle to remain employed due to lack of soft skills. Thus, PWDs must be aware of and develop these two types of skills to survive in today's challenging job market. Hence, this article seeks to explore soft skills or employability skills of PWDs who experienced a technical training program at a selected PWDs training institution. It is hoped that the findings of this study will provide enlightenment on the required skills by employers and consequently improve the employment rates of PWDs in Malaysia.

In past years, the serious efforts to uplift the lives of PWDs have been sporadic. These include studies that have been conducted to determine the number of registered PWDs in databases and cross-checking their pathways after completing educational programs, which is often discussed at the parliamentary level. These efforts have been made by stakeholders at various levels, yet, an accurate figure of PWD recruitment in Malaysia still cannot be determined. In addition, scholars have yet to reach a consensus on how to define employability skills and soft skills (Robles, 2012). Therefore, in order to gain a better understanding of the required employability skills, a quantitative survey was conducted to determine employers' perception of hiring PWDs in industries before an employability skills development training program was conducted for the PWDs in this study. Based on the findings from the quantitative study, specific employability skills based on seven themes were identified and later executed in the training program: (1) communication skills, (2) leadership and managerial skills, (3) active learning skills, (4) self-grooming skills, (5) resilience and tolerance, (6) adaptively and flexibility, and (7) critical thinking and analytical skills. After the implementation of the intervention program, the participants were asked about the employability skills they had developed based on the outcome of the program.

3. Methodology

A case study based on the qualitative inquiry was employed in this study to explore the employability skills that the PWDs had acquired during the training program. The structured employability skills training was developed and conducted by a professional image consultant company registered in Malaysia. The module was developed by the company according to employers' feedback regarding the specific employability skills needed on hiring PWDs, which are (1) communication skills,

(2) leadership and managerial skills, (3) active learning skills, (4) self-grooming skills, (5) resilience and tolerance, (6) adaptively and flexibility, and (7) critical thinking and analytical skills. Non-governmental agencies (NGOs) who provided support to PWDs were invited; the two NGOs that were involved in this project were the Gurney Training Center from the Malaysian Society for the Blind, and PWDs Support and Services Unit at Universiti Putra Malaysia (UPM). The research participants were students with Attention-Deficit/Hyperactivity Disorder (ADHD) syndrome who were enrolled in classes at UPM, as well as a group of students from skill training facilities run by the Malaysian Association for the Blind (MAB). After constructing the interview protocol, 21 respondents were chosen for interviews via the purposeful sampling method. The selection of respondents was done by identifying UPM Students with OKU cards from the Ministry of Women, Family, and Community Development. The program coordinator and the researcher collaborated closely to verify the list of OKU students who met the study's eligibility requirements. From this number, 20 participants were categorized under a certain level of blindness and one participant was an ADHD patient. The program itinerary is given in Table 1.

Table 1. Itinerary of the employability skills development program for PWDs

Date	Time	Activity
30 September 2020 (Wednesday)	8.30 AM - 9.00 AM	Opening Ceremony
	9.00AM - 10.30 AM	Module 1- Exploration of BETTER • First-class people (BETTER module) • Be prepared (B) with VUCA • The Employability Skills Framework
	10.30 AM - 10.45 AM	Breakfast
	10.45 AM - 1.00 PM	Module 2- Integrity Management • Building a personal integrity boundary • Enhancing work and personal ethics (E) • Integrity at workplace
	1.00PM - 2.30 PM	Lunch Break
	2.30 PM - 4.30 PM	Module 3- Communicate Effectively • Establish a trustworthy (T) environment • Exploring personal social style • Adapting social style to work best with others
	4.30 PM - 5.00 PM	Teatime and Dismiss
1 October 2020 (Thursday)	8.30 AM-10.30 AM	Module 4 - Approach to Problems • Tactful (T) in approaching a difficult situation • Problem-solving approach • PDCA analysis
	10.30 AM – 10.45 AM	Breakfast
	10.45 AM – 1.00 PM	Module 5 - Continuous development • Enable (E) yourself to learn new skills • Resources needed to learn • Practice make perfect
	1.00 PM - 2.30 PM	Lunch Break
	2.30 PM – 4.30 PM	Module 6 - Mirror yourself • Re-evaluate (R) yourself • Exploring opportunities • Award yourself
	4.30 PM - 5.00 PM	Teatime and Dismiss
2 October 2020 (Friday)	8.30 AM-10.30 AM	Module 7 – Professional Image Branding • Exploring style personality • Men's & Women's Professional Wear
	10.30 AM – 10.45 AM	Breakfast
	10.45AM – 12.30 PM	Module 7 (Continue)
	12.30 PM - 12.45 PM	Q&A
	12.45 PM	Closing Ceremony

After the three-day employability skills development program, the participants were invited to a one-month focus group discussion (FGD) to share and reflect on their experiences and opinions on the training program. The participants were invited to call in, toll-free, to a group call regularly after completing the employability skills

program. The FGD sessions involved open discussions of participants' feedback both synchronously and asynchronously via structured questions using the WhatsApp instant messaging application. This was to facilitate the participants' engagement in sharing the employability skills that they had acquired during the training program. A question was posted daily in the application, and the participants could choose to give feedback in the WhatsApp group which had been created before the FGD or via private message. The feedback from the participants on the intervention program was collected through a single case study semi-structured interview session. The narratives were collected and encoded in Microsoft Excel for documentation. The Excel spreadsheet was then transferred to the Atlas.ti advanced qualitative analysis software to conduct the thematic analysis.

4. Findings

The thematic qualitative analysis was conducted using a computer-assisted qualitative data analysis software (CAQDAS) namely Atlas.ti (version. 9) for 10 pages of interview transcripts. The software was used to organize the data, conduct exploration and extraction of themes, and present the findings. The purpose of the interview was to determine the employability skills which the participants had acquired during the "Employability Skills Development Program for Orang Kurang Upaya (People with Disabilities) (ESDP-OKU)". The data was examined using thematic analysis. As the initial step in the qualitative data analysis process, the topic analysis involved interview transcription. Atlas.ti (version. 9) was used to classify and code the narrative's textual results. The program computed the pattern to find matching codes and improve the search accuracy in the data. To create the thematic analysis, the codes were updated. Lastly, a peer-checking and validation procedure was conducted to cross-check the specifics of the themes and meanings. Based on the analysis, a total of seven themes and 57 quotations related to employability skills were derived from the interview transcripts. The themes were (1) communication skills, (2) leadership and managerial skills, (3) active learning skills, (4) self-grooming skills, (5) resilience and tolerance, (6) adaptively and flexibility, and (7) critical thinking and analytical skills.

Specifically, from the derived quotations, 11 (19.3%) were related to communication skills, 10 (17.5%) were related to leadership and managerial skills, 10 (17.5%) were related to active learning skills, nine (15.8%) were related to self-grooming skills, six (10.5%) were related to resilience and tolerance, six (10.5%) were related to adaptivity and flexibility, and five (8.8%) were related to critical thinking and analytical skills. The following subtopics narrate the themes along with the quotations.

4.1. Communication skills

Collectively, the OKU students conveyed that they had acquired proper

communication skills during the ESDP-OKU training session. A total of 11 quotations (19.3%) related to communication skills were extracted. For instance, Informant 1 asserted that he/she had acquired the skills to communicate with individuals of different backgrounds and in various settings:

"…the skills I got were communication skills at all levels and situations." (1:28 para(s) 19 in Informant 1)

Similarly, Informant 2 also asserted that he/she managed to learn the proper way of communicating when speaking to a higher level of personnel in an organization as well as in public:

"And also the style of language I should use when dealing with superiors, and the style of language I should use when dealing with other people." (2:10 para(s) 13 in Informant 2)

Informant 3 also noted that during the ESDP-OKU, he/she was able to acquire proper communication skills:

"New skill that I learned while at UPM, I learned how to communicate well…" (3:8 para(s) 16 in Informant 3)

Last but not least, Informant 5 asserted that the ESDP-OKU had changed his perception especially on how to communicate with others:

"What changed my perception during the program was the way we communicate with others." (5:9 para(s) 16 in Informant 5)

4.2. Leadership and managerial skills

The second theme related to employability skills is leadership and managerial skills. A total number of 10 quotations (17.5%) were extracted. For instance, Informant 1 conveyed that he/she managed to acquire leadership and managerial skills, especially in managing an organization during the ESDP-OKU training session:

"The skills I got were leadership skills…" (1:35 para(s) 24 in Informant 1)

"…and also the skills of managing an organization." (1:36 para(s) 24 in Informant 1)

On the same note, Informant 2 asserted that he/she managed to acquire leadership and managerial skills, particularly in managing an organization, during the ESDP-OKU training session:

"The skills I got were leadership skills… and the skills to manage an organization." (2:18 para(s) 19 in Informant 2)

4.3. Active learning skills

The third theme related to employability skills is active learning. A total of 10

quotations (17.5%) were extracted. For instance, Informant 1 said that he/she actively took part in the ESDP-OKU training session, especially the personality test activity. From this, he/she learned how to identify his/her strengths and weaknesses:

"During the program at UPM, I learned how to evaluate the strengths and weaknesses of oneself. Like me, my advantage is… I am good at reflexes, and my strength, I am willing to try things that other people are reluctant to try." (3:3 para(s) 10 in Informant 3)

Similarly, Informant 4 agreed that the personality test activity allowed him/her to actively rediscover him/herself:

"…the most interesting aspect was that I now perceive personality testing from a different perspective. Once the personality test is done we could better understand ourselves, even to the smallest details, it does important." (4:8 para(s) 14 in Informant 4)

The same active involvement was also observed in Informant 5. He/she affirmed that he/she could apply all the knowledge acquired in the actual working environment:

"I feel happy because I got a lot of knowledge from this program and it can be... actually applied when I am an adult and in my career." (5:11 para(s) 18 in Informant 5)

Lastly, similar to Informant 5, Informant 6 was also actively involved in the activities during the ESDP-OKU and agreed that all the activities were fun and he/she acquired a lot of new knowledge:

"…this program is really fun. Everything is fun, for me. I can learn a lot of new knowledge. " (6:3 para(s) 10 in Informant 6)

4.4. Self-grooming skills

The fourth theme related to employability skills is self-grooming. A total of nine quotations (15.8%) were extracted. To illustrate, Informant 1 affirmed that he/she acquired the skills on how to dress for work, especially for the public and private sectors:

"…I have knowledge about self-appearance when we work in the government sector or in the private sector, working in the office." (1:30 para(s) 21 in Informant 1)

On the same note, Informant 2 asserted that during the ESDP-OKU training session, he/she managed to acquire skills on how to present him/herself properly for work:

"Before this, I would not know how to groom myself. But when I take part in the program, I know that whenever I enter the job market, I could prepare myself in terms of self-appearance…" (2:8 para(s) 12 in Informant 2)

Similar to Informant 1 and 2, Informant 3 also agreed that during the ESDP-OKU

training session, he/she was introduced to the skill of choosing the right dress for work, as well as the right perfume to wear for the right occasion:

"During the program at UPM for three days, I gained a lot of knowledge. For instance, I learned how to choose the appropriate attire for a job, and I learned how to choose the right perfume…" (3:1 para(s) 8 in Informant 3)

Informant 4 and 5 similarly agreed that they needed to dress properly and be presentable when working, hence the acquisition of self-grooming skills was considered important:

"Even though we are handicapped, we still need to dress neatly. Only then, we could try new things." (4:13 para(s) 20 in Informant 4)

"…self-grooming." (5:2 para(s) 8 in Informant 5)

4.5. Resilience and tolerance

The fifth theme related to employability skills is resilience and tolerance. A total of six quotations (10.5%) were extracted. To illustrate, Informant 1 asserted that the ESDP-OKU training had changed his/her paradigm toward the challenges in the working environment; they also became more resilient and tolerant:

"…But now it changes my view that I could face challenges in a workplace, especially in the government sector, and I'm confident I could do well and I could face new challenges." (1:24 para(s) 17 in Informant 1)

On the same note, Informant 2 agreed that the ESDP-OKU training had made him/her stronger especially in controlling his/her emotions:

"What I got for myself, from the program was… the strength of being able to control my emotions…" (2:6 para(s) 12 in Informant 2)

Informant 3 also affirmed that the ESDP-OKU training had managed to lift his/her confidence level and made him/her ready to face challenges and solve any predicament:

"After I joined the program that day, I was able to convince myself and uplift my spirit, especially in... dealing with problems. I could uplift my spirit and solving problems. It doesn't matter whether the problem is big or small." (3:4 para(s) 12 in Informant 3)

4.6. Adaptivity and flexibility

The sixth theme related to employability skills is adaptability and flexibility. A total of six quotations (10.5%) were extracted. Firstly, Informant 1 mentioned that he/she was able to adapt and be flexible in dealing with colleagues at work as well as with individuals in certain situations after attending the ESDP-OKU training:

"…I learned about the ways of dealing with others at work. And also dealing with

certain people in certain situations…" (1:37 para(s) 23 in Informant 1)

Similarly, Informant 2 also mentioned that he/she could adapt and be flexible in dealing with colleagues at work and deal with individuals in certain situations after attending the ESDP-OKU training:

"…the interesting thing for me is that…I learned about the ways of dealing with everyone at work, and also when dealing with certain people in certain situations." (2:47 para(s) 17 in Informant 2)

On the same note, Informant 3 mentioned that during the ESDP-OKU training, he/she was able to acquire the skills of adapting to a new environment:

"…secondly I was able to learn how to survive in new places, places I am not used to with." (3:9 para(s) 16 in Informant 3)

Similar to Informant 3, Informant 4 mentioned that during the ESDP-OKU training, he/she was able to acquire the skills of adapting to a new environment:

"…we could adapt to our surroundings." (4:11 para(s) 18 in Informant 4)

Last but not least, Informant 5 mentioned that he/she was able to adapt and be flexible in dealing with colleagues at work after attending the ESDP-OKU training:

"…at work, we will experience various challenges, various obstacles. Not just yourself but others as well. Therefore, we need to be able to adjust ourselves with the people that we are working with, and the people who will... uhh hire us." (5:5 para(s) 8 in Informant 5)

4.7. Critical thinking and analytical skills

The seventh theme related to employability skills is critical thinking and analytical skills. A total number of five quotations (8.8%) were extracted. To elucidate, Informant 3 asserted that the 'Eiffel Tower' activity during the ESDP-OKU training was challenging and required him/her to think critically and analyze the possible ways of raising the tower:

"During the program, the most interesting thing for me was that each group has to build the Eiffel Tower. I thought building the Eiffel Tower was easy but it turns out to be difficult. Just like working where... nothing comes easy. It's all hard work... hard work. That's my opinion." (3:7 para(s) 14 in Informant 3)

As for Informant 4, he/she learned to observe and determine individual personalities in a working environment:

"I guess the new skill I got was how to know the types of people when I am at work. Uhh, umm, during the program, it was stated that there are four types of temperaments or personality traits of an individual… So it is a new skill that is very

useful for uhh, we as OKU, to evaluate people and ourselves." (4:10 para(s) 18 in Informant 4)

Informant 4 also developed his/her ability to think and analyze critically through one of the activities conducted during the ESDP-OKU training, which focused on determining several situations in a working environment:

"…as for example, the islands activities provided, we need certain skills to determine the situation that we are in. And from there maybe... it will be useful when we enter the workforce." (4:14 para(s) 20 in Informant 4)

5.   Summary of findings

The purpose of this study was to determine the employability skills acquired by OKU students during the ESDP-OKU. Overall, based on the thematic qualitative analysis, a total number of seven themes related to employability skills were derived from the interview transcripts. The themes were (1) communication skills, (2) leadership and managerial skills, (3) active learning skills, (4) self-grooming skills, (5) resilience and tolerance, (6) adaptivity and flexibility, and (7) critical thinking and analytical skills. Table 2 shows the distribution of quotations according to each theme.

Table 2. Distribution of quotation according to theme

No.	Theme	No. of Quotation	Percentage (%)	Related Modules
1	Communication skills	11	19.3%	3
2	Leadership and managerial skills	10	17.5%	2
3	Active learning skills	10	17.5%	5
4	Self-grooming skills	9	15.8%	7
5	Resilience and tolerance	6	10.5%	6
6	Adaptivity and flexibility	6	10.5%	5
7	Critical thinking and analytical skills	5	8.8%	4
	Total	**57**	**100.0%**	

6.   Implications and Recommendations

PWDs' involvement in employment has been studied over the last few decades as driven by national initiatives on creating awareness and increasing the participation of PWDs in the country. However, there has been little discussion on the execution phase of the plans that had been developed based on the established policies and documents. Rather, it can be observed that most of the attention of public and private stakeholders had been paid to the preparation of facilities and accommodation to PWDs in the work area. As a result, the focus on talents and skills that PWDs should acquire for employability has been largely overlooked.

This study determined the specific employability skills that are highly demanded by employers not only for prospective employees who do not have any form of disability, but also skills that can lead to a positive perception among employers for those who have disabilities. Based on the qualitative analysis, this study focused on the development of employability skills among PWDs. Research on PWDs employment have often focused on equality and fairness in employment opportunities rather than explore the skills that are required by employers. This is despite the fact that skills are an important factor to be considered in securing employment. Hence, there remains a crucial question regarding the capabilities and capacities of the workforce among PWDs to perform job tasks. Despite automation and assistive technologies aiding motion and product creation, the role of PWDs in employment should not be neglected. Economic challenges, employee retrenchment, and company downsizing policies have made it particularly difficult for one to secure employment. Robles (2012) argued that technical and hard skills are no longer considered primary skills in getting access to the workforce. He added that the complexity of technological evolution due to globalization has transformed the landscape of the workforce to demand new skills for job success and talent retention within organizations.

In today's global society, the ability to adapt and cope with the new workforce ecosystem such as the gig-economy, e-commerce, and industrial revolution has led to a severe disregard for the role of PWDs. These challenges in recruiting PWDs in an organization are exacerbated by the impact of COVID-19, which has led to constant changes in the work environment. Work-from-home, for instance, has become a common practice, which in theory should be advantageous to PWDs as it makes commuting to the workplace unnecessary. Hence, as a new norm for PWDs, having an internet connection and proper technologies such as computers and mobile phones should suffice for them to perform specific tasks. However, based on past literature, the issue related to PWD unemployment is not simply due to the technical inability of the PWD to work or the negative perceptions of employers; rather, there exists a need for PWDs to also possess mainstream employability skills that are highly emphasized in an organization. Guichard (2018) highlighted that the ability to recognize opportunities, self-determination, career adaptability, employability, self-efficacy beliefs, and the ability to integrate all personal changes into life stories in a meaningful way are workforce survival 'kits' for today's employment. These skills also applicable to other employees who do not have any form of disability.

Employment trends today are becoming increasingly distressing and demanding. Despite organizations' need for employees who possess a myriad of theoretical and practical skills, the direction for job recruitment often remains elusive. Potential employees who are resourceful, have positive attitudes, and who are proficient in specific job requirements are sometimes less attractive to some organizations. More

notably, employers in the digital age yearn for outstanding employees who have multiple skills and who can be employable for different types of responsibilities. The fact is that some common jobs such as travel agents, bank tellers, and cooks may someday be replaced by automated machines and technologies (Phillpott, 2021). As the ways in which people perform a job change, employees must continue to align themselves to current trends by developing skills that are impossible for any form of technology to perform, including soft skills and employability skills.

A considerable amount of literature has been published to define employability skills. These studies have produced numerous terminologies to describe the employability skills required in the workplace. Among some examples are transferable skills (O'Neil, Allred & Baker, 1997), career skills (Smith & Krüger, 2011), and work readiness skills (Zinser, 2003) to describe the value of non-technical skills. Additionally, Omar, Bakar, and Rashid (2012) proposed employability skills as transferable skills that are consistently used in the workforce, which can be gained from knowledge and training.

Employability skills can also be developed from values and personality growth through learning and experience. Leadership, teamwork, negotiation, communication, and creative and critical thinking skills are among the employability skills that are relevant to the current work environment. While scholars have yet to reach a consensus on soft skills and employability skills, the meaning of employability skills can be conceptualized as core values, beliefs, traits, and behaviors that are relevant to the job market (Robles, 2012).

A range of life and skillsets are crucial to strive and thrive in today's workforce. In addition to the need to develop employability skills, the empowerment of PWDs through soft skills development is important to improve their employability and enhance social and workforce inclusion. Hence, the findings of this study uncovered unique and vital employability skills that are needed among PWDs. While a few of the employability skills are generally highly demanded in today's workforce, such as communication skills, leadership and managerial skills, critical thinking, and analytical skills, other skills such as active learning skills, self-grooming skills, resilience, and tolerance, and adaptivity and flexibility to the workforce nature can in particular improve the likelihood of PWDs to position themselves in the job market.

Numerous studies have attempted to determine the soft skills that are needed in the workforce (Santilli et al., 2018). Lippman et al. (2015), for instance, compared over 172 studies over the last 20 years that focused on specific soft skills required by employers. They found the following to be particularly important: (a) social skills, referring to a set of skills to collaborate with others, including cultural sensitivity, context-appropriate behaviors, ability to act in line with social norms and resolve

conflicts; (b) higher-order thinking, including problem-solving, critical thinking and decision-making; (c) communication skills, referring to good expression, transmission, understanding as well as interpretation of knowledge and ideas; (d) self-control, regarding the ability to delay gratification, self-control, direct and focus attention as well as regulate feeling and behaviors; and (e) positive self-concept, including self-confidence, self-awareness, self-esteem as well as a sense of well-being and pride. Building on the premise that the aforementioned skills are relevant to employability, as discovered in this research, the complexity of the skills would also evolve depending on the nature of the organization and industrial landscape.

It is recommended for future research to analyze other factors related to employability traits and employ different methods of collecting research data to arrive at a more accurate description of the skills needed for the job market (Matteson et al., 2016), particularly for PWDs' decreased job opportunities as evidenced in the research. Müller and VanGilder (2014) posited that the perception of lack of soft skills in individuals with a disability is one of the main factors that makes it difficult for PWDs to find and maintain permanent and paid jobs. In addition, they added that PWDs often undergo interventions that do not necessarily help with soft skills development. These interventions include attendance at special contexts, high levels of contact with educational or socio-medical staff, low social contacts with peers, as well as low quality training. Consequently, all these can reduce the development of the social, communicative, problem-solving, and higher-thinking skills of PWDs (Lindsay et al., 2014; Nota, Soresi, Ferrari, & Solberg, 2008).

It cannot be denied that PWDs face great challenges in positioning themselves in the job market, which is compounded by the negative perceptions of their capabilities in performing a specific task. As the job market is dominated by individuals who are not disabled, the recruitment of PWDs becomes more uncertain. Therefore, the findings of this research shed light on different ways to tackle the issue of unemployment among PWDs. Soft skills development in particular was identified as an influential factor of job success across different levels of employment (Lippman et al., 2015; Santilli, 2018). By developing employability skills or soft skills among PWD through educational and training programs, they are more likely to survive in the job market.

PWDs can impress and excel in their job responsibilities through tangible efforts to fulfill certain job responsibilities that increase retention and motivation to work; in fact, these can also become the factors for employers to hire them. Building a positive perception on the reputation of PWDs could create a more inclusive job landscape. The absence of employability skills among PWDs is also linked to the discrimination of opportunities in the job market. Lindsay et al. (2014), for instance, demonstrated that employers' perspectives in recruiting people with a handicap were pessimistic as they had unjust perceptions that PWDs were less skillful, particularly in their social

and networking abilities, compared to other colleagues. Hence, the mastery of soft skills can bring advantages and benefits to employees in accessing decent job opportunities. Potential employees that have the necessary employability skills could also secure more job offers and opportunities to enter the workforce that may improve their quality of life (Lippman et al., 2015). This is particularly true for those who are marginalized and isolated from fair job opportunities, such as the struggle faced by PWDs.

Given these pivotal aspects of job success among PWDs, reskilling and upskilling programs should be employed to help increase PWDs' opportunities to secure jobs. With regard to training programs that aim to develop specific soft skills in individuals with a disability, this study makes special mention to employability skills development for PWDs that aim to promote the most relevant skills in today's job market, including soft skills that focus on typical social situations in the workplace for any type of employee. Specifically, it is hoped that the intervention can increase the participation of PWDs in the workforce without neglecting their talents and potential.

7. Conclusion

The present study was conducted to explore the employability skills that were gained by PWDs after attending an intervention training program. The case study analysis revealed seven vital skills to thrive in the workforce especially among PWDs: (a) communication skills, (b) leadership and managerial skills, (c) active learning skills, (d) self-grooming skills, (e) resilience and tolerance, (f) adaptivity and flexibility, and (g) critical thinking and analytical skills. Practically, the above employability skills are significant for PWDs employment. Following this, education and training institutions that are associated with PWDs should strategize and revise their training modules to be more vigorous in producing employable PWDs for the job market. Therefore, a systematic and structured curriculum that integrates employability skills training should be developed to foster the skills that are demanded among PWDs. Relevant instructors and mentors should also facilitate PWDs' employability skills through daily practices that include communication, problem-solving, and other related skills similar to the findings of this study. The emergent traits from the findings of this study tallied with the skills needed by current industrial players and corroborate existing employable trends. While the current job market seems prejudiced against PWD, the values and traits developed during reskilling and upskilling programs can be beneficial for them to venture into other occupations that are beyond their area of expertise. In addition, PWDs can also venture into entrepreneurship as a promising alternative. PWDs should strive to enhance their prospects by engaging in training that supports the development of employability and soft skills that can increase the likelihood of getting recruited by potential organizations. Future research should focus on a longitudinal investigation of PWDs'

employment. For instance, a comprehensive investigation on the influence of employability skills among PWDs' career development can fulfill the gap in this study. Possible research directions could also include the process of developing employability skills through training modules and identify best practices in employability skills training.

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THE ELEMENTS FOR DESIGNING AND DEVELOPING THE FRONT OFFICE INSTRUCTIONAL MODULE: FUZZY DELPHI TECHNIQUE

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ABSTRACT

Incorporating experiential learning methods into classroom activities is crucial for creating an immersive on-campus experience. Front Office students require proficiency in communication, practical skills, knowledge application, and dispositional skills. This study aims to identify the essential elements necessary to integrate scenarios and resources for designing an online scenario-based learning module named the e-SBL FOIM-ATG for front-office courses in a Community College. The research design follows a quantitative approach, utilizing the Fuzzy Delphi technique. Research data was collected through a questionnaire administered to fifteen experts specializing in hospitality (Front Office), educational technology, scenario-based learning, and curriculum development. Analysis of the data revealed that the experts reached a consensus on all elements, with consensus values exceeding 75%, threshold value (d) $\leq$ 0.2, and fuzzy score (A) $\geq$ α-cut value = 0.5. This consensus confirms the importance of these elements in developing the Front Office Instructional Module – Advise the Guest at the Community College. This research holds significant implications for lecturers, students, and the broader education system in Malaysia, promoting the adoption of scenario-based active learning as a transformative educational approach.

Keywords: Experiential learning, scenario-based learning, customer-centric, hospitality industrt, Fuzzy Delphi, Front Office

1. Introduction

The hotel industry assumes a pivotal role in propelling Malaysia's economic growth (Sangaran & Selvanayagam, 2021), thereby necessitating a concerted focus on the development and augmentation of the competencies possessed by front-office professionals who occupy the vanguard of delivering superior services to esteemed guests (Sri Astuti et al., 2018). Paramount among these competencies are effective communication, cultural understanding, and customer service, all of which play an indispensable role in crafting exceptional guest experiences (Gawuna, 2019). Thus, the Front Office Department within hotels is a critical locus of interaction between guests and hotel staff, and the proficiency of front office professionals significantly influences guest impressions and satisfaction (Gumaste et al., 2015).

The ADDIE model is a method often used to design an iterative instructional design framework. For this study, the focus is on the design stage under the ADDIE model. In this stage, the fuzzy Delphi method (FDM), a methodological approach that, while robust, remains relatively underexplored, would be utilized. Serving as the Design stage, FDM facilitates expert consensus to identify and prioritize essential elements, thereby laying the groundwork for subsequent stages such as Development, Implementation, and Evaluation.

However, it is imperative to underscore that this paper intricately revolves around the Fuzzy Delphi Method (FDM). Our narrative aligns with the ADDIE model, with an unwavering focus on leveraging FDM to discern and define the essential elements necessary for constructing an online scenario-based learning module (e-SBL FOIM-ATG) tailored for Front Office courses in a Community College. This unique emphasis distinguishes our approach and positions FDM as the cornerstone of our instructional design framework.

1.1 Problem Statement

The hospitality industry is constantly changing, and institutions need to keep up with the latest trends to provide students with the best education possible (Musseau, 2023). In Malaysia, the hospitality and tourism industry is threatened by an acute shortage of skilled employees (Hussain, Ragavan et al., 2020). These shortages compel this industry to create 600,000 new job opportunities in Malaysia, and thus, the demand for more skilled, work-ready graduates in the coming decade is unparalleled (Hussain, Ahmad et al., 2020). Kasa et al. (2020) also stressed that critical thinking and interpersonal skills are crucial generic skills to be equipped for graduates. Also, Lugosi and Jameson (2017) found that including practical and experiential elements of hospitality courses is paramount to developing highly employable graduates. Therefore, the need to shift the focus from the traditional concepts of teaching to developing skills for course facilitation is dire (Musseau, 2023), as they guide and help students to learn independently (Weill, 2023). Added

by Weill (2023), technology plays a key role in contemporary hospitality instructor training. E-learning platforms, virtual simulations, and other digital resources can help learning centers enhance their training effectiveness. However, most educational institutions, including Community College Malaysia, face challenges in terms of limited resources, time constraints, and outdated training methods (Weill, 2023).

In response to this research problem, the study aims to identify the essential elements necessary to integrate scenarios and resources for designing an online scenario-based learning module, namely, e-SBL FOIM-ATG, for Front Office courses in a Community College. The objectives are two-fold:

i. To identify the main components of the Front Office Instructional Module based on expert consensus.

ii. To identify the elements in the main component of the Front Office Instructional Module based on expert consensus.

2. Literature Review

2.1 Front Office Course in Community College

The Front Office course offered by community colleges holds a pivotal role in the Hotel Operation certificate. It aims to instill knowledge and practical skills crucial for effective hotel management, including check-in, check-out, reservation processing, bill settlement, guest service management, and complaint handling. However, the inherent challenges arising from these short courses have been identified (Kipli et al., 2021; Brennen, 2017), particularly in the acquisition of essential soft skills (Ivančič et al., 2023; Poláková et al., 2023). These soft skills are paramount in the dynamic and customer-centric hospitality industry.

Educators at community colleges face resource constraints, which make it difficult to engage students effectively. Teaching aids and support materials are often insufficient (Chijioke & Naade, 2018; Widiyatmoko & Nurmasitah, 2013), and they can hinder the successful execution of practical sessions. Consequently, students sometimes struggle to grasp materials and actively participate in the learning process.

While innovative teaching approaches are noted for their potential to empower educators and enhance student motivation and comprehension (Trang & Phuc, 2020; Answer, 2019; Mohamad & Ismail, 2018), these approaches need to be explicitly connected to the essential elements required for the proposed online scenario-based learning module. Therefore, the proposed module, named e-SBL FOIM-ATG, seeks to bridge the gap between theory and practice by emphasizing active learning, experiential learning, and the strategic application of technology.

Aligning with contemporary education paradigms and the Industry 4.0 era, the integration of modern technology and pragmatic learning is strongly emphasized (Ministry of Education Malaysia, 2014). To address the challenges identified and cultivate 21st-century competencies such as creativity, innovation, collaboration, critical thinking, and communication among students, this study advocates for a curriculum that incorporates values related to critical thinking and problem-solving skills (Maniram, 2022; Stone et al., 2017).

2.2. Experiential Learning in Hospitality

In the realm of hospitality education, experiential learning techniques are widely embraced to enhance critical thinking skills and bridge the gap between theory and practice. Brennen (2017) and Askren (2017) highlighted the significance of experiential learning in preparing students for the hospitality industry, emphasizing the need for practical experiences. Scenario-based learning and learning-by-doing are advocated as valuable tools (Md Abdul Haseeb, 2018). Kong's (2021) review emphasizes how experiential learning fosters motivation and engagement and promotes active learning and real-world experiences. Simultaneous role-playing, as demonstrated in Ampountolas et al.'s (2018) study, is acknowledged for enhancing practical comprehension and confidence. Parnrod and Panrod (2019) underscore the four essential 21st-century skills, communication, collaboration, critical thinking, and creativity, which are necessary for success in hospitality careers. Based on the previous studies above, experiential learning techniques can serve as an effective method for developing essential 21st-century skills among students. This study aligns with Bartle's (2015) emphasis on acquiring "21st-century abilities" alongside core curriculum knowledge, recognizing the broader scope of skills and traits crucial in the contemporary world.

2.3. Kolb's Experiential Learning Cycle (1984)

Kolb's Experiential Learning Cycle (1984) highlights an active, hands-on approach known as "learning by doing." This method emphasizes engagement and adaptation through interaction with the environment. This method shifts away from a teacher-centered model, as it fosters direct experiences tied to real-world issues and encourages collaboration among students. The teacher's role is to facilitate rather than direct student growth, aligning with the principles of active experimentation and reflective observation. This method introduces the four-step learning cycle that involves concrete experience (where students engage in practical problem-solving), reflection (during which they review and observe), abstract conceptualization (where knowledge is extrapolated from reflection), and active experimentation (students adapt prior knowledge based on new theories developed through experience). This approach is applicable in both educational and on-the-job training settings, promoting a dynamic and holistic learning experience. In this study, the proposed

module will integrate these four cycles, as shown in Figure 1.
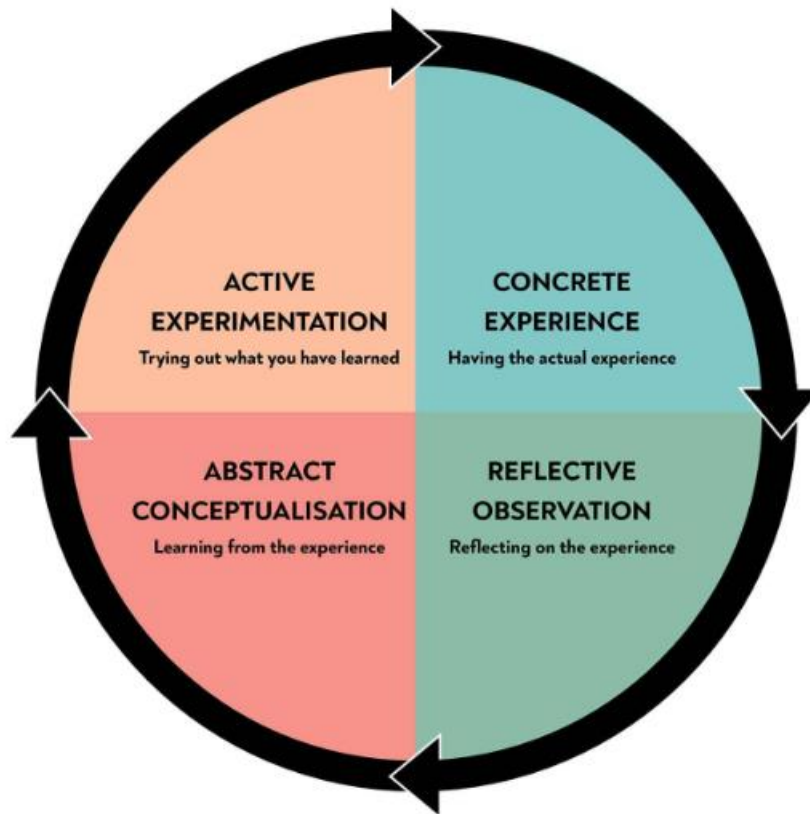
Figure 1: Kolb Experiential Learning Cycle (1984)

(Source: McLeod, 2017)

2.4. Social Learning Theory

Albert Bandura's Social Learning Theory underscores the significance of observation, modeling, and imitation of others' actions, attitudes, and emotions. Aligned with behaviorist theories like classical and operant conditioning, Social Learning Theory (SLT) emphasizes that effective learning occurs through social interactions, where individuals imitate behavior observed in their environment. Bandura introduces two key concepts: mediating processes in the interaction between stimuli and responses and observational learning as the method to assist in acquiring the behavior. Four mediational procedures—attention, retention, reproduction, and motivation—are outlined, emphasizing the importance of focused attention, vivid recall, active reproduction of observed behavior, and motivation for successful imitation. Bandura's SLT provides insights into the cognitive and environmental factors influencing learning and behavior. In this study, these four processes will also be integrated into the proposed module, as shown in Figure 2
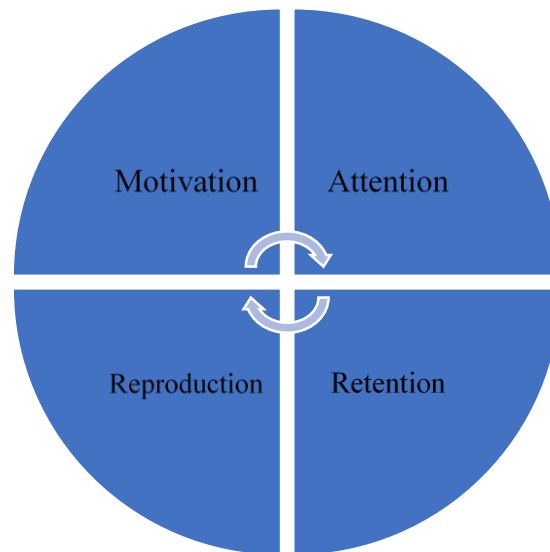
Figure 2: Bandura (1977) Four Mediational Procedures

2.5. Learning by Doing Theory [Goal-Based Scenarios Elements (GBS)]

Experiential learning is recognized as an effective pedagogical approach (Çinar, 2020), and it has been encompassed in numerous methods such as service-learning projects, field trips, internships, role-play, apprenticeships, and simulations. Integrating this theory into these methods comes with unique strengths and challenges (Acharya et al., 2019; Lei & Lam, 2021; Nyanjom et al., 2020; Pratt & Hahn, 2016; Rong-Da Liang, 2021). Goal-based scenarios (GBS), a learn-by-doing assignment, involve students performing roles individually or in groups to achieve specific objectives (Schank, 1996). This strategy fosters active learning, sustaining student motivation, and enhancing critical thinking and problem-solving skills (Kim, 2018; Park, 2017). GBS has seven components: learning objectives, mission, cover story, role, scenario operations, resources, and feedback, and they are crucial for effective implementation (Schank et al., 1999). In this study, these GBS elements were adapted to develop a module using Wakelet as the platform, providing a structured and immersive learning environment, as shown in Figure 3.

| Goal |
| Mission |
| Cover story |
| Role |
| Scenario Operation |
| Resource |
| Feedback |
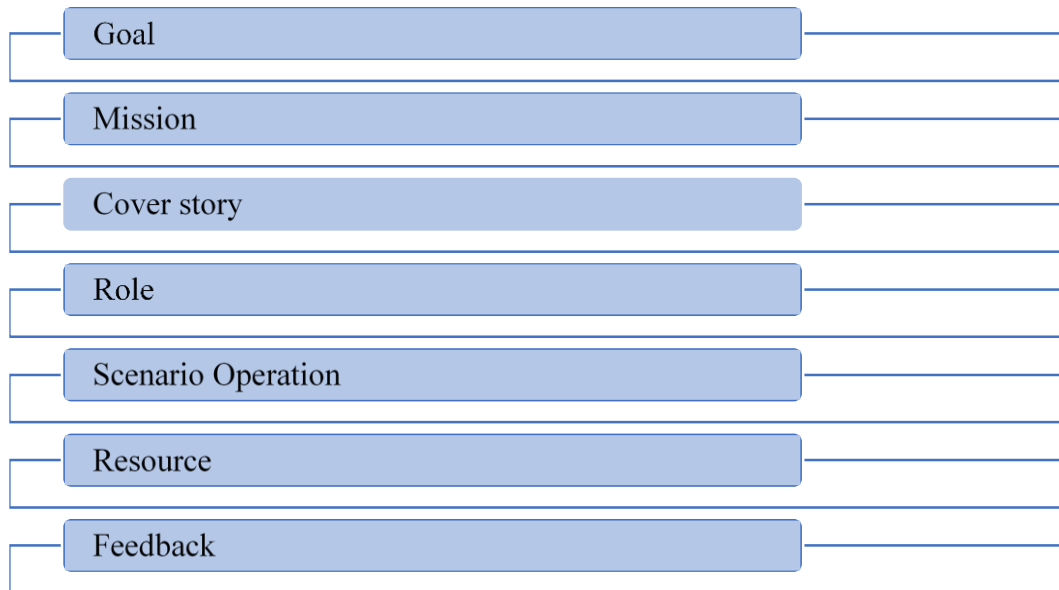
Figure 3: Goal-Based Scenario's Elements

2.6. Analysis, Design, Development, Implementation and Evaluation (ADDIE) Model

In developing instructional modules, researchers have the flexibility to choose a suitable model. In this study, the Analysis, Design, Development, Implementation, and Evaluation (ADDIE) model is employed. Recognized for its straightforward and widely accepted processes, the ADDIE model was chosen to streamline the development of the Front Office Instructional Module (FOIM) systematically, saving time and costs. The ADDIE model is a systematic instructional design framework consisting of five sequential phases: Analysis (identifying learning challenges, objectives, audience demands, and prior knowledge), Design (setting systematic learning objectives), Development (simulation content and instructional materials are produced), Implementation (the simulation technique is practiced and training processes are established for teachers and learners), and Evaluation (formative and summative evaluations at each ADDIE process level). The application of ADDIE ensures a systematic and effective approach to module development, aligning with recent educational research trends (Khalil & Elkhider, 2016; Lim & Han, 2020). The focus of this study is on the Design phase. During the Design phase, specific attention was given to setting clear learning objectives, establishing the structure of the instructional modules, and determining the overall instructional strategy. In this study, this phase played a crucial role in shaping the educational content, scenario-based learning elements, and the overall approach to enhancing students' learning experiences for front-office operations. The design decisions made during this phase are integral to ensuring the systematic development and effectiveness of the instructional modules. To ensure that the proposed module is suitable for practice,

the Fuzzy Delphi Method (FDM) was used in this study.
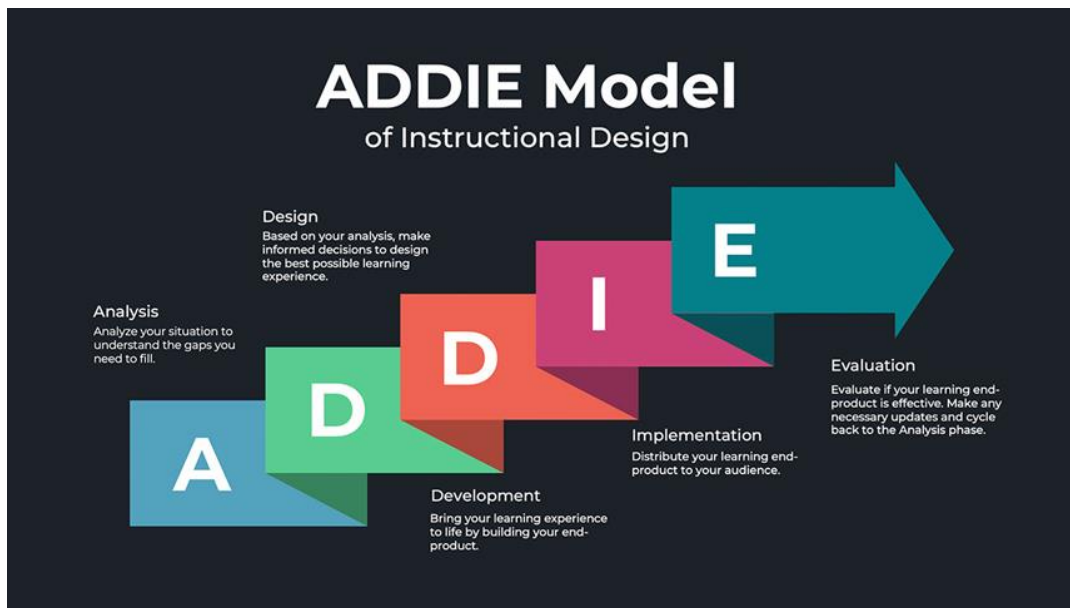
Figure 4: ADDIE Model

(Source: DeBell, 2020)

2.7. Conceptual Framework

The conceptual framework of the current study integrates Bandura's Social Learning Theory (1977), Kolb's Experiential Learning Cycle (1984), and the learning-by-doing theory (Schank et al., 1999). The theories were applied to enhance students' learning experiences and cultivate 21st-century skills. Through the Experiential Learning Cycle and Social Learning Theory, students engage in role-playing within authentic scenarios that include goal-based scenario elements. This approach aligns with the four-stage experiential learning cycles and Bandura's four processes. The study focuses on students' learning experiences, specifically gained through role-playing in authentic scenarios, aiming to significantly impact the teaching of the Front Office subject, fostering a more engaging educational approach for the future. A conceptual framework for this study is shown in Figure 5.
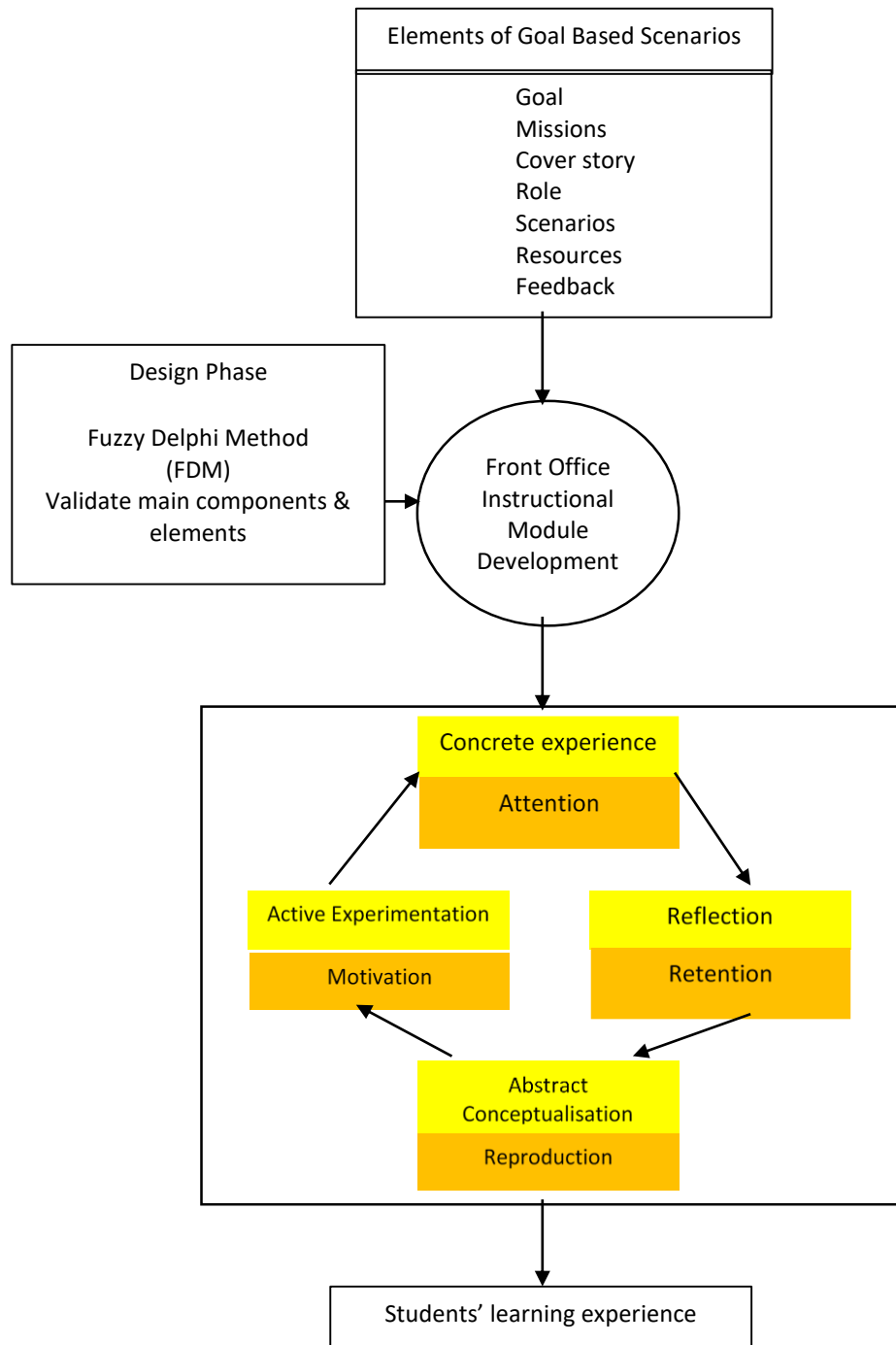
Figure 5: Conceptual Framework

2.8. Theoretical Framework

The theoretical framework of this study is grounded in three main theories: Learning by Doing Theory (Goal-based Scenarios), Kolb's Experiential Learning Theory, and Social Learning Theory. These frameworks suggest that effective learning occurs

through active engagement, particularly in role-playing in authentic scenarios. The role-playing activities are designed to directly align with the mission and goals, incorporating decision points and various operations to enhance students' skills. During role-playing, standardized clients or guests are utilized to simulate realistic scenarios to aid students who assume the receptionist. These role-playing scenarios help develop the students' interpersonal and technical skills as receptionists. Experiential learning, following a four-step cycle, is a key aspect involving concrete experiences, reflection, conceptualization, and application in new situations. Bandura's processes of attention, retention, reproduction, and motivation further contribute to student learning through experiential and situated learning environments. The integration of these theories is depicted in Figure 6, based on Kolb's Experiential Learning Cycle (1984), Bandura's Social Learning Theory (1977), and the Learning by Doing Theory (Essential Elements of a Goal-Based Scenario) (Schank et al., 1999).
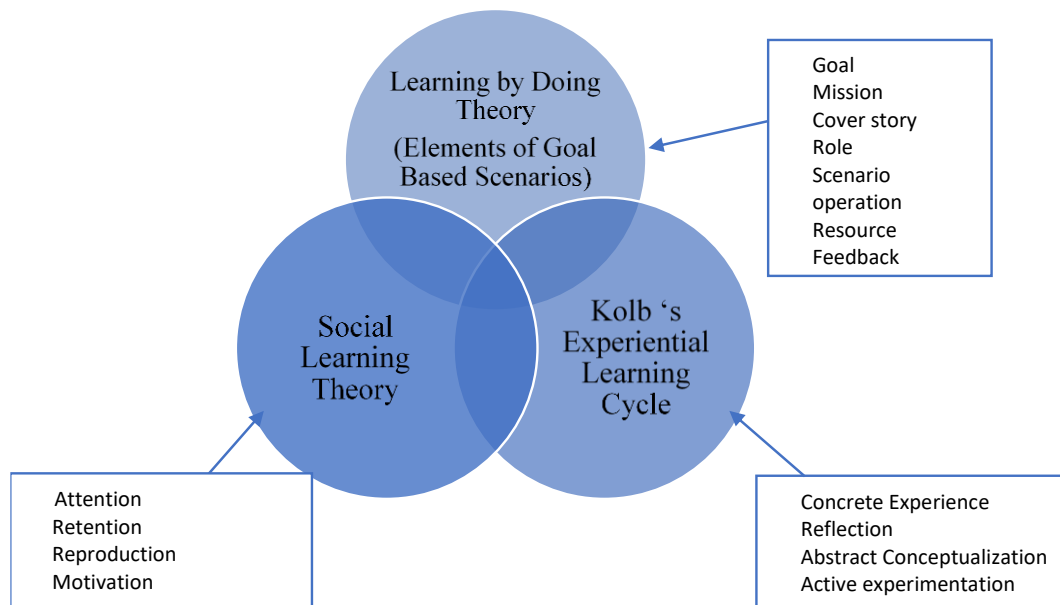
Figure 6: Theoretical Framework

In light of these considerations, this study aims to delineate the components necessary for designing and constructing the e-SBL FOIM-ATG scenario-based learning module tailored to the Front Office course. Drawing insights from experts and emphasizing key variables identified through an extensive literature review, this module aims to provide a comprehensive solution to the challenges faced in hospitality education. The integration of technology and experiential learning methods is proposed as an incentive to encourage students to delve into knowledge acquisition, infusing learning with deeper significance and preparing students for successful careers in the ever-evolving hospitality sector.

3. Methodology

3.1. Research Design

This study employed a quantitative approach called the Fuzzy Delphi Method (FDM). FDM was utilized to secure expert consensus on the constructs and elements necessary for constructing the proposed module. The construct measures were identified and synthesized from the literature to inform the initial construction of constructs and instrument items. The FDM facilitated the analysis of contributions from fifteen experts, and the data were processed using Excel software to determine expert consensus. The FDM method not only expedited the process but also ensured precise data analysis, thereby strengthening the likelihood of attaining expert concurrence (Mustapha & Darusalam, 2018). The FDM method procedure is shown in Figure 7, and Table 1 shows the list of experts employed in this study.

Figure 7: A Flowchart of a Fuzzy Delphi Method (FDM) procedure

Table 1: List of Experts Used

Position	Expertise	Working Experience	Teaching experience in Front Office	Institution
Senior lecturer	Front Office/ curriculum	15	5	PTSS
Senior lecturer	Front Office/ curriculum	15	5	PTSS
Senior lecturer	Front Office/ curriculum	15	7	PTSS
Senior lecturer	Front Office/ curriculum	12	5	PTSS
Senior lecturer	Front Office/ curriculum	17	5	KKSP
Senior lecturer	Front Office/ curriculum/ Scenario-based learning	16	7	KKCP
Senior lecturer	Front Office/ curriculum	11	10	KKCP
Senior lecturer	Front Office/ curriculum/ Scenario-based learning	15	13	KKBB
Senior lecturer	Front Office/ curriculum	12	8	KKBB
Senior lecturer	Front Office/ curriculum	12	12	KKKP
Senior lecturer	Front Office/ curriculum/ Scenario-based learning	15	15	KKRP
Senior lecturer	Front Office/ curriculum/ Scenario-based learning	21	18	KKSY
Trainer FO	Front Office	27	25	Stamford College
Lecturer UPSI	Instructional/ pedagogy	15	15	UPSI
Lecturer UPSI	Information technology/ education technology	19	-	UPSI
Total Experts	**15**			

3.2. Sample Study

The sample size for Fuzzy Delphi studies, as suggested by Mustapha and Darusalam (2018) and Clayton (1997), typically falls between ten to fifteen participants. The selection of this sample was executed through purposive sampling techniques (Chua, 2010). The researcher identified fifteen experts within the field, including educators and trainers. This sample was strategically chosen based on the participants' experience and expertise in hospitality, specifically concerning front-office operations, educational technology, scenario-based learning, and curriculum development. The selection criteria for experts aligned with Berliner's (2004) definition, where an individual is considered an expert in the field if they possess over five years of experience. In this study, the experts had (i) a minimum of ten years of experience in the field, (ii) a minimum of five years of experience in teaching Front Office courses, and (iii) were involved as curriculum drafters for Front Office courses.

The initial identification of potential experts within the hospitality and education sectors involved a multi-faceted approach that encompassed various channels and sources. Firstly, professional networks played a crucial role in identifying individuals who demonstrated expertise in Front Office operations, educational technology, scenario-based learning, and curriculum development. Through established connections with colleagues, peers, and industry professionals within the hospitality field, potential experts were identified based on their reputation, demonstrated knowledge, and contributions to the field. Academic affiliations with universities and educational institutions specializing in hospitality management or related fields also served as key sources for identifying potential experts. Faculty members with expertise in teaching Front Office courses, especially in TVET (hands-on), and contributing to curriculum development initiatives, were identified through their affiliations with academic institutions. Overall, the initial identification of potential experts involved leveraging a diverse array of channels, including professional networks, academic affiliations, and industry connections, to ensure a comprehensive and targeted approach to identifying individuals with the requisite expertise for the study.

3.3. Study Instrument

The theoretical framework outlines the theoretical underpinnings that inform the design and development of the e-SBL FOIM-ATG module. It incorporates Bandura's Social Learning Theory, which emphasizes the importance of observational learning, imitation, and modeling in shaping behavior. Kolb's Experiential Learning Cycle highlights the iterative process of learning through concrete experiences, reflective observation, abstract conceptualization, and active experimentation. This theory is also integrated into the process through role-playing scenarios. Additionally, the Learning by Doing Theory by Schank et al. emphasizes the role of practical, hands-on experiences in facilitating learning and skill development.

The conceptual framework translates the theoretical principles outlined in the theoretical framework into a practical framework through the design of the e-SBL FOIM-ATG module. It identifies essential elements necessary for integrating scenarios and resources to enhance learning experiences and cultivate 21st-century skills in front-office courses. This includes components such as goals, mission, cover story, role, scenario operation, resources, feedback, assessment, and their alignment with the three main theoretical models.

The construction of constructs and instrument items was initiated through an extensive review of the literature and expert interviews. This comprehensive approach aimed to identify and incorporate relevant components and elements into the Front Office Instructional Module. The questionnaire comprises nine parts: Part A for respondent demographics and Part B to J for various components of the

instructional module. The total number of items in the questionnaire is 70, and a 7-point Likert scale was employed to gauge the level of expert agreement.

The process of developing questions for each dimension involved a combination of literature review and semi-structured interviews with experts. From the above, researchers identified key constructs and sub-components within each dimension based on theoretical frameworks, best practices in instructional design, and insights from subject matter experts. Questions were then formulated to assess experts' perceptions, opinions, and experiences related to each construct, ensuring comprehensive coverage of relevant aspects of the instructional module. Goal-based scenario elements from the learning-by-doing theory are the main components, and front-office topics are the sub-components of developing the module. At the same time, Kolb's Experiential Learning Cycle and Social Learning Theory are only involved during the process of using the module, especially in the role-playing parts. Experts' consensus validated the questionnaire, ensuring its reliability and validity for capturing expert perspectives on the instructional module. Overall, the development of the questionnaire involved a rigorous and systematic approach to ensure its alignment with the research objectives and the comprehensive assessment of the instructional module's components and elements.

The relationship between the construct measures, theoretical frameworks, and the FDM is established to facilitate consensus-building among experts regarding the essential elements of the instructional module. The FDM process involves iteratively eliciting and aggregating expert opinions to refine and validate the construct measures identified in the literature, align with the theoretical frameworks, and capture the essential elements necessary for effective scenario-based learning in front-office courses.

3.4. Fuzzy Delphi Method Implementation Process

3.4.1. Step 1: Selection of Experts

The selection of experts in this study was based on the criteria defined by Mustapha and Darusalam (2018). The selection considered the expertise, qualifications, time, and experience of the experts. Ensuring precision is crucial during the selection process to avoid any doubts or disputes regarding the results, opinions, and views. Experts were determined based on an individual's years of experience in the field, with those having more than five years of experience considered experts. In contrast, those with less experience were categorized as novices (Shanteau et al., 2002). Kaviza (2018) and Mustapha and Darusalam (2018) further specified that an expert in the field is an individual with over five years of experience in their specific area of expertise. Qualifications pertain to professional recognition and accreditation based on an individual's academic qualifications. The experts were required to have a minimum of five years of experience in a field relevant to this study.

3.4.2. Step 2: Determination of Linguistic Variables Based on Triangular Fuzzy Number

Linguistic value refers to qualitative descriptions or expressions used to represent expert opinions or judgments on a particular topic or parameter. In FDM, experts provide their views or evaluations using linguistic terms rather than precise numerical values. These linguistic terms can range from qualitative descriptors such as "low," "medium," and "high" to more specific terms tailored to the context of the study. A 7-point Likert scale was chosen as the scale for the expert agreement instrument. After receiving values from the experts, these values were converted into Fuzzy triangular numbers, as explained in Table 2. Triangular fuzzy refers to a type of fuzzy set that is characterized by a membership function that assigns degrees of membership to elements based on a triangular-shaped membership function. In the context of FDM, triangular fuzzy sets are often used to represent the uncertainty or ambiguity inherent in experts' judgments or opinions. This allows for the representation of imprecise or vague information and facilitates the aggregation of diverse expert opinions to reach a consensus. Following Cheng and Lin's (2002) guidance, Triangular Fuzzy Numbers would represent the values $m1$, $m2$, and $m3$, where $m1$ denotes the minimum value, $m2$ represents the median value, and $m3$ stands for the maximum value, as seen in Figure 8 below.
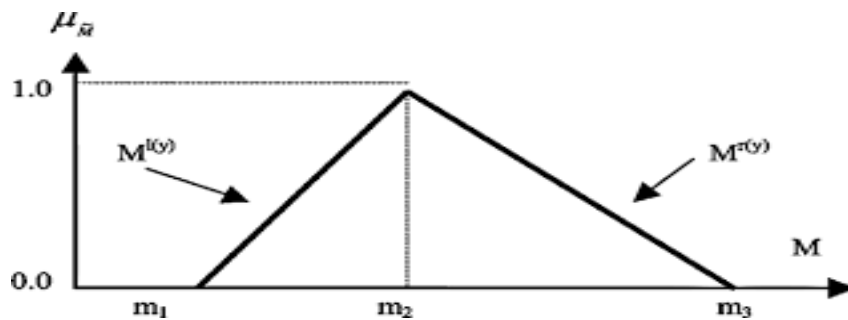
Figure 8: Triangular Fuzzy Number

Table 2: 7-point Fuzzy Scale

Level of Agreement Variables	Fuzzy Scale	Likert Scale
Extremely Agree	(0.9,1.0,1.0)	7
Highly Agree	(0.7,0.9,1.0)	6
Agree	(0.5,0.7,0.9)	5
Fairly Agree	(0.3,0.5,0.7)	4
Disagree	(0.1,0.3,0.5)	3
Highly Disagree	(0.0,0.1,0.3)	2
Extremely Disagree	(0.0,0.0,0.1)	1

Source: Mohd Jamil and Mat Noh (2020)

3.4.3. Step 3: Distance Determination Process to Determine the Threshold Value (d)

The threshold value in FDM refers to a predefined criterion or boundary used to determine the level of agreement or consensus among experts regarding a particular issue or parameter. It serves as a cutoff point beyond which expert opinions are considered sufficiently aligned to reach a consensus. Expert consensus can be gauged through the Threshold Value. The calculation for this Threshold value is as follows:

$$d(m,n) = \sqrt{\frac{1}{3}(m_1 + n_1)2 + (m_2 + n_2)2 + (m_3 - n_3)2} \tag{1}$$

If the computed Threshold value "d" is equal to or less than 0.2 (< 0.2), it is indicative of achieving expert consensus (Chen & Lin, 2002). Moreover, each item must garner an overall agreement surpassing 75% ($>75\%$).

3.4.4. Step 4: Determine Percentage of Group Agreement

To confirm the consensus among experts, it is imperative to attain a minimum threshold of 75% (Chen & Lin, 2002). If this threshold is not met, it becomes necessary to either eliminate the item or construct in question or consider conducting a follow-up round of evaluations.

3.4.5. Step 5: Determining the Alpha Level of the Fuzzy Valuation Aggregate

Fuzzy logic is a mathematical approach that deals with reasoning and decision-making in situations where uncertainty and imprecision exist. It extends classical binary logic by allowing for the representation of partial truth, where propositions can be true to a certain degree. In FDM, fuzzy logic is employed to handle the imprecise nature of expert opinions and to aggregate these opinions to derive a consensus. The determination of the Fuzzy value is accomplished by adding Fuzzy numbers for each item, following the formula: Amax = (1)/4 * (m1 + m2 + m3) (Mohd Jamil et al., 2014).

3.4.6. Step 6: Defuzzification Process Phase

Defuzzification is a crucial step in fuzzy logic systems, including FDM. Its goal is to convert fuzzy linguistic variables (expressed in terms like "low," "medium," or "high") into crisp or numerical values that can be more easily interpreted or utilized for decision-making. In the context of FDM, the defuzzification process involves converting the fuzzy output obtained from aggregating expert opinions into a precise numerical value or decision. The Average Fuzzy Numbers were calculated as the α-cut value, positioned precisely midway between '0' and '1,' denoted by α-cut = (0 + 1)/2 = 0.5 (Mohd Jamil et al., 2014). If the value of Average Fuzzy Numbers falls below this α-cut threshold of 0.5, the item is considered unsuitable and is rejected

due to the absence of expert consensus.

3.4.7. Step 7: Position Determination Process

The last stage includes prioritizing the items according to their Defuzzification values, with the item having the highest value signifying the most significant position, as indicated by Mohd Ramli and Awang (2020).

4. Result

4.1. Analysis of Expert Consensus on Main Component

The Fuzzy Delphi Method (FDM) analysis indicates that experts reached a consensus on all items within the primary component. The items submitted to the experts can be found in Table 3.

Table 3: Items for the Front Office Instructional Module's Main Components

No.	Items
1.	Assessment
2.	Role
3.	Scenarios
4.	Resources
5.	Feedback
6.	Goal
7.	Cover story
8.	Missions

Table 4 presents the threshold value (d), expert consensus percentage, defuzzification, and item position for the above items.

Table 4: Overall Findings of the Main Components

Item number	Condition of Triangular Fuzzy Numbers		Condition of Defuzzification Process	Position	Expert consensus *Threshold value*, d
	Threshold value, d	**Percentage of Experts Group Consensus, %**	*Fuzzy Score (A)*		
1	0.083	93%	0.929	6	Accepted
2	0.195	93%	0.880	8	Accepted
3	0.083	93%	0.929	6	Accepted
4	0.074	93%	0.936	2	Accepted
5	0.074	93%	0.936	2	Accepted
6	0.074	93%	0.936	2	Accepted
7	0.074	93%	0.936	2	Accepted
8	0.063	93%	0.942	1	Accepted

Notes:

Condition to be met:

Triangular Fuzzy Numbers   Defuzzification Process

1) Threshold value(d) ≤ 0.2   3) Fuzzy Score (A) ≥ α – cut value of 0.5

2) Percentage of Expert Consensus ≥ 75

The main component has obtained an expert agreement of 93%, surpassing the threshold value (d) of 0.9. Chu and Hwang (2008) suggested that items receiving as low as 20% expert agreement should not be considered suitable for research purposes. However, in this context, all items have garnered expert agreement levels exceeding 75%, and their defuzzification values also surpass the α-cut value of 0.5. This outcome underscores a unanimous expert consensus on all these items (Chen & Lin, 2002), affirming that experts reached a consensus regarding the main component's elements.

4.2. Analysis of Expert Consensus on Goal Elements

The results indicate that every item in the goal elements has a threshold value (d) equal to or less than 0.2 (Table 5). Thus, all these items have attained a consensus among experts, as per Chen and Lin (2002). Furthermore, the expert agreement percentage affirms that all items exceed the 75% threshold, and the defuzzification values for each item also surpass the α-cut value of 0.5. In conclusion, these findings demonstrate that the goal elements have garnered a unanimous consensus among the experts.

Table 5: Overall Findings of the Goal Elements

Item	Condition of Triangular Fuzzy Numbers		Condition of Defuzzification Process	Expert consensus
	Threshold value, d	Percentage of Experts Group Consensus, %	*Fuzzy Score (A)*	
1	0.063	93%	0.942	Accepted
2	0.049	93%	0.949	Accepted
3	0.049	93%	0.949	Accepted
4	0.074	93%	0.936	Accepted
5	0.074	93%	0.936	Accepted

Notes:

Condition to be met:

Triangular Fuzzy Numbers   Defuzzification Process

1) Threshold value(d) ≤ 0.2   3) Fuzzy Score (A) ≥ α – cut value of 0.5

2) Percentage of Expert Consensus ≥ 75%

4.3. Analysis of Expert Consensus on Mission Elements

According to the results, each item exhibited a threshold value (d) equal to or less than 0.2 (Table 6), signifying a unanimous consensus among the experts, in line with Chen and Lin (2002). The expert agreement percentage validates that all items exceed the 75% threshold, and the defuzzification values for each item also surpass

the α-cut value of 0.5. In summary, these results confirm that the mission elements have secured a unanimous consensus from the experts.

Table 6: Overall Findings of the Mission Elements

Item	Condition of Triangular Fuzzy Numbers		Condition of Defuzzification Process	Expert consensus
	Threshold value, d	Percentage of Experts Group Consensus, %	*Fuzzy Score (A)*	
1	0.063	93%	0.942	Accepted
2	0.063	93%	0.942	Accepted
3	0.063	93%	0.942	Accepted
4	0.089	93%	0.922	Accepted
5	0.089	93%	0.922	Accepted

Notes:

Condition to be met:

Triangular Fuzzy Numbers   Defuzzification Process

1) Threshold value(d) ≤ 0.2   3) Fuzzy Score (A) ≥ α – cut value of 0.5

2) Percentage of Expert Consensus ≥ 75%

4.4. Analysis of Expert Consensus on Cover Story Elements

The results indicate that every item obtained a threshold value (d) equal to or less than 0.2 (Table 7), signifying a unanimous consensus among the experts, consistent with Chen and Lin (2002). The expert agreement percentage affirms that all items significantly exceed the 75% threshold, and the defuzzification values for each item exceed the α-cut value of 0.5. In essence, these findings validate that the items within the cover story elements have garnered unanimous endorsement from the experts.

Table 7: Overall Findings of the Cover Story Elements

Item	Condition of Triangular Fuzzy Numbers		Condition of Defuzzification Process	Expert consensus
	Threshold value, d	Percentage of Experts Group Consensus, %	*Fuzzy Score (A)*	
1	0.074	93%	0.936	Accepted
2	0.074	93%	0.936	Accepted
3	0.074	93%	0.936	Accepted
4	0.083	93%	0.929	Accepted
5	0.089	93%	0.922	Accepted

Notes:

Condition to be met:

Triangular Fuzzy Numbers   Defuzzification Process

1) Threshold value(d) ≤ 0.2   3) Fuzzy Score (A) ≥ α – cut value of 0.5

2) Percentage of Expert Consensus ≥ 75%

4.5. Analysis of Expert Consensus on Role Elements

Considering the outcomes, all items reached a threshold value (d) equal to or less than 0.2 (Table 8), indicating a unanimous agreement among experts, aligning with Chen and Lin (2002). The expert agreement percentage confirms that all items surpass the 75% threshold, and the defuzzification values for these items consistently exceed the α-cut value of 0.5. These results unequivocally establish that the items within the role elements have secured unanimous consensus from the experts.

Table 8: Overall Findings of the Role Elements

Item	Condition of Triangular Fuzzy Numbers		Condition of Defuzzification Process	Expert consensus
	Threshold value, d	**Percentage of Experts Group Consensus, %**	*Fuzzy Score (A)*	
1	0.063	93%	0.942	Accepted
2	0.063	93%	0.942	Accepted
3	0.063	93%	0.942	Accepted
4	0.074	93%	0.936	Accepted
5	0.074	93%	0.936	Accepted

Notes:

Condition to be met:

<u>Triangular Fuzzy Numbers</u>   <u>Defuzzification Process</u>

1) Threshold value(d) ≤ 0.2   3) Fuzzy Score (A) ≥ α – cut value of 0.5

2) Percentage of Expert Consensus ≥ 75%

4.6. Analysis of Expert Consensus on Scenario Operation Elements

According to the results, all items reached a threshold value (d) equal to or less than 0.2 (Table 9), indicating a consensus among experts, as outlined by Chen and Lin (2002). The expert agreement percentage validates that all items comfortably surpass the 75% threshold, and the defuzzification values for these items consistently exceed the α-cut value of 0.5. These outcomes affirm that the items within the scenario operation elements have unequivocally received a unanimous consensus from the experts.

Table 9: Overall Findings of the Scenario Operation Elements

Item	Condition of Triangular Fuzzy Numbers		Condition of Defuzzification Process	Expert consensus
	Threshold value, d	Percentage of Experts Group Consensus, %	*Fuzzy Score (A)*	
1	0.063	93%	0.942	Accepted
2	0.049	93%	0.949	Accepted
3	0.049	93%	0.949	Accepted
4	0.074	93%	0.936	Accepted
5	0.083	93%	0.929	Accepted
6	0.049	93%	0.949	Accepted
7	0.049	93%	0.949	Accepted
8	0.063	93%	0.942	Accepted
9	0.074	93%	0.936	Accepted
10	0.049	93%	0.949	Accepted
11	0.167	93%	0.884	Accepted
12	0.166	93%	0.878	Accepted
13	0.074	93%	0.936	Accepted
14	0.083	93%	0.929	Accepted
15	0.063	93%	0.942	Accepted
16	0.063	93%	0.942	Accepted
17	0.063	93%	0.942	Accepted
18	0.063	93%	0.942	Accepted
19	0.049	93%	0.949	Accepted
20	0.063	93%	0.942	Accepted

Notes:

Condition to be met:

Triangular Fuzzy Numbers   Defuzzification Process

1) Threshold value(d) $\leq$ 0.2   3) Fuzzy Score (A) $\geq$ α – cut value of 0.5

2) Percentage of Expert Consensus $\geq$ 75%

4.7. Analysis of Expert Consensus on Resource Elements

Based on the research outcomes, all items reached a threshold value (d) of 0.2 or less (Table 10), signaling a unanimous consensus among experts in accordance with the criteria established by Chen and Lin (2002). The expert agreement percentage attests that all items comfortably exceed the 75% threshold, and the defuzzification values for these items consistently surpass the α-cut value of 0.5. These results provide strong confirmation that the items within the resource elements have garnered unanimous endorsement from the experts.

Table 10: Overall Findings of the Resource Elements

Item	Condition of Triangular Fuzzy Numbers		Condition of Defuzzification Process	Expert consensus
	Threshold value, d	Percentage of Experts Group Consensus, %	*Fuzzy Score (A)*	
1	0.083	93%	0.929	Accepted
2	0.063	93%	0.942	Accepted
3	0.049	93%	0.949	Accepted
4	0.049	93%	0.949	Accepted
5	0.074	93%	0.936	Accepted
6	0.063	93%	0.942	Accepted
7	0.063	93%	0.942	Accepted
8	0.063	93%	0.942	Accepted
9	0.063	93%	0.942	Accepted

Notes:

Condition to be met:

Triangular Fuzzy Numbers   Defuzzification Process

1) Threshold value(d) ≤ 0.2 3) Fuzzy Score (A) $\geq \alpha$ – cut value of 0.5

2) Percentage of Expert Consensus $\geq 75\%$

4.8. Analysis of Expert Consensus on Feedback Elements

As indicated by the research findings, all items have reached a threshold value (d) of 0.2 or lower (Table 11), presenting a consensus among experts in complete unanimity, as specified by Chen and Lin (2002). The expert agreement percentage affirms that all items comfortably exceed the 75% threshold, and the defuzzification values for these items consistently surpass the α-cut value of 0.5. These results provide solid confirmation that experts unanimously endorse the items within the mission elements.

Table 11: Overall Findings of the Feedback Elements

Item	Condition of Triangular Fuzzy Numbers		Condition of Defuzzification Process	Expert consensus
	Threshold value, d	Percentage of Experts Group Consensus, %	*Fuzzy Score (A)*	
1	0.063	93%	0.942	Accepted
2	0.063	93%	0.942	Accepted
3	0.049	93%	0.949	Accepted
4	0.063	93%	0.942	Accepted
5	0.063	93%	0.942	Accepted
6	0.049	93%	0.949	Accepted
7	0.049	93%	0.949	Accepted
8	0.049	93%	0.949	Accepted
9	0.074	93%	0.936	Accepted
10	0.074	93%	0.936	Accepted

Notes:

Condition to be met:

<u>Triangular Fuzzy Numbers</u>   <u>Defuzzification Process</u>

1) Threshold value(d) ≤ 0.2   3) Fuzzy Score (A) ≥ α – cut value of 0.5

2) Percentage of Expert Consensus ≥ 75%

4.9. Analysis of Expert Consensus on Assessment Elements

In accordance with the research outcomes, all items reached a threshold value (d) of 0.2 or less (Table 12). This outcome signifies that these items have achieved a unanimous agreement among experts, consistent with the criteria outlined by Chen and Lin (2002). The expert agreement percentage demonstrates that each item surpasses the 75% threshold, and the defuzzification values for these items consistently exceed the α-cut value of 0.5. Consequently, the results affirm a consensus among experts regarding the items within the mission elements.

Table 12: Overall Findings of the Assessment Elements

Item	Condition of Triangular Fuzzy Numbers		Condition of Defuzzification Process	Expert consensus
	Threshold value, d	**Percentage of Experts Group Consensus, %**	*Fuzzy Score (A)*	
1	0.049	93%	0.949	Accepted
2	0.049	93%	0.949	Accepted
3	0.049	93%	0.949	Accepted
4	0.063	93%	0.942	Accepted
5	0.063	93%	0.942	Accepted

Notes:

Condition to be met:

<u>Triangular Fuzzy Numbers</u>   <u>Defuzzification Process</u>

1) Threshold value(d) ≤ 0.2   3) Fuzzy Score (A) ≥ α – cut value of 0.5

2) Percentage of Expert Consensus ≥ 75%

5. Discussion

Based on the results obtained from the Fuzzy Delphi analysis, the researchers identified the key components and elements that garnered consensus among the experts. The findings indicate that all of these components and elements are essential for designing and developing the e-SBL FOIM-ATG module. Specifically, the experts reached a consensus that the main components should encompass goals, mission, cover story, role, scenario operation, resources, feedback, and assessment. These items should be the focus of the module development, especially assessment, role, scenario operation, resources, and feedback. Assessment has been pointed out as the most crucial component that needs to be included in the module design. As

Roma (2021) stated, tourism and hospitality students need assessment, specifically to reach the competencies required by the industry. Scenario-based learning strives to offer learners lifelike encounters within simulated scenarios, immersing them in a narrative featuring intricate problems demanding solutions (Elliott-Kingston et al., 2016). This approach enables learners to employ their expertise in the subject matter, as well as their critical thinking and problem-solving abilities in a practical, real-world setting (Sharma, 2018).

Furthermore, concerning the components of goals, mission, cover story, and role, the results indicate that the primary objective in module design is to equip students with the knowledge and competencies required for managing reservation, check-in, and check-out processes across diverse scenarios. Thus, in designing the module, each integrated component will possess distinct objectives and functions tailored to the learning objectives. As outlined by Mandke (2020), front office staff's responsibilities encompass guest reservations, check-in processes, guiding guests to their rooms upon arrival, and upholding a superior standard of guest service and professionalism. It is paramount to include these topics in the module to allow the students to learn through them. Furthermore, Arellano et al. (2023) also showed that these three topics are crucial to be remembered by students, with check-in and check-out procedures receiving the highest mean of 5 and learning about reservations and its different types receiving a mean value of 4.93.

Next, for scenario operation, findings show that the main focus in designing the module is to use items such as 1) reservations with guaranteed bookings, 2) reservations with guaranteed bookings and special requests, 3) check-in without reservation bookings and payment made by cash, 4) check-in with reservation bookings and payment made by credit card, 5) check-in with reservation bookings, and 6) the need to check in early and to deal with normal check-out with payment. In the hotel industry, the front office department is defined as the nerve center or the heart of the hotel, and most hotel employees vouched that it plays a crucial role due to its main operational activity. The basic skill needed in this department is to correctly and efficiently check guests into their rooms. Incorporating scenarios such as handling individual reservations, assigning suitable guest rooms while maintaining room preferences, and managing the payment procedures during guest check-in is crucial for the module's design (Mondal, 2022).

Meanwhile, for the resources that should be included in the module design to support students while doing role play with the scenario operation, the experts emphasized video demonstrations, simulation hotels and rooms (used for Bellmen), YouTube, guests' inventory, a customized simplified hotel system, and dialogues as main communication resources. Incorporating active learning techniques and digital resources into educational methods holds significant promise for fostering not just subject-specific knowledge but also versatile skills essential for graduates (Mio et

al., 2019). Furthermore, learners are supplied with necessary educational materials to facilitate their participation in learning activities (Awang & Mohd Mahudin, 2023) and prescribed assessment duties, along with supplementary resources to enhance their understanding and engagement in these tasks more profoundly (Ariadurai & Rajendra, 2020).

In the context of the e-SBL FOIM-ATG module, the inclusion of assessment tasks aligns with Kolb's Experiential Learning Theory by facilitating the reflective observation stage of the learning cycle, prompting learners to critically evaluate their experiences within simulated scenarios and integrate new knowledge into their existing understanding. Similarly, scenario-based learning activities in the module correspond to Kolb's theory, which emphasizes learning through concrete experiences, and Social Learning Theory, which highlights the role of observation and imitation in learning from others. By immersing learners in realistic situations where they must apply theoretical knowledge to solve problems, scenario-based learning fosters active engagement and experimentation, mirroring Kolb's model of experiential learning. Furthermore, the collaborative elements are often integrated into scenario-based learning activities to encourage social interaction and knowledge-sharing among learners, supporting the principles of Social Learning Theory. Thus, by connecting assessment tasks and scenario-based learning activities to the principles of Kolb's Experiential Learning Theory and Social Learning Theory, the theoretical underpinnings of the e-SBL FOIM-ATG module are effectively integrated into the discussion, providing a clear rationale for their inclusion in the module design.

6. Research Implications

The implications of this study underscore the foundational significance of the identified components and elements in shaping the e-SBL FOIM-ATG module, particularly in meeting the rigorous competency standards of the tourism and hospitality industry. These implications hold considerable relevance for educators, curriculum designers, and institutions committed to enhancing students' practical skills and competencies. Beyond academia, the contributions extend to practical ramifications, as they provide a tangible framework for implementing these key elements in educational settings. These findings can offer stakeholders valuable guidance in tailoring curricula and instructional methods to align with industry demands.

From a theoretical standpoint, this study contributes to advancing the discourse on instructional design and competency-based education. The identified components serve as theoretical anchors, illuminating how theoretical principles manifest in effective instructional modules. The study underscores the critical alignment

between theoretical constructs and practical industry requirements, fostering a nuanced understanding of the symbiotic relationship between educational theories and real-world competencies. These theoretical implications offer valuable insights into the theoretical underpinnings of effective instructional design, enriching scholarly discussions surrounding competency-driven education and paving the way for further exploration in this area.

7. Conclusion

The outcomes derived from the Fuzzy Delphi analysis underscore the unanimous consensus among experts regarding the significance of all scrutinized components and elements for the design of the e-SBL FOIM-ATG module. The critical components identified goals, mission, cover story, role, scenario operation, resources, feedback, and assessment. The integration of these elements into the module is recommended, with a distinct emphasis on evaluation, role, scenario operation, resources, and feedback. Notably, assessment emerges as the most pivotal component, aligning seamlessly with the industry's competency requirements for students in the tourism and hospitality sector. The acknowledgment of scenario-based learning as a valuable approach, fostering real-life experiences and problem-solving opportunities, contributes substantially to students' theoretical understanding and practical skills.

Regarding the specific elements of goals, mission, cover story, and role, the experts' consensus showed that the primary focus is on equipping students with knowledge and skills related to reservation handling, check-in, and check-out procedures across diverse scenarios. Thus, each integrated component must serve specific aims and roles aligned with the predefined learning objectives. This emphasis is substantiated by the paramount importance of these topics in the hotel industry, where front office staff plays a pivotal role in ensuring the seamless execution of check-in and check-out processes.

The design of scenario operation should encompass various scenarios, including reservations with guaranteed bookings, reservations with guaranteed bookings and special requests, check-in without reservation booking, check-in with reservation booking and payment by cash, check-in with reservation booking and payment by credit card, check-in with reservation booking and early check-in, and handling normal check-outs with payment. These scenarios mirror real-world front-office activities, rendering them indispensable for the comprehensive module.

Experts recommend a variety of resources to bolster students during role-plays associated with scenario operations, such as video demonstrations, simulation tools, YouTube, hotel inventories, simplified hotel systems, and communication dialogues.

The inclusion of these resources aligns seamlessly with a pedagogical approach that integrates active learning and digital tools, fostering the development of both disciplinary knowledge and transferable skills essential for graduates.

8. Future Research Recommendations

In light of the findings, it is recommended that future research endeavors focus on several key areas to enhance the academic discourse and practical application of the identified components and elements. Firstly, longitudinal studies should be conducted to assess the sustained impact of these components on students' competency development and subsequent career trajectories. Next, comparative analyses across diverse instructional modules within varying educational contexts could be conducted to provide valuable insights into the nuanced effectiveness of these components. Thirdly, expanding the research scope to explore the adaptability of these elements in different settings and their interdisciplinary applications would contribute to a better comprehensive understanding of their practical implications. Future research should solicit student feedback on the relevance and efficacy of these components. The feedback is crucial for ongoing module enhancement and should be integrated into future research initiatives. Moreover, exploring innovative competency-based assessment strategies can be conducted to foster the continual evolution of educational methodologies. Lastly, collaborative ventures with industry professionals should be pursued to strengthen the alignment of educational modules with the dynamic demands of the industry, ensuring the relevance and applicability of the research findings in real-world settings.

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VALIDITY OF STEM-BASED MODELLING INSTRUMENT FOR PRE-SERVICE TEACHERS OF MATHEMATICS EDUCATION

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ABSTRACT

Mathematical modelling involves a set of interconnected skills that allow students to translate real-world situations into mathematical representations and vice versa. This research aimed to develop the instrument consisting of sub-competency; simplifying, mathematising, computing, interpreting and validating. The study utilized a cross sectional survey research design. A total of 135 pre-service teachers of mathematics voluntarily selected using convenience sampling methods, participated in this study. The data was analysed by item-CVI (I-CVI), S-CVI and exploratory factor analysis (EFA). This tool's preliminary versions demonstrated good content validity for both the individual items and overall, for STEM-based material (S-CVI/UA = 0.88; S-CVI/Ave = 0.93). The Kappa value was K = 0.88, indicating an excellent value of validity. The development of STEM-Based modelling instrument revealed great item-content validity and scale-validity for assessing sub competency in pre-service teachers. At the same time, EFA revealed that STEM-based modelling instrument had five sub-components; simplifying, mathematising, computing, interpreting and validating. The results showed that the STEM-based modelling instrument's reliability was good. Creating and verifying the STEM-focused modelling tool designed for pre-service teachers is essential in mathematics education and research. It offers a valuable means to evaluate and improve the essential skillset related to mathematical modelling, benefiting educators and STEM students alike. Moreover, the research's approach and discoveries have the potential to influence forthcoming investigations and educational methodologies across diverse fields.

Keywords: factor analysis, modelling, STEM, validation

1. Introduction

Science, Technology, Engineering and Mathematics (STEM) education plays a significant role in influencing cultural and economic growth, embracing innovation and caring about creativity and problem-solving (Cooper & Hearverlo, 2013). One of the most important tools for transition in STEM education is mathematical modelling. As pointed out by Minarni and Napitupulu (2020), students can apply modelling abilities to describe context problems mathematically, organize tools, discover relationships, transfer between real-world and mathematical problems, and visualize problems in various ways. Mathematical modelling encompasses a range of interconnected abilities that enable students to convert real-life scenarios into mathematical forms and vice versa. Mathematical modelling applications are composed of concepts related to different disciplines by their nature. Anhalt et al., (2018) indicate that mathematical modelling is a method in which students think about and make sense of a real-life issue which will be analysed using mathematics in order to comprehend, explain or predict something. Modelling exercises help students improve their conceptual knowledge and the procedures they establish while attempting to address a real-world situation. Thus, teachers cannot rely solely on textbooks, since the majority of the exercises are designed to engage modelers in the use of models but not to construct their own models for specific scenarios. An authentic problem is also known as a project that students perform which are relevant to them, as opposed to assignments which are unrelated to any type of work that would be done outside of the classroom. Kaiser et al. (2011) revealed that students did not see the necessary type of mathematics which can be used in real situations. They did not want to perform well in mathematics because their focus is not apparent. In addition, students always imagine that mathematics is a strenuous subject. Therefore, the teacher or pre-service teacher should find the way to assists student to perform well in all subject by doing modelling questions. To utilize mathematical modelling in the classroom, pre-service teachers must first comprehend the significance of mathematical modelling in STEM. Pre-service teachers must plan their teaching skills to develop STEM based mathematical modelling that requires sub competency in simplifying, mathematising, computing, interpreting and validating the solution in order to achieve the students with six key skills.

Mathematical modelling consists of holistic and atomistic approach. Holistic approach is an overall concept of mathematical competence where the subject is taken as a whole instead of through the individual parts that make it up. Alternatively, an atomistic approach focuses on specific stages of the modelling process, particularly the mathematizing and analysis of models. It can be said that the atomistic approach is a detailed approach, while holistic approach is an overall approach. Cevikbas et al. (2021) show that the holistic approach accommodates eight mathematical competencies. The holistic definition refers specifically to the term

'modelling competency' as a 'distinct, recognised, and more or less well-defined thing'. Brand's (2014) study revealed the effect of a holistic versus an atomistic modelling approach on students' mathematical modelling competencies. The result showed that the holistic approach seemed superior to the atomistic approach because students of the comprehensive schools acquired higher performance in the holistic group. A study by Hankeln et al. (2019) developed a new test instrument and evaluated sub-competencies in mathematical modelling. They employed atomistic test questions designed to evaluate each sub-skill of mathematical modelling individually. The findings revealed that test instruments which evaluated mathematical modelling sub-competencies incorporated several sub-competencies rather than treating them as distinct dimensions of a larger general modelling competency. In this study, we used an atomistic test consisting of five sub-competencies which were simplifying, mathematising, computing, interpreting and validating. This is because the atomistic test was more suitable to test the sub-competency in a more detailed manner. The pre-service teacher can be tested by referring to five sub-competencies about STEM-based modelling which include STEM subjects such as biology, physic, chemistry, probability, mathematical reasoning. Moreover, in a systematic literature review conducted by Hidayat et al., (2022), the holistic approach was used by the majority of scholars in the examined study to evaluate the modelling proficiency of pre-service mathematics teachers.

To date, various tools have been employed in recent studies to assess mathematical modeling competence (Haines & Crouch, 2001; Hankeln et al., 2019; Zöttl et al.,2011). Despite the availability of several modern instruments designed for evaluating mathematical modeling competence, these tools exhibit diversity in application contexts and lack a specific emphasis on pre-service mathematics education teachers. The current instruments lack an emphasis on STEM content, processes, and contexts, implying a significant oversight, as the intricate interplay of science, technology, engineering, and mathematics is not adequately addressed. There is a need for assessment tools that go beyond conventional approaches, ensuring a comprehensive understanding and measurement of competencies within the specific domains of STEM education. This article reported the findings from a study involving pre-service teachers in Malaysia on the development of STEM-based modelling proficiency. The main objectives were to develop and validate STEM-based modelling instrument for pre-service teachers of mathematics education. To accomplish this, we set out to discover how pre-service teachers' understanding of STEM-based modelling was manifested in their work through the STEM-based modelling instruments, which included five sub-competencies: simplifying, mathematising, computing, interpreting and validating. As far as the researcher's understanding is concerned, there are limited past studies which develop and validate STEM-based modelling instruments for pre-service mathematics education teachers.

This study contributes to the literature on the development and validation of STEM-based modelling instruments for pre-service mathematics teachers. As such, it can also be used as a benchmark process for the assessment process of mathematical modelling for pre-service mathematics education teachers. Therefore, this study aimed to develop and validate a STEM-based modelling instrument for pre-service mathematics education teachers.

2. Theoretical Perspectives

2.1. Mathematical Modelling

The utilization of mathematical modeling is pivotal in nurturing students' mathematical skills as it enables them to apply theoretical concepts to practical scenarios. This method fosters meaningful engagement with mathematical principles, thereby enhancing comprehension and problem-solving capabilities (Albarracín & Gorgorió, 2020). Through mathematical modeling, students deepen their understanding of the world, thus fueling their learning motivation and proficiency in tackling real-world issues (Kurniadi et al., 2022). Additionally, integrating mathematical modeling into education positively impacts the development of students' creativity and problem-solving prowess (Salingkat & Bilalu, 2021).

Although model and modelling have different connotations, they both serve as important tools for problem solving, forecasting, decision-making, and communication which have been researched and examined in engineering science as well as in the history, philosophy, and sociology of science and technology (Muller, 2009). Hallstrom and Ankiewicz (2019) indicated that models can be anything from simple conceptual sketches and crude prototypes to advanced mathematical models that indicate something about reality. Thus, prediction requires correlation but not causal connection. The capacity to construct, utilize, apply, assess, and revise models is a vital skill for gaining a thorough grasp of technology development processes and scientific practice, as well as a key component of pursuing real learning in technology, math, and science classrooms. Besides, mathematics modeling includes the process, teacher preparation, and theoretical framework that captures mathematical modeling development through a series of sub-competencies which were utilized to monitor modeling activity and cumulatively build modeling competency (Maaβ, 2006). National Council of Teachers of Mathematics (NCTM) indicated that mathematical practices can be used to observe pre-service teacher's preparation as characterized in the Common Core (Common Core State Standard Initiative, 2010).

Students are required to interpret, describe, explain, justify, reject, or revise model

in modeling activities (English, 2003). They must reduce an actual scenario by making justified assumptions and identifying those factors which they believe are important, resulting in an idealized representation of reality (Kaiser & Stender, 2013). Real model is also known as simplified reality (Borromeo, 2006). A real model can be represented mathematically with equations, numeric tables, diagrams, or other relevant representations to answer a mathematical question. One is required to solve the model, which must be interpreted considering the original circumstance. In this situation, the original selections must be altered in order to develop an improved model which leads to a better conclusion using a similar method. Referring to Common Core State Standard in Mathematics (CCSSM), the cycle diagram has been modified by the author in a particular way. We did not utilize the situation or problem as sub-competencies.

2.2. STEM-based Modelling

A positive advantage of mathematical modeling activities is its ability to challenge problem solvers and help them learn in general in the STEM field (Chamberlin et al., 2020). For example, technology and engineering have a modeling sub-domain (Arikan et al., 2020) where modeling is very important for predictive analysis and design level testing in an engineering context (Fan et al., 2020). Furthermore, English (2017) proposed STEM-based modeling with the aim of discussing the competence of mathematical modeling in the perspective of STEM education, STEM integration approach, representation of STEM disciplines and equity in access to STEM education. Blomhøj (2009) states that discussions about models, modeling, modeling processes, modeling competencies and applications are important aspects of the study under the perspective of the educational modeling framework. Therefore, one example of a good study in an educational perspective about mathematical modeling competence is the framework proposed by Stillman et al. (2007). The modeling process in this framework is different from other modeling processes, because it includes the metacognition process of each transition of the mathematical modeling process.

English (2017) proposed STEM-based modeling as a cyclical generic (generative) learning activity where the modeling and engineering processes share the same characteristics and facilitate authentic problem solving involving the content, process and context of STEM. This generative concept is in line with the concept of emergent modeling proposed by Gravemeijer (2008). It refers to the characteristics of the problem where the learning content or process is acquired by the student, rather than provided by the teacher. For France (2018), models and modelling techniques can, through genuine experience, bridge the gap between STEM fields. Subsequently, models and modeling should be used as tools to promote STEM literacy and the transfer of knowledge and skills between contexts, both within and outside the STEM discipline (Hallström, & Schönborn, 2019). Therefore, it must be seen as a

basic component of STEM literacy (Williams, 2017).

STEM professionals, from a broader political viewpoint, are those who possess the requisite skills in science, technology, engineering, and mathematics, which may appear to be straightforward to acquire (Hidayat & Wardat, 2023). The Malaysia Education Blueprint 2013-2025 had invested in innovation for future generations of STEM professionals by inaugurating three stages to reinforce STEM based education in schools. However, from an educational standpoint, we must define what STEM education entails, how it should be thought, and how it may be implemented (Kertil & Gurel, 2016). In other words, learning information, attitudes, and skills to spot real-world problems through an awareness of the characteristics of the STEM courses should be connected to both national economic growth goals and individual student development (Hallström & Schönborn, 2019). Sanders (2009) stated that STEM literacy aims for broad educational objectives, but these objectives must solve real-world concerns by combining two or more STEM fields. Creating authentic learning scenarios is perhaps one of the most difficult aspects of STEM literacy education initiatives. The fundamental characteristics of authenticity, according to Herrington and Parker (2013), include a genuine setting, an authentic task, the presence of expert performances, different viewpoints, cooperation, reflection, articulation, metacognitive assistance, and authentic assessment. Mathematical modeling is a technique involved in all STEM-related applications. All STEM activities are not modeling activities, but many of them allow students to gain expertise with the mathematical modeling process. By using STEM-based mathematical modeling context, pre-service teachers can optimize the knowledge to implement STEM based in class using mathematical modeling instruments. The teachers can implement the mathematical modeling in STEM subject such as biology, physics, mathematics, chemistry, and other related subjects.

Mathematical modeling competency within the realms of STEM content, processes, and contexts is systematically developed by leveraging established theories and insights gleaned from previous research endeavors. Earlier investigations have predominantly employed the Realistic Mathematics Education (RME) theory and the Model and Modeling Perspective (MMP) as foundational frameworks to enhance mathematical modeling competence. However, insights from Carreira and Baioa (2011) suggest a convergence between these theoretical perspectives, emphasizing shared similarities while delineating a limited number of distinctions. In the context of this study, we draw inspiration from the educational modeling paradigm proposed by Stillman et al. (2007), offering a cohesive integration of STEM content, processes, and contextual considerations. A thorough examination of relevant theories and preceding studies forms the basis of this research, culminating in the identification of a singular dimension within the study's scope: the STEM-based modeling instrument. This instrument encompasses a nuanced perspective with five distinct

sub-dimensions, namely simplifying, mathematizing, computing, interpreting, and validating. Each of these sub-dimensions contributes uniquely to the multifaceted landscape of STEM-based mathematical modeling, reflecting the intricate interplay between theoretical underpinnings and practical applications in educational settings. In this study, we have developed a research framework which draws upon theoretical underpinnings and prior research findings (see Figure 1). This theoretical framework not only guides our current research endeavors but also serves as a foundation for future explorations in the field.
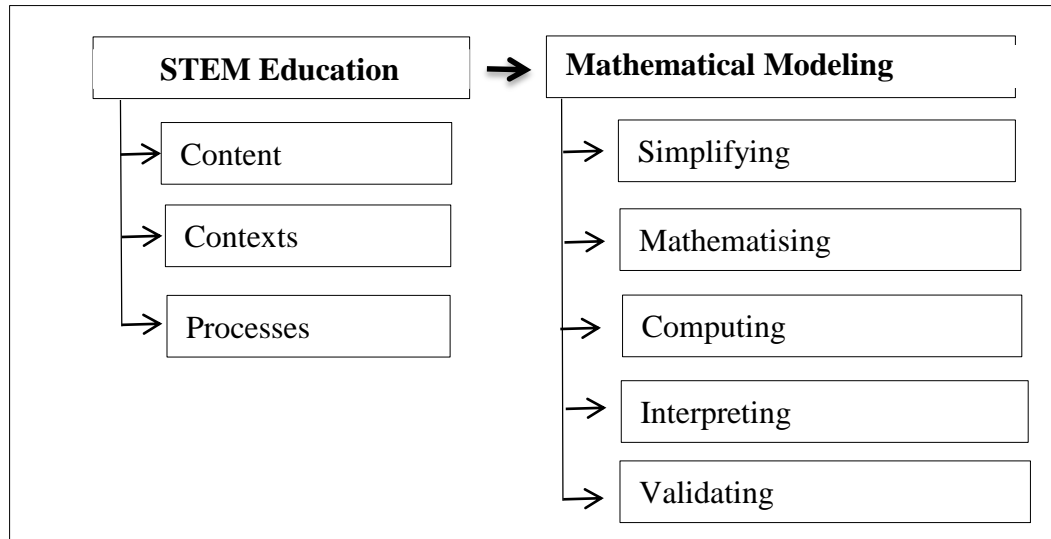
Figure 1: Research framework

2.3. Assessment in Mathematical Modelling

Mathematical modeling is defined as the process of using mathematics to depict, analyze, predict, or otherwise provide insight into real-world occurrences. Mathematical modeling offers far more 'potent and successful strategies to help students become (a) better problem solvers and (b) better equipped to use mathematics in real-life circumstances outside of school. In mathematical modeling, one identifies a scenario in the actual world, makes certain assumptions, and then utilizes a mathematical model to produce a mathematical formulation to obtain conclusions that can be translated back into the real world to validate the practicality of the result. Furthermore, using a real-world issue, students construct assumptions, use a model to obtain a mathematical formula, and apply mathematical tools to that formula to obtain a reasonable result. Blum and Leiss (2007) also stated that mathematical modeling is a process in which an issue in the real world is identified, certain assumptions and choices are made, and then a mathematical model is used to generate a solution that can be translated back into the real world. Modeling is an iterative process that consists of the following stages: (a) comprehending the

phenomenon, (b) developing a physical representation or model, (c) mathematizing the phenomenon and doing computations, (d) interpreting results, (e) validating them in the context of the real world, and (f) spreading them through debates and writing. Cevikbas at al. (2021) indicated that before developing mathematical modeling, the researcher must conceptualize modeling competencies using particular questions: Is the empirical research reflecting the theoretical views defined and expressed in the theoretical frameworks? Modeling skills are understood as an atomistic construct, or are they differentiated as analytic constructions using distinct sub-competencies? Next, which measures for measuring modeling competences have researchers used to study the modeling competencies of (pre-service) teachers or school students? What equipment and data collection procedures were utilized, which groups were targeted, and how large were the sample sizes? Lastly, which strategies for creating and monitoring modeling competencies have researchers utilized to support the modeling competencies of (pre-service) teachers or school students? In this section, we have to consider the assessment of mathematical modeling before developing a mathematical model to answer research questions.

Recent studies (Haines & Crouch, 2001; Hankeln et al., 2019; Xu et al., 2023; Zöttl et al., 2011) have utilized a range of tools to assess mathematical modeling competence. For example, Xu et al. (2023) present a cognitive diagnostic analysis of students' mathematical competency, which can offer valuable insights into developing a framework for assessing preservice teachers' mathematical modeling competency. However, even with the advancements in assessment tools, there persists a conspicuous void in resources customized explicitly to assess the proficiency of pre-service mathematics education teachers. The current array of evaluation instruments demonstrates a wide spectrum of application contexts, yet frequently overlooks a concentrated emphasis on the integration of STEM content, processes, and contexts. This gap is particularly consequential due to its failure to comprehensively acknowledge the intricate interconnectedness inherent in science, technology, engineering, and mathematics. The absence of emphasis on STEM domains in current assessment tools highlights the need for instruments that surpass conventional approaches. It is crucial to develop assessment tools that offer a more comprehensive understanding and measurement of competencies within the specific realms of STEM education. Such tools should account for the intricate interplay between these disciplines, ensuring that future educators are adequately prepared to teach and integrate STEM concepts effectively. Expanding assessment frameworks to incorporate STEM content, processes, and contexts will better equip pre-service mathematics education teachers to meet the evolving demands of modern education. Therefore, bridging this gap becomes imperative for fostering well-rounded educators equipped to meet the evolving needs of STEM education. The proposed study seeks to address this deficiency by creating and employing an innovative

evaluation framework customized for assessing the proficiency of pre-service mathematics education teachers within the STEM environments.

3. Method

3.1. Participant and Design

The research employed a quantitative research model within the framework of a cross-sectional survey research design (Creswell, 2012). In the realm of research, a quantitative research model serves as a practical and systematic method for delving into and comprehending various phenomena. This approach involves the meticulous collection and interpretation of numerical data, providing a robust foundation for analysis. This approach involved collecting data at a single point in time to provide a snapshot of the research variables under investigation. The cross-sectional survey research design facilitated the systematic gathering of quantitative data, allowing for the analysis of relationships and patterns within a specified timeframe. Given the nature of the research and its aim for inclusivity, we employed simple random sampling techniques to meticulously identify and invite prospective mathematics teachers to partake in the online survey. Prospective mathematics teachers in this study pertains to college students enrolled in mathematics education programs who possess comparable modeling experiences. These individuals represent aspiring mathematics educators who are being equipped to teach mathematics at the secondary school level.

A commendable total of 135 prospective mathematics teachers willingly participated in this project, contributing to the richness of our dataset with their diverse perspectives and insights. It is worth noting that the decision to work with a sample size of 135 was purposeful, considering the unique context of developing a novel measurement scale. This size was deemed appropriate to ensure a robust exploration of the self-efficacy dimensions within the specific realm of STEM-based mathematical modeling. The voluntary engagement of this sizable cohort allowed for a comprehensive and well-rounded understanding of the subject matter. Within this participant pool, it is noteworthy that the majority, precisely 135 pre-service teachers, were women. This demographic composition introduces an additional layer of insight, potentially shedding light on gender-specific perspectives and experiences related to self-efficacy in STEM-based mathematical modeling. The diversity within the sample not only enhances the external validity of the findings but also opens avenues for nuanced analyses and interpretations based on gender dynamics within the field of prospective math educators.

3.2. Instruments

The generated items were derived from a thorough examination of pertinent studies

and literature focusing on mathematical modeling. To ensure a comprehensive understanding, a systematic review was undertaken to identify the definitions and existing descriptions of STEM-based mathematical modeling. This involved delving into relevant literature to extract valuable insights, ultimately leading to the identification of four primary dimensions integral to STEM-based mathematical modeling. In the process of scale development, we seamlessly integrated insights from previous literature and theories pertaining to mathematical modeling and self-efficacy contexts. This holistic approach not only informed the creation of the scale but also enriched its foundations with a nuanced understanding gleaned from the broader academic landscape.

The meticulous examination of the item set was initiated with the explicit goal of addressing concerns related to content validity. The overarching objective was to ensure a comprehensive representation of both the theoretical foundations and empirical aspects inherent in STEM-based mathematical modeling. To achieve this, an initial collection comprising 25 items was carefully crafted, strategically employing the principles of mathematical modeling to delve into the nuances of STEM-based mathematical modeling. The conceptual framework for the inaugural version of the STEM-based Mathematical Modeling found its roots in pertinent literature, particularly delving into mathematical modeling (Maaß, 2006) and the models and modeling perspective (MMP). This foundational knowledge served as the bedrock for creating a robust scale that encapsulated the multidimensional nature of self-efficacy in the context of STEM-based mathematical modeling. In the process of generating items for STEM-based mathematical modeling, researchers assumed the responsibility of adhering to the definition and dimensions inherent in STEM-based mathematical modeling. This involved utilizing the established framework as a guide for item development. The formulation of these items was a nuanced process, drawing insights from both qualitative data and existing instruments found in the expansive body of literature. This comprehensive approach aimed to capture the intricacies of self-efficacy within the dynamic realm of STEM-based mathematical modeling.

The STEM-based mathematical modeling was multidimensional with five sub-competencies including simplifying, mathematising, computing, interpreting and validating. The 25 questions on the five scale were changed using item analysis and factor analysis, as well as cognitive evaluations with subject matter experts. Each item was constructed using 5 multiple choice question with score 0 to score 4. Score 0 represents an incorrect answer followed by each score and the correct answer is represented by score 4. Examples of items on the scale included the following: (1) pre-service teacher learn to make assumptions for the problem and simplify the problem; (2) pre-service teacher learn to mathematize relevant quantities and their relations; (3) pre-service teacher learn to use mathematical knowledge to solve the

problem; (4) pre-service teacher learn to interpret mathematical results in a real situation; and (5) pre-service teacher learn to reflect other way to solve the problem if solution can be developed differently. The content experts contributed feedback on the items' applicability, sufficiency, accuracy, and language in order to establish the scale's content validity. The selection of the subject matter specialists was made using purposeful sampling strategies according to their availability, accessibility, and expertise in mathematical modelling. Four mathematics professors with a variety of interests in mathematical modelling and operations research were among the subject matter experts. Three full professors with PhDs in mathematics education and expertise in mathematical modelling were also included.

3.3. Data Collection and Analysis

Potential respondents received invitations to participate in the online poll using Google Form. This approach involved distributing invitations to individuals identified as potential participants in the study. These invitations typically contained a concise description of the survey's objectives, guidance on accessing and completing the questionnaire via Google Form, and details regarding confidentiality and data handling practices. Upon receiving the invitation, participants could access the survey link provided and respond to the questionnaire at their convenience. For statistical analysis, their responses were downloaded and coded. The data analysis for this study's primary objective was to produce solid evidence to support this new assessment scale for evaluating pre-service instructors. The survey data was only acceptable to the degree to which they are determined valid and reliable. Before beginning the survey, the participants were informed that the study was optional and anonymous and they were also given informed consent. In the process of gathering data, the Human Research Ethics approved this study as ethical. The respondents' answers to a STEM-based modelling instrument and demographic data (such as gender and age) were collected. Each participant's data gathering process took about 30 minutes to complete.

The data analysis for this research was done in stages. Firstly, in this study, the index of content validity (CVI) was determined empirically. Item-CVI (I-CVI) can be used to calculate an instrument's content validity (Zamamzadeh et al., 2015). I-CVI is computed as number of experts providing a rating of 'strongly agree' for each item divided by the total number of experts (Rodrigues et al., 2017). The item is considered acceptable when I-CVI > 0.79 when the values range from 0 to 1. Meanwhile, when I-CVI is between 0.70 and 0.79, the item needs to be revised, and if the value of I-CVI is below 0.70, the item is eliminated. Similarly, S-CVI is calculated using the number of items in a tool which have achieved a rating of 'very relevant'. There are two methods to calculate S-CVI. Firstly, we can utilise Universal Agreement (UA) among experts (S-CVI/ UA). Secondly, the Average CVI (S-CVI/Ave) (Zamamzadeh, et. al, 2015). S-CVI/UA is calculated by adding all items

with I-CVI equal to 1 divided by the total number of items, while S-CVI/Ave is calculated by taking the sum of the I-CVIs divided by the total number of items. The output of S-CVI for S-CVI/UA $\geq$ 0.8 and a S-CVI/Ave $\geq$ 0.9 have excellent content validity (Shi et al., 2012). In this study, we utilised S-CVI/Ave as it was easier to calculate. In this study, the result for I-CVI was that 95% acquired the value of 1. Only four questions acquired 0.75 in I-CVI but they were still accepted. Meanwhile, the value of S-CVI was 0.96 which was a higher result for the overall items.

The second phase of our analytical approach involved the utilization of SPSS version 23.0 to conduct exploratory factor analysis (EFA). This statistical technique was employed to delve into the intricate structure of our data, aiming to discern the underlying factors that contribute to the complexity of the STEM-based modelling instrument. EFA served as a powerful tool to scrutinize the interrelationships among variables, unveiling the latent factors that emerged from the set of items designed to measure STEM-based modeling competency. To determine the number of factors, several key metrics were scrutinized. The Kaiser-Meyer-Olkin (KMO) value was assessed to gauge the adequacy of the sample for factor analysis. Factor loading, Bartlett's test of sphericity, scree plot, and eigenvalues were also pivotal elements in this analytical process. These indicators collectively contributed to a comprehensive understanding of the underlying structure, enabling us to identify and interpret the primary dimensions shaping the STEM-Based Modelling instrument. In a complementary approach, we employed EFA with varimax rotation. This rotation method was chosen to enhance the interpretability of the factors and simplify the structure, facilitating a clearer representation of the theoretical underpinnings of the STEM-Based Modelling instrument. Through this multifaceted analysis, we aimed to not only uncover the inherent factors within our measurement scale but also to gain deeper insights into the theoretical foundations that govern STEM-based modeling competency.

4. Results

The instrument was developed consisting of 25 questions with 5 questions in each sub-competency (simplifying, mathematising, computing, interpreting and validating). Each sub-competency shows the level of difficulty in solving the question. For example, the question in the simplified sub-competency was much easier than the mathematical model sub-competency, the question in the mathematical model sub competency was easier than the question in the mathematical question sub-competency and its follow-on result of question in the validation sub-competency was more strenuous.

4.1. Validity of STEM-Based Modelling instrument

Table 1: The I-CVI Result for Each Item

Questions	I-CVI
1	$\text{I-CVI} = \dfrac{\text{Total of experts give score 3 and 4}}{\text{Total experts}} = \dfrac{4}{4} = 1.00$
2	$\text{I-CVI} = \dfrac{\text{Total of experts give score 3 and 4}}{\text{Total experts}} = \dfrac{4}{4} = 1.00$
3	$\text{I-CVI} = \dfrac{\text{Total of experts give score 3 and 4}}{\text{Total experts}} = \dfrac{4}{4} = 1.00$
4	$\text{I-CVI} = \dfrac{\text{Total of experts give score 3 and 4}}{\text{Total experts}} = \dfrac{4}{4} = 1.00$
5	$\text{I-CVI} = \dfrac{\text{Total of experts give score 3 and 4}}{\text{Total experts}} = \dfrac{4}{4} = 1.00$
6	$\text{I-CVI} = \dfrac{\text{Total of experts give score 3 and 4}}{\text{Total experts}} = \dfrac{3}{4} = 0.75$
7	$\text{I-CVI} = \dfrac{\text{Total of experts give score 3 and 4}}{\text{Total experts}} = \dfrac{4}{4} = 1.00$
8	$\text{I-CVI} = \dfrac{\text{Total of experts give score 3 and 4}}{\text{Total experts}} = \dfrac{3}{4} = 0.75$
9	$\text{I-CVI} = \dfrac{\text{Total of experts give score 3 and 4}}{\text{Total experts}} = \dfrac{4}{4} = 1.00$
10	$\text{I-CVI} = \dfrac{\text{Total of experts give score 3 and 4}}{\text{Total experts}} = \dfrac{4}{4} = 1.00$
11	$\text{I-CVI} = \dfrac{\text{Total of experts give score 3 and 4}}{\text{Total experts}} = \dfrac{4}{4} = 1.00$
12	$\text{I-CVI} = \dfrac{\text{Total of experts give score 3 and 4}}{\text{Total experts}} = \dfrac{3}{4} = 0.75$
13	$\text{I-CVI} = \dfrac{\text{Total of experts give score 3 and 4}}{\text{Total experts}} = \dfrac{4}{4} = 1.00$
14	$\text{I-CVI} = \dfrac{\text{Total of experts give score 3 and 4}}{\text{Total experts}} = \dfrac{4}{4} = 1.00$
15	$\text{I-CVI} = \dfrac{\text{Total of experts give score 3 and 4}}{\text{Total experts}} = \dfrac{4}{4} = 1.00$
16	$\text{I-CVI} = \dfrac{\text{Total of experts give score 3 and 4}}{\text{Total experts}} = \dfrac{4}{4} = 1.00$
17	$\text{I-CVI} = \dfrac{\text{Total of experts give score 3 and 4}}{\text{Total experts}} = \dfrac{4}{4} = 1.00$
18	$\text{I-CVI} = \dfrac{\text{Total of experts give score 3 and 4}}{\text{Total experts}} = \dfrac{4}{4} = 1.00$
19	$\text{I-CVI} = \dfrac{\text{Total of experts give score 3 and 4}}{\text{Total experts}} = \dfrac{4}{4} = 1.00$
20	$\text{I-CVI} = \dfrac{\text{Total of experts give score 3 and 4}}{\text{Total experts}} = \dfrac{4}{4} = 1.00$
21	$\text{I-CVI} = \dfrac{\text{Total of experts give score 3 and 4}}{\text{Total experts}} = \dfrac{4}{4} = 1.00$
22	$\text{I-CVI} = \dfrac{\text{Total of experts give score 3 and 4}}{\text{Total experts}} = \dfrac{4}{4} = 1.00$
23	$\text{I-CVI} = \dfrac{\text{Total of experts give score 3 and 4}}{\text{Total experts}} = \dfrac{4}{4} = 1.00$
24	$\text{I-CVI} = \dfrac{\text{Total of experts give score 3 and 4}}{\text{Total experts}} = \dfrac{3}{4} = 0.75$
25	$\text{I-CVI} = \dfrac{\text{Total of experts give score 3 and 4}}{\text{Total experts}} = \dfrac{4}{4} = 1.00$
TOTAL	24

The results showed that 90% of the experts agreed and strongly agreed for each item. In addition, all content validity (I-CVI, S-CVI and Kappa) were used to test the content validity of instruments. The I-CVI result referred to formats of the item including a 4-point Likert scale from strongly disagree, disagree, agree and strongly agree to test the content validity. The items generated were based on relevant literature and research on mathematical modelling. The results showed that I-CVI

for each question was 1.00, but three items acquired a result of 0.75 I-CVI. Table 1 shows the I-CVI for each item.

The S-CVI/UA = 0.88 and the S-CVI/Ave = 0.93. The Universal Agreement was calculated by adding all I-CVI's equal to 1.00 (22 items) divided by 25, while the Average took the sum of all I-CVI (23.25) divided by 25. Overall, the Universal Agreement method and the Average approach showed high content validity of development of stem-based modelling instrument for pre-service teachers of mathematics education in Malaysia. Although CVI was extensively used to estimate content validity, according to chance agreement, this index did not consider the possibility of inflated values. Kappa provides the degree of agreement beyond chance, as calculated using the following formula: K = (I-CVI – Pc)/ (1- Pc), where Pc = [N! /A! (N-A)!]* 0.5^N. In this formula Pc = the probability of chance agreement; N = number of experts; and A = number of experts who agreed that the item was relevant. Kappa values above 0.74 were considered excellent, between 0.60 to 0.74 good and 0.40 to 0.59 fair (Landis & Kosh, 1977). The value of Kappa in this research was 0.89 which indicated excellent validity instruments.

4.2. Descriptive Analysis

The sub-dimensions for mean, standard deviation (SD), skewness, kurtosis, and inter-correlation were calculated (Table 2).

Table 2: Sub-Dimensions with Their Mean Values, SD, Skewness, and Kurtosis

Sub-dimensions	Mean	SD	Skew	Kurtosis	1	2	3	4	5
Simplifying	2.80	.83	.092	-.806	1	.207*	.210*	.211*	.349**
Mathematising	2.50	.92	.565	-.914		1	.361**	.268**	.214*
Computing	2.87	.66	-.387	.722			1	.351**	.193*
Interpreting	2.65	.85	.236	-1.115				1	.318**
Validating	2.76	.75	.123	-.512					1

Based on Table 2, all sub-dimensions and items had kurtosis and skewness values between 3 and +3. (Brown & Greene, 2006). The four sub-dimensions had modest to strong correlations with all scale items, and all scale items had substantial relationships (ranging from $r = .19$ to $r = .36$, p < =.05). Since none of the connections were greater than 90, multicollinearity was not present (Kline, 2005). The mean score differed in each sub-dimension, with M = 2.80 and SD = .83 for simplifying, M = 2.50 and SD = .92 for mathematising, M = 2.87 and SD = .66 for computing, M = 2.65 and SD = .85 for interpretating, and M = 2.76 and SD = .75 for validating. At the same time, given that the values for kurtosis and skewness ranged from -1.96 to +1.96, the data met the assumption of normality.

4.3. Exploratory Factor Analysis

EFA was utilized as the first phase of the empirical technique to examine the pattern

and linkages among the components. The EFA's findings suggested that four factors accounted for 70.86% of the variance (Table 3). The Kaiser-Meyer-Olkin Measure of Sampling Adequacy was .81, showing that the sample was suitable, and Bartlett's Test of Sphericity provided a p-value of <0.001. These scores were not enough (Osbourne, 2015). Therefore, KMO, factor loading, Bartlett, scree plot, eigenvalue, and varimax rotation were used in the current work.

Table 3: The Results of the EFA

Sub-Dimensions	Items	Communalities	Eigenvalue	% of Variance	Loading Factor				
					1	2	3	4	5
Simplifying	A1	.80			.87				
	A2	.74			.84				
	A3	.70	7.13	28.52	.82				
	A4	.72			.76				
	A5	.74			.83				
Mathematising	B1	.72				.82			
	B2	.76				.85			
	B3	.68	3.37	13.47		.80			
	B4	.69				.80			
	B5	.76				.82			
Computing	C1	.53							.67
	C2	.69							.76
	C3	.61	1.88	7.54					.74
	C4	.66							.78
	C5	.60							.70
Interpreting	D1	.65						.78	
	D2	.69						.80	
	D3	.71	2.35	9.41				.80	
	D4	.65						.73	
	D5	.65						.77	
Validating	E1	.64					.76		
	E2	.76					.82		
	E3	.75	2.73	10.92			.83		
	E4	.73					.83		
	E5	.74					.82		

The communalities for these 25 questions ranged from .54 to .80 based on Table 3. The first factor, which accounted for 28.52% of the variance, was the simplifying factor. The second factor, which accounted for 13.47% of the variance, was the factor of mathematising. The third factor, which accounted for 10.92% of the variance, was the validating. The fourth factor, which accounted for 9.41% of the variance, was the factor of interpretation. The final factor, which accounted for 7.54% of the variance, was the computing factor. The item with the highest loading factor was A1 (.87), whereas the items with the lowest loading factors were C1 (.67). All of the items' factor loadings, however, exceeded .50. Cross-loadings were absent from the current work. The scree-plot test supported the decision to preserve four components, hence

the research kept five elements overall (Figure 2).
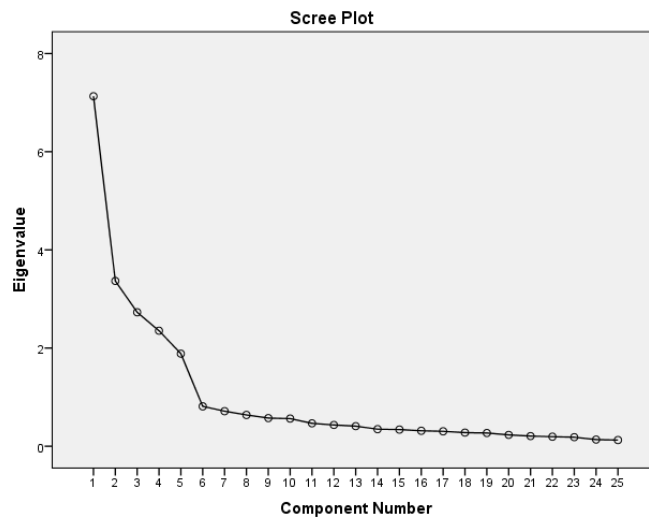
Figure 2: Scree plot of the 25 items for STEM-based Modelling Instrument

4.4. Reliability of Instrument

Reliability is defined as the consistency and stability of the results obtained (Creswell, 2012). When researchers administer the test numerous times during different eras, scores should be nearly comparable. We examined the reliability of the STEM-based modelling scale (simplifying, mathematising, computing, interpreting and validating) and overall STEM-based modelling items for the total respondents (N = 135) (Table 4). In the current work, internal consistency values were: a) simplifying: α = .92, b) mathematising: α = .96, c) computing: α = .91, d) interpreting: α = .91, and e) validating: α = .97. The STEM-based modelling scale was a good Cronbach alpha coefficient (Hair et al., 2015). The AVE values varied from .67 to .79, all over 0.5, indicating that each dimension had good internal consistency (Hair et al., 2017) and supporting convergent validity (Fornell & Larcker, 1981). Furthermore, MSV and ASV scores were lower than AVE ratings, showing that the STEM-based modelling had strong discriminant validity. Composite reliability for the STEM-based modelling ranged from .91 to .97, indicating good internal consistency.

5. Discussion

This study developed and provided content validity of the STEM-based modelling instrument for pre-service teachers of mathematics education which consisted of five sub-competencies related to Science, Technology, Engineering and Mathematics (STEM). Nowadays, most of the pre-service teachers focus on non-subjects related to STEM because their mindset was STEM subjects and question would be much

more difficult than subjects which were not related to STEM. Unfortunately, they did not realize the importance of STEM in this era. As such, this research developed an instrument which could be used to test pre-service teachers answering the items related to STEM consisting of five sub-competencies from easy to difficult. The five sub-competencies were simplifying, mathematising, computing, interpreting and validating. This strategy may also increase high order thinking skills for pre-service teachers when they answer the items. Before the real experiment was conducted, the instrument must go through validation with three steps (I-CVI, S-CVI and Kappa). Face validity was conducted to test to ascertain whether the items met specifications related to STEM. Most of the experts chose scale 3 (agree) and 4 (strongly agree) for overall items.

Calculating the item level CVI (I-CVI) is the most popular way for gauging content validity. Scale-level CVI (S-CVI), which can be calculated using S-CVI/UA or S-CVI/Ave and lead to different values, is an alternative, unrecognized approach to quantify content validity. The I-CVI assesses the content validity of individual items, while the S-CVI assesses the total scale's content validity. The I-CVI or the S-CVI are usually reported in most studies, but not both. As the S-CVI is an average score that might be influenced by outliers, this study used both the I-CVI and the S-CVI. An I-CVI of 1.00 is regarded as excellent. All items had I-CVIs ranging from 0.75 to 1.00, with only three having an I-CVI less than 0.78. This supports the assertion that each item was significant and pertinent when assessing each sub-competence. Any value between 0.80 and 0.90 was considered the minimum acceptable S-CVI. S-CVI/UA and S-CVI/Ave values were computed. The universal agreement method indicated moderate overall content validity (S-CVI/UA = 0.88), whereas the average method indicated high content validity (S-CVI/Ave = 0.93). While the average approach may be more thorough and only take into account items with an I-CVI of 1.00, the universal agreement method may undervalue the content validity of the entire questionnaire because it was less likely to get 100% agreement across the board as the number of experts increased.

The kappa statistic is widely used to assess interdependence. The importance of rater dependability is that it demonstrates how accurately the study's data reflect representations of the variables under investigation. Interrater reliability is defined as the extent to which data collectors (experts) award the same score to the same variable. Due to the possibility that different data collectors may experience and interpret the phenomena of interest, interrater reliability is an issue in the majority of large studies to some level. In this research, the value kappa was higher at 0.89 which indicated that consider that the validity of the instrument can be used. The closer the value to 1.00, the better the validity of the instruments.

EFA is a statistical technique for revealing the underlying organization of a sizable collection of variables. EFA is a method for factor analysis whose main objective is

to discover the underlying connections between measured variables. This work computed a reliable and valid STEM-based modelling instrument for pre-service teachers of mathematics education. The result of EFA revealed that the teacher data involved a five-dimension structure which included simplifying, mathematising, computing, interpreting and validating. The result showed that sampling adequacy was higher enough but the p-value for Bartlett's Test of Sphericity was 0.001. Overall, the findings of this study showed that the STEM-based modelling instrument's components were generally regarded as useful and applicable for assessing modelling proficiency among Malaysian respondents who were pre-service mathematics teachers. The STEM-based modelling construct successfully and internally consistent caught the primary five categories of STEM-based modelling instrument. The study's findings were in line with earlier research by Maaß (2006), which proved that the MMAS were very good for the five sub-competencies.

The findings of this investigation are consistent with those of earlier studies, as documented by Haines and Crouch (2001), Izard et al. (2003), and Lingefjärd and Holmquist (2005). These results underscore the suitability of the mathematical modeling test for prospective teachers in the current study. Our conclusion is drawn from the observed parallels between our research and prior studies, particularly concerning the sub-constructs of STEM-based modelling. This congruence is attributed to the commonality in the educational backgrounds of the populations under scrutiny, characterized by the need for nuanced perspectives in dealing with complex mathematical concepts. The shared patterns across these studies, including ours, point to the significance of considering higher education contexts when assessing the proficiency of individuals in mathematical modeling. The complexity of opinions required within higher education settings seems to contribute to the consistency in findings across various research endeavors. In light of these consistent outcomes, we advocate for the inclusion of a mathematical modeling test in future research endeavors. This recommendation is based on the belief that such assessments have proven effective in gauging the competency levels of individuals, especially those within higher education contexts. By incorporating mathematical modeling tests, future research can continue to contribute to the evolving understanding of competency in this field, fostering advancements in educational strategies and practices.

One of the most significant and prevalent statistics in research concerning test development and application is Cronbach's alpha (Cortina, 1993). We found that all of the sub-dimensions showed satisfactory internal consistency. The reliability of the mathematical modeling test aligns with earlier research, as indicated by Lingefjärd and Holmquist (2005). The results furnish compelling support for the widely acknowledged STEM-based modelling, underscoring its robust global applicability.

Cronbach's alpha value of each domain or construct was all over .80. It is important to remember that Cronbach's alpha was rated similarly to scale reliability, with scores between .70 and.90 being considered as good. Then, the Cronbach's alpha values higher than .80, were considered acceptable. The scale reliability, also known as the construct of reliability, was assessed using the findings of EFA (Dillon et al., 1984; Joreskog, 1971). Our research contributed to the body of evidence by demonstrating the reproducibility of the STEM-based modelling tool for future pre-service mathematics teachers. While the current findings validate the Modeling-based STEM instrument's reliability and validity, it is crucial to acknowledge that the study sample exclusively comprised female students. This limitation highlights the imperative for future research to broaden participant representation, incorporating individuals from diverse demographic backgrounds. Encompassing a wider range of participants, including male students and those from varied cultural and educational contexts, would bolster the applicability and generalizability of study outcomes. Moreover, exploring the instrument's efficacy across diverse student populations holds promise for uncovering potential variations in STEM learning outcomes and instructional requirements. This, in turn, can inform the development of more inclusive and equitable educational strategies.

6. Limitations and Recommendations

The design of any preliminary questionnaire had several limitations. The following limitations apply to this study: probable lack of generalizability; online survey may lead respondents to not read properly; and questionnaire length. Although this instrument was intended for pre-service teachers, it may be useful in senior communities; nonetheless, its generalizability to other teacher demographics is uncertain and needs to be tested. There is a possibility of recollection bias or inflated responses in an online survey. It also takes roughly 20 to 30 minutes to finish the questionnaire. The time may lead respondents to not answer the questionnaire seriously. In terms of data analysis, the current research only calculated validity using I-CVI and EFA. Advanced analysis employing confirmatory factor analysis (CFA) and Rasch analysis should be conducted in different settings. The integration of EFA, CFA and Rasch analysis have been widely employed in mathematics education context (Qudratuddarsi et al., 2022) to validate instrument for diverse settings.

Regarding the composition of our sample, it is noteworthy to highlight that all participants in the current study were female. While this allowed for a focused exploration of certain aspects, it is imperative that future research endeavors prioritize achieving gender balance to ensure the robustness, validity, and reliability of the findings. By including participants of diverse genders, researchers can gain a

more comprehensive understanding of the phenomenon under investigation and account for potential gender-specific differences in responses. Moreover, striving for gender balance aligns with principles of inclusivity and equity in research, fostering a more representative and nuanced interpretation of results. Additionally, addressing gender imbalance in research samples contributes to broader efforts aimed at promoting gender equality and diversity in academia and society at large. Therefore, future studies should actively consider and implement strategies to recruit and engage participants from a variety of gender identities to enrich the research landscape and enhance the overall quality of findings. Given that our research was conducted through an online survey, we encountered challenges related to time constraints. We were unable to control respondents' completion of the questionnaire within a specific timeframe. However, we made efforts to mitigate this by implementing follow-up procedures. Despite these challenges, the online survey methodology allowed for flexibility in data collection and facilitated participation from a wide geographic area. Moving forward, future studies could explore strategies to encourage timely completion of surveys, such as setting clear deadlines or providing incentives for participation. Additionally, considering alternative data collection methods may offer solutions to address time constraints while maintaining research integrity.

7. Implication

The development and validation of the STEM-Based Modelling instrument not only established substantial item-content validity but also affirmed the overall scale validity for assessing sub-competency in pre-service teachers. The exploratory factor analysis identified five distinct sub-components—simplifying, mathematizing, computing, interpreting, and validating—highlighting the multifaceted nature of STEM-based modeling skills. These results underscore the significance of developing and validating focused modeling tools tailored for pre-service teachers in the realm of mathematics education. The implications extend to the body of knowledge, providing a nuanced understanding of the specific competencies involved in STEM-based mathematical modeling. For pre-service teachers, the tool serves as a valuable assessment and development resource, offering insights into their strengths and areas for improvement. Curriculum developers in higher education can leverage this instrument to refine and enhance programs, ensuring that the essential skillset related to mathematical modeling is effectively integrated into STEM education, ultimately benefiting both educators and students.

In addition, exploring how the developed tool aligns with broader goals and challenges in higher education settings is highly relevant for enhancing educational practices and results. By ensuring that the tool meets the specific needs and

objectives of higher education, educators can improve teaching effectiveness, encourage student engagement, and conduct more precise assessments of learning outcomes. Understanding how the tool corresponds with broader goals helps institutions better prepare students for academic and professional success in a rapidly changing global environment. Furthermore, aligning the tool with the challenges encountered in higher education, such as promoting inclusivity, adapting to technological advancements, and nurturing critical thinking skills, enables educators to customize their teaching approaches effectively. Ultimately, this examination not only elevates educational quality but also fosters overall progress and innovation within higher education institutions. The insights gleaned from the data generated by these instruments provide educators with valuable information regarding student performance and misconceptions, empowering them to customize instructional approaches and interventions to effectively target specific needs. Moreover, the utilization of STEM-based modeling tools plays a role in shaping evidence-driven educational policies, directing the development of curricula, refining assessment methods, and allocating resources efficiently to maximize learning achievements and equip students for success in a progressively STEM-oriented society.

8. Conclusion

Students use mathematical modelling as a technique to consider and make sense of a real-world problem that will be examined using mathematics in order to understand, clarify or forecast something. The STEM tool is used to assess the five sub-competencies of mathematical modelling competency. This questionnaire's design employed a one-method strategy to select items required to comprehend STEM-based modelling devices. The tool demonstrated strong content validity of individual items and overall questionnaire content validity. The value of Kappa, which was 0.89, was likewise outstanding. As a result, the instrument had a greater face validity, content validity, and Kappa value. EFA revealed that STEM-based modelling instrument had five sub-components—simplifying, mathematising, computing, interpreting and validating. This suggests that the instrument can be extensively used to assess mathematical modelling proficiency using a STEM setting. Moreover, an actual experiment will be carried out in the future.

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ROLE AND INFLUENCE OF RUBRIC-REFERENCED ASSESSMENT IN POSTGRADUATE EDUCATION: A CASE STUDY FROM A MALAYSIAN PUBLIC UNIVERSITY

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ABSTRACT

Rubric-referenced assessments have been postulated to have both benefits and drawbacks on student learning outcomes. The ambiguity regarding the influence of rubrics on Malaysian postgraduate students' learning experience persists. Thus, in this study, a case study qualitative approach was adopted to explore postgraduate students' perception towards the role and influence of assessment rubrics in their learning experience. Criterion purposeful sampling was employed to select five postgraduate students and the Activity Theory was adopted as the theoretical foundation of the study. Data were collected via focus group discussion and were analysed using content analysis. The findings revealed that the explicit criteria in rubrics provided postgraduate students with clarity on the instructor's expectations, enabling them to set specific academic goals and approach their tasks purposefully. This eventually reduced their anxiety and increased their motivation and confidence in completing the assignments. Nevertheless, one student expressed that the preset criteria could limit learner's creativity and voice. The study also found that students perceived rubrics to have a positive influence on their learning strategies and knowledge gained. The students used rubrics as a tool to facilitate academic goal setting and self-assess their learning progress. Consequently, their knowledge retention and academic achievement improved. The findings imply that rubric-reference assessments should be contemplated by tertiary-level educational stakeholders. However, a well-designed rubric needs to be followed by sound implementation. Ongoing communication is key both between the instructors and between instructors and students to develop a shared understanding of the rubric.

Keywords: assessment rubric, learning experience, postgraduate students, focus group discussion

1. Introduction

The landscape of education in the 21st century is characterised by a shift from teacher-centric pedagogical approaches to those prioritising student-centred learning. This worldwide phenomenon has found fertile ground in Malaysian universities, where assessment practices were transitioning from the conventional assessment which primarily focuses on regurgitating knowledge, to alternative assessment that encourages the development of 21st-century skills among the students (Ministry of Higher Education Malaysia, 2021). While not without merit, traditional assessments presented several limitations. This teacher-centred approach relegated learners to passive receivers of information, prioritising rote memorisation over critical thinking and understanding (Dikli, 2003). Traditional assessments also rarely provided students with opportunities for developing 21st-century skills such as problem-solving, creativity, and collaboration (Dikli, 2003). Moreover, conventional often employ a one-size-fits-all approach, which may not cater to diverse learning styles and individual strengths, it may also provide limited feedback beyond a numerical or letter grade, making it challenging for students to understand specific areas for improvement (Dikli, 2003).

One of the emphases in the Malaysia Education Blueprint 2013–2025 is that *"…*assessment must be aligned with international benchmarks to ensure that Malaysian students are acquiring the knowledge and skills necessary for their success in the 21st century and beyond…*"* (Ministry of Education Malaysia, 2013, p. 4-1). The significance of alternative assessment became more evident during the COVID-19 pandemic whereby instruction was mandated to be conducted online and learning became more self-directed. Educators had to come up with new and more holistic ways of assessing students' learning. Rubric-referenced assessment (RRA) is one of the alternative assessments that have attracted widespread attention among scholars and practitioners, considering the upsurge in the number of relevant studies in the past decade (Brookhart, 2018).

Since the dawn of the transformation from traditional assessment to alternative assessment more than three decades ago (Anderson 1998), the effectiveness of rubrics as a tool in assessments has been studied broadly in various educational fields and age groups (Andrade, 2005; Andrade *et al.*, 2008; Panadero & Jonsson, 2013; Dawson, 2017; Pérez-Guillén *et al.*, 2022). Over the years, various definitions of rubric have been constructed by different practitioners and researchers but according to Brookhart (2013), *"*a rubric is a coherent set of criteria for students' work that includes descriptions of levels of performance quality on the criteria*"* (p. 4). Rubrics can be segregated into two categories which are analytic and holistic rubrics. The analytic rubric presents multiple assessment criteria in separate rows with its respective descriptors for each rating across columns, whereas the holistic rubric comprises rating scales along the rows and the description of overall performance

for each rating is presented on a single column (Popham, 1997).

1.1. Theoretical Framework

This study draws upon the Activity Theory (AT) framework developed by Vygotsky (1978) to delve deeper into how postgraduate students perceive and engage with RRA. In education, AT is a socio-cultural perspective which argues that a learning activity is shaped by the complex interaction between subjects, mediating tools, and the object within an activity system, which ultimately leads to an outcome (Engeström, 1993). The theoretical framework which underpins this study is shown in Figure 1. Within the study's context, the activity system revolves around the integration of RRA in the learning process. Although both learners and instructors are the users of rubrics, this study focuses on delving into the learning experience of students only. Thus, the subjects are the postgraduate students whose experiences with RRA were being investigated. The object of the AT in this study refers to the academic assessments that the students needed to complete, which are the desired learning outcomes such as knowledge and understanding that the students were expected to achieve. Finally, rubrics act as the mediating tools in this activity system. They guide and shape students' engagement with the assessments, influencing the activity system into the outcome (student learning experience).

Figure 1: Theoretical framework based on Activity Theory.

AT posits that mediating tools can either facilitate or hinder the activity's progress (Engeström, 1993; Vygotsky, 1978). In this study's context, rubrics could potentially enhance students' experiences by providing clarity, structure, and feedback. Nevertheless, they might also create stress, stifle creativity, or lead to superficial learning if not implemented effectively. By employing AT as the theoretical lens, this study seeks to uncover the nuanced experiences of postgraduate students in using rubrics, and how this mediating tool influences their engagement with academic assessments, as well as their learning experience.

To illustrate the bi-directional relationships between the three components (subject,

object, mediating tool) in the context of this study, the design of the rubrics and the objectives of the academic assessment are closely interconnected, changes in either one of these components would change the design of another. The design of the rubrics and the academic assessments would also shape the ways students utilise the rubrics and approach the academic assignments. The intertwined relationship between the students, rubrics, and the academic task would produce a unique learning experience (outcome). In this study, the researchers are interested in exploring the role and influence of rubrics as a mediating tool in this activity system.

The various ways rubrics mediate the activity of assessing students' learning were found in numerous previous studies. Rubrics served as a mediating tool in RRA by clarifying the success criteria (Andrade et al., 2008). The explicit description of the rating for each criterion provides students with a clear understanding of the instructor's expected outcomes (Laurian & Fitzgerald, 2013). This clarity allows learners to be more focused and purposeful when approaching academic assessments (Pérez-Guillén et al., 2022). Also, academic assessments were mediated by rubrics in terms of enhancing students' self-efficacy. Given the clarity on the assessment's success criteria, rubrics could increase confidence while lowering anxiety levels among the students, enabling them to engage in assignments with more assurance and competence (Panadero & Jonsson, 2013).

Other than the clarity of the instructor's expectations and increased self-efficacy, rubrics also mediate the RRA process by promoting self-regulated learning. Students engage in project planning and self-assessment to solve their academic tasks when they are clear on the expectations of the evaluator (Bukhari et al., 2021; Fraile et al., 2017). This could foster responsibility and autonomy in their academic journey (Jonsson, 2014). Moreover, rubrics also mediate the learning process by helping students identify key information (Andrade et al., 2008; Holmstedt et al., 2018). Rubrics guide students in focusing on important concepts by delineating the essential criteria of an assessment, thereby enhancing the depth and quality of their learning (Saeed et al., 2019).

The improvement in the feedback process and grading consistency is also one of the ways rubrics served as a mediating tool in RRA. Students are more willing and adept at both receiving and giving feedback about their academic performance through the use of rubrics (Chowdhury, 2019). The consistency in grading across multiple instructors also can be fostered by incorporating assessment rubrics, ensuring fairness and equity in assessment outcomes (Andrade & Du, 2005). Ultimately, the aforementioned mediations of rubrics enable RRA to be a student-centered assessment (Fraile et al., 2017; Oakleaf, 2009). This empowers students to take an active role in their learning progress and eventually enhance their academic performance (Greenberg, 2015; Lipnevich et al., 2014).

On the contrary, several previous studies have also revealed that rubrics can serve as a mediating tool which negatively influences student learning. One of the mediating roles of rubrics is causing a knowledge gap in understanding the success criteria among learners. Even with rubrics readily available, many students struggle to grasp the description of each rating (Matshedisho, 2020). This misalignment between the expectations of instructors and students' interpretation of assessment rubrics could create significant gaps in understanding the true essence of components that are being evaluated, which could then affect students' academic performance. Despite offering clear expectations, rubrics could mediate the learning process by inadvertently increasing stress and hindering self-regulated learning among the students. The detailed criteria provided in the rubrics may induce pressure and the fear of not being able to attain each criterion among learners, affecting their motivation and enjoyment of the learning process (Panadero & Romero, 2014).

Although descriptions of criteria are provided in rubrics, various interpretations may arise when rubrics are utilized by multiple instructors (Sadler, 2014). This causes rubrics to mediate the learning experience in terms of inconsistent grading. This mediating effect is especially prominent in subjective works such as essays and artwork, potentially leading to a lack of anchorage and inconsistencies in scoring (Sitorus, 2020). Furthermore, students' overreliance on the preset criteria of rubrics could also be one of the mediating roles of rubrics. Learners might prioritize fulfilling those criteria rather than forming their unique understanding (Sadler, 2014). Consequently, this dependence towards rubrics could lead to the risk of superficial learning. Learners might resort to superficial strategies solely to tick the boxes and achieve good grades, compromising the depth of their learning experiences (Bearman & Ajjawi, 2018; Torrance, 2012).

Numerous empirical studies have scrutinized the role and influence of RRA among university students' learning experiences, yet the discourse regarding the merits and drawbacks of RRA persists. Essentially, rubrics can be a double-edged sword in mediating the process of learning as the aforementioned studies have shown that rubrics could both enhance and hinder student learning experience. The effectiveness of RRA hinges heavily on both its design and implementation (Bukhari et al., 2021; Panadero & Jonsson, 2020). A poorly designed or inconsistently executed rubric could negate its benefits. Effective use of RRA requires instructors to carefully tailor rubrics to specific learning objectives, provide clear explanations, and allow open discussions around the purpose and limitations of RRA.

Given the aforementioned mixed conclusions regarding the potential role and influence of RRA among postgraduate students' learning experience, there is a dire need to explore deeper into how postgraduate students in Malaysia perceive assessment rubrics as a mediating tool, and how their learning experience is shaped by the integration of RRA in their learning process. Per se, the following are the

research questions of this study that emerged from the previous studies and theoretical framework:

1) How do postgraduate students perceive the role of rubrics in facilitating or hindering their learning experience?

2) In what ways does the implementation of rubric-referenced assessment influence postgraduate students' learning strategies and perceived knowledge gained?

2. Methodology

2.1. Participants

The population of this study was the postgraduate students enrolled at the Faculty of Educational Studies, Universiti Putra Malaysia (FESUPM). The samples were selected using a criterion purposeful random sampling technique. The inclusion criteria are postgraduate students who have completed a course offered in FESUPM which incorporated RRAs. This method allows the researchers to select information-rich cases that enable the researcher to gain substantial insights into issues of pertinence to the purpose of the central inquiry (Patton, 2015). Among the eligible cases, five postgraduate students were randomly selected as the samples of this study. Even when working with small sample sizes, the random sampling technique could enhance the credibility of the findings (Patton, 2015). The demographics of the participants are presented in Table 1. All their career background were related to the field of education and training. They were working in the public sector of the respective industry. Their range of working experience was between nine to 20 years. One of the participants is from the army training field, another teaches media production in an institution, and the rest were working at public secondary schools. The participants' names and any names mentioned by the participants throughout the FGD have been modified for confidentiality purposes.

Table 1: Demographics of Participants

Respondent	Gender	Age	Career background	Years of experience
Ahmad	Male	40	Teacher	11
Fatimah	Female	34	Teacher	9
Lee	Male	36	Teacher	11
Ali	Male	41	Army Officer	19
Hassan	Male	42	University Media Producer	20

2.2.   Instrumentation

A case study approach of qualitative design was utilised to answer the two research questions on postgraduate students' perception towards RRA and how RRA influenced their learning strategies and perceived knowledge gained. The objective of a qualitative study is to elicit participants' personal experiences, perceived meanings, and understanding of the particular phenomenon. In this study, a focus group discussion (FGD) was conducted because it creates a safer space for participants to share their thoughts and feelings when compared to a one-on-one interview, which allows the researchers to obtain in-depth experience and insights among the participants (Krueger, 2014).

An FGD protocol was developed as the research instrument based on previous literature and the theoretical framework, which was then improved via consulting experts in the field of social science research. Semi-structured questions were utilized in collecting the data. A few guiding questions were prepared pre-FGD, and open-ended questions were prompted spontaneously throughout the FGD. This is so that accurate information regarding RRA can be acquired and at the same time, viewpoints from the participants are not limited to the researcher's presumption (Kallio et al., 2016). As the primary aim of this study is to explore postgraduate students' learning experience regarding the integration of RRA, the sub-themes employed in guiding the FGD process of this research are conceptualised as follows:

- **Facilitation of learning**: Postgraduate students' perceptions on the ways RRA aided their learning process.

- **Hindrance in learning**: Postgraduate students' perceptions on how their learning process was negatively impacted by RRA.

- **Perceived influence on learning**: Postgraduate students' feelings about how RRA influenced their learning strategies and perceived knowledge gained.

Consequently, different semi-structured questions were developed to guide the FGD process to gain the participants' insights:

- What do you like about using rubrics in assessing your assignment? Why?

- What do you dislike about using rubrics in assessing your assignment? Why?

- How do you feel when you are doing assignments with rubrics? Why?

- How do you feel when you are doing assignments without rubrics? Why?

- How do rubric-referenced assessments change your learning strategies?

- Do you think using rubrics helped you in gaining knowledge? How so?

Creswell and Creswell (2018) mentioned that the limitations of conducting FGD include (1) participants may not express their opinion equally, and (2) biased

responses may be induced by the researcher's presence. To ensure all participants articulate their perspectives equally, the first author checked with all participants for any other comments before moving to the next question. And to limit biased responses from the participants, the researcher emphasized that *"…there is no right or wrong answer…"* at the start of the FGD and reminded the participants throughout the FGD when needed. The FGD took about one hour and 15 minutes. Before beginning the FGD, consent for audio recording was obtained from all participants, and they were given a printed copy of the rubric for their last assignment to refresh their memory on the rubric used. Analytical rubrics were used among the participants of this study.

2.3.   Data Analysis

Based on Erlingsson and Brysiewicz (2017), the goal of qualitative content analysis is to *"systematically transform a large amount of text into a highly organized and concise summary of key results"* (p.94). The content analysis approach was utilized in this study to analyse the data obtained. The following presents the general steps of content analysis adapted from Erlingsson and Brysiewicz (2017), Forman and Damschroder (2007), and Mayring (2014):

1. **Gain overall impression**: Before initiating content analysis, the researchers read and reread the transcripts, forming an overall impression of the conversations during the FGD while keeping the research questions in focus. Intuitive insights and initial impressions of key ideas shared by the participants were documented.

2. **Divide into meaning units**: Following familiarisation, the researchers break down the text into segments capturing meaningful units of information while staying aware of the research objectives and questions.

3. **Condense meaning units**: Each meaning unit was condensed into shorter versions of the same sentence, preserving the core meaning. The researchers ensured that the meaning units were appropriately sized (avoid too much content or multiple meanings) to minimise the loss of meaning during condensation.

4. **Label with codes**: Each condensed meaning unit was assigned a label (code) that succinctly characterises it. During this process, a close connection to the data was maintained by the researchers and interpretation was minimised.

5. **Forming categories**: Codes were compared, and recurring or related codes were grouped to create categories which aligned with the research questions, facilitating the organisation of content for deeper analysis.

6. **Development of themes**: Similar to category formation, overarching themes were identified to bind multiple categories together, enhancing the understanding of underlying patterns in the content.

7. **Iterative approach**: Content analysis is not a linear, but an iterative process. The

researchers kept notes on the overall understanding of the transcript, then revisited and reconsidered these notes from various perspectives as needed throughout the analysis. Throughout the analysis, steps 1 to 6 above were also repeated and revised as necessary, enabling a more comprehensive and nuanced examination.

As the responses given comprised English and Malay language, the discussion was first transcribed in both languages. To ensure the accuracy of language translation, the Malay transcript was first translated to English and back-translated to Malay and then reviewed by comparing it to the original Malay transcript. All translations and reviews were done by three experienced language experts. Further, both the first and second authors of this study autonomously interpreted and analysed the transcripts to bolster the trustworthiness of the results. Subsequently, the analysed data sets were compared to identify similarities or differences. A considerable number of agreements were observed between both authors' interpretations, and any disparities were deliberated upon to arrive at valid conclusions. This process is crucial for assessing the study's credibility.

3. Findings

3.1. Research question 1: How do postgraduate students perceive the role of rubrics in facilitating or hindering their learning experience?

This section presents findings following the research questions. The first research question is *"How do postgraduate students perceive the role of rubrics in facilitating or hindering their learning experience?"*. The following illustrates the themes regarding the role of rubrics in facilitating student learning.

3.1.1. Rubric clarifies instructor's expectations for students

A common theme that threads most of the participants' sharing is about their fondness for rubrics is the increased clarity about the instructor's expectations, *"If I want to get exemplary, then I will read that category in detail. So [I] will be reading and knowing what it is that [the lecturer] actually want."* says Lee. With the descriptions of criteria, the students felt that the *"rubric is like a guide when I want to do my assignment, it guides my flow, like what should I start with my writing."* (Ahmad). Hassan resonated with Ahmad's comment, saying *"Actually this rubric is like an indicator for me, a guide for us to do our assignment"*.

Ahmad continued to share that the point weightage for each criterion *"shows emphasis on which part needs more of our attention and focus"*. *"I agree"* says Fatimah *"We can know the main points to be included based on the converted points allocated"*. This clarity also enabled students to be more capable of identifying pertinent information while the lecturer was teaching during formal classes, as shared

by Lee: *"During lectures or when I'm looking at slides, we tend to be more able to focus more and catch the more important information"*.

3.1.2. Rubric reduces feelings of anxiety among students

Another theme which emerged from the content analysis in this study is related to the reduction of psychological distress among students due to the presence of rubrics. Fatimah raised concerns about doing assignments without rubrics: *"Because like [there are] a few assignments that have no rubrics..."* and other participants actively chipped in their experience. *"We would be confused..."* (Hassan). *"I feel uncertain and will have a lot of doubts... When I discuss it with my friends in our class, we find that our understanding of the question is different. So it becomes like, am I doing this correctly?"* (Ahmad). *"Yes"* Fatimah agrees with the participants' comments.

The participants contrasted their aforementioned negative emotions with the positive affective domains they experienced when rubrics were utilized in their assessments. Fatimah mentioned, *"I feel happy with this rubric, because I like to have something that I can follow, I just follow what [the lecturer] wants"*. Ahmad shared the same sentiment by adding *"For me, I feel calmer in doing the assignment because we have our own guide. According to the rubrics, we can know how we manage the assignment"*. Similarly, Hassan also experienced less anxiety and shared that *"I feel more organized in terms of I will hold other parts first, and finish the introduction then only go to the next part. If without the rubrics, it will go like haywire you know, like all over the place"*.

Ali further elaborated on Hassan's comment by saying *"Rubrics can take away our feeling of worry in doing assignments. If [there are] no rubrics, before we hand in the assignment, we will always want to change the answer and think [about] what points that haven't been included. With rubrics, we follow the description with the highest mark, then ahh, it is completed now. It washes away the chaos in our mind haha"*.

3.1.3. Rubric enhances students' self-efficacy

Through the FGD, the researchers also found that RRA leads to higher motivation in completing academic tasks among the students. Almost all the participants shared the opinion that they would *"focus more on the assignments with rubrics rather than the ones without the rubrics and complete them first"*. *"For me, rubric is something that gives me motivation"* says Hassan. Apart from motivation, Ali also mentioned that the use of rubrics heightened their confidence in learning, saying *"When we submit the assignment based on the rubric, we gain confidence, that what we did there is correct, and you gained some knowledge from the assignment that you have done"*.

3.1.4. Rubric limits self-expression

Regarding the mediating role of rubrics in hindering student's learning, a theme emerged in the transcript of this study and it is associated with limited self-expression and heightened emotional distress among the students. One respondent clearly expressed his frustration by saying *"With the rubrics, I couldn't express my own opinion. I am like limited by the rubrics"* (Ali). This limitation of the rubric could then conjure anxiety among the students, Ali added *"If I do something different from the rubrics, I would be worried that my marks will be affected because this is what the lecturer wants and all the marks are stated there. So whether I want to or not, I will have to follow the rubrics"*.

When prompted to elaborate further, he mentioned that the limitation in self-expression is mainly caused by the converted points of the rubric as it could limit the number of main points written by the student: *"So for example in this rubrics, for this category, the converted points is 20, maybe 5 main points is already enough, right, because we are given the portion of the converted points. As compared to assignments without rubrics, I would just write as many points as I can because, for me, more main points mean more marks. It's why I say it limits, not to say in a bad way. But ya, because the guide is there, you cannot express freely"* (Ali).

3.2. Research question 2: In what ways does the implementation of rubric-referenced assessment change postgraduate students' learning strategies and perceived knowledge gained?

The second research question was *"In what ways does the implementation of rubric-referenced assessment change postgraduate students' learning strategies and perceived knowledge gained?"* This section delves into the learning strategies aspect of the research question.

3.2.1. The influence of rubrics on students' learning strategies

Setting personalised goals based on the rubric is one of the emerging themes about the change in learning strategies. Almost all participants mentioned that they would *"glance through [descriptions of criteria], then focus on what you want to achieve"* (Lee), allowing them to set their desired goal for each criterion and read its description in detail. They would also adjust their goals according to their perceived feasibility *"I will try to go for as high as possible but if I feel like I cannot, then I go to the previous rating category"* says Lee. While most of the participants focus on the performance descriptor of the highest rating category, Ahmad mentioned that he read descriptions for both the highest and the lowest score by saying *"I only refer to these two columns, [the highest and lowest]"*. This is so that he knows what is needed to succeed while being aware of the bare minimum criteria: *"because the highest is the most important. Then the lowest column is for me to check what is the minimum that is needed"* (Ahmad).

Another theme which emerged is regarding the use of rubrics among students as a guide and self-assessment tool in completing their assignments. Apart from setting their goals, the students also used the rubric as a guide in breaking down the assignment into parts that they could work on according to the criteria. *"I would refer [rubric] first, then find the main points, then after done elaborating for the first part then only I go to the next part"* says Ahmad. Fatimah also employed a similar strategy and self-assess her work based on the rubric as she progressed through the assignment: *"I aim [for the desired rating category] first, then do [the first part of the essay], then look back [at the rubric], until I finish that particular part [of the essay]"*.

Astoundingly, Hassan shared that he transferred his knowledge of utilising rubrics into other assignments that were not accompanied by rubrics: *"There was an assignment that does not have rubrics. So what I did was, after I learnt how to use rubrics, automatically, I would use the rubrics given by Prof. and implement them in assignments that do not have rubrics. So it's also like a guide for the subject that does not have a rubric. Because we have used the rubrics, we can know sort of the direction of the assignment that does not have rubrics also."* (Hassan)

Moreover, rubric enables students to make informed decisions in engaging an assessment is also one of the themes that emerged. With the clarity provided by the rubrics, they were also able to determine the essay questions that they were more confident in answering, as shared by Lee *"There was one question that many of us almost did. But after we looked through the rubrics, we felt that this [question] was a bit too tedious for us. So then most of us abandoned the questions because we felt like we couldn't answer."* Hassan added *"...the question seems easy"*, *"Ya, looks easy"* agreed Ali. In other words, rubrics are able to aid students in decision-making when they are given multiple options in an assessment, as explained by Lee: *"With rubrics, it also helps us to decide which questions to go for, because rubric stated all the criteria there, so you are clearer"*.

3.2.2. The influence of rubrics on students' perceived knowledge gained

With regards to the change in perceived knowledge gained, increased clarity on the knowledge gained as well as improved academic performance are the themes that emerged from the content analysis. One respondent pointed out that rubrics enabled students to clearly know the knowledge that they have gained via completing the assignment: *"It's a written rubric right, so when we do the assignment, we are clear that we know something, and we learnt something"* (Ali). When the participants were asked about the difference in their academic results before and after rubrics were implemented in their assessments, Fatimah claimed to have *"Big [positive] changes"*. After further probing, the researcher found that their experience and understanding of using rubrics play a significant role in improving their grade,

"During the first semester, actually, we are given rubrics too, but at that time we were still inexperienced about rubrics" (Hassan).

Fatimah added: *"Like we do not know how to use yet"*. Hassan continued sharing about how he utilised rubrics to identify the areas for improvement and motivate himself to enhance his academic performance: *"Ya. Like for me, during the first semester, my result for the first assignment was the lowest, but I referred to the rubrics and I know what are the things that I had missed. So it gives me motivation to improve myself for the second assignment. For the second assignment, I refer to the rubrics more, making sure it's correct. Then when we got the result, it improved. So it's like a satisfaction for us when we compared to the first assignment"*.

4. Discussion

This research intended to explore postgraduate students' perception towards the role and influence of RRA within their learning experience. Through the perspective of AT, the researchers aimed to explore how rubrics as the mediating tool facilitated or hindered the interactions between the subject (postgraduate students) and the object (academic assignments) within an activity system of integrating RRA in learning, which leads to the student learning experience. The findings of this study revealed that clarifying instructor's expectations is the biggest mediating effect of rubrics in facilitating student learning. This resonates with the findings by Andrade *et al.* (2008), Fraile *et al.* (2017), Laurian and Fitzgerald (2013), Oakleaf (2009), and Pérez-Guillén *et al.* (2022), all of which concluded that one of the key advantages of rubrics is the explicit description of success criteria.

This finding signifies that even in the context of adult learners such as postgraduate students, providing them with clear academic success criteria is pertinent to creating a more positive learning experience. This is because when students have this clarity in mind, they are more motivated to learn and complete academic tasks. They could also set personalised goals at the beginning of the task and break the assignment down into smaller parts to be solved. Similar findings were also found by Pérez-Guillén *et al.* (2022) who concluded that learners approach their task more purposefully when they are clear about the success criteria. Hence, rubrics can serve as an effective mediating tool in circumstances with learners who lack motivation to learn and complete academic tasks. This also suggests that rubrics can be particularly meaningful for students when dealing with complex projects.

Based on the information in the rubric such as description of criteria, rating scales, and converted points, students can choose the question which fits them best and self-assess their progress in completing the assignment. Bukhari et al. (2021) and Fraile et al. (2017) found that this could foster self-regulated learning among the students.

Indeed, findings in this study have shown that students can not only self-evaluate their assessments in this study, but also the assignments beyond the scope of this study which did not have rubrics. This shows that the knowledge of utilising rubrics in guiding and improving student's work is transferrable, and it empowers students to take ownership of their learning path (Jonsson, 2014). However, this skill requires the understanding and experience of using rubrics effectively, indicating the important role of the instructor in scaffolding the ways of using the rubrics, as well as following up with the students regarding any concerns and challenges that they faced in using the rubric.

The aforementioned influences of rubrics as the mediating tool could also enhance students' learning experience both emotionally and academically. In accordance with Panadero and Jonsson (2013), students feel calmer while they are undergoing the assessment as well as more satisfied and confident with their work. Through shedding light on both the accomplishments and the areas for improvement among the students, rubrics can be an effective tool for educators to assist low-performing students, instill self-confidence within them, and inspire them to close the gap between their current attainment and their aspirations. This has been shown possible by Greenberg (2015), Holmstedt et al. (2018), Lipnevich et al. (2014) and Saeed *et al.* (2019), who found that rubrics could empower students to improve their academic grades by discerning the key information.

On the contrary, the descriptors and converted points given in the rubric may limit one from expressing freely and creatively. As students generally would want to pass their assessments with flying colours, they would be forced to abide by the rubric even though they do not fully agree with it. This is congruent with the critique by Bearman and Ajjawi (2018), and Torrance (2012) who stated that autonomous thinking should be developed among the tertiary students rather than complying with pre-set criteria. As stated by Andrade and Du (2005), the purpose of a rubric is to communicate that standard to the learners, which gives each student an equal chance to excel in that assessment. Therefore, during the implementation of RRA, it is important to remain adaptable, such as discussing the rubric's criteria between the instructor and students, followed by amendments to the rubric if needed (Panadero & Jonsson, 2020).

Another potential shortcoming of the rubric that is worth mentioning in this research is that during the FGD, phrases such as *"I like to follow"* or *"I just follow"* emerged among the participants. This suggests that rubrics may have the possibility of diminishing the development of an individual's soft skills such as critical thinking and self-leadership (Sadler, 2014; Sitorus, 2020). Additionally, the findings of this study postulate that merely giving RRA is inadequate, students need to understand effective ways to make use of the rubric as well (Panadero & Jonsson, 2020). According to the participants' sharing, they did not obtain their desired result during

the first semester despite having assessment rubrics. Their results improved after learning how to incorporate rubrics better via experience and trial-and-error, which means that students, especially novice users of rubrics possess the risks of not having higher performance and experiencing higher stress due to the unfamiliarity towards rubrics (Panadero & Romero, 2014).

In summary, findings from this study showed that rubrics can facilitate student learning and have a positive impact towards their learning strategies and perceived knowledge gained. The interconnected nature of the multifaceted benefits of RRA such as providing students with clarity and guidance, fuelling students' confidence and motivation, together with improving their academic performance, could ultimately cultivate independent learners. Nevertheless, the preset criteria in rubrics can backfire as they could potentially hinder learners from meaningful learning. Individualism and student voice can be diminished due to the preset criteria, implying that the developers of rubrics must strike a balance between describing the success criteria explicitly and tailoring the rubrics to be inclusive of different students.

5. Implications

Findings from this study have shown that almost all postgraduate students perceived RRA as a significant tool in facilitating learning, and all of them perceived RRA to have a positive effect on their learning strategies and knowledge gained. Given the positive experience and impact on postgraduate students' learning experience, educational stakeholders such as policymakers, practitioners, and leaders in higher institutions should contemplate integrating RRA in the curriculum, syllabus, or assessments in higher education. Educators also should consider incorporating rubric-referenced assessments in the teaching and learning process. However, a sound rubric is not a panacea, effective implementation of RRA is vital in maximising students' learning experience.

Since this study revealed that students' understanding of using rubrics plays a significant role, communication between the lecturer and students is essential to close the gap of understanding. Students should be given time to digest the information in the rubric, educators ought to be open to students' feedback and enquiries. The practitioners also need to expect an adapting period from the students before rubrics come into effect on students' learning experience. Perhaps, briefing or training sessions regarding the best practices in utilizing rubrics can be given to the students so that they can avoid pitfalls in using rubrics, and the adaptation period can be shortened. To actualize that, the educators must be equipped with sufficient knowledge. Thus, educational stakeholders such as policymakers and higher institution leaders should allocate a budget and initiate training on the professional development among instructors regarding the design and implementation of

assessment rubrics.

Several theoretical implications are present while viewing the findings of this study through the lens of AT. The results revealed a complex interplay between rubrics as a mediating tool, postgraduate students as the subject, academic tasks as the object and students' learning experiences as the outcome. As posited by AT, while rubrics were introduced as mediating artefacts to support learning, they also invoked external constraints on student outcomes. This tension reflects the inherent contradictions that can exist within an activity system, as well as the fact that a mediating tool may facilitate or hinder the relationship between the subject and the object. AT also focus on the social and cultural aspects of teaching and learning, this implies that the limitations of RRA can be addressed through social interaction and collaboration, such as open communication among the students and instructors as well as within faculty members who are incorporating RRA. This could develop a shared understanding of rubrics within the learning community, which could enhance student learning outcomes. Collectively, these implications aim to support educational stakeholders and practitioners in integrating RRA effectively.

6. Limitations of the Study

While this exploratory study has concluded several key findings on RRA that practitioners and scholars can take note of, there are a few limitations. The research findings were based on the perception and subjective experience of individuals, and the data were self-reported by a small group of postgraduate students. Thus, it is vital to recognize that these findings cannot be generalized to the population of students with a background that differs from this study. As researchers served as the primary instrument in qualitative research data collection, it is acknowledged that the findings in this study are prone to the researchers' bias and idiosyncrasies.

7. Recommendation for Future Studies

Considering the qualitative insights gained from this study on postgraduate students' experiences with RRA, several recommendations for future research emerged, which could enrich the understanding of this complex educational phenomenon. Firstly, the scope of the study can be expanded by investigating the impact of rubrics across different disciplines and subject areas. Rather than traditional essay-based subjects, the effectiveness of rubrics can also be explored in areas like science, mathematics, arts, and vocational skills. Furthermore, rubrics can be digitalised or integrated with technologies such as artificial intelligence and learning analytics. Examining the impact of these digital rubrics on students' experiences and learning outcomes would be insightful during the current digital era. Future research could also be extended to include other types of rubrics such as the holistic rubrics, as well as student groups with diverse learning styles, cultural backgrounds, and academic abilities. A comparative analysis between the mentioned different subject areas, student groups,

and rubric types could provide valuable insights into the strengths and weaknesses of each rubric and the effectiveness of RRA in different learning scenarios, guiding practitioners in selecting the most suitable approach for their specific instructional contexts. Moreover, longitudinal studies which track the evolving impact of RRA over an extended period or multi-method research design that combines qualitative and quantitative approaches could illuminate a more comprehensive understanding of the effects of RRA on student learning outcomes.

8. Conclusion

In this study, four postgraduate students perceived that RRA played a role in facilitating their learning whereas one of them perceived that RRA may hinder student learning. They appreciated the clarity of the instructor's expectations provided by the rubrics. All the participants felt calmer, more at ease and less anxious in completing their work because of the guidance provided by the rubric except one who felt limited by the rubric in terms of self-expression. This means that while rubrics can bring advantages to many students, a few of them may experience the opposite due to the gap in understanding regarding the rubric's criteria. Thus, sole having a well-designed rubric is insufficient. During the implementation of RRA, it is crucial to have regular communication between the students and instructors to close the gap of knowledge among the students or to adjust the rubrics as necessary.

As for the influence of RRA towards learning, all five of the postgraduate students perceived RRA to have a notable positive influence on their learning strategies and knowledge gained. Based on the description of the criteria, they were able to set specific academic goals, determine the steps needed to reach those goals, and self-assess their progress regularly throughout the process of doing their assignment. They even transferred this knowledge of self-evaluation using rubrics to better other courses' projects which did not come with a rubric. Students also felt more motivated and confident to do assignments with rubrics and have a higher sense of fulfilment when the task is accomplished. This eventually enhanced students' knowledge retention and academic performance. This shows that rubrics can be an effective tool to boost students' self-efficacy and academic performance, notably among students who are struggling academically as well as novice students such as first-year or first-semester students. In a nutshell, integrating RRA into instruction could take up more of the educators' and students' time and energy, but the positive responses found in this study have shown that the fruit of this extra effort is well worth it.

Acknowledgements

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FOCUS GROUP DISCUSSION ON PSYCHO-PHYSICAL TRAINING, PHYSICAL TRAINING AND PSYCHOLOGICAL TRAINING AMONG MALAYSIA UNIVERSITY STUDENTS' ATHLETE.

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ABSTRACT

The impact of psycho-physical training, physical training, and psychological training is crucial in developing professional athletes, but the perception and understanding of these trainings in particular has been relatively ignored. For example, prior to this research the understanding of these trainings was more on instructions and paper-pencil test. Thus, the aim of this research was to explore the experiences of young university student-athletes towards the psycho-physical training, physical training and psychological training throughout their athlete's career. The idea, factors and components of each training should not be overlooked especially in the populations of young university athletes, as they are exposed to more psychological risks associated with the nature of their career such as stressful and tensed competitive circumstances, monotonous training, academic works and interpersonal conflict factors. There are three (3) themes concluded from each training in exploring the ideas, components they found and factors in improving for each training. This research on young university athletes enables future research to develop module in creating new insight and awareness in contribute practical strategies and techniques to be implemented for sports psychologists, counsellors, and educational authorities. Such efforts definitely assist more young university athlete by inventing early prevention strategies to improve the educational environment and contribute towards the athletes' performance.

Keywords: Mental Health, Training, Psychological, Physical, Young University Athletes

1. Introduction

Universities or any tertiary education institutions aim to excel their students' potential. Certainly, not only should academic performance be emphasized but also students' potential, talent and capability which enable them to contribute significant development to the nation, such as sports performance (Yusof et, al., 2013).

In Malaysia, mental health issues have begun to attract attention as statistics show that individuals aged 16 years and older are experiencing mental health related problems, from 10.6% in 1996 to 29.2% in 2015 (NHMS, 2015; Shukurov, 2021). Thus, well-planned strategies to maintain and improve wellbeing are needed as primary prevention (Lovell et al., 2014). In general, student-athletes face barriers in dealing with academics compared to non-student-athletes (Yusof, Chuan, & Shah, 2013; Gomez et al., 2018). Additionally, curriculums for university student-athletes overseas are different from those in Malaysia, in which the selection process is very stringent, but provide numerous benefits to athletes. Examples of these programs include the Elite Athlete Program by Western Sydney University and Western Carolina University and Athletic Training, and Athletic Training Fieldwork I-IV by Western Michigan University. On the other hand, there are few manuals, programs and trainings in Malaysia, therefore, this study expects to investigate the effects of psycho-physical training, physical training and mental training on young student-athletes so that mental health program, promotion and guidelines can also be implemented for academic and educational situations.

The latest technology implementation has been providing a better learning experience in higher education institutions. Unfortunately, young university students-athletes are still interpreted as more vulnerable to adjustment issues in university, they are vulnerable to mental health issues as other students (Razali, Sulaiman, Ayub & Majid, 2022; Sasso, et.al., 2022; Grubic, et. al., 2021; Neal, et. al., 2013; Thompson & Sherman, 2007). Young university student-athletes are the talented minority group whom have different roles from other university students as they need to fulfil a role as a university student as well as the role of an athlete in representing the university or country in sports. Indeed, both roles are equally important (Chuan, et. al., 2013). These young university student-athletes are having dual responsibilities, it could be challenging to them in terms on balancing their time between academic and training sessions. This is not the only mental health pressure to young university student-athlete. They also experience stress in inadequate control of their performance during the competition, which caused them more mental health risks experience. However, young university student-athletes are discouraged from seeking help or even acknowledging that they have any sort of psychological risks and mental health issues due to social stigma.

As a result, athletic performance and academic obligations against their own private

experiences, will increase the risk of student-athletes developing a range of mental health issues and poor well-being (Sasso, et. al., 2022). Despite the mental health risks associated with their academic and competitive circumstances, several psychological and physical training had been performed towards young athletes in playing indoors and outdoors games (Teodor & Claudiu, 2013; Miçooğullari & Ekmekçi, 2017). Limited attention has been given to identify how the training experience from psycho-physical contributed to young university student-athletes'. The integration of psycho-physical training may be an effective technique for increasing the well-being and performance of young university student-athletes'.

Therefore, the current research is conducted to investigate the experiences of young university student-athletes towards the psycho-physical training, physical training and psychological training throughout their athlete's career through a qualitative approach. Athletes who satisfy the inclusion criteria of this study participated in the focus group discussion to investigate the student-athletes' experiences pertaining on their perception on the idea, factors and components towards the trainings. Hence, the focus group member's idea, factor and important components in the training will be derived in the focus group discussion. The focus group discussion was carefully planned and executed according to Van Eeuwijk and Angehrn (2017) to explore the elements related to the psycho-physical training, physical training and psychological training to enable future directions in composing good internal and external environment leading to a beneficial influence on their extreme situation in sport performance.

2. Literature Review

Mental health is increasingly recognized as a serious, worldwide public health concern. It includes our psychological, emotional, and social well-being that affect the way we think, behave, and feel. National Health and Morbidity Survey 2017 reported a total of 29 percent of Malaysians had depression and anxiety disorders compared to 12 percent in 2011 due to environmental and individual-related stress (Berita Harian, 2018). According to the National Health Morbidity Survey 2015, there has been an increase in mental health problems from 10.6 percent in 1996 to 29,2 percent in 2015.

Sports activity and physical activities related to psycho-physical training will improve an individual's mental health (Abdluaziz et.al., 2020). "Yes" or "no" for student-athletes depends on balance of responsibilities between a student also an athlete in attending classes, training, and competitions (Daniel, 2018). Young university student-athletes schedule will prioritise training rather than academic. This forces them to be absent to class, submit their assignments late, and face difficulties in committing to classroom discussion, eventually making these athletes

as "anti-intellectual" subculture (Adler & Adler, 1985). Student-athlete are exposed to elevated rates of stress and low control of their performance during the competition, which can put them at increased risk for a range of mental health conditions such as depression, anxiety, and poor well-being, indirectly affecting their athletic performance (Motevalli, et.al., 2013). Thus, psycho-physical training may become an important element to them. In order to be effective, their perception and understanding are equally important in order to tailor up the training module in assisting them in their future training.

Interestingly, professional athletes have positive characteristics such as higher athletic identity, self-esteem, positive expectation than those who do not compete at a professional level. Sport exercise also bring impact to the raising of the hormones that significantly affect mental health such as hormones endorphins and serotonin in the blood (Abdulrasool et al., 2020; Chang, et.al., 2020; Samadzadeh et al., 2011). Physical activity or sport activities bring health benefits namely positive mental health to the youth student-athletes, such as reduced stress, depression, anxiety and others, which indirectly improve academic and athletic performance (Abdulaziz Muhsen & Abdulaziz Muhsen, 2020; Motevalli, et.al., 2022). Despite these benefits brought from sports, limited attention has been given in identifying how these positive characteristics are derived from physical and psychological training and act as a critical individual factor that contribute to Malaysian student-athletes' mental health (Foong & Kwan, 2021). Therefore, this research serves as preliminary research to determine the perceptions of the idea, factors and components of psycho-physical training, physical training, and psychological training among young university student-athletes based on their experiences from the trainings.

Warburton and his colleagues confirmed that there is undisputable evidence of the effectiveness of regular physical activity in the primary and secondary prevention of several chronic diseases and premature death. Moreover, there is a linear relation between physical activity and health status, such that a further increase in physical activity and fitness will lead to additional improvements in health and sport performance status (Warburton, et al., 2006). Therefore, this current research serves as an in-depth understanding of the psycho-physical training, physical training and psychological training in exploring the young university student-athletes' experiences from the trainings. This attention is necessary because university student-athletes are likely to constitute as significant role-models for the future elite athletes, thus, their habits and behaviours towards the training is utmost important to study (Telleria-Aramburu et al., 2019). After all, it is considered significant among Malaysian young athletes in order to gain adequate knowledge to design a reliable framework and module that target increasing sustainable adaptive behaviours and well-being among young athletes.

The significant of the psychological training is to be guided and understand to young

university student-athletes as well as to athlete in all level so that they are aware to the process of significant changes eventually strengthens their psycho-physical health. Hence, it is imperative to investigate the idea, factors and components of each training among Malaysian young university student-athletes' perceptions and experience towards psycho-physical training as an initiation before developing appropriate modules (e.g., psycho-physical modules) to assist them to enhance their mental health as well as trainings in their daily life.

2.1. Theoretical Framework

There are some prominent theories related to athletes' psycho-physical training and cognitive restructuring in which every one of them looks at this process from different perspectives. For instance, Sport Confidence Theory (Short & Short, 2005) concentrate on athletes' beliefs and degree of certainty, Deficit Skills Theory (Lustig et al., 2007) pay attention to the lack of information and knowledge to cause psychological problems, and Biopsychosocial (BPS) Model (Engel, 1977) attempts to explain mental health and well-being on the basis of various and vital factors.

Based to the above theories, psychosocial training can be influence athletes' mental health and well-being in different ways. Physical education of students emphasizes psychological and psycho-physical training (Hutsol & Pylypei, 2020). Studies indicated that basic systematic usage of programmed training in the training process of athletics, that could assist the training process to be more rational and effective and promote better recovery of athletes after significant training and competition (Hucol & Pylypej, 2019).

Psychological training is considered as one kind of athletes' training in which has the same significance for athletes' perfection as other components. It can be classified into two kinds of athletes' psychological training such as general and special psychological training. Stable psycho-physical readiness is built up of two mutually beneficial states - mental and physical, therefore, exercise such as running, cycling, and swimming have been well documented (Azman et al., 2018; Garber et al., 2011). Moreover, the mental training of each athlete is directly related to his physical training, based on sports training, physical endurance, physical exercise, and more (Valev et al., 2019).

The term psycho-physical training refers to training learners on the basis of two psychological and physical domains. It is notable to say that the mental training of each athlete is directly related to his physical training, based on sports training, physical endurance, physical exercise, and more. Sports training can be considered as a system involving the following physical, tactical, technical, and psychological components. These aspects of preparation are associated in unity - the psycho-physical of the athlete and the results of sports show the effect of these two components on athletes' performance (Iancheva T., 2006). Mental training is a

pedagogical process for improving mental processes, qualities, and personality traits in order to increase efficiency and improve health. That is, mental training is a pedagogical process to form mental readiness. The goal of psychic training is to form a mental preparedness for actions in extreme situations (Tishinov, Khadziev, Ivanov, Yordanov, 1987). The expression of individuality, creativity, and uniqueness of using high cognitive skills is essential for high sporting skills to achieve the top sporting achievements. According to Iancheva (2004):

"there may be different types of external factors - uncontrollable natural phenomena, pavement, unforeseen dangers, audience behavior, judges, coaches, unusual lighting and many others. These factors cause individual, subjective, ambiguous experiences in the athlete and have a different impact on competitive behavior and realization. It is safe to say that the influence of the environment is objectively subjective in nature, emphasizing the role of mental or cognitive factors in managing sports training."

Kaikov (1998) divides the mental readiness into "general" and "specialized". The general readiness is engaged with athletes' performance once mental training is applied in the process of sporting activity systematically and for a long period, while the psychological training is performed to the formation of mental phenomena essential for a certain activity and specific type of sport. Stable psycho-physical readiness consists of mental and physical states that assist athletes in coping with various sports circumstances.

2.2. Conceptual Framework

In relation to the theories above, physical education of students emphasizes psychological and psycho-physical training (Hutsol & Pylypei, 2020). Studies show that the systematic usage of programmed training basic in the athletic training process, which can help the training process to be more rational and effective and promote better recovery of athletes after significant training and competition (Hucol & Pylypej, 2020). In addition, psychological training is considered one of the types of athlete training that has the same importance for the athletes' perfection as other components. It can be classified into two types of athlete psychological training such as general and special psychological training. Moreover, according to Trendafilov and Dimitrova, (2013), the quality of physical training includes strength, coordination, endurance, balance, speed, and flexibility. Meanwhile, Fisher and his colleagues showed different important factors in psycho-physical training such as responsibility, confidence, control, and concentration (Fisher et al., 2016).
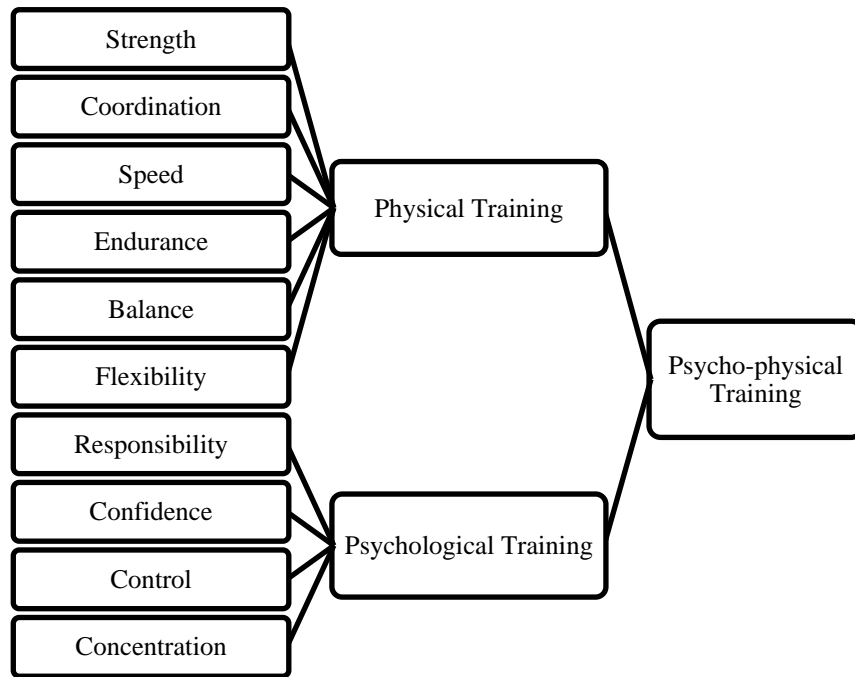
Figure 1: The Framework of Psycho-Physical Training

Based on this framework, all psycho-physical qualities for athletes' training further build positive self-esteem, confidence, expectations, and good performance and also enhance monitoring and control over the internal and external environment leading to having a positive influence on anxiety, stress or tension that may be experienced in extreme situation such as a sport competition (Fisher et al., 2016).

3. Research Methodology

This paper aims to discuss the idea, factors, and components of psycho-physical training, physical training and psychological training among young university student-athletes. This section describes the study participant, research instrument, data analysis as well as the validity and reliability of the current study. In order to gauge the young university student-athletes' experiences in psycho-physical training, physical training, and psychological training, a qualitative research methodology using the Focus Group Discussion (FGD) has been employed.

Focused group discussion was conducted with Malaysian young university student-athletes' to clarify, assure or challenge finding of the emerged themes. New themes are also allowed to emerge as the individual responses as well as the interactions between participants, can be analysed to identify other areas of agreement about psycho-physical training, physical training and psychological training experiences among young athletes in Malaysia. The focus groups consist of seven (7) respondents in two (2) focus groups in the West and East Malaysian public universities located in *Perak* and *Sabah*. There are also inclusion criteria: (i) Students must be registered as a full-time student in the selected public universities and (ii) Students must be

diagnosed as university student-athletes by the university authoritarians. The exclusion criteria are: (i) University student-athletes with mental or chronic illness, (ii) University student-athletes with mental retardation and (iii) University student-athletes with learning disabilities (LD). The rationale is due to the idea, factors and components of psycho-physical training, physical training, and psychological training is important to gain adequate knowledge to design a reliable module that target increasing sustainable adaptive behaviours and well-being among young athletes. After the participant is identified, the FGD is transcribed into words, furthermore, with triangulation strategy employed to reach data confirmation (Guest et al., 2017).

Interview protocol was developed through the reading and analysis of the literature studies in the interview of psycho-physical training, physical training and psychological training. Moreover, the interview protocol in the current FGD was also an outcomes derived from expert interviews to formation the series of interview protocol for the FGD to formulate themes pertaining the idea, factors and components of psycho-physical training, physical training, and psychological training allowed to emerge as the individual responses as well as the interactions between participants, can be analyzed to identify other areas of agreement about psycho-physical training, physical training and psychological training among young university student-athletes in Malaysia. There are total of 14 respondents and 2 focus groups conducted in two public universities as well as three (3) experts invited in the related to the research field as for reviewed the interview protocol and the established themes during the data analysis process.

The data confirmation employed triangulation strategy to increase the trustworthiness of the analysis. To avoid bias, triangulation is one of the strategies in qualitative research to strengthen and enhance the internal validity of the study (Carter, et.al., 2014). Additionally, triangulation refers to the use of more than one approach when investigating a research problem, in order to maximize confidence in the findings (Bryman, 2006).

3.1. Sampling Method

The sample techniques were intended to selected participants based on the inclusion criteria: (i) Students must be registered as a full time student in the selected public universities and (ii) Students must be diagnosed as university student-athletes by the university authoritarians, whereby the exclusion criteria are (i) University student-athletes with mental or chronic illness, (ii) University student-athletes with mental retardation and (iii) University student-athletes with learning disabilities (LD). Besides, as mentioned by Tuckett (2004), qualitative study is emphasizing the richness and essence of the information collected rather than the number of study participant. Therefore, a total of fourteen (14) university student-athletes gave their

consent and agreed to participate in this research. However, both universities were selected as they provide good student-athletes as recommended. The student-athletes were chosen by the university authorities based on the inclusion and exclusion criteria mentioned. The demographic background of the participants is shown in Table 1 and Table 2.

Table 1: Participants Background Information FGD 1

CODE	INSTITUTION	GENDER	ACADEMIC LEVEL	EDUCATION BACKGROUND
A01	Universiti Pendidikan Sultan Idris	Male	Undergraduate	Bachelor Degree in Sports Science
A02	Universiti Pendidikan Sultan Idris	Female	Undergraduate	Bachelor Degree in Sports Science
A03	Universiti Pendidikan Sultan Idris	Male	Undergraduate	Bachelor Degree in Sports Science
A04	Universiti Pendidikan Sultan Idris	Female	Undergraduate	Bachelor Degree in Sports Science
A05	Universiti Pendidikan Sultan Idris	Male	Undergraduate	Bachelor Degree in Sports Science
A06	Universiti Pendidikan Sultan Idris	Male	Undergraduate	Bachelor Degree in Sports Science
A07	Universiti Pendidikan Sultan Idris	Female	Undergraduate	Bachelor Degree in Sports Science

Table 2: Participants Background Information FGD 2

CODE	INSTITUTION	GENDER	ACADEMIC LEVEL	EDUCATION BACKGROUND
B01	Universiti Malaysia Sabah	Male	Undergraduate	Bachelor Degree in Sports Science
B02	Universiti Malaysia Sabah	Female	Undergraduate	Bachelor Degree in Sports Science
B03	Universiti Malaysia Sabah	Male	Undergraduate	Bachelor Degree in Sports Science
B04	Universiti Malaysia Sabah	Male	Undergraduate	Bachelor Degree in Sports Science
B05	Universiti Malaysia Sabah	Female	Undergraduate	Bachelor Degree in Sports Science
B06	Universiti Malaysia Sabah	Female	Undergraduate	Bachelor of Finance with Honours
B07	Universiti Malaysia Sabah	Female	Undergraduate	Bachelor of Science (Business Mathematics)

3.2. Data Collection & Data Analysis

The FGD was conducted to explore unknown information to answer the research objective. The data collection process begins by building an initial relationship by making an appointment through phone calls. After the participants agreed to be part of the study, the group discussion session was conducted face-to-face. The group discussion was recorded using a voice recorder for the purpose of data management of the study. The data collection from the focus groups consists of shared understanding, views, and opinions of the participants. Additionally, the moderator needs to be capable of managing and ensuring that each individual in the group can take turns in sharing their understanding, views, and opinions so that the time limit set could be utilized fully and smoothly to save time for data analysis (Creswell, 2002).

The study has two focus groups, each with seven students from Malaysia public universities. This range of focus group size is to create an environment where participants can safely and comfortably share their thoughts, ideas, and opinions (Onwuegnuzie, et.al, 2009). The current focus group data would be included in the analysis to further refine and improve the understanding in psycho-physical training, physical training, psychological training and cognitive restructuring.

The data of this qualitative study appeared in the form of focus group discussion interviews and transcript documents. However, the entire data analysis process begins with data collection. An experienced moderator presides over the sharing sessions and takes notes on the information shared and exchanged. After all groups had carried out their discussions, the data from the notes taken during the observation of the two (2) focus groups were analysed and categorized. The participation of the groups also assists researchers to achieve data saturation, which is a crucial component in the qualitative study (Doody, et.al., 2013).

The discussion data collected from students were transformed into tables. Students' insights pertaining to the psycho-physical training, physical training and psychological training are obtained through notes, categories and themes. A total of nine (9) open-ended questions were included in the focus group discussion.

Data saturation is essential in qualitative research, as through data saturation, the qualitative researchers can fulfil or gain the research needs (Bernard, 2012). Researchers in qualitative research would like to obtain as much information as possible, therefore the interview questions should be well prepared to allow rich information to be gathered from the research participants (Ness, 2015). Another important aspect of qualitative research is data triangulation. This research used data triangulation, as the focus group discussion questions were uniformly conducted to obtain data from Malaysian young university student-athletes', who are full-time students in public universities and acknowledged as university student-athletes by

the university authoritarians. The rationale is due to the idea, factors and components of psycho-physical training, physical training, and psychological training is important to gain adequate knowledge to design a reliable module that target increasing sustainable adaptive behaviours and well-being among young athletes. After the participant is identified, the FGD is transcribed into words and the triangulation strategy was employed to reach data confirmation (Guest et al., 2017). In the process, the analyzing of the interview data, all young researchers were gathered for discussion to form a preliminary theme. Senior researchers met for the preliminary theme discussion, which ensures the investigator's triangulation is implied (Rugg, 2010). Therefore, data validity is verified. Furthermore, research reliability was tested through the inter-rater reliability (IRR) test, IRR is a coding technique that involves multiple researchers in the coding process (McAlister et al.,2017). Research questions are provided to the two experts in sport psychology as they were invited to go through the data to complete the IRR process. With the completion of the analysis process, the interviews were converted into written form, grouped, and concluded with a theme to answer the research question. These themes were narrowed into three main themes for each training. All the data were analysed to identify themes that emerged. In short, the theme that emerged from the focus group discussion indicating participants' experiences in psycho-physical training, physical training and psychological training are as Table 3.

Table 3: Theme that emerged from the Focus Group Discussion (FGD)

Psycho-Physical Training	*4.1.1 - Tweak and strengthen athlete mental health*
	4.1.2 - Benefits to trainee in prepare match/competition
	4.1.3 - Booster athletes' professional development
Physical Training	*4.2.1 - Fitness, skills and interest*
	4.2.2 - Healthy body healthy mind
	4.2.3 - Practice fundamental sport skills
Psychological Training	*4.3.1 - Methodological system*
	4.3.2 - Manage athletes' emotion for their performance
	4.3.3 - Assist athletes to have better self-control

4. Findings & Discussion

The findings of the study are based on the focus group discussion. The purpose of the current research is conducted to investigate the experiences of young university student-athletes towards the psycho-physical training, physical training and psychological training throughout their athlete's career. Therefore, focus group discussion interview questions including the meaning, experiences and important of

the skills in the training. Eventually, there are total of three (3) parts in answering the experience pertaining to psycho-physical training, physical training, and psychological training among young university student-athlete. Each section analysed three (3) themes namely psycho-physical training, physical training and psychological training.

4.1. Psycho-Physical Training

4.1.1. Tweak And Strengthen Athlete Mental Health

The first objective is to explore the meaning of the psycho-physical training to the members in the focus group discussion. This is intended to understand the student-athletes' opinions toward the psycho-physical training experience during their professional life as an athlete. It can be a thought-provoking physical and mental training method for the students. While they knew about psycho-physical training, their meaning in training is limited, however, studying the term in physical education or sports education courses made the FGD members' experience with the training content more interesting (Prots et al., 2021; Pichurin, 2014). In overall, the term psycho physical training is interpreted directly by the student-athletes as training related to a person's psychology and physical activities.

A03:	"...*focusing on training a person's psychology and physicality*..."
A06:	"...*psychology combined with physical matters*..."
B02:	"...e*xercises that involve the athlete's psychology and physique*..."
B03:	"...*involves two things namely mental and physical in a training*..."

Sasso, et.al., (2022) reported student-athletes bear dual responsibilities between the responsibilities in athletic performance and responsibilities to strike in their academic obligations, these raising the risk of student-athletes developing a range of mental health issues and poor well-being. However, several members in the focus group discussion provided another deepen acknowledgment to the term's psycho-physical training, that is a training related to improving an athlete mental health to deal with their problems as seen from the following:

A04:	"...*mental strength...dealing with environmental problems as well as personal problems (family/friends)* ..."
A05:	"… *improve mental health*…"
B01:	"…*training in improving the psychological state of the*

> *mental health condition of the individual/athlete in dealing with stress in sports…"*

B04:   "... *a form of training to improve the mentality view towards the level of intensity of physical activity...*"

B05:   "…*specific training for innovative solutions and increased mutual assistance and support within the team and improve mental health…*"

B06:   "...*exercise that provides many benefits to mental health...*"

B07:   "…*training to test a person's ability, mentality in sport…*"

These results of the focus group discussion also revealed the psycho-physical training is not only helping to improve the mental healthiness of an athlete, the training also involve some elements that related to the cognitive development As stated by A01, it "...directs towards the cognitive development of an individual...". In addition, the members also include the idea pertaining to psycho physical training are related to the inner and outer world of an athlete as to see from A02 and A07:

A02:   "...*psychophysical relates to the relationship between the inner (psychic) and outer (physical) worlds of a person...*"

A07:   "...*psychophysical relates to the relationship between the inner (psychic) and outer (physical) worlds of a person…the relationship between physical stimuli and their subjective relevance...*".

4.1.2. Benefits to Trainee in Prepare Competitions

In conjunction with the meaning of psycho-physical training, hence, the discussion leads to link the meaning to experiences. The purpose of this discussion question is aimed to link both the athletes' personal and professional life towards psycho-physical training. Notwithstanding anything contained to the contrary, some of the members are yet to have a complete experience for the psycho-physical training, such as participants A06, B01, B06, B07. Participants from the FGD 2 agreed with "…*psycho-physical training is a very challenging exercise…playing mind testing games*" as mentioned by B02 and B5, as well as B4: "... *psycho-physical training can gain improvement in terms of physical and mental...*". Furthermore, the athletes in the focus group discussion points out that their psycho-physical training involves a variety of exercises that is beneficial to the young athletes to adjust themselves before competitions.

A01:   "…*variety of exercises or activities that involve interacting with external relationships to open social space in life for the*

A03: *"…the training that is engaged in firmly and continuously until there is a feeling to stop practicing because you feel too tired*

and unable, but the psychological training is given as revealed more by the achievements and awards received than the hard training which every done makes wanting to give up will bear fruit in the future with a strong self-confidence in going through all the hard training..."

A04: *"... run really hard when the coach makes a test 2.4 km a week 3 times it really tests me mentally ...after all, I become more confidence after the training hardship…"*

Sports activities improve individual's mental health (Abdluaziz Muhsen & Abdulaziz Muhsen, 2020). However, in terms of mental health, focus group discussion members perceived that psycho-physical training are also bettering their performance in sport. As the below excerpts.

B03: *"… was able to improve my performance in sports. In addition, this training is able to change my way of thinking when facing a competitive situation..."*

A02: *"…helps improve mental health by reducing anxiety, depression, and negative moods as well as by improving self-esteem and cognitive function…"*

A05: *"…ensure a good performance during a match…even in a critical situation…"*

A07: *"... training help to control/lesser pressure... able to control my stress and compete in a healthy manner without aggressiveness in competition..."*

4.1.3. Booster Athletes' Professional Development

Discussion in knowing the athletes' personal and professional life towards psycho-physical training meaning and experience, the next question is to approach a self-reflection pertaining to the importance of psycho-physical training for them also for the others student-athletes. Based on the discussion, participants are agreeing with A05: *"… to improve performance…"* in FGD 1 and B6 *"…increase sportsmanship…"* in FGD 2. Besides, the participants' opinion that psycho-physical training is helping athlete in their sports performance.

A07: *"...helping athletes in balancing mentally and physically..."*

B01:   *"...increasing the level of psychology and psychological skills in overcoming and adapting during the competition..."*

B03:   *"...in my opinion, the importance of this training to young athletes is able to help them in facing different situations and be able to find a better way when in sports. In addition, this exercise is able to improve their physical performance much better…"*

B04:   *"...can help improve the performance and potential of young athletes in facing a new sport or sports norm..."*

B05:   *"... helps the athletes to increase their metallicity in any situation they face either during competition or in training…"*

Among the quality developed as professional athletes include higher athletic identity, self-esteem, and positive expectation (Abdulrasool, EmadOdaJoda & Abdulrasool, 2020; Chang, et.al., 2011; Samadzadeh et al., 2011). The psycho-physical training is considered crucial in assisting student-athletes' professional development for an athlete in an explanation of chemical reactions from the psycho-physical training, enhancing their self-confidence:

A01:   *"...release of endorphins, suitable for reduction of emotional stress, increase social relationships, protection against cognitive decline..."*

A02:   *"…reduces stress and depression…stimulates the production of endorphins…prevents stress and depression. Endorphins can also make you feel more relaxed and optimistic after a hard workout in the field…"*

A03:   *"... train their perception in facing all challenges with calmness and strong self-confidence..."*

A04:   *"... the training involve situation that challenge mental strength…release endorphins booster self-confident during the test as they realize their weaknesses and able to overcome… then improve to be strong in the competition…"*

A06:   *"…train better psychology in athletes…brains release chemical and increase confidence…"*

B07:   *"…recognize the ability, with the psycho-physical training…brain release some types of chemicals to make sure they know their ability and have enough confidence…"*

B02:   *"…helps improve athlete performance…build self-confidence*

in athletes… be able to know the strengths and weaknesses of athletes…"

4.2. Physical Training

4.2.1. Fitness, Skills and Interest

Psycho-physical training has two (2) parts, physical training and psychological training both are playing important role in developing of an athlete. Thus, by gathering the psychological training in-deep discussions would be seeming incomplete to understanding the training. Therefore, the researchers again lead the FGD to have an in-depth discussion so that people can have a deepen knowledge in discussion and understand from general to specific. There are fitness and skills most discussed to be consider into account in physical training.

A02:	*"…physical skills that involve combining components such as balance, flexibility, speed, strength and stamina with skills that will then push them towards…"*
A03:	*"… muscle endurance and also cardiovascular …to stay playing at maximum performance longer and better…"*
A04:	*"…appropriateness of training…level of physical fitness…training area…training goals… athlete commitment…"*
A05:	*"… physical activities that must involve endurance…. improve mental health …"*
A06:	*"…includes all fitness activities such as speed, agility, power and others…"*
A07:	*"… fitness...this is said to be so because it helps athletes compete in a healthy way…"*
B01:	*"… fitness… skills training"*
B04:	*"…athlete's skills and fitness to perform exercises … different levels of training intensity…"*
B05:	*"…basic sports skills…"*
B06:	*"…fitness… very crucial to athlete…"*
B07:	*"…strength training…"*

Lastly, in other respects, interest is important for an athlete in physical training. This is because training is repetitive behaviours requiring high interest as they would often lead to boredom and an eventual drop out.

A01:	"…their interest in the type of training…"
B02:	"…training that can attract attention and not be boring…"
B03:	"…interest…what purpose they want to achieve … what the young athlete wants to improve…"

4.2.2. Healthy Body Healthy Mind

The input of the FGD pertains to physical training is fitness, skills and interest. The discussion lead to a more specific question, which is the types of physical factors or components are more important to consider for physical training. Based on the focus group discussion member, physical component is crucial in physical training, as mentioned by B3, "…*the physical requirements they want to carry out the exercise…*". Based on A07 and B07, "…*healthy lifestyle and a fit body…*" and "…*healthy lifestyle and with good attitude…*" respectively. According to Abou Elmagd, (2016), regular exercise can maintain a person healthiness, energy and independency as they get older. This is a great motivation to promote people to not only succeed but also maintain participation in sport in one's life. In addition, based on A01, A04, A05 and B06 discussion, the lower body is important to physical training, "…*an important physical component is the lower body …*", "*…lower body is a component that is often involved in human daily activities...*", "…*quality training period needed in focusing on lower body during training…*" and "…*more skills need more course focusing on lower body…*". However, beside of the lower body component in training, some specific skills mention by the participant such as strength, speed, conditioning and so on are in line in mentioned by Trendafilov & Dimitrova, (2013), that these skills are important in physical training.

A02:	"…*in any movement or sport, there are basically 4 physical attributes that need to be exhibited or used by an athlete, strength, speed, conditioning, and position…*"
A03:	"…*strength, in terms of strength young athletes are better than older athletes so young athletes can make better achievements…. agility, speed training can help young athletes to train themselves and the working muscles to adapt to different conditions with the same or better performance level…*"
A06:	"…*in terms of health is cardiovascular endurance…*"
B01:	"…*body composition…cardio endurance…*"
B02:	"…*cardiovascular flexibility and endurance…*"

B04:   "… *physical component to consider for young athletes is cardiovascular endurance…*"

B05:   "…*physical fitness in terms of body composition endurance…*"

4.2.3.   Practice Fundamental Sport Skills

After exploring the important and the crucial factors for physical training, the discussion opened an opportunity to explore some more physical skills that young athletes need to learn about them in order to booster these important components in physical training. Interestingly, to booster the physical skills, the training will be needed for fundamental sport skills. This is important to athletes, as athletes tend to practice the skills in the context of their game or sport, for instance, baseball athlete would be practicing hitting as this has been taught to them as meaningful skills. They included that the public has forgotten fundamental sport skills such as warm up activities, which has been purported as contributing to children's as well as adolescent's physical, cognitive and social development and is thought to provide the foundation for an active lifestyle Pot & Van Hilvoorde, (2014); Lubans, et.al., (2010). Therefore, in line with the current study, the FGD discussed the fundamental sport skills is crucial to booster the physical skills among athletes.

A01:   "…fundamental…*jump force expansion …*"

A02:   "…*fundamental skills that are manifested outside with sports skills…it includes strength, speed, endurance, coordination and flexibility...*"

A04:   "…d*ynamic workout…*warm up… basic skills"

A05:   "*...focus on the basic (fundamental) skills…*"

A06:   "…fundamental skills that can increase the performance in a*gility and reaction time…*"

A07:   "…*training basic skills that can help endurance, strength, flexibility, coordination, speed, agility, reaction time and balance…*"

A03:   "…*the fundamental skills and basic skills such as kicking correctly using the correct technique... these are very important in an effort to get scoring opportunities…*"

B01:   "*…skill-based fitness …*"

B02:   "…*fundamental skills, so body can be more flexibility, agility, muscular endurance…*"

B03:	*"...such as in my sport, the basic pass, header, shoot must presence..."*
B04:	*"…among the physical skills that young athletes need to learn are important fundamental skills …"*
B05:	*"...fundamental skills especially in running, jumping, swimming..."*
B07:	*"...basic (fundamental) skills to improve/increase stamina, balance, agility..."*

4.3. Psychological Training

4.3.1. Methodological System

The term psycho-physical training refers to the mind and body training of learners based on both psychological and physical domains. Since the body and the mind of the human cannot be assumed as two separate elements, they are considered jointly (Samadzadeh, et.al., 2011). Thus, in the current study, a deepen exploration about their experience in psychological training is explored. Unfortunately, most of the member in the group merely have the experiences in answering the psychometric test and have some psychological learning as part of their psychological training such as for participant A01, A03, A05, A06, A07, B01, B02, B04, B05, B06 and B07. Nonetheless, few feedbacks received as followed:

A02:	"…psychological skills training is a methodological system that performers use to manage and control their psychological state. It is effective in and out of performance…"
A04:	"… a methodological system that strengthen someone who has a weak mentality, for me, they should not engage in sports because sports require people who are patient, disciplined and steadfast. For example, running 25 round tracks
B03:	"…Psychological training helps the athlete mentally to be much better in facing the surrounding situation…"

4.3.2. Manage Athletes' Emotion for Their Performance

Next, the athletes' idea about mental training/ rehearsal training and psychological training in sport were explored. Sports offer various of benefits to those who are capable to repeat and perform it every day and eventually generate healthy body and strength to prevent health diseases and stroke (Abou Elmagd, 2016). In addition, physical activity contributes to the mental health and well-being of the general

public, primarily by improving mood and self-perception (Ali, 2018). During the FGD sessions, most participants discussed the psychological training as taking care and managing athletes' emotions.

A01:   "… *take care of the athlete's emotions…*"

A06:   "…always give motivation to athletes in training… assist them overcoming the negative emotions from the past…"

A07:   "…mental training is the idea of overcoming past failures by staying positive and improve negative emotions…"

B01:   "…important to expanding mental training methods to athletes across the country…help them improves emotion and performance"

B02:   "…give training that are suitable but leave a big impact on the athlete's emotions…"

B03:   "…this training is an exercise that helps athletes to improve their emotions…"

B04:   "…doing exercises that help in improving the psychological, emotions and mental level of the individual…"

B06:   "…an exercise that improves emotion and performance…"

B07:   "…training that sooth an athlete's mind, eliminate previous failure emotions …

Other than emotions, the FGD members discuss other factors related to the psychological skills. In sport culture, technical skills, tactical strategies and physical training are used to be the focus, until recent years some focus shifting to the psychological factors (Miçoogullari & Ekmekçi, 2017), therefore besides of managing emotions, others' ideas towards psychological factor from the FGD are:

A03:   "…*important training is given before the competition to calm someone down so that they are not anxious so that their level of readiness remains and does not disappear…*"

A04:   "… mental training needs to mix with the positive community and repetition training, it has to improve athletic ability…"

A02:   "…*mental rehearsal is where the performer visualizes themselves performing a skill and practices that skill in their mind…*"

A05:   "…experience more situation…visualizes the past experience and improve…"

| B05: | "…doing chasing activities, playing traditional games, playing mind-testing games such as hajj checkers, soduku *to calm down athlete after a stressful competition* …" |

4.3.3. Assist Athletes to Have Better Self-Control

Training is non-separated to athletes at all levels, Psychological training provided to athletes intend on preparing the athletes to face all the possibility of scenario that might lead to mental discomfort resulted from stressful and tensed competitive circumstances, monotonous training, academic works, and interpersonal conflict factors (Teodor & Claudiu, 2013). The psychological training can be more meaningful if the training inserts the important, vital, meaningful or useful elements in the psychological training such as the techniques the athletic skills, the respond to contextual cues and the focus on the required aspects of competition or training. Thus, the effect of the psychological training towards our young university athlete are enabled to assist them in:

A01:	"…helping athletes in terms of mental control from stress…"
A06:	"…very important in the development of sports, as athletes faces a lot of stress, they have to use the learned knowledge and control …"
A05:	"…improve performance in terms of control stress, anxiety…"
A07:	"…can reduce the stress faced by athletes…"
B01:	"…able to help athletes in improving mental health such as lesser stress and anxious…"
A02:	"…in the context of competition, knowledge and manipulation of psychological variables such as attention, self-confidence, stress control, anxiety, motivation, unity, self-control or emotional self-regulation, mood and interpersonal skills can influence athlete performance…"
A03:	"…make athletes more confident and not easily feel anxious (self-control) even when facing something unexpected…"
A04:	"... the effect is important in performance improvement, the quality of training increases, be more open minded and positive and high self-motivation…"

B04:	"…helps in creating motivation to strengthen mental…"
B02:	"…can improve the athlete's focus…"
B06:	"…helping athletes focus on the necessary aspects of competition or training…"
B03:	"…good effect can be achieved for young athletes, especially in their performance…"
B05:	"…improve the quality of national sports in terms of the mental strengths…"
B07:	"…increase the confidence in an athlete…"

5. Implications

This study is expected to have great impacts on society, economy and the nation by focusing on examining the status, level and characteristics of mental health among young Malaysian athletes. Athlete students will be able to understand their mental health or well-being capacity and be able to seek help once needed before leading to severe mental disorders, for example, chronic depression, anxiety, and test anxiety from experiencing academic situations that are intolerant. Since the current study relates closely to psychological and physical aspects, cognitive approach, such as Rational Emotive and Cognitive Behaviour Therapy (RE&CBT) is recommended to be imply for the module or related training session as the theory emphasizes on the student's responsibility for creating their behaviours and dysfunctional emotions, such as depression, anxiety, and stress that affect their well-being. Consequently, Rational Emotive and Cognitive Behaviour Therapy (RE&CBT) advises to change such irrational beliefs and substitute more rational ones (Ellis, 1999). Moreover, it addresses the aim of the Eleventh Malaysian Plan in promoting the wellness of the society to ensure balanced development in tandem with economic growth. With the expected enhanced module on psychophysical and cognitive restructuring, the introduction of guidelines for mental health promotion and programs for academic and educational situations can also be implemented. Comprehensive mental health strategies and direction in psychological health will help in improving the quality of educational performance for young athletes.

6. Conclusions

This study discusses and advocates a comprehensive consideration of qualitative-interpretive methodology in thematic analysis for the evaluation of the framework of survey questionnaires on athletes' psycho-physical and cognitive components intertwined with athletes' performance. In conducting this research, the goal is to

give recommendations, so that the university can improve the practices, resources, and procedures as it relates to young student-athletes The identification of these factors is an important contribution to the understanding of athletic performance and athletes' well-being. The results of this study may be used by athletes, coaches, and sports psychologists to improve the physical and psychological well-being of athletes.

7. Limitations of Study and Recommendations

Several limitations were present in this intervention such as interviewing the coach and student-athletes in an individual session, or making sessions interesting for university athletes so that they feel more comfortable with physical activities, presenting the contents in simple, scientific, and sporty forms, and applying a complementary or integrative training involving different methods and skills such as psychological, physical, and cognitive restructuring techniques.

Based on the findings, the university athletes will be able to clarify the positive effects of psycho-physical training. Correspondingly, the psycho-physical training could be a reliable intervention to assist university athletes in combating properly common negative emotional problems related to their competitive circumstances that impact their sports performance and well-being. Athlete's psycho-physical training will be used for athletes and may be applied to other emotional disorders such as depression, phobia, anger, and so on in order to enhance mental health.

Working with young athletes requires the knowledge in comprehending the inherent variability in their training development that will impact the implementation of a psycho-physical training program (Visek et al., 2013). At the same time, complex of questions about using of physical culture in formation of psychological and psycho-physical readiness for professional function has still remained insufficiently solved. In this direction the highest progress was achieved by scientists, who studied application of physical exercises for psychological training of military or home affairs officers (Pichurin, 2014). Moreover, high quality survey-based research is dependent on effective standardized tests to ask the right questions.

The application of the study provide recommendation for (1) young athletes to aware of and to identify and increase their mental health capacity, (2) the management of the educational authorities for prevention, promotion and educational programme to alleviate mental health problems, and (3) policymakers as a structured mental health guideline to add into their safety protocol for young athletes in promoting their academic achievement. This study aligned with the National Mental Health Policy, and the Ministry of Education Malaysia in urging young athletes to create mental health awareness and early prevention strategies to improve the educational environment and is able to contribute to the community.

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THE RELATIONSHIP BETWEEN MALAYSIAN PRE-UNIVERSITY STUDENT-ATHLETES MENTAL HEALTH AND FUTURE CAREER PLANNING

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ABSTRACT

An athlete's life is full of stress and pressure, as they are more susceptible to stressors like injuries, performance pressure, high expectations, and other difficulties during the transition from an active athlete to retirement. Eventually, student-athletes may withdraw from schools, or drop out from athletic program, which is a great loss to the country. Therefore, this study aimed to investigate the relationship between mental health and career planning—career optimism, career adaptability, career knowledge, college and career readiness self-efficacy and self-efficacy planning—among current Malaysian pre-university student-athletes. This study was conducted in a quantitative manner and employed a Pearson correlation study design. Pre-university student-athletes were selected and three hundred and eighty-nine (389) completed questionnaires were collected for data analysis using the Mental Health Continuum-Short Form (MHC-SF) and Career and Tertiary Education Readiness Inventory (CaTERI). Results revealed that student-athletes' mental health positively correlated with career planning. These findings can be used to assist and guide the development of career planning or skill enhancement programs for Malaysian pre-university student-athletes.

Keywords: Sport, Counseling, Mental Health, Career Planning, Career and Tertiary Education Readiness Inventory (CaTERI)

1. Introduction

Career counseling is a specific area that assist people in career developments pertaining to the relationship of those who work, how they work, why they work and their needs for guidance in seeking and maintaining the jobs and handling related issues (Azizah & Siti Salina, 2015; Duarte, 2017). Counseling in career planning is important especially in the 21th century industrial revolution. Different from the 20th century, life is becoming increasingly complex and unstable. Individuals are expected to be facing difficulties in planning their career pathway, thus affecting their life along with life plan. Therefore, guidance is needed for the youth so that they could strive to live in difficult times (Cheung, 2009).

Today, unemployment is a practical challenge for every individual from varying levels, such as fresh graduates, post-graduates or senior employee. If left unmanaged, it will cause a major problem globally. Hence, guidance and counseling is urgently needed, focusing on career counseling for personal growth and guidance, which will assist youth in determining the skills required in the transition from school to work (Jenschke, 2003; Schmid, et al., 2023). Career planning consists of an intensive activity and conducted in one-to-one or small group settings with the intention of providing assistance to enable individuals to identify, own and manage their concerns about future or personal careers (Patton & McMahon, 2001).

Mental health is a critical concern worldwide, which involves psychological, emotional and social stressor. According to National Health and Morbidity Survey, Malaysian experienced depression, anxiety disorders and other environmental and individual-related stress, which dramatically increased from 12 percent of the population to 29 percent since 2011 (Sahril, et.al., 2021). If mental health issues leave unattended, it will lead to major negative impacts on anxiety, self-doubt, and academic performance (Motevalli, et.al., 2013).

Young athletes are experiencing higher levels of stress during competition and less control over performance exposes them to at risk for mental health conditions (Nuetzel, 2023). Unfortunately, limited attention has been given in addressing the critical individual factors such as distorted cognition and fallacy thinking styles that may contribute to young athletes' mental health as well as student-athletes' responses to their mental health stressor. Therefore, this study aims to determine the relationships between pre-university student-athletes' mental health and career planning via quantitative method using the Mental Health Continuum-Short Form (MHC-SF) to measure and define the pre-university student-athletes' mental health. The operational definition of the career planning is defined by using the Career and Tertiary Education Readiness Inventory (CaTERI), a researcher-adapt instrument, which consists of the definition of career optimism, career adaptability, career knowledge, college and career readiness self-efficacy and self-efficacy planning. In

career counseling, the relations of understanding one self and the available job market serve as a basic planning for people to explore their potential career (Hizam, 2017). In the current study, student-athletes' career optimism, career adaptability, career knowledge, career and college readiness self-efficacy and self-efficacy planning were evaluated upon pre-university sports school life graduation. These constructs are defined based on the selected instruments including Career Future Inventory (CFI), Career and College Readiness Self-Efficacy Inventory (CCRSI) and Career Decision Self-Efficacy Scale (CDSE).

The following are five (5) hypotheses formed in the current study:

H₁a: There is a significant relationship between mental health and career adaptability among pre-university student -athletes.

H₁b: There is a significant relationship between mental health and career optimism among pre-university student-athletes.

H₁c: There is a significant relationship between mental health and career knowledge among pre-university student-athletes

H₁d: There is a significant relationship between mental health and career and college readiness self-efficacy among pre-university student-athletes.

H₁e: There is a significant relationship between mental health and self-efficacy planning among pre-university student-athletes

2. Literature Review

2.1. Career planning and student-athletes

Career planning is an important element in counseling competence in 21st century to assist and enlighten individuals on their life choice when experience difficulty choosing a career. In addition, career planning as part of career development is identified as a core area in career counseling competence (Niles & Harris-Bowlsbey, 2017). Sport career has short professional timeframe and is very competitive. Some sports like badminton, tennis, swimming, diving, and athletics are open to a limited number of persons. These sports careers span are very short periods and they are required to transition to a new life, either working or pursuing next level of education at a young age; this may lead to depression, self-doubt and other difficulties during this transition of life (Surujlal, & Van Zyl, 2014). Thus, upon pre-university student-athletes finish their pre-university, is it time to retire from sports and what will they do with the rest of their lives? Athletes are often faced with these sorts of concerns.

Career counselors who are educated and trained in practicing the relevant knowledge and skills are needed to guide and assist students to developing and maintaining

positive psychological, emotional, and physical well-being and the ability to make decision without undue influences from others (Ching & Ng, 2010). Career counseling provides awareness and knowledge through career planning. In the process of planning, career optimism plays an important role related to the likelihood of positively indulging in positive career planning and being able to resist temptation, face challenges and be willing to endure to ensure the success of their planned career (Charokopaki & Argyropoulou, 2019).

During planning for future career, concerns regarding the future, readiness and the capacity to face the future demands in the career market is an important competencies; these career expectations are related to career adaptability (McIlveen et al., (2013). In addition, in the interconnection of career optimism and career adaptability, knowledge is key and enable student-athletes to be prepared for their career and their future life (Stambulova, Ryba & Henriksen, 2019).

School is an important place for students to unearth and discover their potential. According to Mann et al. (2020), career success is consistent with the student's success in school or college. The career and college readiness self-efficacy in the current research is to examine pre-university student-athletes' career readiness as well as college readiness in a basis of understanding their college and career situations as part of the career planning. Along with career optimism, career adaptability, career knowledge, college and career readiness, self-efficacy planning is included in the current study, planning is not an easy task for student-athletes, especially for pre-university student-athletes; this is because they strive harder to balance their academic and athletic year ((Healy, Ntoumanis, & Arthur, 2020). To illustrate the self-efficacy planning in the current study, Career Decision Self-Efficacy Scale (CDSE)-Planning construct is adopted.

Career planning serves as a helping hand in assisting clients to understand about career and also provide information about the career activities and career guidance for direction, it is a process involving thinking and talking about career (Jouber & Crous, 2005). Based on Career Future Inventory (CFI), career optimism, career adaptability, career knowledge are derived. According to the definition of the instrument's developer, Rottinghaus, Day, & Borgen, (2005), career optimism is defined as an individual's mentality of expecting the best possible outcomes pertained to his/her career planning; career adaptability is explained as an individual's perception of his or her ability to cope, adapt and recover to the unforeseen events that alter career plans; career knowledge is referred as the understanding and perceptions towards the job market and employment trends in the respective interest. Meanwhile, Career and College Readiness Self-Efficacy Inventory (CCRSI) and Career Decision Self-Efficacy Scale (CDSE) were adopted to serve as readiness in making successful planning and to measure the pre-university student-athletes preparedness in achieving the career planning respectively.

2.2. Mental health and student-athletes

Mental health is the epidemic of the 21st century and will become the next big global health challenge (Lake & Turner, 2017). For so many years this phenomenon has been taken for granted and non-existence due to many who do not have the basic knowledge (Henderson, et.al., 2013). Any abnormal behaviors among children and adolescents tend to be regarded as deviance and rebellion by most adults. These students need guidance and a clear understanding of their future in sports schools. For this, counseling is necessary. Counselors must be a significant part of the program in assisting the students for planning their career, helping them with their personal psychological and emotional issues, including their social ones. Career planning can prepare them for their life after becoming active athletes or active sportsmen or women or if they fail to achieve their dream. Through counseling they can transfer their athletic and sport talents to life skills (Hinkle, 1994). They will have a meaningful function to society and at the same time, they can have a career related to their expertise. If this is not taken care of, we are doing injustice to these "special and talented minorities".

As far as the current situation is concerned, the invasion of the Coronavirus Disease 2019 (Covid-19) is a pandemic with staggering impacts on the global economy, public health and security, and education. In the education sector, student safety and mental health are the utmost important issues (Sulaiman, et.al., 2021). Sports schools are forced to close; indirectly, student-athletes are forced to take a break from training or physical activity until further notice as the Covid-19 have changed the learning and planning in education. These changes affect the mental health of the students in any learning institutions due to school activities could be described as increased screen time but decreased in physical activity. The changes in the school activity's structure led to a decline in mental health among youth (Shepherd, et.al., 2021; Razali et al., 2022).

Mental health is a state which if lacking is called mental illness. To prevent the onset of mental illness, self-awareness, and positive emotions, outlook, emotions or mindset in any stressful environment or stressful situation play an important role in representing good mental health (Galderisi, et.al., 2015). Thus, mental health in this study is defined as the status of students' positive or negative effects on their sports training and competition.

Often student-athletes become stressful, in which the stressors affect the psychological well-being, with worse scenario leading to more severe mental health issues (Fogaca, 2019). The inner part of the student-athletes is the crucial because humans are influenced, driven and dictated by their psychological, emotional and social values (Robinson & Minikin, 2012). Psychological well-being is the commonly related to negative impact to academic as well as functioning

performance. By the same token, the finding of the study is significant to the purpose of exploring the possibility of integrating the relationship between psychological well-being and career planning as an integral part of understanding student-athletes (Loevass, et. al., 2020). In addition to the current situation, athletes are in an alarming situation to more complex mental health or emotional related issue, as they are lacking coping strategies related to emotional well-being (Ong & Tan, 2014; Colagrai, et.al., 2022). Concurrently, in regards to the social well-being, student-athletes face lots of social challenges/stressor in involving in sport; as a response, they are reacting to cope with these stressors in various ways they think suitable (Tamminen, et al.,2012). In view of the situation mentioned, this study aims to look at the significance of mental health and career planning playing by investigating the relationship of related variables.

2.3. Theoretical Framework

In this research, career planning is presented as pre-university student-athletes' career optimism, career adaptability, career knowledge, career and college readiness self-efficacy and self-efficacy planning needed to be career-ready upon high school sports life graduation. The theoretical framework of the present study is derived from Social Career Cognitive Theory (SCCT) and Cognitive Information Processing Theory (CIP), with SCCT for career planning and CIP for mental health respectively.

In the context of the present study, SCCT was applied to determine the student-athletes career planning. The core foundation of SCCT for career counseling is the career development readiness, therefore, individuals plan career choices based on their background (e.g., family factors), academic experiences, and other factors that influence self-efficacy and career outcome expectations (Betz, & Luzzo, 1996). Nonetheless, the current study was to determine the relationship between mental health and career planning.

Social Career Cognitive Theory (SCCT) was developed by Lent et al. (1994) based on the Bandura's Social-Cognitive Theory (2014). The theory of SCCT is the core foundation career development readiness that includes: i) career interest and development; ii) career choice; and, iii) career success achieved (Lent et al., 2002). Over the years, SCCT has been applied in various disciplines and is expected to shed light on the exploration of career planning issues among student-athletes. First of all, SCCT have been used in various setting, such as engineering student (Hartman & Hartman, 2008), medical student (Kilminster, 2007), and science students in the field of counseling especially in exploring their career planning through the lens of SCCT (Foley & Lytle, 2016; Chan et al., 2018; Wendling & Sagas, 2020), Secondly, in the field of sports, a past research conducted in Asia, South Korea, SCCT attempted to outline the impact on career development (Nam & Marshall, 2022); however, in a

past research conducted in the West, SCCT served as a theoretical framework to investigate the post-athletic career planning of college athletes. The current study applies SCCT as the theoretical framework to examine the current career planning of student-athlete from pre-university level.

In addition, SCCT promotes that an individual's choice based on motivation from oneself or others, and self-efficacy in decision making and problem solving to increase expectations for themselves (Casas & Blanco-Blanco, 2017; Chan, et.al., 2018). The structured form of SCCT can help organize all the relevant information in a sequential setting for better understanding through CaTERI by the measurement of career adaptability (motivation from oneself or others), career optimism (motivation from oneself or others), career knowledge (motivation from oneself or others), career and college readiness self-efficacy (self-efficacy in decision making), as well as self-efficacy planning (problem solving).

Apart from this, the theory to explain mental health in the current study is CIP, which was developed by Sampson, et al., (2020) discussing about human beings having a special capacity to internalize, interpret and store various types of information that they experience and encounter in their lives. As supported by Hayden et al. (2023), Cognitive Information Processing theory (CIP; Sampson et al., 2020; Sampson et al., 2004) accounts for the interconnected elements of career and mental health. Thus, mental health is the variable to study its relationship with the career planning among Malaysian pre-university student-athletes. CIP was applied in explaining the progress of problem-solving and the reactions and interactions between information processing system; for instance, the problem solver reacts to the task environment and represents the situation in terms of problem space, the way the problem is perceived by the problem solver. Information processing system, task environment and problem space lead to problem-solving behavior as the outcome of the process. The context of the current study focuses on the interaction of the information processing system, the mental health issue and how Malaysian pre-university student-athletes perceived the mental health problems within their personal environment , such as family environment, and school environment.

These include positive and the negative memories that live with the individuals and somehow influence their perceptions, beliefs, thought, behaviors and worldviews that can be beneficial or detrimental the individuals' future life endeavors. In a nutshell, CIP explains the relationship between mental health and career planning among student-athletes. CIP has been applied in various disciplines, and using the theory in the present study seems appropriate and beneficial for the purpose of the study. Figure 1 demonstrates the research framework of this study supported by these theories.

Social Career Cognitive Theory
(SCCT)
(Lent, Brown and Hackett, 1994)

Cognitive Information Processing Theory (CIP)
(Sampson, et al., 2020)

Career and Tertiary Education Readiness Inventory (CaTERI)

- *Career Optimism,*
- *Career Adaptability*
- *Career Knowledge*
- *Career and College Readiness Self-Efficacy*
- *Self-Efficacy Planning*

Mental Health Status
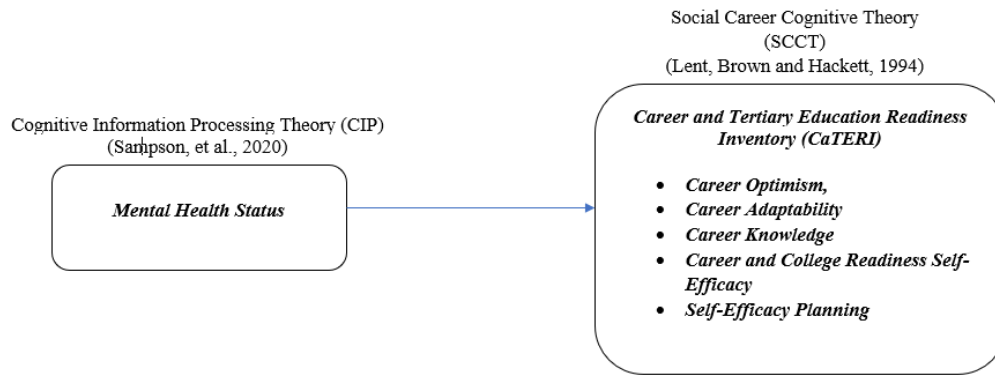
Figure 1: Theoretical framework of the study linking mental health and career planning

3. Methodology

3.1. Research Design, Population and Sampling

This study was conducted in a quantitative manner and descriptive-correlational research design was employed. Correlational research is more suitable in the current study because the researcher is interested in investigating the relationship between independent variables (mental health) and dependent variables (career planning). Survey questionnaires were used to collect data for analysis with some adapted instruments according to the target population (pre-university student-athletes) in Malaysian sports schools.

There are two categories of sport schools—the national sport schools and the state sports schools—with a total of 20 sports schools in Malaysia. These schools are selected as the schools are established to groom students who have shown strong achievements in certain sports with the aspiration of producing the country's top sportsmen or women in various sports. In a long run, they would be the powerful driving force to ensure the sustainability of the sports programs to seek potential sports talents for the country in the future.

The target population is pre-university student-athletes because they are considered to be senior students with more experience in professional professions in sports. Therefore, their career planning opinion is important to find out. The cluster sampling method was used to select potential respondents. This sampling method involves dividing the population into smaller subgroups known as clusters; however, clusters are formed based on common characteristics shared by the target population, such as age (Hayes & Westfall, 2020). Cluster sampling method is a two-step sampling process, therefore, 20 sports schools are the 20 clusters; the second step of the sampling process divided the sports school based on zones. To randomize, the researchers selected the clusters through fishbowl method. In the current research,

the researchers applied the Raosoft sample size calculator in addition to Cochran, (1977) to determine the minimum sample size, in which the recommended size was 362 students.

An average number from each school is obtained from the Ministry of Education Malaysia officer—150 form 4 student-athletes and 150 from 5 student-athletes. Hence, estimating a total of 300 form 4 and form 5 student-athletes per school, the population size is 20 x 300 = 6000 student-athletes. Hence, according to Guwahat, (2013), Cochran's sample size formula (1977), the sample size is 361, while the Raosoft sample size calculator was 362 student-athletes needed to be recruited. However, as the target population for the current study was student-athletes, the sample size increased by 10% to compensate for expected dropouts and incomplete records to avoid the possibility of rejection (Andrade, 2020; Martínez-Mesa, et.al., 2014). Thus, the researchers end up recruiting 397 Malaysian pre-university student-athletes. In this study, the data collected in number also known as hard data for the quantitative research design (Neuman, 2007).

In short, data collection took the form of school visits, as this method ensured a high response rate and low researcher bias in the data (Oppenheim, 2005). With the help of the student-athlete guardian (teacher or coach), the target student-athletes were identified. Prior to the questionnaire distribution, the researchers introduced themselves and mentioned names, research institutions, research title, and informed consent forms to student-athletes to ensure participating student-athletes were aware that their information would be kept confidential and that their responses would be used only for intended academic purpose. All questionnaires were returned to the researcher after completion, and the researcher immediately clarified inquiries about the scales throughout the questionnaire. Throughout the school visit, the student-athletes guardian (teacher or coach) works together to ensure that the data collection process is safe and controlled.

Once the student-athletes completed the self-administered questionnaire, the questionnaires were collected and finally the data were entered into SPSS for analysis.

3.2. Instrumentation

This study used existing instruments highly used by researchers. These questionnaires were tailored to fit the target population—student-athletes. A researcher-adapt instrument is also developed based on relevant and well-established career counseling instruments. The full instrument is in Appendix.

Instrumentation is an important process in developing an appropriate instrument in measuring the investigating problems or issues of the study (Fraebkel et al., 2016); thus, Mental Health Continuum-Short Form (MHC-SF) and Career and Tertiary Education Readiness Inventory (CaTERI) are relevant to help identify the mental

health status of the youth. MHC-SF is the instrument measuring the mental health level of the pre-university student-athletes, however, mental health to measure stress, depression or anxiety is too common and well-being is equipping people to learn well, work well, manage one-self and make plans for live and contribute to their communities (World Health Organization [WHO], 2022), therefore, MHC-SF is employed in the current study. Additionally, CaTERI in the current study is the instrument used to measure student-athletes career planning through adaptations. The researchers gather several instruments that relate to career counseling such as Career Decision-Making Difficulties Questionnaire, Career Future Inventory, Career Factors Inventory, Career Decision Scale, Career Decision Self-Efficacy Scale (Short-form); after reviewing the instrument manual, the age range as well as the constructs, hence, adoption of (CaTERI) is form. CaTERI adopts from several well-established career counseling instruments, which is from Career Future Inventory (CFI), Career and College Readiness Self-Efficacy Inventory (CCRSI) as well as Career Decision Self-Efficacy Scale (CDSE).

The instruments adopted and adapted by the researcher in this study are tailored to specific groups of respondents who are pre-university student-athletes. This is important because the study involves a wide spectrum of variables that are related to the focus issue of the study.

Table 1 Career and Tertiary Education Readiness Inventory (CaTERI)

Instrument	Constructs adapted	Items related to CaTERI	Source
Career Future Inventory (CFI)	Career Adaptability	11	Patrick J. Rottinghaus (2000, 2008)
	Career Optimism	11	
	Career Knowledge	3	
Career and College Readiness Self-Efficacy Inventory (CCRSI)	All	14	Stanley B. Baker & Sejal Parikh Foxx (2012)
Career Decision Self-Efficacy Scale (CDSE)	Planning	10	Nancy Betz & Karen Taylor (2001)
	TOTAL	**49**	

3.3. Pilot Study

The pilot study would be employed to access CaTERI's before the actual pilot study is carried out. In the current study, the researcher used Malay language as a medium in the questionnaire instrument for the purpose of data collection. The instruments were originally developed in English Language, which was translated into Malay language. Thus, the back-to-back translation method is implemented in order to

validate the instrument, this process is important because it aims to increase the effective understandings for the student-athletes who participate in the current study (Miyabe & Yoshino, 2015).

The reliability of the instruments used were tested. The 14-item MHC-SF is derived from the 40 items of Mental Health Continuum- Long Form (MHC-LF). According to Keyes (2005), MHC-SF has shown excellent internal consistency (>.80). Whilst, the internal consistency for CaTERI ranged from .7 to .9. and respectively: .85 for career adaptability, .87 for career optimisms, .73 for career knowledge, ,85 for career and college readiness self-efficacy and .92 for self-efficacy planning based on the past studies (Baker et al., 2016; Buyukgoze-Kavas, 2014; McIlveen, Burton, & Beccaria, 2013).

The validity of the instruments used is very crucial. It refers to how far the instrument is measuring what are to be measured with precision (Ary et al., 2006). To ensure this, all items designed must be in line with the objectives of the study. Failing to do so lead to the data collected not suitable with the analysis that are carried out. Consequently, it caused errors in the results of the study which means they are not answering the questions objectively and correctly. athletes who participate in the current study (Miyabe & Yoshino, 2015). Language validation was involved to evaluate the content of the translation instrument, thereafter, content validity invited experts in counseling, sports and statistics to evaluate the subject matter as well as the measurement scale. Thirty set of the instruments was sent to form 4 and form 5 students with the purpose of analyse them meanwhile comments section was provided in the sets of the instrument to gain their level of the understanding towards the meaning and wording of instruments. Lastly, reliability was obtained using the Cronbach alpha. Through the current pilot study, the MHC-SF as well as CaTERI respectively show the Cronbach's alpha value of .857 and .827 (Table 2).

Table 2: Cronbach Alpha Instruments

	Cronbach's Alpha	N
Mental Health Continuum- Short Form (MHC-SF)	.857	14
Career and Tertiary Education Readiness Inventory (CaTERI)	.827	49

3.4. Data Analysis

The study analyzed the data using SPSS version 25, in which data cleaning was performed prior to the actual data analysis. Descriptive analysis was conducted via coded and transferred data files. Frequency distribution was used to list the number of responses received from each questionnaire; this method transfer the raw data into

grouped. The grouped data was run using the Pearson correlation between independent variable—mental health—and dependent variable—career planning— to examine the relationship between pre-university student-athletes.

4. Research Findings

The respondents in the current study are pre-university student-athletes. Table 3 describes the demographic information of 389 student-athletes'. There are 174 student-athletes (44.7%) aged at 16 and 215 student-athletes (55.3%) who aged of 17 participated in this current study. A total of 220 (56.6%) are male respondents and 169 (43.4%) female. Malaysia is a multicultural country, therefore, respondents involved in the current study include 304 Malay student-athletes (78.1%), 11 Indian student-athletes (2.8%), 38 Chinese student-athletes (9.8%) and 36 student-athletes from other races (9.3%). Furthermore, Malaysia has two (2) types of sports schools—is National Sports School and State Sports Schools. Student-athletes who participated in the current study from National Sport Schools are 185 students (47.6%) and State Sports schools are 204 students (52.4%).

Table 3: Frequency Distribution for Demographic Background Information (From, Gender and Race) (N=389)

Demography Background	Category	Frequency (N)	Percentage (%)
Age	16 years old	174	44.7
	17 years old	215	55.3
Gender	Male	220	56.6
	Female	169	43.4
Race	Malay	304	78.1
	Indian	11	2.8
	Chinese	38	9.8
	Others	36	9.3
School Type	National Sports School	185	47.6
	State Sports School	204	52.4

The aim of the current research is to determine the relationships between pre-university student-athletes' mental health and career planning, in which the Pearson correlation test was used to test the research hypotheses. The findings of the correlation between the tested variables are shown in Table 4.

Table 4: Pearson Correlation between Mental Health and Career Planning

Variables		Mental Health	Hypothesis result
Career Adaptability	Pearson Correlation	.351**	Hypothesis Accepted
	Sig. (2-tailed)	.000	
	N	389	
Career Optimism	Pearson Correlation	.351**	Hypothesis Accepted
	Sig. (2-tailed)	.000	
	N	389	
Career Knowledge	Pearson Correlation	.331**	Hypothesis Accepted
	Sig. (2-tailed)	.000	
	N	389	
Career and College Readiness Self-Efficacy	Pearson Correlation	.351**	Hypothesis Accepted
	Sig. (2-tailed)	.000	
	N	389	
Self-Efficacy Planning	Pearson Correlation	.483**	Hypothesis Accepted
	Sig. (2-tailed)	.000	
	N	389	

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

Based on Table 4, the relationships between mental health and career adaptability, career optimism as well as career and college readiness self-efficacy were tested using Pearson product moment correlation coefficient, according to the results ($r = .351$; $p = .000$). This indicated that there were low positive relationships between mental health and career adaptability, career optimism as well as career and college readiness self-efficacy. In short, the result also explain positive mental health of the students is linked with increase the Career Adaptability among Malaysian pre-university student-athletes. Therefore, the research hypotheses H_1a, H_1b, H_1d are accepted.

Similarly, Pearson product moment correlation coefficient applied and the result shows the relationships between mental health and career knowledge was at $r = .331$, $p = .000$, indicating that there were low positive relationships between the two variables. The result positive mental health of the students is linked with increase in the career knowledge among Malaysian pre-university student-athletes. Therefore, the finding accepted H_1c.

The relationship between mental health and self-efficacy planning were tested using Pearson product moment correlation coefficient. Results indicated that there were moderate positive relationships between the two variables, $r = .483$, $p = <. 01$. Positive mental health of the students improves the planning among Malaysian pre-university student-athletes. Therefore, the finding accepted H_1e.

5. Discussion and Implications

5.1. Discussion

Mental health is an integral component of health and well-being underpinning our ability to form relationships and shape the world we live in (World Health Organization, 2022). The relationships between mental health and career adaptability found a low positive relationship. Career adaptability indicates an individual's perception of his or her ability to cope, adapt and recover from the unforeseen events that alter career plans (Rottinghaus et al., 2005). Xu, et. al., (2020) found that mental health is negatively correlated with depressive symptoms such as anxiety, loneliness, self-blame, allergic tendencies, physical symptoms, phobic tendencies and impulsive tendencies. This is consistent with the current study as mental health in the current study defined as flourishing and therefore, career adaptability of Malaysian pre-university student-athletes is positively related to mental health.

Besides, career optimism is defined as an individual's mentality of expecting the best possible outcomes pertained to his or her career planning (Rottinghaus et al., 2005). Based on the findings, the relationships between mental health and career optimism found a low positive relationship. Mental health is rarely linked to other populations of interest, such as in career counseling (Kegelaers, et. al, 2022). Therefore, in the current findings, a positive relationship between mental health and career optimism indicating career optimism among the pre-university student-athletes towards the future are important for understanding the vulnerability to mental healthiness (Conversano, 2010).

Career knowledge is referred as the understanding and perceptions towards the job market and employment trends in the respective interest (Rottinghaus, Day, & Borgen, (2005). Based on the results, there was a low positive relationship between mental health and career knowledge. Athletes commonly hide their mental health to pretend they are a strong athlete, as well as not to seeking for help; thus, they have limited knowledge about their sport career and other career possibilities associated with their sport career (Schinke et al., 2017). Therefore, the positive relationship between mental health and career knowledge suggested that positive mental health would improve the career knowledge among student-athletes.

The relationships between mental health and career and college readiness self-efficacy indicated that there were low positive relationships between the variables. The mental health of student-athletes should not be overlooked because mental health can deeply affect student-athletes' readiness during the transition period, such as life after high school (Purcell, et al., 2019; Alimbekova, et.al, 2016). Therefore, the result obtained from the current study suggested that positive mental health would increase the career and college readiness self-efficacy among student-athletes. The relationships between mental health and self-efficacy planning indicated that

there was a moderate positive relationship between the variables. Self-efficacy planning is very important for student-athletes as they gain the life balance of "training" to be not only physically fit but also mentally fit to become top athletes. Effective planning assists student-athletes to stay on track to achieve a greater goal as planned while reducing languishing mental health conditions among student-athletes (Adam & Blair, 2019; Gomez, et.al., 2018) consistent with current study findings that suggest positive mental health leads to a higher self-efficacy planning for student-athletes in terms of career planning.

5.2. Implications

The researchers highlight that it is vital to identify the mental health status of student-athletes as a screening measure to assess and identify the appropriateness and need for intervention strategies to the student-athlete (Sullivan et. al., 2019). The shift in learning lessons from face-to-face to online mode during the Covid-19 lockdown involving all students including student-athletes forced the transition away from sports, leading to a poor mental health (Knowles, et. al., 2021). Thus, the present study responds to the critical need to increase research awareness concerning mental health among this sample group.

This study has benefits for various groups including students, counselor, parents and teachers. The findings showed that mental health among student athletes significantly correlate with career-related aspects, which further support knowledge in career counseling, especially career planning. In terms of career planning in the Malaysian context, the awareness is considered at a medium to low level; therefore, the results based on the current study provides some practical applications for counselors working with pre-university student-athletes by reviewing the special circumstances that student-athletes face. This includes assessing their mental health level during counseling sessions for career planning considerations (Wong & Baki, 2020). Mental health issues potentially jeopardize the student athletes' sports performance (Bradley, et. al.,2019; Sato, et. al., 2023), in connection with the sports performance. Thus, identifying student-athletes' mental health status is crucial, necessitating collective roles of teachers, coaches and parents in boosting their sport performances and encouraging the development of adaptive behaviors. It is important that student-athletes receive proper and adequate guidance and exposure to relevant resources and knowledge during their pre-university level to prepare them for their future. Direct guidance from authoritative, respected, and close figures such as teachers, coaches and parents can help students develop a better understanding of mental health support them in their lives after they retire as active athletes or active sportsmen or women, or risk failing to achieve their dreams.

6. Conclusion and Recommendations

This quantitative study found that mental health significantly correlate with career-related aspects among pre-university student athletes. The findings were derived from Pearson correlation, reporting significant values for the relationships between mental health and career planning among the Malaysian sample group. The variables were tested based on the Mental Health Continuum-Short Form (MHC-SF) and Career and Tertiary Education Readiness Inventory (CaTERI). The constructs in CaTERI, which is a researcher-adapt instrument, were defined based on selected instruments to test career adaptability, career optimism, career knowledge, college and career readiness self-efficacy and self-efficacy planning. These findings were discussed, where the authors argue that it is urgent to identify the mental health status from the student-athletes as an effort to screen and assess the appropriate need for intervention to the student-athlete.

Results indicate a better understanding in positive expectations regarding the student-athletes' future and mental health. The result obtained found and provides a new insight regarding to the Malaysia pre-university student-athletes are having better responding to their mental health and the career adaptability, career optimism, career knowledge, career and college readiness self-efficacy and self-efficacy planning. When student-athletes are unable to focus, all training and coaching becomes meaningless, which in turn jeopardizes sport aspirations. In this case, it is very unfortunate because we have assets full of potential, but are open to emotional instability and weakened performance. Based on the results of the current study, student could realize and understand the connection between sports and mental health and linked with developing socio-emotional learning which facilitates in developing sports aspiration so they would have better career plan (Smith, 2020; Mercader-Rubio & Ángel, 2023). Nevertheless, among the career planning construct, mental health and self-efficacy planning had moderate relationship, while career optimism, career adaptability, career knowledge and career and college readiness self-efficacy indicated low positive relationship. This indicated Malaysian pre-university student-athletes is better in earning a life balance of "training" to be not only physically fit but also mentally fit to planning to become top athletes (Adam & Blair, 2019).

Nonetheless, the present study was conducted quantitatively, thus, it is recommended that qualitative research methods such as focus group discussion and interviews be considered in future studies. Additionally, recommendation of the further research could attempt exploring the influence of personal and institutional background. Future studies could consider causality by conducting experimental research designs to explore more causal relationship. Furthermore, pre-university's student-athletes are relatively under-researched, and most studies have paid less attention to career planning proposition (Robertson, 2013). In this regard, it is recommended that future research consider conducting more studies on student-athletes from other education level.

Appendix

Research instrument

<u>**Demographic information**</u>

Please fill the blank and tick (/) in the box provided. Thank you

1. Email:

2. Date of Birth:
   ___ ___ / ___ ___ / _____ [DD/MM/YEAR]

3. Gender:
   o Male
   o Female

4. Race:
   o Malay
   o Indian
   o Chinese
   o Others: _____ (Please specify) (Please specify)

5. Type of school
   o National Sports School
   o State Sports School

6. School name: _____

<u>**Mental Health Continuum- Short Form**</u>

INSTRUCTIONS: Please read each statement and circle a number 1, 2, 3, 4, 5 or 6 which indicates how much the statement applied to you over the past week. There are no right or wrong answers. Do not spend too much time on any statement.

<u>**Place a checkmark in the box that best represents experiences and feelings DURING THE   PAST   MONTH.**</u>

		Never	Once or Twice	About Once A Week	2 or 3 Times A Week	Almost Everyday	Everyday
1	Happy	1	2	3	4	5	6
2	Interested in life	1	2	3	4	5	6
3	Satisfied with life	1	2	3	4	5	6
4	That you had something important to contribute to society.	1	2	3	4	5	6
5	That you belonged to a community (like a social group, school, neighborhood, etc.).	1	2	3	4	5	6
6	That our society is a good place, or is becoming a better place, for all people.	1	2	3	4	5	6
7	That people are good.	1	2	3	4	5	6
8	That the way our society works made sense to you.	1	2	3	4	5	6
9	That you liked most parts of your personality.	1	2	3	4	5	6
10	Good at managing the responsibilities of your daily life.	1	2	3	4	5	6
11	That you had warm and trusting relationships with others.	1	2	3	4	5	6
12	That you had experiences that challenged you to grow and become a better person.	1	2	3	4	5	6
13	Confident to think or express your ideas and opinions.	1	2	3	4	5	6
14	That your life has a sense of direction or meaning to it.	1	2	3	4	5	6

Career and Tertiary Education Readiness Inventory (CaTERI)

This questionnaire assesses critical factors for people considering career transitions. You will be asked a series of questions regarding your current thoughts and feelings about how you plan your career. Please answer the following items as honestly as you can. There are no right or wrong answers. Read each statement carefully, then use the following scale to indicate how strongly you agree or disagree with each statement:

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	I get excited when I think about my career.	1	2	3	4	5
2	I am eager to pursue my career dreams.	1	2	3	4	5
3	I am unsure of my future career success.	1	2	3	4	5
4	Thinking about my career frustrates me.	1	2	3	4	5
5	It is difficult to relate my abilities to a specific career plan.	1	2	3	4	5
6	I understand my work-related interests.	1	2	3	4	5
7	I do not understand job market trends.	1	2	3	4	5
8	I can overcome potential barriers that may exist in my career.	1	2	3	4	5
9	It is difficult for me to set career goals.	1	2	3	4	5
10	I am not in control of my career success.	1	2	3	4	5
11	I tend to bounce back when my career plans do not work out quite right.	1	2	3	4	5
12	I am rarely in control of my career.	1	2	3	4	5
13	Thinking about my career inspires me.	1	2	3	4	5
14	My efforts will determine my career success.	1	2	3	4	5
15	I will make the right decisions in my career.	1	2	3	4	5
16	I enjoy trying new work-related tasks.	1	2	3	4	5
17	I am good at adapting to new work settings.	1	2	3	4	5
18	I can adapt to changes in my career plans.	1	2	3	4	5
19	It is hard to discover the right career.	1	2	3	4	5
20	Others would say that I am adaptable to change in my career plans.	1	2	3	4	5
21	I will adjust quickly to shifting demands at work.	1	2	3	4	5
22	I can adapt to change in the world of work.	1	2	3	4	5
23	Planning my career is a natural activity.	1	2	3	4	5
24	I am good at understanding job market trends.	1	2	3	4	5
25	It is easy to see future employment trends.	1	2	3	4	5
26	I know how post-high school education can help me achieve my life and career goals.	1	2	3	4	5

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
27	I believe I can succeed in the right post-high school education situation.	1	2	3	4	5
28	I know and understand the post-high school education application process.	1	2	3	4	5
29	I know how to get the post-high school information I need.	1	2	3	4	5
30	I know how to get the financial aid needed for a post-high school education.	1	2	3	4	5
31	I know how to set goals for myself.	1	2	3	4	5
32	There are important, influential persons in my life who believe in me.	1	2	3	4	5
33	Other persons can help me achieve my goals.	1	2	3	4	5
34	I know how to read a textbook successfully.	1	2	3	4	5
35	I know how to prepare for a test successfully.	1	2	3	4	5
36	I know how to take class notes successfully.	1	2	3	4	5
37	I know how much pay it takes to make a good living for someone's work.	1	2	3	4	5
38	I have confidence living a good life 10 years from now.	1	2	3	4	5
39	I know about the various ways to pay for post-high school education.	1	2	3	4	5

		No Confidence at All	Very Little Confidence	Moderate Confidence	Much Confidence	Complete Confidence
40	Make a plan of your goals for the next five years.	1	2	3	4	5
41	Determine the steps you need to take to complete your chosen major.	1	2	3	4	5
42	Prepare a good resume.	1	2	3	4	5
43	Get letters of recommendation from your professors.	1	2	3	4	5
44	Get involved in a work experience relevant to your future goals.	1	2	3	4	5
45	Find and use the Placement Office on campus.	1	2	3	4	5
46	Decide whether or not you will need to attend graduate or professional school to achieve your career goals.	1	2	3	4	5
47	Plan course work outside of your major to help you in your future career.	1	2	3	4	5
48	Identify employers, firms, institutions relevant to your career possibilities.	1	2	3	4	5
49	Successfully managed the job interview process.	1	2	3	4	5

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INFLUENCE OF SOCIAL MEDIA, COUNSELING HELP-SEEKING ATTITUDES AND CYBERBULLYING ENGAGEMENT AMONG YOUNG ADULTS IN SELANGOR, MALAYSIA

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ABSTRACT

The main purpose of this research study is to investigate the influence of social media, counseling attitudes and cyberbullying engagement among young adults in Selangor. It explores how social media platforms influence the prevalence and impact of cyberbullying incidents in the local community. It also investigates the role of counseling help-seeking attitudes in mitigating the adverse effects resulted from cyberbullying. This study employs a quantitative methodology by collecting data from a sample of young adults residing in Selangor. Statistical analyses, including descriptive analysis, correlation, and multiple regression were conducted to examine the relationships between these variables. The result revealed that there is no significant direct effect of social media usage on cyberbullying perpetration. However, there are statistically negative relationships between social media usage and counseling attitudes on cyberbullying victimization. Counseling attitude is significantly and negatively associated with cyberbullying perpetration, reflecting its role to potentially minimize the risks of young adults being exposed to cyberbullying. This study underscores the importance of implementing effective counselling strategies, particularly within higher education institutions, to mitigate cyberbullying engagement and social media use among young adults in Selangor, Malaysia.

Keywords: bullying behavior, counselling attitude, cyber world, mental health, online violence, youth

1. Introduction

Social media has created new opportunities for people to network, exchange ideas, feelings, and generate content. Social media platforms are rapidly altering the public discourse and establishing trends for subjects including politics, technology, education while also having an impact on the entertainment sector due to its accessibility, speed, and reach (Kamisan & Abu Bakar, 2021). Nevertheless, it is vital to acknowledge that along with the benefits, there can be negative impacts associated with the utilization of technology. One of the disadvantages of social media usage is the possibility of being exposed to cyberbullying, either as a perpetrator or a victim. Like bullying, cyberbullying is concerning for an individual's mental health status because it makes victims feel incompetent and diminishes their self-esteem (Peebles, 2014). The continuous harassment, humiliation, and intimidation inflicted through online platforms can lead to profound psychological distress and emotional harm. The consequences of cyberbullying also extend beyond mental health as there have been documented cases of individuals resorting to extreme measures such as suicide or acts of violence as a result of the psychological pressure associated with cyberbullying (Adebayo et al., 2020). The potential for long-lasting damage and irreversible outcomes highlights the severity and urgency in addressing this issue.

Cyberbullying comes in different forms such as impersonation, harassment, cyberstalking, and cyberthreats (Willard, 2006). These activities are performed in many ways to reach the victims, including social networking websites, instant messaging over the Internet, and text messaging by phone. Young adults are now becoming more technologically savvy that they can easily register websites and accounts to send harmful messages with relative anonymity. The anonymity of cyberbullying over the use of the Internet is often out of the legal reach of authorities (Peebles, 2014). This allows bullies to happen around the clock and leaves victims in a constant struggle to find peace.

UNICEF Malaysia (2020) reported that 3 out of 10 young Malaysians encounter cyberbullying on a regular basis through private messaging, gaming, and social media sites including WhatsApp, Twitter, Instagram, and Facebook. Another poll conducted by UNICEF Malaysia in 2020 also revealed that 4 in 9 young people in Malaysia are aware of the private online groups that function as bullying platforms. However, only 2 in 7 young Malaysians knew of a helpline to seek help if they are a victim of cyberbullying. According to Cybersecurity Malaysia (2020), young Malaysians have a moderately high likelihood of becoming cyberbullies, reported at more than 53% while around 25% of young Malaysians have been bullied online. More than 44% of young Malaysians experienced cyber-related anxiety, despair, and stress as a result of cyberbullying engagement. It is important to note the data may not be the actual reflection of cyberbullying cases as these activities are often under-

reported in Malaysia as people lack awareness of the significance of cyberbullying situations (Adebayo et al., 2020).

Young adults refer to individuals who are in the transition period between adolescence and adulthood, generally ranging from late teens to early thirties. In reference to Balakrishnan's (2022) study on problematic use of online information among young adults in Malaysia, this study considers young adults as those aged between 18 to 35 years old. This age range overlaps with those in universities, as many students in Malaysia enter university around the age of 18 or older. This demonstrates that there is a significant portion of young adolescents transitioning into university education, making them vulnerable to cyberbullying throughout their academic journey.

It has been shown that an empowering support network with appropriate resources can guide young people in comprehending and navigating through the cyber world safely while protecting them from cyberbullying engagement (Dennehy et al., 2020). Seeking counselling services has also been identified as an effective strategy in response to cyberbullying victimization and perpetration. However, cyberbullying engagement, especially victimization goes largely unreported. Young people's reluctance to report cyberbullying has been attributed to challenges in establishing cybervictimization, anxiety about losing access to cyberspace, worry about reprisals or intensification of bullying, lack of faith in adults' ability to assist, and the notion that little can be done to stop cyberbullying. Therefore, counsellors and mental health professionals are in a distinctive position to mitigate the psychological impacts resulted from cyberbullying engagement and increased social media use. Young adults must first become aware of cyberbullying incidents and feel safe to disclose with authorities.

There are considerable research studies on young adults' problematic Internet use in Malaysia which demonstrated the detrimental consequences of the Internet on the psychological health of students (Balakrishnan, 2022). However, the literature yield very few studies on cyberbullying practices. The majority of empirical research on cyberbullying has focused on children and teens rather than adults (Schodt et al., 2021). There is comparatively lesser research that studies the interrelation between cyberbullying and mental health among adults. Yet, it is important to recognize that adult populations are affected differently than younger ones since they use social media for various things and are more likely to engage in cyberbullying in different ways.

In the context of Malaysian young adults, this study seeks to add empirical evidence to the exploration of the relationship between social media use, counseling help-seeking attitudes, and cyberbullying engagement. Research conducted by Lee and colleagues (2023) revealed that among 270 medical students from a Malaysian

public university in Kuching, the prevalence of cyberbullying victimization was 24.4% and cyberbullying perpetration was reported at 13.0%. The same study revealed that social media addiction was associated with higher tendencies in depression, anxiety, and stress. By offering statistical analyses based on the experiences of Malaysian young adults residing in Selangor, this study seeks to add depth to the existing studies. It is expected that the findings would contribute to the literature and help practitioners especially Malaysian counselors in developing resources for counseling the young adults who face issues with social media usage and cyberbullying.

However, it was highlighted that the majority of studies on cyberbullying were conducted with students in primary and secondary school, ranging in age from 9 to 18 years old (Peled, 2019). Studies exploring individuals beyond this age group is crucial to improve understanding and provide empirically supported data for future intervention strategies aimed at mitigating cyberbullying issues. Studying human behavior on social media usage and cyberbullying practices may enhance mental health practitioners' knowledge and skills in combating the negative consequences of such online practices. The findings may help counselors to understand how social media usage can be linked with young adults' cyberbullying behaviors. This could be beneficial for the case management of the counseling services in university or community settings.

Understanding the identified patterns of association between the variables, counselors could modify their intervention strategies to ensure social media safety in preventing cyberbullying practices. The findings will act as references for counselors to develop appropriate interventions and counseling services for young adults. It holds potential for reducing young adults' mental health issues stemming from social media usage and cyberbullying behaviors, which in turn can improve their overall psychological wellbeing.

Selangor was chosen to be the location of this study as it is Malaysia's most urbanised state and boasts the country's highest Internet penetration rate. It belongs to one of the 13 states that make up Malaysia. In light of these considerations, the current study aim to study the influence of social media usage, counseling help-seeking attitudes, and cyberbullying engagement among young adults in Selangor. The specific goals of this research include:

(1) To measure the prevalence of social media usage, counselling help-seeking attitudes, cyberbullying perpetration and victimization among young adults in Selangor.

(2) To investigate the relationship between social media usage and cyberbullying perpetration among young adults in Selangor.

(3) To investigate the relationship between social media usage and cyberbullying

victimization among young adults in Selangor.

(4) To investigate the relationship between counselling help-seeking attitudes and cyberbullying perpetration among young adults in Selangor.

(5) To investigate the relationship between counselling help-seeking attitudes and cyberbullying victimization among young adults in Selangor.

(6) To investigate the influence of social media usage and counselling help-seeking attitudes on cyberbullying engagement.

2. Literature Review

2.1. Cyberbullying

A meta-synthesis review revealed that there were no articles that referenced 'cyberbullying' before 2004 (Tokunaga, 2010). This reflects that the concept of cyberbullying is a recent emergence following technological advancement in communication and entertainment. Cyberbullying is commonly defined as a deliberate and aggressive act performed by an individual or a group using electronic forms of contact persistently and over time against a victim or a group of people with a power imbalance that they cannot easily defend themselves (Willard, 2006). Cyberbullying is sometimes referred to as online violence, cyberharassment, and electronic aggression. Forms of cyberbullying that occur on social networking sites include mocking, uploading photos or videos to embarrass others, offending others with status updates, commenting with harsh words, insulting the person's body image, stalking victims through fake accounts, spreading gossip, or pretending to be someone else (Husna et al., 2020).

According to a meta-analysis conducted by Lozano-Blasco and colleagues (2020), university students and young adults are subject to cyberbullying, with incidence rates ranging from 3% to 40% for perpetration and 7% to 62% for victimization. Another study conducted by Lai and colleagues (2017) revealed that compared to male respondents among Malaysian university students, female respondents had a higher prevalence rate of cyberbullying. Additionally, it was discovered that compared to other ethnic groups, Malay people made up the majority of cyber victims. They cited Facebook as the common venues for cyberbullying. It is alarming that bullying on social media platforms continues to increase and expose more people to emotional and psychological stress. A research conducted by Saharrudin and colleagues (2019) also reported 10% of the 400 youths investigated have moderately engaged in cyberbullying activities. Hence, it is essential to determine the current prevalence of cyberbullying engagement as there are mixed findings in this area.

2.2. Social media usage and cyberbullying

Several research have attributed the interrelation between cyberbullying and mental health towards social media use. One study conducted by Balakrishnan (2022) that investigated cyberbullying issues among young adults in Malaysia concluded that internet usage frequency could initiate cyberbullying. Another study by Shaikh and colleagues (2021) reported that cyberbullies and the victims are mainly heavy social media users which therefore stimulate the youths to harm each other. Cyberbullying victimization has a higher occurrence when both victims and perpetrators are using the same virtual venues as social media platforms without adequate safeguards in place. This presents the increased chances for cyberbullying engagement when there is a higher degree of social media use. Thus, the following hypotheses were formulated to examine the relevant relationships for young adults residing in Selangor, Malaysia:

H1:   There is a significant relationship between social media usage and cyberbullying perpetration.

H2:   There is a significant relationship between social media usage and cyberbullying victimization.

2.3. Counselling help-seeking attitudes and cyberbullying

Counseling services have gained attention over the years as Malaysian society continues to grow in diverse settings including population, economy, and international recognition (Talib, 2010). Despite the fact that recent research indicated a rise in the number of people seeking assistance for mental health issues, a sizable portion of people continue to decide against using psychological services (Pheng et al., 2019). Research pointed out that the counseling services have been underutilized among Malaysian young adults (Arifin et al., 2022). The level of help-seeking was reported to be low among Malaysians. The rationales behind this phenomenon were often related to stigma, lack of awareness about the counseling services and anticipated costs. There are also attitudinal barriers towards counseling help-seeking where people choose to handle the problem on their own and thinking that the problem will go away.

A pilot study conducted by Chillemi and colleagues (2020) revealed that adolescents were more likely to use coping skills after going through an online, self-guided psychoeducational program. There was a significant increase in adolescents' help-seeking attitudes that resulted in the increased likelihood of engaging counselling services in the event of being victim of cyberbullying. This implies that counselling initiatives are vital to increase youths' behavioural intentions in seeking help during cyberbullying engagement. Besides that, research shows that school children who had suffered from cyberbullying had worse help-seeking attitudes (Gustainiene & Valiune, 2015). It is important to educate youths to change their attitudes toward help seeking if they encounter cyberbullying.

Hence, the following hypotheses were formulated:

H3: There is a significant relationship between counselling help-seeking attitudes and cyberbullying perpetration.

H4: There is a significant relationship between counselling help-seeking attitudes and cyberbullying victimization.

2.4. Research framework

The underpinning theory used in this research is Theory of Planned Behaviour (TPB) (Ajzen, 2005). It is predicated that a person's subjective desire to engage in a particular behaviour is the most accurate predictor of that behaviour. The attitudes towards the behaviour, the subjective normative beliefs about executing the behaviour, and the perception of behavioural control to conduct the behaviour are the three factors that determine the intent to perform a certain behaviour. Theoretically, a person's behavioural intention will rise with more favourable assessments of the three elements, increasing the likelihood that they will engage in the particular behaviour. As a result, we develop positive attitudes towards behaviours we feel will predominantly result in desirable results while developing negative attitudes towards behaviours we think will mostly result in bad consequences. This theory has been applied in many research studies to understand help-seeking behaviors (Hamidi, 2014) and likelihood of involving in cyberbullying behavior (Shaikh, 2021). The following hypothesis is developed to investigate factors influencing cyberbullying engagement:

H5: There is a significant influence of social media usage and counselling help-seeking attitude on cyberbullying perpetration and victimization.

With TPB as a theoretical framework, it helps to inform how mental health professionals can develop interventions to increase the chances of behavioral changes. Particular procedures can be followed to increase the likelihood of behavior change. The conceptual framework is illustrated in Figure 1. This framework aided in developing research objectives, research questions and research hypotheses. It laid out the variables studied in this research. Independent variables are social media usage and counseling help-seeking attitude. Dependent variable is cyberbullying engagement, which has two domains, perpetration, and victimization.
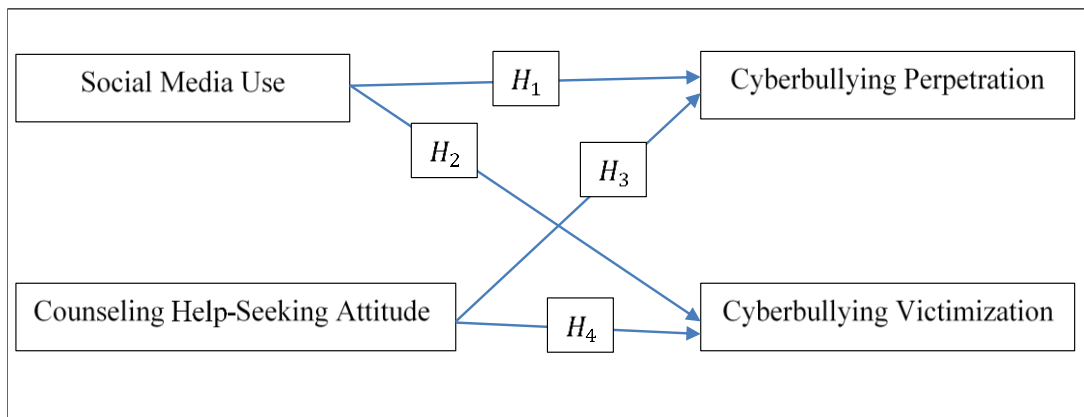
Figure 1: Conceptual framework

3. Methodology

The current research utilizes a quantitative approach to examine the influence of social media usage and counselling attitudes on cyberbullying perpetration and victimization among young adults in Selangor, Malaysia. The present study utilizes a combination of descriptive and correlational research designs. The current state of undergraduate students' use of social media, cyberbullying behaviors, and counselling help-seeking attitudes are described in depth through descriptive research design. It also serves as a preceding strategy to assemble data about the research interest.

The population of the present study is the young adults residing in Selangor. Based on the research objectives, the inclusion criteria included (1) people aged between 18 to 35 years old, and (2) Selangor residents. According to the Department of Statistics Malaysia (2022), there are 1.9 million people who aged between 18 to 35 years old who stay in Selangor.

The primary sample strategy used was cluster sampling, followed by simple random sampling. At the primary stage, all nine districts under Selangor were listed. They are Sabak Bernam, Kuala Selangor, Hulu Selangor, Petaling Jaya, Klang, Kuala Langat, Hulu Langat, Gombak, and Sepang. Estimates were made of the typical population members in each cluster. Four clusters are required for this investigation, as determined by dividing the sample size by the predicted size per cluster. By giving each district a number and choosing from a table of random numbers, four districts were chosen at random. The chosen districts are Hulu Langat, Petaling Jaya, Gombak, and Klang. All young adults in each of the four districts are in the sample.

For the present study, the significance level (α) is set at 0.05, indicating that the results have a 5% of occurring, or less, if the null hypothesis is true. The confidence level is set at 95%. This infers that one can be 95% certain that the results contain

the true mean average of the specified population. The standard deviation is set at 0.05, with a margin of error plus or minus 5%.

Using Cochran's formula for sample size estimation, $n_0 = \frac{Z^2 pq}{e^2}$.

The symbol e refers to the margin of error; p is the estimated proportion of the population that has the attribute in the research question, and q is 1-p. Taking into consideration the above, for a population size of 1.9 million, with primary variables being continuous data, the sample size needed is 385.

3.1 Instrumentation

Several instruments are used to measure the variables of the present study. There are four parts for the survey questionnaire. The first part collects the respondents' demographic information. These include respondents' age, gender, and ethnicity. By capturing the diversity of the study population, this study can provide insights that are more representative of the broader young adult population in Selangor, Malaysia. Participants are also required to respond affirmatively to the question "Are you currently residing in Selangor?" in order to be included in the study. It is followed by the second part that assesses respondents' social media usage using Social Networking Activity Intensity Scale (SNAIS) (Li et al., 2016). The third part of the questionnaire examines respondents' cyberbullying engagement through the Revised Cyber Bullying Inventory (Erdur-Baker & Kavsut, 2010). The fourth part of the survey explores respondents' counselling attitudes using the Attitudes toward Seeking Professional Psychological Help Scale (ATSPPHS) (Fisher & Farina, 1995). In adherence to the ethical standards and protocol, the present study obtained permissions from the respective authors of the instruments utilized in the research. No adaptations were made to the instruments as they were validated and established in previous research contacts. This serves to minimize cultural biases and distortions in the data.

Given that cyberbullying can occur in various social media channels, Social Networking Activity Intensity Scale (SNAIS) developed by Li and colleagues (2016) was used. In a systematic review conducted by Sigerson & Cheng (2018) that investigated psychometric properties of scales related to problematic use of social media, SNAIS fulfills both entertainment and social function of measuring social media engagement. It shows positive correlation with Facebook Intensity Scale (FBI) and two additional scales measuring social networking and Internet addiction. The items are written in the format of questions, "How often have you performed the following on online social networking activities in the last month" and respondents are required to answer with the 5-point Likert scale from 0 (Never), 1 (Few), 2 (Sometimes), 3 (Often), and 4 (Always). Scores are added up with no specific cut off for specific level of social network activity usage, higher scores imply higher usage

levels. The overall internal reliability was reported to be adequate (Cronbach's α = .89).

The Revised Cyber Bullying Inventory (Erdur-Baker & Kavsut, 2010) was adopted to examine respondents' cyberbullying engagement. It was revised upon the Cyber Bullying Inventory (CBI) that was first introduced in 2007. It added acts of cyber bullying performed on specified social media platform such as Facebook to increase relevancy for respondents. The Bully scale and Victim scale are the two subscales that make up the inventory. Each scale has 14 distinct examples of behaviors, totaling a 28-item self-report questionnaire with a 4-point Likert scale. Participants are required to rate from 1 (not at all) to 4 (more than 3 times) by reflecting on their behaviors over the past twelve months. The inventory links aggressive cell phone, email, social networking, and general computer usage to the behaviors indicated. With Cronbach coefficients of .80 for the Victim scale and .92 for the Bully scale, the RCBI is demonstrated to have high reliability.

Respondents' counselling attitudes were assessed using the Attitudes toward Seeking Professional Psychological Help Scale (ATSPPHS) (Fisher & Farina, 1995). The original scale was developed by Fisher and Turner in 1970 while the shorted version was revised in 1995, and has consistently demonstrate acceptable psychometric properties across a range of samples. It is a 10-item Likert scale where respondents rate their level of agreement with each item ranging from disagree (0) to agree (3). Items 2, 4, 8, 9 and 10 are reverse scored. All scores are added together. The higher the score, the more favorable one's attitude towards asking for assistance is. The reliability of the four dimensions included in the 29-item scale ranged from .62 to .74. The reliability of the overall scale was .86.

3.2 Data Collection Procedures

The data collection procedures for this study involve the use of a self-administered questionnaire. The questionnaire was distributed to the targeted population through community centers located at the four selected districts. Individuals visiting the community centers and those who are in the mailing list for community events were invited to participate in the survey by completing the questionnaire. Permission from the Ethics Committee for Research Involving Human Subjects Universiti Putra Malaysia (JKEUPM) were obtained before recruiting participants for this study. Each participant must acknowledge informed consent on the first page of the questionnaire in order to participate in the study, which is required to assure ethical compliance. A description of the nature of the research, including its objectives, and ethical considerations, along with the researcher's contact details were displayed with the consent form. Additionally, the responders were made aware of their freedom to withdraw from the study at any time without consequences.

3.3 Data Analysis

Given that standardized instruments are used for data collection, each participant's responses were scored following the manual key respectively. After that, the data was screened to address problems such outliers, missing data, and normality. A descriptive statistical analysis was used to characterize the data and present the participants' demographic information and their prevalence of social media usage, cyberbullying engagement and counselling help-seeking attitude. The hypotheses were tested using correlation and regression analyses. Correlation analysis assesses the strength and direction of the relationship between variables, aiding in understanding how changes in one variable may be associated with changes in another. Regression analysis investigates which variables have significant predictive value in explaining variations in cyberbullying engagement. The statistical analysis was carried out with the Statistical Package for Social Sciences (SPSS).

4. Results and Discussion

In the present study, a total of 395 responses were obtained through the proposed methodology. These responses represent valid cases with complete information. Upon initial screening, it was discovered that eight respondents declared that they did not reside in Selangor, Malaysia, the specific location of interest for this study. Hence, they were excluded from the final sample. This helps to ensure the accuracy and appropriateness of the findings within the targeted population. The number of respondents who met the inclusion criteria and were considered for the analysis amounted to 387.

4.1. Demographic Information

Table 1: Demographic Information of the Respondents

Variables	Frequency (n=387)	Percentage (%)
Age		
18 – 25	158	40.8
26 – 30	159	41.1
31 - 35	70	18.1
Gender		
Male	200	51.7
Female	187	48.3
Ethnicity		
Malay	172	44.4
Chinese	158	40.8
Indian	56	14.5
Others	1	0.3

This section presents the respondents' demographic data including age, gender, and ethnicity. Table 1 shows the demographic information of the respondents in details The data was analysed using the IBM SPSS software. The demographics of the respondents were examined using descriptive statistics. Out of the total of 387 samples, 200 were males and 187 were females. 158 (40.8%) of them were between the ages of 18 and 25; 159 (41.1%) were between the ages of 26 and 30; and 70 (18.1%) were between the ages of 31 and 35. Among the samples, 172 (44.4%) were of Malay ethnicity, followed by 158 (40.8%) Chinese, 56 (14.5%) Indians, and 1 (0.3%) who belonged to other ethnic groups.

4.2. Descriptive Analysis of Social Media Usage, Cyberbullying Engagement and Counseling Help-seeking Attitude

The level of social media usage of the respondents is shown in Table 2. The total scores range from 0 to 56, with the mean of 39.2 (SD = 13.8). A total of 219 (56.6%) respondents reported very high usage of social media, rated to be always engaging in online social networking activities in the last month. It is followed by 68 (17.5%) respondents that reported either sometimes or often engaging in online social networking activities. 63 (16.3%) respondents reported low social media usage while 37 (9.6%) respondents reported very low social media usage over the past month.

Table 2: Prevalence of Social Media Usage

Level	n	%	Min	Max	Mean	SD
Social Media Usage			0	56	39.2	13.8
Very low (<20)	37	9.6				
Low (20 – 29)	63	16.3				
High (30 – 39)	68	17.5				
Very high (40<)	219	56.6				

Findings on the high prevalence of social media usage among young adults in Selangor is consistent with the report published by the Malaysian Communication and Multimedia Commission (2020) on social media usage and the research conducted by Kamisan and Abu Bakar (2021) on the usage patterns of social media among young adults in Malaysia. It shows that social media is becoming a necessity for young adults as it encompasses a major part of our daily lives.

The level of cyberbullying perpetration is summarized in Table 3. The total scores range from 14 to 45, with the mean of 19.1 (SD = 9.0). There were 316 (81.7%) respondents reported low level of cyberbullying perpetration, where they rated their engagement in cyberbullying perpetration to be never or once. 64 (16.5%) respondents were moderately involved in cyberbullying perpetration, with an average of involvement between two to three times. There were 7 (1.8) respondents with high engagement in cyberbullying perpetration, indicating that they have

committed to this act for more than three times.

Table 3: Prevalence of Cyberbullying Perpetration

Level	n	%	Min	Max	Mean	SD
Cyberbullying Perpetration			14	56	19.1	9.0
Low (14 – 27)	316	81.7				
Moderate (28 – 41)	64	16.5				
High (42 – 56)	7	1.8				

Current findings revealed that there is a low prevalence of cyberbullying perpetration among young adults in Selangor. This finding is consistent with the research conducted by Saharrudin and colleagues (2019), where they reported 10% of the 400 youths that they investigated have moderately engaged in cyberbullying activities. However, this finding differs slightly with other research studies. The findings by Lai and colleagues (2017) indicating one-third of Malaysian young adults had cyberbullied someone, and a meta-analysis conducted by Lozana-Blasco and colleagues (2020) revealed that the cyberbullying perpetration rate among university students and young adults were 3% to 40%. The inconsistencies in findings may be due to the act that there is social desirability that influenced respondents' reported rates. It may also be an increase of digital resilience among young adults surveyed due to greater cyber safety awareness created by the society that encouraged positive Internet use.

The level of cyberbullying victimization is presented in Table 4. The total scores range from 14 to 56, with the mean of 22.1 (SD = 8.8). A total of 283 (73.1%) respondents reported low level of cyberbullying victimization, where they have never experienced cyberbullying or had one encounter in the past. 99 (25.6%) respondents reported moderate level of cyberbullying victimization, and 5 (1.3%) respondents have experienced cyberbullying for more than 3 times.

Table 4: Prevalence of Cyberbullying Victimization

Level	n	%	Min	Max	Mean	SD
Cyberbullying Victimization			14	56	22.1	8.8
Low (14 – 27)	283	73.1				
Moderate (28 – 41)	99	25.6				
High (42 – 56)	5	1.3				

Compared with cyberbullying perpetration, the prevalence of cyberbullying victimization is higher but it is also comparatively low among the sample studied. This finding is consistent with other research findings that revealed a higher

prevalence rate in cyberbullying victimization than perpetration (Zhu et al., 2021; Lozano-Blasco et al., 2020). The fact that a substantial number of cyberbullies were also cybervictims can complicate the research findings. This study revealed a moderate-high correlation between cyberbullying victimization and perpetration (r = .76), which is consistent with Lozano-Blasco and colleagues' findings.

The counselling help-seeking attitudes of the respondents are captured in Table 5. The total scores range from 0 to 30, with the mean of 17.3 (SD = 4.2). According to Fischer and Farina (1995), higher scores obtained from this scale indicate a better counselling help-seeking attitude. The threshold score is greater than 20 points, the attitude is regarded as negative for points below 10. A total of 133 (34.4%) respondents scored above 20 points, showing a positive attitude toward counselling help-seeking, while 230 (59.4%) respondents scored between 10 to 19, reflecting a neutral attitude toward counselling help-seeking. There were 24 (6.2%) respondents who held negative attitudes toward counselling help-seeking.

Table 5: Prevalence of Counselling Help-seeking Attitude

Level	n	%	Min	Max	Mean	SD
Counseling Help-seeking Attitude			0	30	17.3	4.2
Negative (<10)	24	6.2				
Neutral (10 – 19)	230	59.4				
Positive (20<)	133	34.4				

Current findings show that majority young adults are neither having positive nor negative counseling help-seeking attitudes. The study outcome differs from other research studies (Salim, 2010; Arifin et al., 2022) that found that Malaysian young adults have reservations about seeking counseling services even when they struggle academically, professionally, socially, or personally. These two studies reported that majority of young adults rarely seek for help with low scores on the scale, followed by those with neutral category, and the least was those with positive counseling attitudes. It is worth noting that the current finding is in line with Berry and colleagues' (2019) finding that young people in Malaysia have a non-stigmatizing counseling attitude.

4.3. Hypothesis Testing

Correlational analysis was used to analyze the relationship between variables, alongside multiple regression analysis. All the research objectives were achieved, and the results are summarized in Table 6.

Table 6: Summary of Research Hypotheses, Results of Analysis

Research Hypothesis	Result	Decision
There is a significant relationship between social media usage and cyberbullying perpetration.	$r = -.02$, $p = .72$	Rejected
There is a significant relationship between social media usage and cyberbullying victimization.	$r = -.20$, $p < .05$	Accepted
There is a significant relationship between counselling help-seeking attitudes and cyberbullying perpetration.	$r = -.44$, $p < .05$	Accepted
There is a significant relationship between counselling help-seeking attitudes and cyberbullying victimization.	$r = -.59$, $p < .05$	Accepted

The findings suggested that social media usage has no significant direct relationship with cyberbullying perpetration but it has a significant relationship with cyberbullying victimization. Besides, counselling help-seeking attitude has a significant relationship with cyberbullying engagement among young adults residing in Selangor.

Multiple linear regression was used to test if social media usage and counselling attitude significantly predicted the frequency of cyberbullying perpetration among young adults. SPSS output is outlined in Table 7.

Table 7: Results of Multiple Regression Analysis with Cyberbullying Perpetration as the Dependent Variable

Variables	Beta	SE	β	Sig.
Social media	.10	.02	.15	.000
Counseling help-seeking attitude	.09	.05	.05	.000
Cyberbullying victimization	.96	.03	.94	.000

Note: Dependent variable: Cyberbullying Perpetration; SE: Standard Error

The results of the regression model show that the three predictors explained 79% of the variance ($R^2 = .79$, $p < .05$). The largest beta coefficient is .94, which is for cyberbullying victimization. This indicates that cyberbullying victimization makes the strongest unique contribution to the cyberbullying perpetration, when the variance explained by all other variables in this model is controlled for. It was found that social media usage significantly predicted cyberbullying perpetration at a lower level ($\beta = .15$, $p < .05$), followed by counselling help-seeking attitude ($\beta = .05$, $p < .05$). All relationships are shown to be making statistically significant unique contribution to the dependent variable.

The multiple linear regression analysis with cyberbullying victimization as the dependent variable is shown in Table 8. All three independent variables explained 82% of the variance ($R^2 = .82$, $p < .05$). Cyberbullying perpetration has the highest beta coefficient, reported at .78, indicating that it makes the strongest unique contribution to the cyberbullying victimization. Following that is counselling help-seeking attitude that significantly predicted cyberbullying victimization ($\beta = -.21$, $p < .05$), and social media usage ($\beta = -.11$, $p < .05$). Therefore, the research hypothesis is accepted as there is a significant influence of social media usage and counselling help-seeking attitude on cyberbullying perpetration and victimization.

Table 8: Results of Multiple Regression Analysis with Cyberbullying Victimization as the Dependent Variable

Variables	Beta	SE	β	Sig.
Social media	-.07	.02	-.11	.000
Counseling help-seeking attitude	-.31	.04	-.21	.000
Cyberbullying perpetration	.76	.02	.78	.000

Note: Dependent variable: Cyberbullying victimization; SE: Standard Error

4.3.1. Relationship between Social Media Usage and Cyberbullying Engagement

The current research findings indicated that there was no significant relationship between social media usage and cyberbullying perpetration as the influence was reported to be at a negligent level. However, it was found that there was a significant yet negative relationship between social media usage and cyberbullying victimization. This is inconsistent with previous studies that found significant and positive relationships between social media usage and cyberbullying behaviors (Shaikh et al., 2021; Balakrishnan, 2022).

One of the factors resulting in the found insignificance could be that social media usage was investigated as a moderating or mediating role between cyberbullying intention and behavior (Abaido, 2020). The lack of causality indicates that higher social media usage does not directly lead to higher cyberbullying engagement. The presence of other mediating variables can influence the relationship between social media usage and cyberbullying engagement. Factors investigated in previous studies include individual personality traits (Ghazali et al., 2020), depressive symptoms (Pang et al., 2023), aggression (Yusup, 2019), etc.

These mixed findings suggested that the relationship is complex and context-dependent. Though the previous studies showed that increased utilization of social media platforms stimulates cyberbullying engagement among young adults, it is also vital to consider the positive aspects of social media usage that can positively impact users' behaviors and attitudes, such as fostering social connections virtually,

supporting mental health, and providing educational opportunities. Individual factors can result in different objectives and goals when utilizing social media. Hence, a balanced view of the influence of social media is needed to understand the influence between social media usage and cyberbullying engagement.

4.3.2. Relationship between Counseling Help-Seeking Attitudes and Cyberbullying Engagement

The findings on the relationship between counselling help-seeking attitudes and cyberbullying engagement revealed that there was a significant negative relationship between counselling attitudes and cyberbullying engagement. In other words, as one has a more positive counselling help-seeking attitude, their level of cyberbullying engagement are deemed to be at a lower level. This result is in line with previous findings that revealed positive help-seeking attitudes can reduce one's likelihood to engage in unfavorable activities (Arifin et al., 2022; Pheng et al., 2019). Counseling help-seeking attitudes have also been studied as a potential mediating factor that influence an individual's cyberbullying engagement. Tazilah and colleagues (2022) pointed out that a positive attitude towards counselling may be linked to higher self-esteem, empathy, emotional regulation skills, and problem-solving abilities. These protective factors can contribute to healthier relationships and lower tendencies to engage in cyberbullying behaviors.

Drawing upon the Theory of Planned Behavior (Ajzen, 2005), attitudes toward the behavior is one of the determinants of the intent to perform a specific behavior. Counseling help-seeking attitudes are linked with one's subjective intention to engage in cyberbullying. This indicates that as one has a positive counselling help-seeking attitude, the negative appraisals towards cyberbullying intention will decrease the likelihood of engaging in cyberbullying behavior. The present finding and previous results (Shaikh et al., 2021) confirmed that a positive attitude towards help-seeking can lead to a lower chance of engaging in cyberbullying behavior.

5. Implications and Suggestions for Future Studies

Cyberbullying is a growing social issue that affects people around the world, including Malaysia, where young adults have easy access to technology. The research findings present an alarming rate of social media usage among young adults residing in Selangor. However, the cyberbullying engagement may not have been a prominent concern among the current sample population. Nevertheless, the high level of reported social media usage still warrants consideration for preventive measures for addressing the possibility of cyberbullying engagement. This data could help higher education institutions to integrate various mental health support services into campus resources through understanding the current trend among young adults. It is also worth noting that social media platforms are constantly evolving and the dynamics of online interactions can change rapidly. Therefore,

preventive measures can be taken in place to mitigate the negative consequences resulted from problematic use of Internet.

This study added new findings to the current literature that mainly focused on studying cyberbullying behavior in the population of children, adolescents, or school students. This new findings can shed light in identifying key factors related to cyberbullying among young adults in Malaysia. It is also important to recognize that cyberbullying goes beyond schooling age. It is with higher risk when young adults are not under the surveillance of their parents, especially when they first enter colleges or universities. As they begin to gain freedom in making own choices, their behaviors and attitudes can also be easily influenced by personal, social and environmental factors.

Based on the Theory of Planned Behavior, this study highlighted the negative relationships between counselling attitudes and cyberbullying engagement. This helped inform general public, including counselling professionals, the importance of promoting positive counselling attitudes among young adults and effective counselling interventions to address cyberbullying issues. It is also vital to identify risk factors and protective factors associated with the prevalence rates of cyberbullying engagement. By encouraging help-seeking behavior, individuals may be more inclined to address their own emotional needs rather than resorting to cyberbullying.

There is a need for comprehensive research that adopts the lens of qualitative research in the future. Comprehensive methodologies, such as longitudinal studies, detailed interviews, and mixed-method approaches can be adopted to uncover the underlying mechanisms and contextual factors that contribute to the relationship. The quantitative findings may not have been providing a comprehensive understanding of the relationships between the variables studied. Combining quantitative data from self-reported questionnaires with other qualitative methods can provide researchers a deeper understanding of respondents' experiences, motivations, and perceptions.

Besides that, future study should recruit participants according to the ratio of ethnicity, age, and gender among Malaysian young adults to generate more representative results. The recruitment process can be tailored to target undergraduate students from either private or public universities, thereby enhancing the clarity of the population of interest and minimizing potential result distortions. The surveys should also be targeted at cyber bullies and victims directly to collect more accurate responses. Particular constructs in Theory of Planned Behavior shall be investigated closely to understand the actual intention, attitudes, or subjective norms behind cyberbullying engagement. To comprehend how technological applications and psychological impacts affect the behavioral intents of

cyberbullying, other theories, such as Social Cognitive Theory (SCT) and the Technology Acceptance Model, might be applied.

Although cyberbullying has not been recognized as a mental condition by any classification systems for mental illnesses, it is portrayed as a kind of problematic internet use. Future studies might want to look into those with problematic internet use and investigate its connections with cyberbullying, examining if they exhibit similar addiction symptoms that are linked to distress or functional impairment. Given the available research, it seems premature to categorize cyberbullying as a separate mental disease. Future studies might therefore examine the psychopathology of cyberbullying and its presentation in greater detail.

Overall, the key information obtained is essential to help policymakers, educators, and mental health professionals in developing targeted interventions and preventive measures to address cyberbullying issues in the country. Policymakers can adopt the present research outcomes in developing regulations aimed at addressing cyberbullying and promoting safe social media environments. Educators and counselling professionals can use the findings to develop effective educational initiatives and prevention programs to combat the cyberbullying issues. Fundamentally, the mental health aspects are crucial for an individual's wellbeing to cope with challenges in life.

6. Conclusion

This study explored the relationship between social media, counselling attitude, and cyberbullying engagement among young adults in Selangor, Malaysia. Through quantitative descriptive and correlational research approaches, this study aimed to contribute useful analytics for various stakeholders including the higher education institutions in tackling the issues arising from cyberbullying and social media use. The findings indicated that there was no significant correlation between social media usage and cyberbullying perpetration but there was a significant yet weak and positive correlation between social media usage and cyberbullying victimization. This showed that social media usage alone may not necessarily lead to increased cyberbullying. Other factors, including individual characteristics, situational factors, and cognitive processes may play a part in determining the cyberbullying engagement. This study also revealed a significant and negative relationship between counselling help-seeking attitudes and cyberbullying engagement. Specifically, individuals with more positive attitudes towards seeking help from counselling professionals demonstrated a lower likelihood of engaging in cyberbullying activities. This finding suggested that fostering positive counselling attitudes among young adults may serve as a protective factor against cyberbullying. Overall, this contribution aids university counselling units, educators, and policymakers by providing valuable insights to develop targeted interventions as proactive measures to mitigate the escalating challenges associated with cyberbullying and social media usage.

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INFLUENCES OF TECHNOLOGY AND DATA USE ON THE PROFESSIONAL SELF-EFFICACY OF MALAYSIAN TEACHERS

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ABSTRACT

The trend of early retirement among teachers is worrisome as it results in the loss of experienced teachers and contributes to the expanding teacher shortage. This condition is thought to have been caused by the workload and strain connected with technology and data use. Early retirement signifies teachers' burnout, stress, and lack of job satisfaction, and multiple studies have suggested that they significantly affect professional self-efficacy. This article explores the influence of technology and data use on a teacher's self-efficacy in relation to their profession. A total of 525 school teachers in Malaysia have participated in a research study by completing a questionnaire. The results indicated that teacher professional self-efficacy, technology use, and data use are at a moderate level. The findings demonstrate a favorable correlation among these constructs. However, the connections are not influenced by factors such as age, gender, or school location. The study's implications for the higher education setting are also addressed, suggesting the implementation of enhancement of professional development opportunities, mentorship and peer support, and recognition to teachers. These suggestions aim to better equip teachers with the indispensable skills required in the swiftly evolving realm of data and technology.

Keywords: technology use, data use, professional self-efficacy, higher education, learning analytics

1. Introduction

In today's dynamic educational landscape shaped by the volatility, uncertainty, complexity, and ambiguity (VUCA) of 21st-century learning and Industrial Revolution 4.0 (IR4.0) technologies, educational institutions must remain vigilant and adaptable. This environment poses challenges that can unpredictably impact education stakeholders, particularly teachers, affecting their engagement, performance, and persistence. In recent decades, transformations in the education system have profoundly influenced teaching practices and the work patterns of teachers, who now rely on internet-based technologies and advanced tools as integral components of teaching and learning. It is advocated that teachers possess adequate ICT competencies and skills to facilitate learning and meet the demands of IR4.0 effectively. They should be trained to proficiently utilize technology and adeptly handle data, enabling them to interpret and utilize it for interventions aimed at enhancing teaching and learning outcomes (Aleksic et al., 2019). Such readiness ensures that teachers remain aligned with the requirements of 21st-century education, thus ensuring they thrive in the IR4.0 era (Ismail et al., 2020).

In Malaysia, digital education is being actively promoted through the adoption of various online educational technologies, such as Google Classroom, for online learning management and the use of centralized student management systems to handle student data. The introduction of the Digital Educational Learning Initiative Malaysia (DELIMA) in 2020 has further facilitated this shift by providing a centralized platform offering diverse educational resources and tools for teachers, students, parents, and stakeholders. Malaysia aims to fully integrate digital solutions into all schools by 2025, with DELIMA serving as a crucial catalyst in this transformation by continually updating its content and expanding its reach for optimal effectiveness (PMD, 2021a). Efforts are also underway to enhance digital access and awareness within the Malaysian education system, enabling better utilization of technology for teaching and learning purposes (Ebrahimi & Yeo, 2018).

The utilization of education technologies and digitalization in education is associated with a significant factor contributing to early retirement among teachers in Malaysia (Bernama, 2024). The trend of early teacher retirements exacerbates this issue, signaling a worrying annual increase in experienced teacher loss (Bernama, 2022; Nasbah, 2022; Parkaran, 2022). By 2030, an estimated 69 million teachers will be needed worldwide to meet the demands of education, yet teacher shortages persist due to high attrition rates and retirement, particularly during the early years of teaching (UNESCO Institute for Statistics, 2016; Vincent Dupriez et al., 2016). This shortfall poses a significant challenge in accommodating the growing student population and educational institutions globally (UNESCO, 2015). Similarly, Malaysia is grappling with a shortage of teachers both in urban and rural areas

(Mutalib, 2019; Bestari, 2022).

2. Literature Review

Malaysia has made significant efforts in integrating technology into its education system. Since 1998, the Malaysian government has been investing in computer technology for education, with a focus on e-learning programs offered through the Ministry of Education. Particularly during the Covid-19 epidemic, there has been a dramatic change in the use of educational technology in schools. Online teaching and learning have ensured the school system's survival and mitigated the impacts of the Covid-19 epidemic (Yunus, 2018).

2.1. Technology and Data Use Challenges in Education

Described as the process of determining which tools and implementation strategies are most effective in enriching classroom teaching and learning environments (M. D. Roblyer, 2010), technology use encompasses the utilization of devices such as computers, laptops, and smartphones that are accessible to both teachers and students (Johnson et al., 2016). This integration of technology has significantly transformed traditional classroom instruction, rendering education more engaging and efficient (Pazilah et al., 2019). Given the proficiency of present-generation students, commonly referred to as digital natives, in technology use, it is undeniable that technology plays a crucial role in enhancing educational outcomes (Ahmadi, 2018). In this regard, it is advocated that teachers utilize technology as a tool for communication and idea exchange within the classroom setting (Ahmed & Nasser, 2015).

Furthermore, the rapid advancement of IR 4.0 technology corresponds with swift strides in digitalizing the education sector, with extensive data use emerging as a fundamental aspect of this digitalization endeavor. Data use in education entails a series of data-driven activities ranging from collection to analysis, interpretation, presentation, and intervention, all aimed at extracting pertinent information and informing decision-making in educational practices (Coburn & Turner, 2011). Educational data collection provides insights into institutional operations, teaching methodologies, and student learning, encompassing various metrics such as assessment values, exam scores, observations, and student backgrounds (Schildkamp & Kuiper, 2010). Studies have also observed a growing emphasis on adopting a data-driven approach in education for purposes of accountability, enhancement, and educational advancement globally (Bolhuis, 2019a).

Adopting new technology and embracing digitalization in educational settings pose significant challenges for teachers, particularly those accustomed to traditional teaching approaches. Many teachers encounter hurdles in adjusting to novel methodologies, including the integration of technology into their teaching practices

(Boonmoh et al., 2021). While some teachers recognize the benefits and efficacy of digital technology in education, not all are motivated to incorporate and adapt to it. A considerable number of teachers feel uneasy about technology use, citing insufficient competence due to the time and effort required to acquire the necessary technological skills for effectively utilizing classroom technology (Singh, 2021). Moreover, inadequate classroom facilities further impede teaching processes and activities, and the lack of technological resources leads to frustration among teachers (Kelly, 2015).

The extensive use of data provides an opportunity to educate teachers on its effective use within educational contexts (Mandinach & Gummer, 2016). Nevertheless, current studies reveal limited engagement with data among teachers, primarily focusing on accountability rather than school development or instructional improvement (Mandinach & Gummer, 2016). Despite acknowledging the necessity for teachers to work with data, there has been minimal effort to enhance teachers' data literacy through professional development programs or explicit recruitment criteria (Mandinach & Jimerson, 2016). Many teachers lack confidence in using data to inform teaching and learning decisions, highlighting low self-efficacy in data utilization (Sun et al., 2016).

The pandemic's impact on the teachers' practices following school closures is explored, revealing a correlation between positive teaching experiences and increased technology and data use (Paetsch et al., 2023). Effective implementation of educational activities hinges on teachers' capacity to organize, develop, and deploy such activities, underscoring the importance of their ability to integrate technology and utilize data in teaching and learning contexts (Abunowara, 2014). There is a critical need to emphasize teachers' use of technology and data within the classroom (Boonmoh et al., 2021). As expressed by Roy (2019), while technology cannot replace exceptional teachers, it has the potential to bring about transformative educational outcomes when used by skilled teachers.

2.2. Teachers' Professional Self-efficacy

Research has shown that teacher efficacy is an important variable in teacher effectiveness and is consistently related to teacher behaviors (Bray-Clark, N & Bates, 2003). Self-efficacy, regarded as a pivotal measure of teacher effectiveness and instructional quality, refers to individuals' belief in their capacity to execute various aspects of their job (Tschannen-Moran et al., 1998). This belief system significantly impacts human functioning through cognitive, motivational, affective, and decision-making processes. Teachers with heightened levels of professional self-efficacy exhibit confidence in executing job tasks proficiently, adeptly planning, organizing, and executing required actions (Bandura, 1977). Research indicates that self-efficacy tends to remain consistent across various factors such as gender, professional

identity, salary, relationship satisfaction, experience, educational levels, and tenure (Burić & Kim, 2020).

Professional self-efficacy, extensively studied as a key motivator for teachers, strongly correlates with retention intentions, job satisfaction, and commitment (Burić & Kim, 2021). Unlike a fixed personality trait or job quality, it represents a belief in one's capacity to complete tasks with specific qualities (Peng et al., 2021). Teachers with high professional self-efficacy demonstrate increased preparation time, superior organizational skills, receptiveness to innovative approaches, enthusiasm for teaching, and dedication to assisting struggling students (Tschannen-Moran & Hoy, 2001). This attribute is essential for teachers to enact transformative changes in facilitating effective student learning, ensuring they possess up-to-date knowledge, competencies in curriculum and pedagogy, and proficiency in utilizing various technologies to enhance teaching and learning performance. Moreover, teachers' professional self-efficacy significantly influences their satisfaction and engagement in their profession, thereby fostering greater loyalty to the teaching profession.

Professional self-efficacy has been identified to mediate the relationship between professional factors such as job satisfaction and career calling, between in-role performance and career calling (Peng et al., 2021), work performance and work motivation (Cetin & Celik, 2018), and job insecurity and job-related learning (Hootegem et al., 2021). As a result, several countries are attempting to solve teacher shortages and early retirement by implementing support and enhanced policies and services to boost teachers' professional self-efficacy. As teacher retirement contributes considerably to teacher shortages in educational institutions, it is anticipated that professional self-efficacy influences increasing early retirement.

2.3. Technology and Data Use Influence On Professional Self-Efficacy

Kuh and Hu (2001) illustrated that technology stimulates greater student engagement and enhances learning outcomes. Active involvement of students in knowledge creation, collaboration, and reflection facilitated by technology, including computers and various educational applications, has been shown to improve learning effectiveness (Rosická & Hošková-Mayerová, 2014). Furthermore, research indicates that leveraging data can improve teaching practices (Gelderblom et al., 2016).

Nonetheless, as noted by Alnoor et al. (2020), teachers' self-efficacy plays a crucial role in determining their positive perception of organizational readiness for change, particularly as new technologies often demand a high level of self-efficacy. Enhanced self-efficacy contributes to teachers' well-being and satisfaction, reducing negative feelings or a sense of helplessness when adopting new technology. Abror et al. (2020) identified a link between self-efficacy, employee engagement, satisfaction, and loyalty in the workplace, underscoring the significance of

investigating self-efficacy in the current study.

In a higher education setting, Velu et al.'s (2011) study revealed that factors predicting higher education teachers' self-efficacy towards research include expertise, interest, motivation, positive environment, and personal strength, with stronger self-efficacy increasing their engagement in research activities (Velu et al., 2011). This suggests that positive self-efficacy among teachers contributes towards the overall improvement in work tasks and performance.

In pursuit of enhancing both quality and performance, educational systems frequently institute modifications that entail the incorporation of advanced technologies, such as the digitalization of educational processes. Nevertheless, the introduction of novel technologies can present significant challenges for teachers, potentially resulting in diminished performance and a less favorable perception of their profession. Research indicates that meaningful integration of technology into the classroom remains a paramount challenge confronting teachers today (Gomez et al., 2021). However, the use of technology and data has been reported to contribute to teachers' low professional self-efficacy. Existing literature reveals a correlation between teacher self-efficacy and job satisfaction (Kasalak & Dağyar, 2020; Matos et al., 2022), stress management (Galindo-Domínguez & Bezanilla, 2021), burnout (Kim & Burić, 2020), and technology acceptance (Fearnley & Amora, 2020).

The stress and exhaustion stemming from data and technology use have been cited as primary reasons for early retirement trends (Nasbah, 2022). Retired teachers have expressed dissatisfaction with the demands of technology use, reporting feelings of demotivation and burnout (Nasbah, 2022). Furthermore, the overwhelming workload associated with technology use has been consistently identified as a source of pressure and burden for many teachers (Parkaran, 2022; Bestari, 2022).

A study conducted by McDonald and Siegall (1992) demonstrated a positive correlation between technology use and various indicators of job satisfaction, commitment, work quality, and quantity, as well as a negative correlation with absenteeism and tardiness. Additionally, Medici et al. (2022) discerned that technology employment was linked to reduced intentions of occupational mobility, suggesting its pivotal role in fostering professional commitment and mitigating turnover intentions. Conversely, Weibenfels et al. (2022) proposed that technology use positively impacts changes in classroom management.

Further research has elucidated a notable negative relationship between teachers' professional self-efficacy and job stress and burnout (Smetackova, 2017; Hassan and Ibourk, 2021). Studies have revealed that the perceived loyalty to one's career in light of technological advancements anticipates feelings of job insecurity (Nam, 2019), which subsequently influences job satisfaction, organizational commitment, and turnover intentions (Staufenbiel & König, 2010). Technology integration in

classroom settings thus may pose challenges for teachers as they are expected to make active adjustments, which can have an impact on their professional self-efficacy. It is also apparent from the literature that only a restricted number of studies had constructed statistical models to investigate the relationship between gender and computer teaching efficacy and student teachers' intentions to use technology (Wong et al., 2012). It is a logical argument that teachers' social background moderates technology use and its link to self-efficacy. Thus, this study investigates the influence of technology and data use on teachers' professional self-efficacy, with the possibility of gender, age, and school location moderating the relationships.

2.4. Research Objectives

This study aims to understand teachers' professional self-efficacy in school empirically. It seeks to confirm several assumptions by achieving the research objectives. These objectives are:

i.   To determine the level of teachers' technology use, data use, and professional self-efficacy.

ii. To examine the influence of teachers' technology use and data use on their professional self-efficacy.

iii. To examine the roles of gender, age, and school location as moderators between teacher's technology use, data use, and professional self-efficacy.

3. Methodology

3.1. Population and Sampling

This study employed the correlational quantitative design, specifically the survey approach, to collect data. A set of questionnaires has been formulated based on a 5-point Likert scale and distributed using an online survey tool. The population for the study consisted of teachers from public national schools in Malaysia. The population was estimated at 416743 (Ministry of Education Malaysia, 2021). Using Raosoft's sample size calculator, 384 or more respondents are needed to reach a confidence level of 95% that the value is within ± 5% of the surveyed value. Raosoft's sample size calculator is an online tool used to determine the appropriate sample size for a survey or research study. The calculator takes into account factors such as population size, confidence level, margin of error, and expected response rate to generate an estimate of the sample size needed for the study.

The sampling of respondents was done using a random sampling technique by utilizing Furey's online random number generator. 300 randomly chosen schools have received emails containing links to questionnaires and questionnaire guidelines. Each school administrator has designated one male and one female teacher as respondents to these inquiries. The responses to the teachers' questionnaire were

automatically documented and forwarded to the researcher using the Google Forms application. The survey consists of three sections:

Section A: Schoolteacher's Demographic Information

Section B: Teacher Professional Self-Efficacy

Section C: Technology Use, Data Use

A total of 525 teachers participated and submitted their responses to the questionnaire. The representation of female (62%) is higher than male (38%) respondents, and the majority of teachers are aged between 30 – 49 (77.9%). Most respondents were serving in primary (62.5%) and rural schools (62.5%).

3.2. Measures and Instrumentatio

The research framework is shown in Figure 1. The study statistically measured three constructs: technology use, data use, and professional self-efficacy using structural equation modeling (SEM) statistical analysis. The study also measured the moderating effects of gender, age, and location using multigroup analysis (MGA).
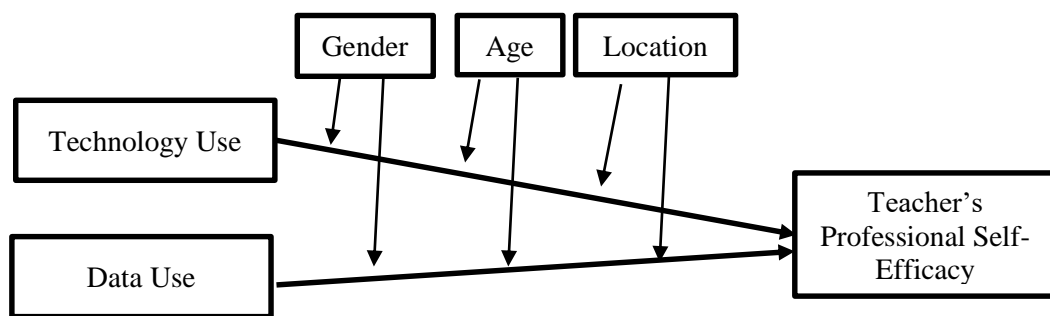
Figure 1: Research Framework

As illustrated in Table 1, professional self-efficacy consists of 4 items adapted from the sense of self-efficacy instrument by Geijsel et al. (2009). The instrument measures the extent to which teachers feel a sense of self-efficacy regarding their profession. Technology use consists of 6 items adapted and modified from the Teacher Use of Technology in Instructional Practices (T-STEM) instrument (Innovation, 2012). The instrument measures the use of technology in the classroom. The instrument reveals how frequently teachers use technology during teaching and learning sessions. Data use self-efficacy consists of 8 items adapted from the data-based decision-making efficacy instrument (Dunn et al., 2013), which measures the use of data in the classroom. The instrument reveals how frequently teachers use data during teaching and learning sessions. Specifically, the T-STEM instrument is designed to assess changes in teachers' confidence and self-efficacy pertaining to STEM subject content and teaching, use of technology in educational settings, proficiency in 21st-century learning skills, leadership attitudes, and awareness of

STEM career prospects. However, for this study, only the items related to the integration of technology in classroom settings were adjusted to gauge teachers' technology utilization within the Malaysian educational framework. These items underwent modifications and expert review to ensure their relevance and applicability within the context of the Malaysian education system.

Table 1: Research Instrument

Variable	Statements
Professional SE	"I can work effectively." "I am satisfied with the quality of my work." "I feel that I am being successful in my work." "I have sufficient self-confidence to defend my points of view about the work."
Technology Use	"Use various technologies for teaching and learning, e.g., productivity, data visualization, research, and communication tools." "Use technology to communicate and collaborate with others beyond the classroom." "Use technology to access online resources and information." "Use technology to help solve problems." "Use technology to support higher-order thinking, e.g., analysis, synthesis, and evaluation of ideas and information." "Use technology to create new ideas and representations of information."
Data Use	"Identify learning needs of students." "Discuss student progress or instructional strategies with other teachers." "Tailor instruction to individual student needs." "Identify instructional content to use in class." "Set learning goals for individual students" "Assign or reassign students to classes or groups." "Discuss data with a parent or student." "Interact with your principal about data use."

For the reliability analysis, Cronbach's Alpha was used to obtain the reliability index of each construct in the research instrument. As shown in Table 2, the Cronbach's alpha coefficient for the questionnaire ranges from 0.838 to 0.898. Therefore, the instrument was considered suitable for subsequent use in the study as all the constructs with Cronbach's Alpha values are higher than 0.70 (Nunnally & Bernstein, 1994). Furthermore, the inter-item correlation mean value above 0.25 indicates that the construct is valid for research (Nunnally & Bernstein, 1994). The reported item correlation mean ranges from 0.530 to 0.564, confirming that the research instrument is valid and can measure constructs well. To check whether a data set is distributed normally, two statistical numerical measures of shape – skewness and excess kurtosis – are used. Data is assumed to be expected if the skewness value is between -2 to +2 and kurtosis is between -7 to +7 (Hair et al., 2010).

Table 2: Constructs' Validity, Reliability, and Normality

Variables	Cronbach's Alpha	Inter-Item Correlation Mean	Skewness	Kurtosis
Professional SE	0.838	0.564	-0.250	0.850
Technology Use	0.864	0.527	-0.397	-0.239
Data Use	0.898	0.530	-0.279	0.202

3.3. Analysis

The descriptive analysis, reliability, validity, and normality tests were conducted in this study using SPSS 26.0. SEM consists of 3 levels of analysis: confirmatory factor analysis (CFA), measurement model analysis, and structural model analysis. SEM was run and measured using AMOS 26.0. P < 0.05 was considered to be statistically significant. According to (Hair et al., 2010), the SEM analysis model was considered to have a reasonable goodness fit if relative chi-square (χ^2) <= 5.0, root mean square error of approximation (RMSEA) < 0.08, and one or two of fit indices (GFI/AGFI/IFI/CFI/NFI/TLI) > 0.90. Moreover, the MGA was tested to explore the moderating role of gender, age, and school location in the relationship between technology use, data use, and professional self-efficacy. The analysis involves splitting the data into groups based on the moderator.

4. Findings

4.1. Descriptive Analysis

Table 3 shows the result of descriptive analysis for the analytics used in mean in descending order. Based on the result, teachers' most frequent agreement of a sense of professional self-efficacy in school is being able to work effectively (Item 1). The second most frequent agreement of professional self-efficacy is feeling confident about the work (Item 4). The third frequent agreement of professional self-efficacy is feeling satisfied with the quality of work (Item 2). The least frequent agreement of professional self-efficacy is feeling successful in work (Item 3). Overall, the mean value ranges from 3.00 (Undecided) to 4.00 (Agree). As a result, Malaysian teachers have a moderate sense of self-efficacy in the teaching profession.

Table 3: Analytics Use Descriptive Analysis

Item	N	Minimum	Maximum	Mean	Standard Deviation
1	525	1.00	5.00	4.20	0.62
4	525	2.00	5.00	4.09	0.64
2	525	2.00	5.00	3.98	0.61
3	525	1.00	5.00	3.89	0.64
			Total	4.04	0.63

Table 4 shows the result of descriptive analysis for the analytics used in descending order. Based on the result, teachers' most frequent use of technology in school is to access online resources and information (Item 3), followed by solving problems (Item 4). The least frequent use of technology is for communication and collaboration (Item 3) and teaching and learning (Item 1). Overall, the mean score varies from 3.00 (Sometimes) to 4.00 (Frequent), indicating that teachers' frequency of technology use in school is moderate.

Table 4: Technology Use Descriptive Analysis

Item	N	Minimum	Maximum	Mean	Standard Deviation
3	525	2.00	5.00	4.30	0.75
4	525	1.00	5.00	4.13	0.78
6	525	1.00	5.00	3.90	0.84
5	525	1.00	5.00	3.79	0.83
2	525	1.00	5.00	3.66	0.99
1	525	1.00	5.00	3.39	0.90
			Total	3.86	0.85

Table 5 shows the result of descriptive analysis for the data used in descending order. Based on the result, the most frequent data used by teachers in school is to identify instructional content to be taught in the class (Item 4), to set learning goals for individual students (Item 5), and to tailor instruction for individual student needs (Item 3). The least frequent data use is to assign students to groups (Item 6), to discuss with the school principal (Item 8), and to discuss with parents or students (Item 7). Overall, the mean value varies from 3.00 (Occasionally) to 4.00 (Frequently), indicating a moderate frequency of data use by teachers in the classroom.

Table 5: Data Use Descriptive Analysis

Item	N	Minimum	Maximum	Mean	Standard Deviation
4	525	2.00	5.00	4.06	0.73
5	525	2.00	5.00	3.91	0.74
3	525	2.00	5.00	3.89	0.74
1	525	1.00	5.00	3.87	0.75
2	525	1.00	5.00	3.84	0.77
6	525	1.00	5.00	3.82	0.75
8	525	1.00	5.00	3.70	0.82
7	525	1.00	5.00	3.30	0.87
			Total	3.80	0.77

4.2. Confirmatory Factor Analysis (CFA)

The results of the CFA analyses in Figures 2, 3, 4, and Table 6 show how well the model fits each variable. Based on the data collected, the fit values of the model were

found to be acceptable without modification, except for Technology Use, where items 3, 4, and 6 were discarded, and Data Use, where item 7 was removed from the model. All factor loadings for other items' was observed at >= 0.5. To ensure the goodness of fit, all standardized factor loadings must be i) more than 0.5, ii) positive, and iii) not more than 1.0. (Byrne, 2010). Notably, convergent validity refers to a set of indicators that are presumed to measure a construct (Kline, 2016), and the Average Variance Extracted (AVE) values > 0.5 indicate high convergent validity. Meanwhile, construct reliability (CR) is comparable to Cronbach alpha, and an instrument with CR > 0.70 is considered reliable (Hair et al., 2010)

Chi-Square=4.030; p value (>.05)=.045
DF=1
Relative Chi-Sq (<5.0)=4.030
GFI (>=.9) =.995
AGFI (>=.9) =.970
CFI (>=.9) =.995
IFI (>=.9) =.995
NFI (>=.9) =.994
TLI (>=.9) =.986
RMSEA (<= .08) =.076
AIC (lower better)=14.030
(Standardized estimates)
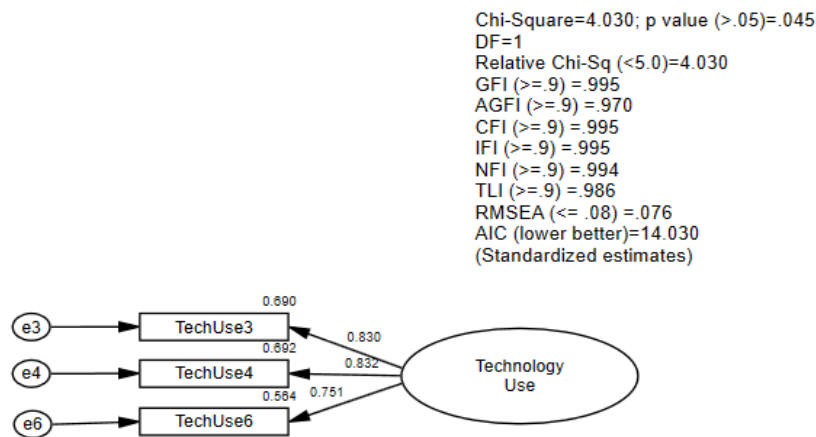
Figure 2: Confirmatory Factor Analysis for Technology Use

Chi-Square=50.626; p value (>.05)=.000
DF=13
Relative Chi-Sq (<5.0)=3.894
GFI (>=.9) =.974
AGFI (>=.9) =.944
CFI (>=.9) =.980
IFI (>=.9) =.980
NFI (>=.9) =.974
TLI (>=.9) =.968
RMSEA (<= .08) =.074
AIC (lower better)=80.626
(Standardized estimates)
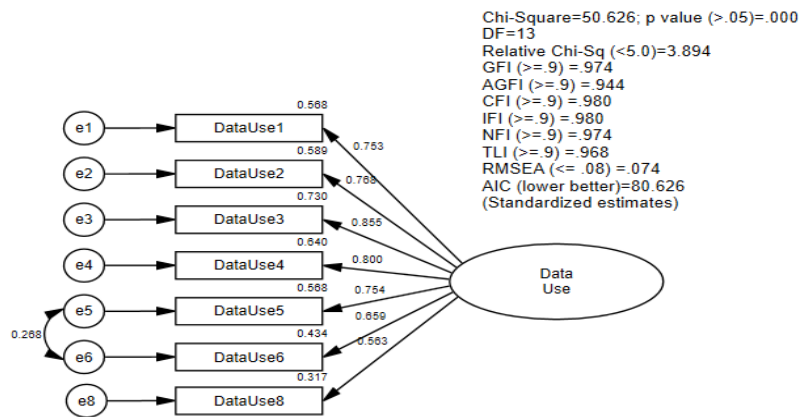
Figure 3: Confirmatory Factor Analysis for Data Use

Chi-Square=1.245; p value (>.05)=.537
DF=2
Relative Chi-Sq (<5.0)=.622
GFI (>=.9) =.999
AGFI (>=.9) =.994
CFI (>=.9) =1.000
IFI (>=.9) =1.001
NFI (>=.9) =.998
TLI (>=.9) =1.003
RMSEA (<= .08) =.000
AIC (lower better)=17.245
(Standardized estimates)

Figure 4: Confirmatory Factor Analysis for Professional Self-Efficacy

Table 6: Fit Indices, AVE, and CR

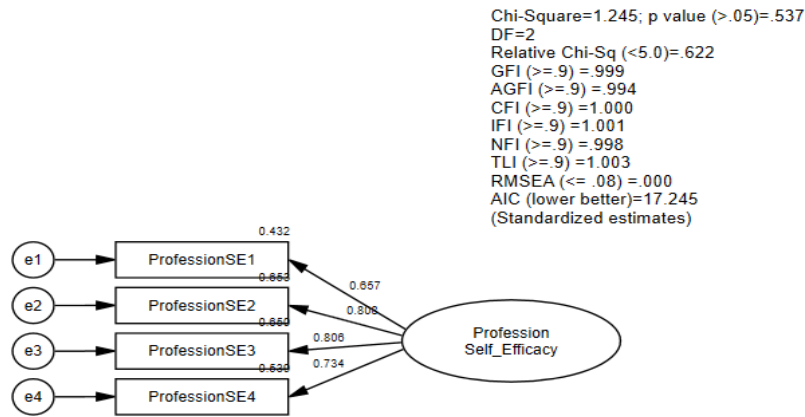| Variables	Relative χ^2	RMSEA	GFI/AGFI/IFI/CFI/NFI/TLI	AVE	CR
Professional SE	0.662	0.000	All > 0.9	0.568	0.839
Technology Use	4.030	0.076	All > 0.9	0.652	0.848
Data Use	3.894	0.074	All > 0.9	0.550	0.894

4.3 Measurement Model

All individual variables should be correlated to each other to build a measurement model. Based on the result of the analysis, it was observed that all items have a loading factor of>0.5. Relative chi-square (χ^2) = 3.546, root mean square error of approximation (RMSEA) < 0.070, and one or more (GFI/AGFI/CFI/NFI/TLI) > 0.90. The goodness of fit of the model was deemed acceptable without modification. Subsequently, a discriminant validity test was performed to confirm how much a variable discriminates from other constructs. Discriminant validity involves an association between a specific latent construct and other constructs of a similar nature (Brown, 2006), where all constructs are assumed to be genuinely distinct from others. In this regard, the AVEs for the two interrelated variables must be greater than their r^2 (Byrne, 2010). Based on Figure 5 and Table 7, it can be concluded that all constructs exhibit sufficient discriminant validity.
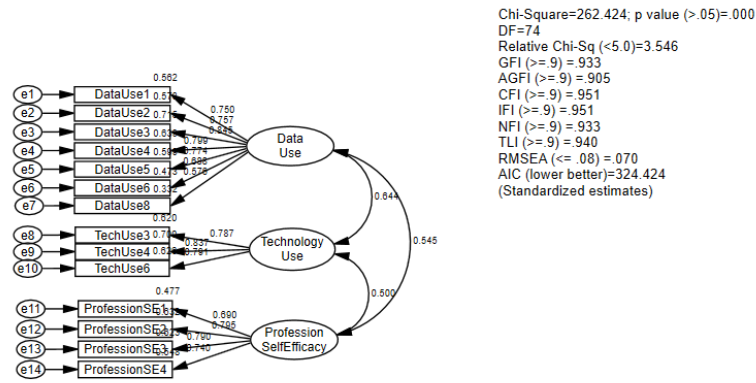
Chi-Square=262.424; p value (>.05)=.000
DF=74
Relative Chi-Sq (<5.0)=3.546
GFI (>=.9) =.933
AGFI (>=.9) =.905
CFI (>=.9) =.951
IFI (>=.9) =.951
NFI (>=.9) =.933
TLI (>=.9) =.940
RMSEA (<= .08) =.070
AIC (lower better)=324.424
(Standardized estimates)

Figure 5: Measurement Model

Table 7: Discriminant Validity

Variables	CR	Professional SE	Technology Use	Data Use
Professional SE	0.841	0.570*		
Technology Use	0.897	0.297**	0.556*	
Data Use	0.847	0.250**	0.415**	0.649*

* AVE, ** correlation squared (r^2)

4.4. Structural Model

The measurement model has identified exogenous and endogenous variables based on the study's conceptual framework to build the structural model (Figure 6). A structural model represents a set of one or more dependence relationships linking the hypothesized model's variables. The model is significantly helpful in representing the interconnections between exogenous and endogenous constructs. It was observed that all items factor loading > 0.5. Relative chi-square (χ^2) = 3.546, root mean square error of approximation (RMSEA) < 0.070, and one or more (GFI/AGFI/CFI/NFI/TLI) > 0.90. The goodness of fit of the structural model was found acceptable without modification.
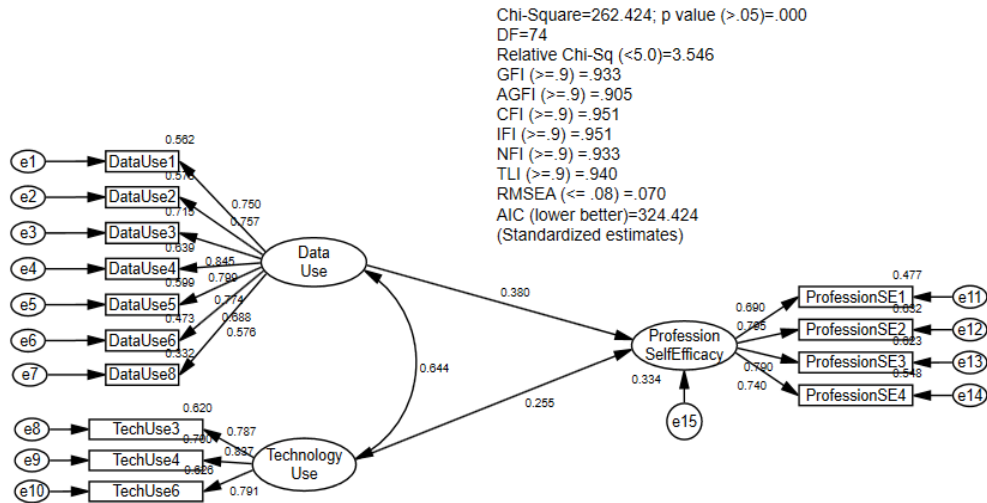
Figure 6: Structural Model

The structural model analysis is employed to fulfill the secondary objective of this study, namely, to investigate the impact of teachers' utilization of technology and data on their professional self-efficacy. The causal path shown in Table 8 shows that technology use positively affects professional self-efficacy (β=0.255; $p < 0.05$) and data use positively affects professional self-efficacy (β=0.380; $p < 0.05$). There are moderate positive correlations between professional self-efficacy, data use, and technology. Therefore, according to the results of the structural model analysis, both technology use and data utilization have exhibited a positive influence on the professional self-efficacy of teachers. It can be observed that data use and technology use explain 33.4% variance in professional self-efficacy.

Table 8: Causal Path for Professional SE and Analytics Use

Causal Path	b	Beta	CR	p
Technology Use – Professional SE	0.184	0.255	3.955	0.000
Data Use – Professional SE	0.287	0.380	5.832	0.000

Professional Self-Efficacy (R= 0.578 $R^2 = 0.334$)

4.5. Multigroup Analysis for Moderating Effects

The MGA involves the following two stages: The overall model test for the moderation effect in the model is shown in Table 9. The individual path test moderation effect for the individual path is shown in Table 10. Hair criteria were used to determine the moderating effect. According to (Hair et al., 2010), the moderation effect for a two-group moderator can be established if:

- The beta for one group is significant, while the beta for the other group is non-significant or

- Both Betas for both groups are significant. However, the beta for one group is

positive, while the beta for the other group is negative.

Table 9: CMIN (χ^2) Model Fit Summaries

	Gender		Age		Location	
	CMIN	p	CMIN	p	CMIN	p
Unconstrained	339.765	.000	320.841	.000	358.091	.000
Measurement Residuals	396.495	.000	346.458	.000	377.530	.000
Model Fit Comparison	56.495	.003	25.617	.739	19.439	.947

Table 10: Individual Path of Gender Moderating Effect

Individual Paths	B	Beta	CR	p
Technology Use – Profession Self-Efficacy				
Male	.272	.359	3.526	.000
Female	.131	.187	.2.272	.023
Data Use – Profession Self-Efficacy				.
Male	.270	.367	3.750	.000
Female	.320	.410	4.775	.000

Based on the moderator effect test in Table 9, it was found that gender has a moderator effect on the relationship between technology use, data use, and professional self-efficacy. Meanwhile, the moderation effects of teachers' age and school location in the relationship between technology use, data use, and professional self-efficacy are insignificant. However, based on individual path analysis for male and female teachers, as shown in Table 10 gender have no significant effects on both technology and data use. Therefore, the study inferred that gender, age, and school location did not moderate the relationship between technology use, data use, and professional self-efficacy of teachers.

5. Discussions

It is intriguing to examine professional self-efficacy among teachers employing data and technology in the classroom. Teachers report and believe that the workload associated with the use of data and technology makes them feel burdened, burnout, and stress (Parkaran, 2022; Bestari, 2022; Fernández-Batanero et al., 2021). Burnout and stress are said to have contributed to the early retirement decision, directly impacting the school teacher shortage.

As the use of technology and data in education is crucial to developing 21st-century education and delivering IR4.0 standards, teachers must not only accept and adapt technology or data use in their practices. They also must possess a reasonable sense of self-efficacy to ensure the effectiveness and sustainability of current educational needs and responsibilities.

It can be concluded from the analysis that most teachers have a moderate sense of professional self-efficacy. In this regard, teachers with moderate self-efficacy may be less likely to participate in professional activities as they may feel less confident in their ability to teach efficiently and effectively (Alibakhshi et al., 2020). Even while teachers believed they could teach well in the classroom, they felt less secure at work and were less pleased with the quality of their teaching. They also did not feel successful in their profession.

Nevertheless, it can be deduced that teachers' use of technology and data in the classroom is minimal. Such low level of use is influenced by many factors including time limitations, insufficient training, distrust of data, and a lack of proficiency in data literacy (Herodotou et al., 2019). Teachers may not have attained proficiency in utilizing technology and may lack a thorough understanding and expertise in its applications (Fasiah et al., 2023). It is found that teachers primarily use technology and data to access online resources and information and determine the most effective instructional content for classroom instruction. However, teachers utilize technology and data for discussion and cooperation with other stakeholders, such as management, parents, and students, regarding the results of teaching and learning analysis very infrequently.

Thus, examining the relationships between professional self-efficacy, technology use, and data use provides nuanced details, which is significantly helpful in proposing practical solutions to the issue of early retirement and teacher shortage in school. The findings manifest that technology use and data use have moderate positive relationships with the professional self-efficacy of teachers. Moreover, these relationships are not moderated by gender (male and female), age (younger and older), and school location (urban and rural). The findings are in line with Burić & Kim (2020) and Wong et al (2012). Positive relationships between the variables seem reliable and valid across different personal and contextual conditions. Therefore, education stakeholders and policymakers should pay great attention to teachers' technology use and data use to improve their sense of self-efficacy toward the teaching profession.

6. Conclusions

In conclusion, this study demonstrates a significant correlation between the use of technology and data and the level of professional self-efficacy among teachers. This suggests that teachers who effectively employ technology and data are more likely to possess a heightened feeling of professional self-efficacy. Most importantly, this association is unaffected by variables such as gender, age, or school location, underscoring the universal importance of technology and data use in developing teachers' confidence in their profession.

This study's findings have substantial implications for educational institutions. The

study highlights the significance of teachers' use of technology and their proficiency in interpreting data as factors that impact their confidence in their professional abilities and their choice to retire. Furthermore, the study emphasizes the importance of education stakeholders and policymakers giving significant consideration to teachers' utilization of technology and their proficiency in interpreting data. This is crucial for enhancing their confidence and effectiveness in the field of teaching. Institutions can contribute to reducing early retirement decisions and addressing teacher shortages by taking this action.

Enhancing the utilization of data and technology in education can greatly bolster teachers' self-efficacy. In order to accomplish this, educational institutions should emphasize equipping teachers with essential tools, training, and assistance to improve their proficiency in utilizing technology and understanding data. This objective can be achieved by means of professional development initiatives that specifically target the integration of technology into teaching methodologies and the improvement of data literacy competencies. Furthermore, it is imperative to engage in partnership with stakeholders, researchers, and policymakers to guarantee that teachers are provided with suitable working environments and conditions that facilitate their retention in the profession.

Investigations into the roles and responsibilities of teachers in integrating technology and data use in the teaching and learning process are well-established. Consequently, it is unsurprising that the outcomes of this research align closely with those of prior studies. Educational institutions, leaders, and stakeholders, particularly teachers, should recognize the significance of technology and data use in education. Notably, teachers and other stakeholders must acknowledge and understand the roles they play in this context. Substantial investments and initiatives aimed at integrating technology and data into education will be futile if these roles are overlooked or underestimated.

7. Implications to Higher Education Institutions

The current study reported an improvement in teachers' professional self-efficacy, which is linked with positive technology and data use, necessitating efforts to support and encourage teachers to integrate digital use into classroom activities. In this case, the Higher Education Institutions (HEI) must assume responsibility for preparing teachers in Malaysia with relevant skills and resources. Supporting teachers' life-long learning is a critical mission of HEI. To enhance teachers' self-efficacy regarding technology and data in education, HEI should prioritize the implementation of comprehensive training programs tailored to teachers' varying proficiency levels. These programs should offer practical workshops, online courses, and seminars led by experienced educators and technology experts, providing teachers with the necessary skills and strategies for effective technology integration

and data utilization.

Additionally, HEI mentorship programs and peer support networks can offer invaluable guidance, encouragement, and collaborative opportunities, fostering a sense of community and empowerment among teachers as they navigate the complexities of technology integration and data-driven teaching practices. Instituting incentives and recognition programs for innovative practices can further motivate teachers to invest in enhancing their technological skills and leveraging data effectively, ultimately contributing to a culture of continuous improvement and innovation in education. Given the interpersonal nature of the teaching profession, it is reasonable that the HEIs implement and maintain a system that could provide effective feedback and recognition to teachers. Constructive feedback, both from administrators and peers, can help teachers identify areas for growth and improvement while also affirming their strengths and accomplishments. Recognizing teachers' efforts and achievements through awards, public acknowledgment, or professional development opportunities can reinforce their sense of competence and efficacy in their profession.

Moreover, reflective practices should be promoted among teachers during their teacher training by encouraging regular self-reflection and self-assessment. Suggested measures include journaling about their teaching experiences, setting goals for professional growth, and engaging in critical self-evaluation. It is also imperative to facilitate opportunities for teachers to engage in peer observations and feedback sessions, where they can reflect on their teaching practices and receive constructive input from colleagues. Reflective practices can help teachers develop a deeper understanding of their strengths and areas for improvement, ultimately enhancing their self-efficacy in their profession. These initiatives will be useful to instill lifelong learning in teachers by maximizing the resources available and the HEI's capacity for graduating and deploying teachers into the workforce.

8. Limitations and Suggestions for Future Studies

Some limitations of the study should be noted. Firstly, the discussion regarding the use of technology and data by teachers in Malaysian public schools specifically addresses the systems and applications that have been officially provided by the Malaysian Ministry of Education (MOE). Any other forms of technology or data that teachers might use beyond those officially provided by the Ministry of Education are not within the focus of this study. Therefore, the study's scope is limited to the technology and data frameworks endorsed and supported by the MOE, with any other variations lying outside its investigative scope.

Secondly, the professional self-efficacy of school teachers and university educators differs due to variations in their roles and contexts. School teachers primarily focus on teaching specific subjects, managing classrooms, and fostering student

engagement and success in school settings. Their self-efficacy often revolves around their confidence in these areas. Conversely, university educators are typically engaged in teaching undergraduate or graduate courses, conducting research, and contributing to academic leadership roles. Their self-efficacy encompasses designing rigorous academic programs, engaging students in critical thinking, mentoring graduate students, conducting research, and contributing to the scholarly community. Despite both groups' commitment to promoting student learning, their professional self-efficacy is shaped by distinct factors related to their roles, experiences, and environments. Future studies investigating university educators' professional self-efficacy regarding technology and data use are warranted towards improving the learning process at both school and higher education settings.

Based on the results of the present investigation, several suggestions for future research have been put forth to address identified gaps and overcome the limitations of the study's findings. A common characteristic of the failure to implement educational innovations in real-world settings and ensure their continued adoption is the lack of understanding of teachers' barriers and the limitations they encounter (Scanlon et al., 2013). While teachers generally recognize the potential benefits of educational technologies, they frequently experience difficulties and feel overwhelmed when it comes to adopting and implementing new educational technologies. Therefore, it is suggested that future studies investigate both facilitators and barriers concerning teachers' perspectives on technology and data use to promote successful implementation at the micro-level.

Moreover, teachers' knowledge and competency level in using the technology and data for learning improvement is still unknown. To what extent and how teachers use technology and data in schools needs to be studied more deeply. As concluded by Bolhuis et al. (2019), teachers mainly use technology and data only for accountability and less for school development or to improve instruction. Therefore, it is recommended that the purpose of teachers' use of technology and data be investigated in more detail. Additionally, it is recommended that further investigation be undertaken into teachers' roles in utilizing technology and data for education purposes to tackle their sense of self-efficacy in the field.

Acknowledgments

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INFLUENCE OF E-COUNSELING SKILLS, ETHICS, AND LIMITATIONS ON COUNSELING SELF-EFFICACY AMONG E-COUNSELORS IN MALAYSIA

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ABSTRACT

The growing use of e-counseling in various institutions in Malaysia has called for more e-counselors with high self-efficacy to carry out e-counseling responsibilities. However, current studies in Malaysia lack empirical data on counseling self-efficacy among this population. Hence, this study identified the influence of e-counseling skills, ethics, and limitations on counseling self-efficacy among e-counselors in Malaysia. A correlational study design was employed, where 233 e-counselors in Malaysia were selected using a simple random sampling procedure. Through emails, the respondents were given an access link to an online questionnaire. The inferential analysis using Pearson correlation reported a positive correlation between e-counseling skills and counseling self-efficacy, as well as between e-counseling ethics and counseling self-efficacy. e-Counseling limitations reported a negative correlation with counseling self-efficacy. A multiple regression analysis was also conducted, and e-counseling skills was found to be the best predictor of counseling self-efficacy, followed by e-counseling limitations. The findings from this study are pertinent to support research that investigates e-counseling in the Malaysian context. It also provides suggestions for professional counseling associations, counseling program providers, and counseling educators to improve the higher education training and delivery of e-counseling services in Malaysia.

Keywords: challenges, counseling program provider, ethical conduct, online counseling, online therapeutic skills, efficacy expectations

1. Introduction

The integration of technology and the Internet has expanded the method of conducting counseling sessions from telephone and text-based methods to synchronous video calls, which has provided more opportunities for counselors to reach individuals from diverse cultural backgrounds. In fact, the advancement of e-counseling is necessary for the counseling field to remain relevant in current and future decades (Nagarajan & Yuvaraj, 2019; Johnson & Rehfuss, 2020). e-Counseling is convenient as it overcomes transportation difficulties or a fear of stigmatization (Elsharkasy et al., 2021; Wong et al., 2018) and is easily accessible and cost-effective (Nagarajan & Yuvaraj, 2019; Wong et al., 2018). The global crisis of Coronavirus Disease 2019 (COVID-19) further rendered online-based mental health delivery as a primary method for one to receive counseling help (Maurya et al., 2020). This development was imperative as a good mental health was found to be linked with higher social support, particularly during the COVID-19 period among university students, according to Hamzah and Athaha (2022). With increased reliance on technology for work and academic purposes, mental health providers must therefore address the need for an online platform for counseling support (Alias et al., 2022). Hence, more studies related to e-counseling practices will help the counseling community (e.g., counselors, counseling program providers, and professional counseling associations) understand what is necessary to provide quality counseling services to clients.

Competent counselors are quick to participate in counseling tasks that are new and challenging; this is an important quality that counselors need, especially as the counseling profession is known to be hazardous in nature (Yusof et al., 2017). Existing studies suggest that work performance, resiliency and commitment to counseling work are highly associated with the development of counseling self-efficacy (Yusof et al., 2017). Counselors with higher self-efficacy have higher adaptability to various counseling tasks, therefore, they have a positive outlook on their abilities to accomplish established goals. However, concerns around technical proficiency and confidentiality of a virtual space often deter counselors in Malaysia from conducting e-counseling competently (Foon et al., 2020). Thus, it is imperative for current research to emphasize on identifying counseling self-efficacy among e-counselors.

In order for counselors to perform counseling tasks effectively, it is crucial that they seek additional trainings that are specific to e-counseling skills (Holmes & Kozlowski, 2016). Findings from past studies suggest that counseling skills acquisition is associated with counseling self-efficacy (Crowe et al., 2022). In Malaysia, several studies have shown that high multicultural competency and emotional intelligence are correlated with increased levels of counseling self-efficacy (Noor et al., 2018; Yusof et al., 2017). Hence, the development of skills that

are culturally appropriate with the current transition in counseling delivery will be advantageous for e-counselors to adopt e-counseling services and provide quality care to those who require professional help (Johnson & Rehfuss, 2020). Therefore, the identification of counseling skills that are applicable among e-counselors is important so that adequate information can be obtained on skills that can be incorporated into counseling curriculum and training in Malaysia.

Counseling involves a professional helping relationship that takes place in a private and secure setting; thus, ethics are important counseling components that counselors need to resolve social issues within a community (Saidi & Hassan, 2018). Nevertheless, researchers from previous studies have indicated a lack of ethical clarity in the use of technology in counseling delivery (Cipolletta & Mocellin, 2018). In fact, several ethical dilemmas have been identified in Malaysian studies, such as maintaining confidentiality and privacy (Foon et al., 2020). Counseling ethical codes are an important source of information for counselors to solve ethical issues that may arise in counseling sessions (Saidi & Hassan, 2018). In Malaysia, the Counselor Code of Ethics that was formed by Malaysia's Board of Counselors (2016) provides ethical guidelines for counselors who choose to adopt e-counseling services. However, these guidelines are far behind those developed by other professional counseling associations outside of Malaysia (e.g., the American Counseling Association) and are inadequate in meeting the current counseling trend in Malaysia. This lack of e-counseling-specific ethical guidelines may have contributed to the dearth of studies in Malaysia on ethical responsibilities and behaviors among e-counselors, which makes the current study critical to address the presence of ethical behaviors among this group.

In addition to ethical concerns, counselors have described major drawbacks in the use of technology in counseling services, including the loss of verbal cues, cybersecurity ambiguity, and the lack of technical skills and training specific to virtual modalities (Foon et al., 2020; Maurya et al., 2020; Nagarajan & Yuvaraj, 2019). Counselors who use e-counseling as a primary medium of counseling services risk being discouraged from doing so if they fail to acknowledge the impact that these limitations have on the efficiency of the counseling services (Nagarajan & Yuvaraj, 2019). Counselors must therefore understand what they find problematic when conducting e-counseling sessions, which will be helpful to determine what is needed to improve their ability to provide quality services. Counselors who lack the incentive to update their knowledge or who are not well-trained in the services that they are expected to offer may not be efficient at their work once they are assigned to their respective institutions. Schools in particular struggle with the lack of quality professional counselors who are experts in specific counseling fields, such as career counseling and mental health counseling (Tran et al., 2020). If issues concerning counselors' professionalism persist, it may be difficult for counselors to expand and

maintain the use of e-counseling in their professional setting, especially if they have not received the necessary training.

Linking all findings from past studies, the higher application of e-counseling skills and ethical behaviors is assumed to be associated with more positive beliefs or confidence to do well and strive in e-counseling work. Counselors who perceive many limitations in e-counseling may demonstrate higher anxiety, which may hinder them from overcoming difficult situations in the e-counseling setting. With the focus on the Malaysian cultural setting, this study addresses the link between the aforementioned variables to contribute to existing e-counseling research in Malaysia by identifying how e-counseling skills, ethical behaviors, and potential challenges of e-counseling influence e-counselors' self-efficacy.

1.1. e-Counseling Skills and Counseling Self-Efficacy

In order to deal with clients who have emotional or psychological concerns, it is especially important and useful for counselors to be able to master basic counseling skills. However, as Holmes and Kozlowski (2016) noted, face-to-face counseling skills cannot be automatically transferable and applicable in the virtual space, especially if e-counselors lack online-specific training. Their quantitative study using an exploratory design on online counseling group leaders reported 11 counseling skills that were marked as easy to use 46% of the time upon completion of group counseling sessions. These skills include asking open-ended and closed-ended questions, summarizing, and managing silence. Four and six skills were marked as difficult to use and not used respectively. Both sets of skills include more advanced group-specific counseling skills, such as facilitating communication and helping clients process emotions which are considered difficult, while skills in communicating nonverbal gestures and making eye contact were not used.

Hawke (2017) described the micro-skills model of counseling that was utilized by online counselors in the Kids Helpline Service. The model consisted of three main stages, with each stage covering several components of basic counseling skills, including asking open and closed questions, building rapport, and paraphrasing (stage one); identifying and devising clients' core issues (stage two); and working with clients to strategize a plan of action (stage three). On top of applying these basic counseling skills, it is especially important for counselors to acquire technical skills, such as knowing what applications or tools to use when communicating online (e.g., utilizing various language styles, phrase repetition, and emoticons). This is imperative to ensure that e-counselors can maintain participation in e-counseling services to develop higher confidence to strive in this setting.

Consequently, when linking counseling self-efficacy and e-counseling skills, Adeyemo and Agokei (2019) found that counseling self-efficacy is significantly correlated with skills in emotional intelligence among postgraduate counseling

students. Individuals with higher self-efficacy have the ability to be more emotionally aware and can better cope with overwhelming feelings. Furthermore, Kozan's (2020) qualitative study among school counselors in Turkey reported that with respect to counseling self-efficacy in counseling skills, increased supervisory feedback during undergraduate counseling training is perceived to be the best source and predictor of enhancement in counseling self-efficacy. Through semi-structured interviews, the participants noted that counseling skills development is linked to improved self-efficacy. This coincides with Akçabozan-Kayabol et al.'s (2021) study that found a significant increase in counseling students' self-efficacy after taking Virtual Modelling (VM) counseling skills and technique courses. The students noted that the course provided an opportunity for them to strengthen their knowledge and observe techniques previously learned outside the course, which helped to deepen their understanding of counseling processes and gave them a boost in their self-efficacy.

The link between e-counseling skills and self-efficacy suggested that the period during counselors' formal training as trainees at higher education studies is vital. Counseling skills acquired during this period will be important for supporting their counseling endeavors and improving their ability to adapt to various counseling modalities. As the previous study made apparent, it is assumed that the use of e-counselling skills—which integrate digital skills with basic counseling skills, such as developing rapport, demonstrating empathy, active listening, and problem-solving—is associated with improved self-efficacy or overall perceptions of the counselors' capacity to provide e-counseling. Hence, the following research hypothesis is developed, which was tested in this study:

H_1: There is a significant relationship between e-counseling skills and counseling self-efficacy among e-counselors in Malaysia.

1.2. e-Counseling Ethics and Counseling Self-Efficacy

Ethics is an important aspect of professional counseling services in any setting, whether face-to-face or online. Despite the gap between the ethical issues raised in e-counseling and those raised in face-to-face counseling, ethical and legal counseling policies are not sufficiently clear with regards to legal counseling practice (Cipolletta & Mocellin, 2018). To address online counseling, the Board of Counselors (Malaysia) (2016) included a sub-section in the Counselor Code of Ethics that explains the ethical responsibilities and guidelines in technology-assisted counseling services. In contrast, the American Counseling Association (ACA) (2014) highlights the use of distance counseling, technology and social media in e-counseling services in a separate section, Section H, in its Counselor Code of Ethics. The nature of e-counseling can be challenging for counselors, as they require additional skills and knowledge about digital use and internet features. However, published studies in

Malaysia lack empirical data on ethical behaviors and knowledge among e-counselors.

The counseling law in Malaysia provides a background on how the counselor code of ethics was established. Saidi and Hassan (2018), in their qualitative study using the semi-structured interview technique with a registered counselor in Malaysia regarding the ethical and legal issues in Malaysia, highlighted issues on (1) the implementation of counseling law and ethics that is far behind other western countries and (2) discrepancies between the number of counselors who are registered with the Board of Counselors (Malaysia) and those who have successfully graduated from counseling training. Further findings revealed ethical dilemmas that frequently plague counselors, such as the lack of a site supervisor to consult with when faced with a difficult decision-making process; a hazy professional boundary between counselor and client; difficulty accepting or rejecting referral cases; and maintaining client confidentiality from third parties. Finally, the study found that among the factors that cause ethical dilemmas are the lack of clear understanding of ethical and legal counseling issues and lack of resources such as counseling colleagues and other counseling experts when faced with issues in managing clients. Counseling services require counselors to provide psychological support and guidance to distressed clients. Thus, this lack of awareness and understanding of the ethical protocols and responsibilities of counselors is detrimental to clients, as it will affect counselors' performance and confidence to maintain a good and competent image as a professional.

When linking ethical conduct in e-counseling to counseling self-efficacy, Haktanir (2020) described self-efficacy as an ethical necessity for counseling practices. Self-efficacy was found to improve when counselors had more positive beliefs about their ability to conduct counseling based on ethical conduct. Subarimaniam et al. (2021) identified the factors that predict counseling self-efficacy among Malaysian counselors when addressing ethical perplexities among 148 counseling trainees. The findings reported multicultural competence as the best predictor of counseling self-efficacy. As Subarimaniam et al. (2021) added, the ability of counselors to utilize knowledge, awareness and skills in a multicultural component directly influences their ability to digest ethical and legal perplexities in counseling effectively. Consequently, the Counselor Code of Ethics has highlighted the need for e-counselors to have high multicultural awareness, especially in evaluating the appropriateness of online intervention according to their clients' social and cultural backgrounds. Thus, although there is scarcity in past literatures that linked ethical adherence and counseling self-efficacy, it is implied that higher knowledge and demonstration of ethical behaviors is linked to a higher driving force to do well in counseling tasks, including those related to e-counseling. In other words, counselors' self-efficacy is associated with their ability to provide counseling services as licensed

and righteous counselors, obtain clients' informed consent, and maintain security and confidentiality of the counseling sessions. This study tested this assumption using the following research hypothesis:

H₂: There is a significant relationship between e-counseling ethics and counseling self-efficacy among e-counselors in Malaysia.

1.3. e-Counseling Limitations and Counseling Self-Efficacy

Earlier studies have noted several challenges and disadvantages in e-counseling that have been identified by counselors, such as unfamiliarity with using online tools (Foon et al., 2020) or the loss of non-verbal cues and physical contact as major obstacles to online counseling (Amos et al., 2020; Cipolletta & Mocellin, 2018). Schlenger et al. (2022) highlighted online counselors' fear of miscommunication and lack of a clear and accurate counseling process when digitalizing counseling services. e-Counseling limitations in this study thus refers to features and issues in e-counseling services that e-counselors perceive as challenging when providing counseling help to clients.

A study by Nagarajan and Yuvaraj (2019) on 11 mental health professionals found that the absence of human contact contributed to a negative attitude towards technology integration in counseling (18.2%). Most respondents (72.7%) reported the loss of nonverbal cues in text-based (email or chat) and telephone counseling as the main disadvantage of online counseling. In addition, several counselors perceived that clients can easily become dependent on counselors, and that the credibility of both clients and counselors can be questioned as they are not in the same physical setting. The analysis also reported that the respondents perceived confidentiality, privacy, and the counselor's competence as major drawbacks in online counseling. The lack of current training specific to technical skills in the virtual space also means that these counselors' concerns go unaddressed, which was also expressed by the participating counselors in this study.

Foon et al.'s (2020) descriptive study identified the deterrent factors to school counselors' intention to offer e-counseling. The study recruited 66 Malaysian school counselors and descriptive analysis showed that most respondents (90%) reported fear of miscommunication due to unfamiliarity with online language skills as the top key deterrent factor to using e-counseling. This was followed by the lack of technical resources and lack of specific training in e-counseling and professional development (89.4%).

When associating e-counseling limitations with counseling self-efficacy, a Malaysian study by Ooi et al. (2021) found that better access to training contributed to higher counseling self-efficacy as counselors can increase their knowledge through adequate e-counseling training, which will prepare and allow them to adjust to different aspects of e-counseling. Kozan's (2020) qualitative study also presented

qualitative findings that explored the influence of challenges that counselors experienced on self-efficacy levels. The study adopted a phenomenological research design to investigate the sources of self-efficacy beliefs and enhancement strategies among 19 school counselors and reported that the lack of undergraduate education and insufficient training were prominent sources of counseling self-efficacy in counseling skills. This suggests that increased counseling knowledge and experience gained through formal training is a source of counseling self-efficacy. Other e-counselling limitations such as the possible communication barrier, security and privacy of conducting counseling virtually, the tools and basic skills needed when setting up the online sessions, and the anonymity of e-counseling may be associated with e-counselors' self-efficacy when providing these services. Thus, to test this, the following hypotheses were developed:

H_3: There is a significant relationship between e-counseling limitations and counseling self-efficacy among e-counselors in Malaysia

H_4: e-Counselling skills, ethics and limitations significantly influence counseling self-efficacy among e-counselors in Malaysia

1.4. Self-Efficacy Theory

Self-efficacy refers to individuals' expectations of certain skills and capabilities to take a desired course of action while overcoming present obstacles (Bandura, 1977). Individuals with high efficacy expectations or positive judgments on their capability to handle intimidating or risky situations are more likely to participate and endure in the associated activities. A strong sense of efficacy enhances personal accomplishment and well-being in multiple aspects (Bandura, 1994). Highly efficacious individuals can become engrossed and committed to the selected activities and do not become easy prey to setbacks; thus, they are insusceptible to extreme stress and depression (Bandura, 1994). How people think, feel, behave, and motivate themselves are determined by their self-efficacy beliefs (Bandura, 1994). The Self-Efficacy Theory (SET) by Bandura (1977) assumes that one's efficacy mediates the relationship between what one knows regarding what action to take and what they do in a real setting (Larson et al., 1992). However, while perceived personal efficacy is not the sole determinant of a desired behavior or performance, the adequate possession of skills and incentives will make self-efficacy a major determining factor in one's choice of activities and the coping mechanism that follows (Bandura, 1977).

According to Bandura (1977, 1994) and Larson et al. (1992), self-efficacy is developed and influenced by four sources of information. Given that it is based on one's own experiences of outcome successes and failures, "performance accomplishment" demonstrates the highest influence on one's self-efficacy (Bandura, 1977, 1994). Repeated successes also lead to positive expectations, as

once individuals develop a strong sense of efficacy, they become resilient to setbacks (Bandura, 1994) and are unlikely to be impacted by occasional failures. Additionally, Bandura (1977) indicated that once self-efficacy is established, individuals tend to generalize this belief to other tasks or situations; hence, improvement in behavioral patterns for certain tasks is likely to be transferred to other situations. However, this generalization is more likely to occur for activities or tasks like those associated with established self-efficacy (Bandura et al., 1969, as cited in Bandura, 1977).

Larson and Daniels (1998) maintained that when Bandura's (1977) definition of self-efficacy is applied to the counseling context, counselors' self-efficacy is defined as the confidence to conduct any counseling-related activities such as individual and group sessions and programs. More specifically, counseling self-efficacy represents counselors' beliefs or expectations of their capabilities to conduct counseling activities with clients (Larson & Daniels, 1998). Many existing studies have shown the applicability of self-efficacy in the counseling setting. Haktanir's (2020) quantitative study on counseling students' self-efficacy noted self-efficacy as an important indicator to identify overall counseling performance. Studies on counseling self-efficacy have also reported its link to multicultural competence (Yusof et al., 2017) and counselor commitment (Adeyomo & Agokei, 2019). These studies, however, are limited to face-to-face counseling services.

Thus, this study utilized the SET to explain the relationships between counseling self-efficacy and its predicting factors (e-counseling skills, ethics, and limitations) among e-counselors in Malaysia. The research objectives were as follows:

(1) To identify the relationship between e-counseling skills, e-counseling ethics, e-counseling limitations, and counseling self-efficacy among e-counselors in Malaysia.

(2) To identify the variables which influence counseling self-efficacy among e-counselors in Malaysia.

2. Methodology

2.1. Research Framework

The SET (Bandura, 1977) supports the framework of this study by describing how counseling self-efficacy is influenced by e-counselors' perspectives on their ability to perform e-counseling skills and ethics and the challenges they encounter when conducting e-counseling services. Past studies have shown that the ability of counselors to apply counseling skills is linked to higher counseling self-efficacy. Higher ethical behaviors and more positive perceptions toward e-counseling services also suggest higher beliefs in e-counselors' ability to encounter difficult situations in their services. Hence, this study identifies how e-counselors' perspectives toward e-counseling components influence their beliefs or confidence in their ability to strive

for and persist against obstacles that may be present in e-counseling tasks. The research framework for the relationship between these variables is shown in Figure 1.
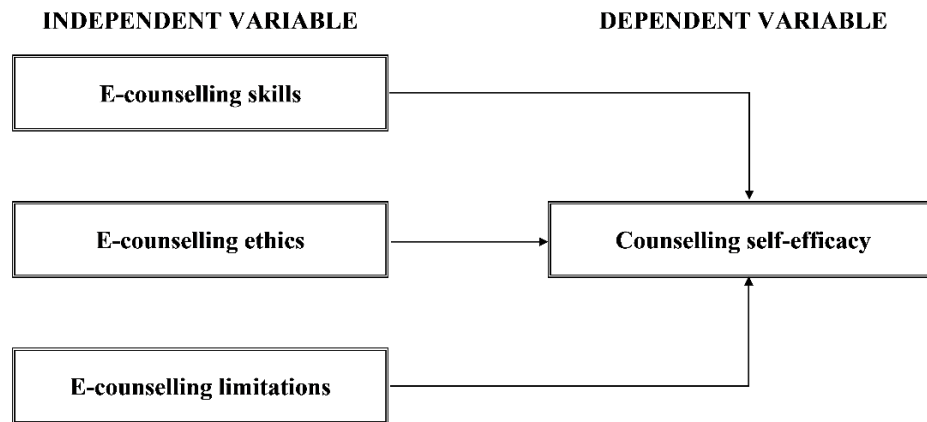
INDEPENDENT VARIABLE   DEPENDENT VARIABLE

```
┌─────────────────────────┐
│   E-counselling skills  │──────────────┐
└─────────────────────────┘              │
                                         ▼
┌─────────────────────────┐    ┌─────────────────────────┐
│   E-counselling ethics  │───▶│ Counselling self-efficacy│
└─────────────────────────┘    └─────────────────────────┘
                                         ▲
┌─────────────────────────┐              │
│ E-counselling limitations│─────────────┘
└─────────────────────────┘
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Figure 1: Research Framework Demonstrating the Link between the Variables

2.2. Research Design

This research employed a quantitative method and utilized the correlational study design to achieve this study's objectives. A quantitative study was selected as it was the most appropriate method to achieve the research objectives in this study. This study employed the correlational study design to identify the magnitude, strength, and direction of the relationship between the independent and dependent variable in this study.

2.3. Instrumentation

The researcher utilized a self-report questionnaire as the instrument of this study. This comprised five sections pertaining to the demographic information, e-counseling skills, ethics, limitations, and Larson et al.'s (1992) Counseling Self-Estimate Inventory (COSE).

2.3.1. e-Counseling skills, ethics, and limitations

The available instruments from past studies that measure e-counseling skills, ethics, and limitations have shown a lack of focus specifically for the Malaysian culture; hence, the questionnaire was developed after rigorous review of past literatures and instruments that measured the tested variables. The validation of these questionnaire was achieved by adapting Creswell's (2014) item development procedure. The process includes five main stages as shown in Figure 2.
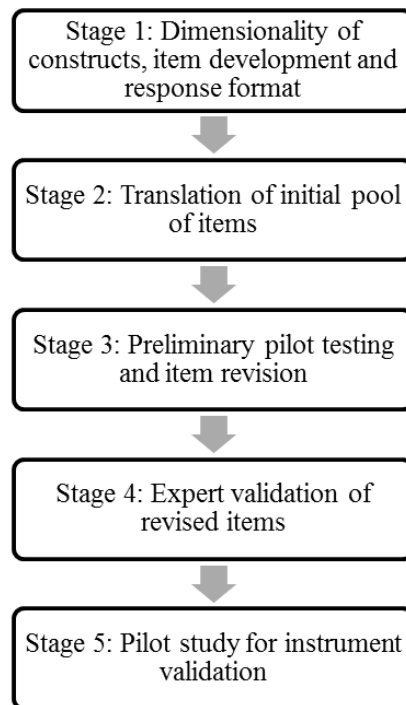
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┌─────────────────────────────┐
│   Stage 1: Dimensionality of │
│ constructs, item development and │
│       response format        │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│ Stage 2: Translation of initial pool │
│          of items           │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│ Stage 3: Preliminary pilot testing │
│        and item revision    │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│  Stage 4: Expert validation of │
│          revised items      │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│ Stage 5: Pilot study for instrument │
│           validation        │
└─────────────────────────────┘
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Figure 2: Item Development Process of e-Counseling Skills, e-Counseling Ethics and e-Counseling Limitations Questionnaire (Source: Creswell, 2014)

The initial development of the items began by extensively reviewing existing literature to identify relevant constructs items and appropriate response formats. The suitability of items for each construct was discussed between the research members. Next, the initial pool of items was subjected to a rigorous translation process from English to Malay, especially since most of the literature used were Western-based. Harkness's (2003) Translation, Review, Adjudication, Pre-testing, and Documentation (TRAPD) method, as described in the European Social Survey (ESS, 2018), was used as a guide for the translation process. This process utilized the committee-based approach, which involved all research members and an impartial party who is an expert in both languages and the counseling field. This was to make the adjudication process easier and to produce a more quality item translation. The third stage resumed with a preliminary pilot test on the initial pool of items to identify the feasibility of the questionnaire in the Malaysian context, with the goal to establish the content validity of the scores and improve the questions, formats and scales adopted. Items with Cronbach's coefficient alpha less than .60 were omitted to improve the reliability of items while items with factor loadings of less than .30 were omitted. The items were further revised with respect to their language and sentence structure according to respondents' suggestions and discussions among the research members.

The fourth stage involved expert validation to provide the final evaluation and validation of the questionnaire. Two experts in the field of counseling, item

evaluation, and Malay and English language were involved to confirm validation and appropriateness of the questionnaire. The item development process concluded with the pilot study, in which all three questionnaires reported high reliability with an alpha consistency that was larger than .60. Table 1 shows the literatures adapted for the item construction and the sub-constructs for e-counseling skills, ethics, and limitation.

Table 1: Sources of item construction of e-counseling skills, e-counseling ethics, and e-counseling limitations

Constructs and sub-constructs	Total items	Original sources
E-counselling skills (overall)	34	
Structuring Skill & Rapport Building	3	Torres Rivera (1995) Boylan & Scott (2008) Lambie, Mullen, & Swank, & Blount (2014)
Exploration Skill	5	
Communication Skill	13	
Goal Identification & Attainment	4	
Problem-solving	3	
Empathy	3	
Multicultural Skill	3	
E-counselling ethics (overall)	30	
Benefit and limitation	3	Board of Counsellors (Malaysia) (2016)
Technology-assisted services	5	
Law and statute	3	
Technology and informed consent	10	
World wide web	9	
E-counselling limitations (overall)	18	
Counsellor-client Presence	2	Banach & Bernat (2000) Kasket (2003) Dubois (2004) Campbell & Glasheen (2012)
Counsellor-client Perception	3	
Training Requirement	3	
Time Delay	3	
Client and Anonymity	2	
Confidentiality an Privacy	3	
Cost	2	

The items for e-counseling skills, ethics, and limitations comprised 34, 30 and 18 items respectively, and utilized a 5-point Likert scale that ranged from "strongly disagree" to "strongly agree". e-Counseling skills consisted of seven sub-constructs: (i) structuring skill and rapport building; (ii) exploration skill; (iii) communication skill; (iv) goal identification and attainment; (v) problem-solving; (vi) empathy, and (v) multicultural skill. An example item is, "express empathy to client." e-

Counseling ethics contained five sub-constructs: (i) benefit and limitation; (ii) technology-assisted services; (iii) law and statute; (iv) technology and informed consent; and (v) World Wide Web. An example item is, "establish a method for verifying client identity." Lastly, e-counseling limitations consisted of seven sub-constructs: (i) counselor-client presence; (ii) counselor-client perception; (iii) training requirement; (iv) time delay; (v) client and anonymity; (vi) confidentiality and privacy; and (vii) cost. An example item is, "lack of voice intonation may cause misinterpretation in written discussion."

2.3.2. Counseling Self-Estimate Inventory

The original author of COSE was contacted to obtain their permission to utilize the inventory in this study. Despite being a foreign inventory, all items were found to be relevant for the sample study. However, to improve the accuracy of the responses and ensure that the language used was both relevant and convenient for the Malaysian setting, both English and Malay languages were used. The inventory was translated from English to Malay after validation process by the researchers using the TRAPD method. The coefficient alpha value of COSE indicated high reliability at .92 during a pilot study among 33 randomly selected counselors offering e-counseling in Malaysia.

The 37-item inventory utilized a 6-point Likert scale that ranged from "strongly disagree" to "strongly agree" and contained five sub-constructs: (i) micro-skills; (ii) process; (iii) difficult client behaviors; (iv) cultural competence; and (v) awareness of values. An example item is, "I feel confident that I will appear competent and earn the respect of my client." Table 2 shows the distribution of the items in COSE.

Table 2 : Distribution of Items in the Counseling Self-Estimate Inventory

Constructs	Total items
Counselling self-efficacy (overall)	37
Microskills	12
Process	10
Difficult Client Behaviors	7
Cultural Competence	4
Awareness of Values	4

(Source : Larson et al., 1992)

2.4. Sample

Potential respondents were randomly selected from 799 e-counselors across the states in Malaysia in June 2020. The sampling frame included e-counselors who provided counseling services across the states in Malaysia regardless of their work institutions. They provided e-counseling services at their work settings or were volunteers who had taken part in providing psychosocial support helpline service

during the COVID-19 outbreak in Malaysia. The researchers derived their information from the Malaysia's Board of Counselors and from counselors who advertised their services online. The means of virtual sessions offered by e-counselors included synchronous (e.g., live chat room, telephone) or asynchronous counseling (e.g., email).

Cohen's (1988) G-power analysis estimated that at least 138 subjects were required for the sample size for the effect size of .30, alpha probability error .05 and statistical power .95. However, rigorous literature review and discussion among the research team members concluded that at least 200 subjects were required for this study. The researchers applied a simple random sampling procedure using the fishbowl method to assign numbers to the members of the population for identification purposes before subjecting them to random selection.

The recorded data identified that females (77.7%) took up the majority of the respondents. Most of the respondents were Malay (73.4%), followed by Others (14.2%), Chinese (6.4%) and Indian (6.0%). The majority were at least 41 years old (36.1%). Only 22.7% of respondents were between the ages of 30 and 35, 21.9% were between the ages of 23 and 29, and 19.3% were between the ages of 36 and 40. The majority of the respondents (53.2%) owned a bachelor's degree, followed by 41.2% who owned a master's degree, and only 5.6% completed a doctoral study. Most of the respondents had short to moderate years of counseling experience: 37.8% had 6 to 15 years of experience, and 36.5% had at most 5 years of experience; the rest had 16 to 30 years of counseling experience (24.9%), and at least 31 years of experience (0.9%). Finally, the majority of the respondents were identified as registered and licensed counselors, taking up about 75.5% and 69.1%, respectively.

2.5. Data Collection Procedure

This study was approved by the Ethics Committee for Research Involving Human Subjects in Universiti Putra Malaysia (JKEUPM). The data collection process involved distributing a Google Form link to respondents' respective email addresses or personal contact numbers. Possible respondents were identified by the researchers through a contact list of e-counselors in Malaysia maintained by the Board of Counselors (Malaysia). The respondents were randomly selected and contacted via their email addresses twice throughout the study: first, to inform them of their rights to privacy and confidentiality and explain the research objectives; and second, to provide a follow-up to complete the survey if they decided to participate in the study. The follow-up was necessary to obtain a higher response rate (Creswell, 2014). Despite efforts to increase the response rate, the current study encountered difficulties in reaching out to respondents during the COVID-19 data collection period. Hence, potential respondents who failed to be contacted due to technical errors were contacted via WhatsApp. The data collection concluded when 233

responses were collected. Completed surveys were automatically stored in an online database, which allowed the researchers to access the data for analysis.

2.6. Data Analysis

The data was analyzed according to the research objectives. The respondents' demographic information, including gender, ethnic group, age group, education level, years of counseling experience, counselor registration, and licensure status were analyzed using the descriptive method.

To test the research hypotheses, the Pearson correlation test was employed to determine the relationship between e-counseling skills, e-counseling ethics, and e-counseling limitations towards counseling self-efficacy. The variables demonstrated normal distribution and were measured on interval scales (Talib, 2017). Cohen's (1988) interpretation of magnitude and strength of correlation between variables was employed, which suggested that a correlation coefficient from .10 to .29 is small, .30 to .49 is medium, and .50 to 1.0 is significant.

Finally, the multiple regression test was employed to identify the influence of predictor variables (e-counseling skills, e-counseling ethics, and e-counseling limitations) on the dependent variable (counseling self-efficacy). This test was relevant as it involves several techniques to explore the relationships between a continuous dependent variable and several predictors (Pallant, 2016). The multiple correlation coefficient ® resulting from the regression analysis test was useful to identify the relationship between the variables involved (Ary et al., 2010). Without violating the assumptions of multiple regression (sample size, multicollinearity, outliers, and normality), the test was employed to identify the contributing factors toward counseling self-efficacy.

3. Findings

3.1. Relationship between e-Counseling Skills, Ethics and Limitations and Counseling Self-Efficacy among E-counselors in Malaysia

Pearson correlation analysis was conducted to test the relationship between the sub-constructs of e-counseling skills, ethics, limitations, and counseling self-efficacy. The results of this analysis as depicted in Table 3 show that there was a significant and positive relationship between overall e-counseling skills and counseling self-efficacy (r = .42, p < .01). All sub-constructs of e-counseling skills also showed positive relationships with counseling self-efficacy. This means that a higher application of e-counseling skills among e-counselors is associated with higher counseling self-efficacy.

Table 3: Results of Pearson correlation analysis between e-counseling skills and counseling self-efficacy (N=233)

E-counselling skills and sub-constructs	Correlation coefficient (r)	p
E-counselling skills (overall)	.42**	.000
Structuring skill and rapport building	.22**	.001
Exploration skill	.34**	.000
Communication skill	.40**	.000
Goal identification and attainment	.42**	.000
Problem-solving	.35**	.000
Empathy	.37**	.000
Multicultural skill	.34**	.000

Note: *p* =p-value; ** correlation is significant at the 0.01 level (2-tailed)

The Pearson correlation analysis also showed that there was a significant and positive relationship between overall e-counseling ethics and counseling self-efficacy (r = .16, p < .05). Among the sub-constructs of e-counseling ethics, "technology-assisted services", "technology and informed consent" and "law and statute" showed positive relationships with counseling self-efficacy (Table 4). This means that e-counselors who reported greater ethical practices in e-counseling had a greater tendency to demonstrate higher counseling self-efficacy.

Table 4: Results of Pearson correlation analysis between e-counseling ethics and counseling self-efficacy (N=233)

E-counselling ethics and sub-constructs	Correlation coefficient (r)	(p)
E-counselling ethics (overall)	.16*	.017
Benefit and limitation	.10	.140
Technology-assisted services	.18**	.006
Law and statute	.31**	.000
Technology and informed consent	.13*	.045
World wide web	.06	.336

Note: *p*=p-value;** correlation is significant at the 0.01 level (2-tailed)

Finally, the Pearson correlation analysis showed that the overall e-counseling limitations had a significant and negative relationship with counseling self-efficacy (r = -.35, p < .01). Additionally, all sub-constructs except "time delay" and "cost" showed significant correlations to counseling self-efficacy (Table 5). These findings indicated that e-counselors who perceived fewer limitations in e-counseling were more likely to demonstrate higher counseling self-efficacy.

Table 5: Results of Pearson correlation analysis between e-counseling limitations and counseling self-efficacy (N=233)

E-counselling limitations and sub-constructs	Correlation coefficient (r)	(p)
E-counselling limitations (overall)	-.35**	.000
Counsellor-client presence	-.30**	.000
Counsellor-client perception	-.34**	.000
Training requirement	-.19**	.003
Time delay	-.11	.105
Client and anonymity	-.25**	.000
Confidentiality and privacy	-.25**	.000
Cost	-.10	.124

Note: p=p-value; ** correlation is significant at the 0.01 level (2-tailed)

3.2. Influence of e-Counseling Skills, Ethics and Limitations on Counseling Self-Efficacy among E-counselors in Malaysia

The ability of e-counseling skills, ethics, and limitations to predict the variance in counseling self-efficacy among e-counselors was tested using the analysis of multiple regression. The data was fit for the multiple regression test after a successful preliminary analysis. The enter method was used for the analysis, and the results revealed that the variables significantly predicted counseling self-efficacy (R^2 = .275, F [3,229] = 29.02, p < .001). The independent variables explained 27.5% of the variance in counseling self-efficacy, as reported in Table 6.

Table 6: Results of multiple regression (enter method) between e-counseling skills, ethics and limitations towards counseling self-efficacy (N=233)

	R square	B	Beta	t	p
Model	.275				
Constant		3.709			
E-counselling skills		.432	.366	5.33	.000
E-counselling ethics		.056	.051	.72	.471
E-counselling limitations		-.430	-.328	-5.41	.000

Note: B=Unstandardized coefficients; Beta=Standardized coefficient Beta; t=t-value; p=p-value

The results showed that e-counseling ethics did not contribute to a significant variance in counseling self-efficacy. Additionally, e-counseling skills had the highest Beta value (β = .366, t = 5.33, p < .001), followed by e-counseling limitations (β = -.328, t = -5.41, p < .001). This implies that e-counseling skills were the best predictors of counseling self-efficacy among e-counselors in Malaysia.

4. Discussion

First and foremost, it should be understood that the sample study under consideration

included Malaysian e-counselors without regard to the specifics of their work environments. This suggests that different work cultures and client social pools are involved, indicating the possibility that respondents' varying levels of engagement with digitizing counseling may have impacted to these findings.

4.1. Principal Findings

Findings from this study showed that e-counseling skills and e-counseling ethics had positive correlations with counseling self-efficacy, while e-counseling limitations had a negative correlation with counseling self-efficacy. Among the independent variables, e-counseling skills predicted counseling self-efficacy the best, which was followed by e-counseling limitations. All hypotheses were therefore accepted. These findings were discussed as follow:

4.2. e-Counseling Skills and Counseling Self-Efficacy

These findings support Kozan's (2020) study who found that counseling skills development led to improvements in self-efficacy among school counselors. Crowe et al. (2022) also showed consistent findings as they reported significant improvement in counseling trainees' self-efficacy after the completion of counseling skills courses. Additionally, Akçabozan-Kayabol et al.'s (2021) study also supported these findings and reported the contribution of the acquired counseling skills in increasing self-efficacy levels. An increased knowledge and application of counseling skills in e-counseling may thus contribute to higher self-efficacy among e-counselors. Positive correlations between self-efficacy and skill acquisition with respect to emotional intelligence were also reported by Adeyemo and Agokei (2019), which is consistent with the current findings that indicated positive correlations between the sub-constructs of e-counseling skills (empathy and communication skills) and counseling self-efficacy. The ability of e-counselors to be aware of self and others and have the knowledge to express understanding of clients' emotions are associated with higher counseling self-efficacy. In contrast, their inability to communicate emotional language can deteriorate rapport-building with clients, which can have a negative effect on their self-efficacy in any counseling setting.

4.3. e-Counseling Limitations and Counseling Self-Efficacy

The e-counseling limitations sub-construct such as counselor-client perception (e.g. lack of non-verbal cues) and inadequate training that is specific to e-counseling showed negative correlations with counseling self-efficacy. In other words, the perception among e-counselors that e-counseling is limited by the lack of physical cues and training in e-counseling corresponds to lower self-efficacy. The possible difficulty to incorporate communication skills that are crucial in face-to-face counseling into e-counseling may clarify why e-counselors find it challenging to conduct e-counseling, particularly when they perceived that these limitations exist. Johnson and Rehfuss (2020) and Amos et al. (2020) concurred that e-counseling

lacks physical presence and nonverbal cues, which are obstacles to effective counseling conduct as they cause inaccurate understanding and miscommunication between counselors and clients. However, adequate training can allow e-counselors to improve their self-efficacy. As suggested in the current findings, e-counselors perceived sufficient training in digitalizing counseling to overcome limitations in e-counseling, which consequently increases self-efficacy in counseling settings. Continuing training and education in e-counseling is therefore necessary to equip counselors with the required skills and techniques to overcome drawbacks in e-counseling (Foon et al., 2020). Hence, counseling supervisors play a crucial role as social models for trainees to gain e-counseling knowledge. Adequate and appropriate training experiences will also enable counselors to find previously intimidating limitations more manageable, which can have a positive influence on their counseling self-efficacy.

4.4. e-Counseling Ethics and Counseling Self-Efficacy

Finally, the current study found that despite the positive correlations with counseling self-efficacy, e-counseling ethics did not significantly influence counseling self-efficacy. As professionals, counselors are bound by the Counselor Act 1998 (Act 580) to complete counseling training and register with the Board of Counselors (Malaysia) to provide counseling services. In e-counseling, counselors are responsible for ethical obligations such as informing clients of possible confidentiality issues and evaluating clients' readiness to receive e-counseling. Saidi and Hassan (2018) stressed that the negligence of the counseling law may tarnish the image of counselors as professionals. Subarimaniam et al. (2021) reported that counseling self-efficacy in addressing ethical and legal perplexities is directly influenced by multicultural competency. Higher awareness and the ability to acknowledge clients' unique cultural values contribute to higher counseling self-efficacy in ethical components, which contradicts the current findings. A possible explanation for the current findings could be the lack of understanding and awareness among e-counselors in Malaysia about the applicability of the current ethical policy to conduct e-counseling competently. For example, the professional boundary between counselor and client in e-counseling is unclear, as clients can easily become dependent on the counselor due to high accessibility and frequent contact (Nagarajan & Yuvaraj, 2019). The credibility of e-counselors as professionals is also in doubt, as there are not many counselors who are registered as members of the Board of Counselors (Malaysia) (Saidi & Hassan, 2018). To complicate matters, the current situation in Malaysia does not properly enforce legal action against counselors who violate this law (Saidi & Hassan, 2018). This is unfair to counselors who have professional qualifications but are not recognized by society due to ethical negligence on the part of non-qualified counselors.

5. Implications of the Study

5.1. Theoretical Implications

The current findings provide a new theoretical explanation for Bandura's SET with regards to its applicability in e-counseling. Self-efficacy is a thought pattern that connects one's knowledge of certain tasks with their actions to succeed in these tasks. An increase in the repertoire of counseling skills and the ability of counselors to apply these skills can significantly improve previous bias and judgement towards counseling services, thus leading to higher resiliency and confidence levels to engage in counseling activity. On the other hand, lower self-efficacy is caused by higher perceptions among counselors regarding the lack of nonverbal cues, client confidentiality and appropriate training that limit e-counseling services. Counselors who are uncertain about how to operate in an unfamiliar setting, such as e-counseling, may become hesitant and anxious due to the lack of expertise and experience. This corresponds with Ooi et al.'s (2017) study, who found that psychological and affective states such as anxiety and stress have a direct influence on counseling self-efficacy. Likewise, e-counselors who dismiss ethical conduct when conducting e-counseling are likely exposed to failed counseling attempts that can harm both the counselor and client. This is associated with lower counseling self-efficacy, as the current findings suggest. In accordance with this, based on Bandura (1977), self-efficacy is a major determining factor in an individual's course of behavior when they have acquired adequate relevant skills and knowledge. Hence, the current findings support skills acquisition and lack of expertise and experience in self-efficacy. In addition, the findings also adds to the relationship between good ethical behavior and self-efficacy and offer a new explanation for the self-efficacy theory from the perspective of Malaysian e-counselors.

5.2. Implications towards Higher Education Training

Counseling is a therapeutic practice that enables clients to find support and guidance for any issue, including psychological, career, academic, family, or social. Hence, it is important for counselors to strive to be competent by acquiring adequate knowledge and receiving quality training to provide quality support and help to clients in any setting, including e-counseling. That said, the present findings suggest that training specific to providing e-counseling must be provided consistently for counselor at all levels, especially during their trainee period. Self-efficacy for work- or professional-related aspects is developed as a result of adequate training and education. Basic counseling skills, ethics, and exposure to various counseling case studies are developed early in counselors' formal training periods. The experience and exposure obtained during this time enhance counselors' future professional endeavors. Resilience and the capacity to adapt effectively and pro-actively to the dynamics of the counseling workforce follow. To cope with this concern, it will be

crucial to consider the formal training that was acquired in higher education institutions and approved by Malaysia's Board of Counselors, which acts as the accrediting body for counselor qualifications in Malaysia. This training suggests that e-counselor training components should be incorporated into the counseling syllabus assessment process.

The time counselors have spent receiving formal education and training prior to entering the workforce suggest the pivotal role of higher education institutions when providing counseling programs that fulfill the expectations of the counseling profession today. In Malaysia, counselors complete their bachelor's degree from counseling programs in universities recognized by the Board of Counselors (Malaysia). This qualifies them as licensed counselors. While the counselling curriculum was successful by far in preparing counselling trainees entering the professional field and directing professional counselors entering the academic field, formal training focusing on e-counseling is almost absent, which further renders counselors unprepared to provide e-counseling effectively (Mercadal & Cabré, 2022). While it is true that counselors may receive e-counseling training from professional development workshops and seminars outside the formal education period, it is questionable whether they are sufficient compared to receiving an independent course on e-counseling during counselors' training period. This implies that the authorized counseling curriculum and syllabus now in use need to be reviewed to meet the shifting demands of the counseling profession. As such, Malaysia's Board of Counselors ought to collaborate with providers of counseling programs in order to regulate the curricula and courses that counselor trainees must complete in order to get their degrees. The mutual cooperation of the Ministry of Higher Education will be vital to accomplishing this improvement and the upholding of counseling ethics.

The present study found that the best predictor of self-efficacy was e-counseling skills, indicating that training focusing on skills in e-counseling is crucial (Johnson & Rehfuss, 2020). Through counseling skills course provided in higher education institutions, counselor educators and supervisors hold play a key role to guiding, facilitating, and encouraging students to practice both face-to-face and online counselling. With this knowledge and skills developed, internship programs offered to the students must consider collecting counseling hours specifically for e-counselling as opposed to only face-to-face counseling. The involvement of various work industries in this effort will be beneficial so that higher education institutions' counseling program providers can connect with suitable internship settings that provide trainee counselors with a wealth of learning and development possibilities.

6. Conclusion

The findings from this study revealed that e-counseling skills, ethics, and limitations

have significant correlations with counseling self-efficacy. In addition, e-counseling skills have the best influence on counseling self-efficacy. This implies that higher counseling self-efficacy is associated with a greater ability to apply e-counseling skills and ethical conduct, as well as fewer perceived limitations in e-counseling. This study supports previous findings on the correlation between counseling ethics, skill acquisition and counseling self-efficacy, and provide alternative explanations for the SET from the perspective of Malaysian e-counselors. Through this study, the researchers suggest for counseling program providers to actively provide a learning platform for counseling trainees across various fields of expertise to gain e-counseling skills and knowledge on the integration of ICT in counseling services. However, due to the inadequacy of the current counseling ethical codes to guide e-counselors on online counseling, initiatives must first be taken by the Board of Counselors (Malaysia) to improve counseling policies and curriculum. Practical implications of the present study were discussed, highlighting the role of various stakeholders, such as counselor educators and counseling course providers.

7. Limitations and Recommendations for Future Studies

There were several limitations from this study. First, cultural and social backgrounds such as ethnicity, years of counseling experience, and work institutions were not explored in the relationship between the variables. The said factors could result in significant variations in perceptions between counselors. Similarly, the sample group did not correspond to their operational work environment, which may have caused variations in associated variables. Counselors at different operating work environments deal with an array of clients and have access to different resources when putting e-counseling services into practice. It is suggested that future studies investigate the constructs of the current study among counselors in their respective sub-populations, such as their work institutions. This will be essential to improving generalizability of the research findings and directing more research efforts toward understanding e-counselors' unique challenges and factors of self-efficacy in their respective settings and professional backgrounds.

Additionally, the researchers did not differentiate between respondents' primary medium of e-counseling services, which may be either synchronous or asynchronous. Some skills that are relevant in a videoconferencing setting, for instance, may not have the same applicability in text-based settings. Thus, future researchers may consider replicating this study to identify the mediating effect of e-counselors' cultural and social factors on the relationship between the variables and establish one form of communication for the e-counseling service offered by e-counselors. The findings will provide more depth to the current findings and minimize possible bias in the population.

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INFLUENCE OF SELF-EFFICACY ON CAREER EXPLORATION BEHAVIORS AMONG MALAYSIAN GOVERNMENT SCHOOL YOUNG ADOLESCENTS

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ABSTRACT

Education professionals, including teachers and school counselors, have long been drawn to studies on students' self-efficacy and career exploration behaviors. Career development theories have shown that career exploration begins in the teenage years; however, studies on self-efficacy and career exploration mainly targeted the tertiary education sample group and are rarely found within the Malaysian secondary school student group who are about to enter tertiary institutions. This study set out to investigate the connection between upper secondary students' self-efficacy and career exploration. The difference between school grades and career exploration was also examined. The quantitative-correlational research was carried out using a self-reported survey among secondary students. A stratified random sampling method was employed to obtain 219 respondents. Descriptive analysis was used to investigate high career exploration behaviors among secondary school students. Pearson correlation showed a positive correlation between self-efficacy and career exploration. Meanwhile, linear regression analysis reported that self-efficacy significantly predicted career exploration. Lastly, the ANOVA result showed a significant difference in the career exploration behaviors among all school grades. Among the respondents, Form 4 students had higher career exploration behaviors than Form 3 and Form 5 students. The results of this study indicated that self-efficacy plays a significant role in predicting career exploration; hence, recommendations were made for school counselors to guide students in their career exploration. The implications highlighted the role of higher education institutions in designing more comprehensive career exploration interventions to prepare students at both pre-university and university levels.

Keywords: Career preparation, career attitude, career development theory, Malaysia education blueprint, self-belief, students

1.   Introduction

In Malaysia, students in upper secondary schools, specifically referring to those in Form 4 and Form 5, face crucial decisions about their academic and professional futures. The Ministry of Education (MOE) launched the Malaysia Education Blueprint 2013-2025 to enhance the country's education system to meet global standards. One noteworthy initiative introduced under this blueprint was the concept of the Science, Technology, Engineering, and Mathematics (STEM) education (Ng & Adnan, 2018). STEM education emphasizes early career exploration, which requires students to identify their career interests early. However, while facilitating access to career information, the internet's advent introduced variability in the quality of such information. Hence, students may become confused when selecting a career pathway (Harris-Bowlsbey et al., 2002).

In order for students to experience a seamless transition to higher education, equipping students with the necessary skills and resources to make informed decisions about their academic and career pathways is essential. Understanding the landscape of the Malaysian higher education and emphasizing career development components can help students navigate this transition effectively (Bragg, 2007). By shedding light on the challenges and obstacles facing STEM education in Malaysia, the quality and accessibility of STEM education can be enhanced to provide valuable insights for policymakers, educators, and stakeholders in the academic community (Cartigny et al., 2019).

STEM education plays a crucial role in shaping students' career prospects and self-confidence, which significantly impacts Malaysia's educational, employment, and economic advancement. By providing students with essential skills and knowledge, STEM education prepares students to excel in an ever-evolving, technology-driven global workforce. A recent report by the World Economic Forum (2018) emphasized the value of STEM-related abilities across various industries, such as analytical thinking, problem-solving, and digital literacy, which underscore the importance of STEM education in preparing students for future career opportunities. The report highlighted that STEM education is a key driver of innovation and productivity, which is critical for economic growth and competitiveness in the 21st century. As such, STEM education is an imperative strategy for Malaysia's long-term growth and development, and policymakers, educators, and businesses must work together to ensure that students have access to the skills and knowledge they need to succeed in the digital age (Guzey et al., 2014).

STEM education is essential in preparing students for employment opportunities as well as in shaping their future in higher education, particularly in STEM-related fields. The skills acquired through STEM education such as analytical thinking, problem-solving,

and digital literacy are also highly valued in academia as it provides students with a strong foundation for advanced studies and research. Moreover, the interdisciplinary nature of STEM education enables students to have a holistic understanding of complex scientific concepts that help to prepare them to meet the rigorous academic demands of higher education institutions (Martín-Páez et al., 2019).

Junior high school marks a critical period for career preparation and determination, where students begin to contemplate their future academic and professional paths. As adolescents navigate this transitional phase, they face the daunting task of choosing an educational trajectory that is aligned with their career aspirations (Sugiharto & Sunawan, 2019). This juncture is intrinsically linked to career decisions, self-efficacy, and the development of crucial skills for successful career exploration.

During the formative years, junior high school serves as a pivotal period to prepare students for their future academic and professional endeavors, particularly in STEM education. This critical period is characterized by substantial cognitive, social, and emotional growth, which can shape students' interests, abilities, and confidence, ultimately guiding their informed career choices. According to Super's Developmental Theory (1973), junior high school is a crucial juncture where students can begin to explore and solidify their career aspirations, paving the way for future career exploration and decision-making (Kelley & Knowles, 2016).

Self-efficacy is defined by Bandura (2012) as an individual's belief in their ability to successfully accomplish tasks and achieve goals. This concept is of utmost importance in shaping career decision-making as it influences students' confidence in assessing information, setting objectives, and overcoming obstacles (Bandura, 1993; Bandura, 2012). Adolescents who have high levels of self-efficacy actively explore career options and exhibit eagerness and preparedness for various paths (Makki et al., 2015).

Career exploration, defined as activities that aim to increase individuals' understanding of career options, is a fundamental aspect of the developmental process during junior high school (Crites, 1978). Career exploration allows students to gather information, assess their interests and abilities, and make informed decisions about their future career paths (Atkinson & Murrell, 1988). This proactive approach to career exploration equips students with the necessary skills and knowledge to prepare for future challenges, ensuring they are well-equipped to make successful career decisions. However, it is essential to note that existing research on self-efficacy in career development has predominantly focused on university students, which warrants further investigation into its influences on secondary students (Hackett & Betz, 1981).

2. Literature Review

2.1. Conceptual Framework

Super's Developmental Theory was chosen for this study as the target group was adolescents facing the transitional stage in their career development. Super's Developmental Theory, introduced by Super in the 1950s, explains vocational development and delineates various career stages. The theory comprises five stages, with the first stage being the Growth stage, spanning from birth to 14 years old. During this stage, self-concept develops through experiences with family and the school environment, while needs, fantasies, interests, and capacities are explored (Super & Jordaan, 1973). The second stage is the Exploration stage, covering the age range of 15 to 24. In this stage, individuals engage in extensive self-examination and trial-and-error processes to identify suitable and exciting career paths. The third stage is the Establishment stage, where individuals focus on establishing a permanent place (Super & Jordaan, 1973). In this research, the emphasis was on secondary students who were deciding to select their courses to shape their future careers. By age, this falls within the transition stage from Growth to Exploration. This theory was applied in this study to examine the career exploration behaviors as variables.

The Social Cognitive Career Theory (SCCT) emphasizes the importance of actively seeking and gathering information regarding career options, interests, and goals during the career exploration process. Career exploration is primarily influenced by an individual's self-efficacy beliefs. According to Lent et al. (2000), individuals with higher levels of self-efficacy tend to engage in more proactive career exploration behaviors. The SCCT framework suggests that career exploration allows individuals to test their skills and abilities in real-world settings, which helps them refine their self-efficacy beliefs. Positive experiences during exploration also reinforce self-efficacy beliefs and encourage continued participation in career exploration activities. In turn, this can support well-informed decision-making regarding one's career path.

Figure 1 shows the research framework that links the relationship between the examined variables.

Figure 1. Conceptual framework on the influences of self-efficacy on career exploration and the difference between school grades on career exploration

2.2.   Career Exploration Behavior

According to Super (1957), career exploration is a continuous process in all stages of career development, with the most intensive exploration occurring during late adolescence and early adulthood. Tiedeman (1961) characterized exploration as a crucial antecedent to crystallization, decision, and implementation. Notably, career exploration emerges as a central activity when the need for decision-making arises (Harren, 1979), which contributes to informed and satisfying decision-making.

Individuals who fail to derive benefits from their exploration tend to disengage from the career decision-making process (Taylor, 1985). Career exploration extends beyond merely providing information and knowledge for career choices (Lent et al., 2016); it actively supports overall career development. As Porfeli and Lee (2012) described, career exploration is a dynamic process through which individuals explore themselves and the external environment.

During adolescence, both personal and external factors significantly impact career exploration. Parents, peers, and mentors can offer valuable insights, advice, and support to help adolescents make informed decisions about their future careers (Kost et al., 2022). Adolescence is a critical period during which positive adults outside the familial context may significantly influence development (Miranda-Chan et al., 2016). Role modelling and mentorship have been shown to play a crucial role in shaping primary care career choices based on extensive research conducted over the past 30 years (Kost et al., 2022). Gender norms and cultural values, for example, can influence the types of careers that adolescents consider (Kayani et al., 2022).

The age of the adolescent is an essential factor in career exploration. Older adolescents have a better understanding of the world, their abilities, and the job market, which can impact their career aspirations and approach to career exploration. Younger adolescents, on the other hand, may be more influenced by societal expectations and pressure from peers and family (Hill et al., 2004; Al-Bahrani et al., 2020; Hoff et al., 2021; Özdemir & AS, 2022; Owusu et al., 2021; Sawitri & Suryadi, 2020). Therefore, the different ages of students' research are reviewed.

Blustein (1992) underscores career exploration as a fundamental process wherein individuals collect information to augment their self and environmental knowledge in pursuing career goals. A range of activities falls under the umbrella of career exploration, encompassing job searching, career planning, fund-seeking opportunities, and contemplating various career options. Any behavior linked to career-related activities that foster career growth is considered as part of the broader scope of career exploration. Therefore, career exploration is a crucial variable for students to acquire. This research thus determined the level of career exploration among students.

2.3. School Grades and Career Exploration Behavior

According to Super's (1957) developmental theory, the exploration stage spans from 15 to 24 years old, during which individuals engage in increased self-examination and trial-and-error processes. At this stage, individuals actively seek careers that align with their interests (Super & Jordan, 1973). Additionally, Taveira et al. (1998) found that adolescent exploration behaviors tend to increase with age. Their study revealed that 12th-graders exhibit higher levels of self-exploration and environmental exploration compared to 9th-grade students. Consistent with these findings, Roger et al. (2008) conducted a study with 414 Australian high school students and found that higher-grade students expressed a greater desire to engage in exploration activities than their younger counterparts. The authors concluded that students approaching graduation displayed increased curiosity about the working world, leading to heightened involvement in career exploration activities.

The positive relationship between age and career exploration behaviors is supported by Blustein (2011), who found that increased age is associated with improved exploration of work. Similar trends were identified in a Korean study by Na and Jung (2011) involving 250 students majoring in food service and culinary. Higher-grade students reported more active involvement in career exploration than lower-grade students. The authors concluded that older individuals were more likely to engage in career information collection and experiences. This study aimed to identify whether there is a significant difference in career exploration based on school grades. In addition, a recent study conducted in Canada also indicated that as grade levels increase, students in higher grades were more likely to seek career information than their counterparts in lower grades. This trend is attributed to higher-grade students often approaching graduation (Heymann et al., 2021).

However, it is essential to note that some research had suggested no significant differences in career exploration based on age or school grades. Ferrari et al. (2015) observed no age-related increase in career exploration among Italian students, a finding that was further supported by the results of Noack et al.'s (2010) research. Their findings suggest that career exploration remained relatively stable from childhood through adolescence. Consequently, the researchers in this study was motivated to investigate whether a difference in career exploration exists based on school grades.

2.4. Self-efficacy and Career Exploration

Bandura (1993, 2012) defines self-efficacy as the level of confidence of an individual toward themselves regarding their capabilities to carry out a desired action or given task. Self-efficacy can determine whether an individual will decide to perform or avoid playing out an errand (Bandura, 1982). Through engagement in activities, self-efficacy

increases along with self-knowledge and self-perception. It helps the individual demonstrate more stable emotions and acquire a healthier lifestyle by increasing their coping skills to overcome stress and depression (Taylor & Betz, 1983). Alternatively, self-efficacy is understood as an individual's self-belief or confidence regarding their capabilities (Ahmed, 2011). Individuals with high self-efficacy harbor a strong belief in their ability to tackle tasks and challenges successfully. This positive self-belief fosters positive career attitudes and a well-defined vocational identity. This outcome is attributed to the increased likelihood of engaging in and enjoying career exploration and planning activities (Choi et al., 2012). Such engagement aids in the discovery of personal interests related to the individual's chosen career path and goals (Hou et al., 2014).

In a comparative study of American and Korean students, Choi and Kim (2013) emphasized that career self-efficacy is pivotal for individuals to sustain their career preparation behaviors. Findings from both samples indicated a positive correlation between career self-efficacy and career preparation behaviors. Individuals with positive self-efficacy tended to successfully engage in career exploration behaviors, while those with negative self-efficacy were inclined to avoid such behaviors (Choi & Kim, 2013). Supporting these results, Tsai et al. (2017) conducted research in Taiwan with 613 student participants, which revealed that career self-efficacy is a mediating factor in career preparation. Higher levels of self-efficacy also enhance students' motivation and confidence in career preparation. Further supporting these findings, a study in Taiwan by Chan (2017) reported positive correlations between social support, career self-efficacy, and career exploration. Adachi (2008), in a study conducted in Japan, described students with high levels of career self-efficacy as being more likely to be actively involved and engaged in self and environmental exploration activities.

A correlational study involving 325 final-year undergraduate engineering students at a private university in Malaysia revealed a positive and significant relationship between career self-efficacy and career exploration (Makki et al., 2015). The skills and readiness demonstrated by the final-year students were identified as contributing factors to effective career exploration. This finding is consistent with a separate study that was conducted in 2016 among 62 final-year students (Makki et al., 2016). In that study, high mean scores were reported for readiness, career self-efficacy, and career exploration, highlighting that heightened career readiness and self-efficacy resulted in more active engagement in career exploration.

Despite these findings, more research still needs to be done in Malaysia regarding the relationship between self-efficacy and career exploration among secondary students. Consequently, this research addresses this gap by investigating the relationship between self-efficacy and career exploration among secondary students. Besides that, regression was run to analyze the prediction effect between self-efficacy and career exploration.

The present study aimed to assess the levels of career exploration and the relationship between self-efficacy and career exploration behavior among secondary students. Furthermore, the study aimed to determine whether there are variations in career exploration based on school grades and to investigate potential differences in exploration across different age groups. Hence, the present study addressed the following research questions:

1. What is the level of career exploration among secondary school students in Malaysia?
2. Is there a difference between school grades on career exploration among secondary school students in Malaysia?
3. Is there a relationship between self-efficacy and career exploration among secondary school students in Malaysia?
4. Does self-efficacy predict career exploration among secondary school students in Malaysia?

3.   Methodology

3.1.   Research Design

The present study implemented a quantitative research approach through a survey methodology to identify the link between self-efficacy and career exploration behavior. The present study used validated questionnaire scales for data collection to examine the correlation between self-efficacy and career exploration.

3.2.   Sample study

The respondents of this study consisted of 219 upper secondary students from a government school at Bukit Jalil. Data collection was made in 2019. Stratified sampling methods were applied to choose the participants based on strata. This sampling method divided the population into subgroups, where the sample was selected from each subgroup. The examining outline was isolated into homogeneous and non-covering subgroups, and a straightforward irregular example was drawn inside every subgroup (Bhattacherjee, 2012). As a result, the strata was divided into three (3) grades, namely Form 3, Form 4, and Form 5 students. Samples retrieved from each grade totaled up to 33% or at least 72 students out of the required sample size. For their grade, the total sample included 72 respondents from Form 3 (32.9%), 74 respondents from Form 4 (33.8%), and 73 respondents from Form 5 (33.3%).

3.3. Instrumentation

The first part of the research questionnaire addressed the respondents' demographic data, including gender, school grade, age, and race. Two instruments were employed: (1) the Vocational Identity Status Assessment (VISA) – In-Depth and In-Breadth Career Exploration Scale (Porfeli et al., 2011) and (2) the General Self-efficacy Scale (GSE) (Schwarzer & Jerusalem, 1995). The originality of the instruments was maintained in this study.

The In-Depth and In-Breadth Career Exploration Scale represents a modified version of the Vocational Identity Status Assessment that focused exclusively on the original survey's subscales (Porfeli et al., 2011). Comprising 10 items, this scale was employed to gauge the extent of career exploration undertaken by individuals. The selection of this scale was driven by its appropriateness for use with adolescents. The scoring system was based on a 5-point Likert scale, with responses ranging from (1) Strongly Disagree, (2) Disagree, (3) Agree and Disagree, (4) Agree, to (5) Strongly Agree. Total scores were derived by summing up the individual item scores, where a higher total score indicated greater career exploration. Previous studies have demonstrated the excellent reliability and validity of the subscales. The In-Depth and In-Breadth, Career Exploration Scale exhibited high internal consistency, with coefficient alphas for each subscale ranging from .72 to .88. This establishes the scale's reliability.

The GSE assesses individuals' predictive capabilities in coping with daily hassles and measures their confidence levels in completing tasks (Schwarzer & Jerusalem, 1995). This instrument comprises 10 items and utilized a Likert-like scale from 1 to 4, where: (1) Not at all true, (2) Hardly true, (3) Moderately true, and (4) Exactly true. Scoring involved summing up the responses for each item. The total scores on the GSE ranged from 10 to 40, with higher scores indicating greater levels of self-efficacy. The scale was unidimensional and demonstrated strong internal consistency with Cronbach's alphas ranging between .76 and .90 for individual subscales and .80 for the overall alpha score.

3.4. Data Analysis

The first phase of the data collection process required obtaining permission from relevant authorities, including the secondary school's head office. Once approval was secured, the researchers planned a visit to the school to distribute the questionnaires. The questionnaire was created using an online form, specifically Google Forms. Collaboration with teachers was established to disseminate the Google Forms link to students through their respective classroom WhatsApp groups. The teachers were informed about the required number of participants, and each class, consisting of approximately 12 to 13 students, was encouraged to complete the form. The researchers

made sure to clarify any questions or confusions that the teachers had regarding the instruments. This allows informed and accurate response by the students.

After one month, Google Analytics was employed to compile the collected data. Subsequently, the responses from participants were transferred from Google Forms to Microsoft Excel, where coding was applied for data analysis. Statistical Package for the Social Sciences (SPSS) version 26 was utilized for coding and analysis.

Descriptive statistics such as mean, median, and standard deviation were calculated for quantitative research. One-way ANOVA was employed to determine whether there was a significant difference between school grades concerning career exploration. Additionally, Pearson correlation analysis and regression was applied to test the correlations and identify the predicting factors of self-efficacy on career exploration. A significance level of $p<0.05$ was considered statistically significant in all analyses.

4.   Result

Table 1 shows the mean scores and standard deviation for career exploration behaviors. Mean scores equal to or higher than 35 were considered high in terms of career exploration. The mean score of the overall career exploration was 35.19 (SD = 6.07), thus, the level of career exploration was high, indicating that the level of career exploration behaviors among the Malaysian upper secondary school students was high.

Table 1: Mean and Standard Deviation of Career Exploration

	Mean (M)	SD
Career Exploration	35.19	6.07

Note: M<35 = Low, M≥35= High

Table 2 shows the result of ANOVA between school grades on career exploration. The level of career exploration was significantly different between school grades (F[2,216] = 6.352, p<.05). The highest mean scores obtained for career exploration among the school grades was for Form 4 students (M=37.14), followed by Form 5 (M=34.58) and Form 3 students (M=33.80).

Table 2: Result of One-Way ANOVA between School Grades on Career Exploratio

Grades	n	Mean	SD	df	F	Sig. *p*
Form 3	72	33.80	5.81			
Form 4	74	37.14	6.04	2,216	6.352	.002
Form 5	73	34.58	5.91			

Table 3 shows the post-hoc test for the ANOVA test. There was a significant difference in the level of career exploration between Form 3 and Form 4 students and between

Form 4 and Form 5 students. No significant difference was found between Form 3 and Form 5 students.

Table 3: Multiple Comparisons of School Grades on Career Exploratio

Grades (I,J)	Mean difference (I-J)	Sig. p
Form 3, Form 4	-3.32958*	.002
Form 3, Form 5	-.76979	.714
Form 4, Form 5	2.55979*	.025

*The mean difference is significant at the 0.05 level.

Table 4 shows the results of the correlation analysis between self-efficacy and career exploration. The Pearson correlation value for self-efficacy and exploration was .369 ($p<.01$), which showed a significant and positive relationship between the variables. The correlation strength was moderate. Thus, increased self-efficacy was correlated to increased career exploration.

Table 4: Correlation between Self-Efficacy and Career Exploration

Relationship Self-efficacy with	R	Sig.p	Correlation strength
Career Exploration	.369**	.000	Moderate

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

Table 5 below shows the regression result between self-efficacy and career exploration. The results show that the regression model was statistically significant (F=34.24, $p<.05$). This means that self-efficacy significantly predicted career exploration behaviors among secondary school students.

Table 5: Regression between Self-Efficacy and Career Exploration

Variable	Adj. R^2	R Square	Std.β	F	Sig.p
Self-efficacy	.132	.136	.369	34.235	.001

5.   Discussions and Implications

The level of career exploration among secondary students was high; however, this level only met the bare minimum high score. Nonetheless, this shows that the students were ready to seek and gather information on their career development, choice, and adjustment. Career exploration can thus help the individuals to have clearer information and improve their chances of success in their chosen career path. When individuals are actively involved in career exploration activities, they will gain knowledge and accurate information for their careers (Atkinson & Murrell, 1988).

A significant difference in career exploration levels was found among school grades, which aligned with previous research outcomes (Blustein, 2011; Na & Jung, 2011; Roger et al., 2008; Super & Jordaan, 1973; Taveira et al., 1998). However, it is worth noting that most prior studies indicated that students in higher school grades exhibited greater career exploration behaviors. This is in contrast to the current findings, which reported the highest level of career exploration was among Form 4 students. This discrepancy might be attributed to the age of the students. Approximately half of the Form 4 students in the school were 17 years old, similar to the age of Form 5 students, which meant that most of the students were 17 years old in this study. In line with Blustein (2011), age demonstrates a positive and significant correlation with career exploration behaviors, whether the older the students, the higher the level of career exploration observed. Additionally, past research had indicated that older students who participated in more extracurricular activities tended to experience decreased career indecision and increased career exploration (Denault et al., 2019). This was attributed to the students gaining valuable experiences that contributed to an enhanced sense of career self-efficacy, ultimately leading to increased engagement in career exploration.

Furthermore, the study findings may be influenced by the students' levels of anxiety. Vignoli (2015) identified a significant and positive relationship between various forms of anxiety and career exploration, indicating that higher anxiety levels negatively impacted career exploration. Lower levels of anxiety, on the other hand, were associated with greater exploration. It is worth noting that students in Form 3 and Form 5 undergo standardized examinations, namely the college-based Form Three Assessment (PT3; Malay for *Penilaian Tingkatan Tiga*) and the Malaysian Certificate of Education (SPM; Malay for *Sijil Pelajaran Malaysia*), respectively. The higher levels of anxiety among Form 3 and Form 5 students may thus contribute to the observed lower career exploration behaviors. These findings suggest that factors related to anxiety levels could be significant considerations for future studies.

The result also showed a significant relationship between self-efficacy and career exploration, which is consistent with previous studies (Adachi, 2006; Chan, 2018; Choi & Kim, 2013; Makki et al. 2015; Makki et al. 2016; Tsai et al., 2017). As Blustein (1989) described, self-efficacy can predict an individual's career exploration activity, as self-efficacy is one of the internal motivations that help enhance exploration behaviors. Individuals who have high self-efficacy have a better understanding of themselves, which contributes to better planning for career exploration activities (Blustein, 1989). This proves that self-efficacy is related to career exploration.

According to a study conducted by Gushue et al. (2006), students who were highly confident in their careers also scored higher in knowledge, interest, and goal attainment measures. Foltz and Luzzo (1998) posited that engaging in career exploration activities contributes towards an individual's self-efficacy and that self-efficacy increases through

a variety of interventions, including career counseling. On the other hand, low self-efficacy caused individuals to experience barriers when exploring and advancing their careers (Dawes et al., 2000). Hence, schools must make plans to improve students' self-efficacy levels and ensure a positive career exploration experience.

An increase in self-efficacy is associated with greater career exploration, while a decrease in self-efficacy results in decreased career exploration behaviors. High levels of self-efficacy in career decision-making are also positively correlated with extensive exploration of career options in the United States (Karma & Nadine, 2019). As the authors posited, individuals' self-efficacy is essential to maintain their career preparation behaviors. As a consequence, it is not surprising that individuals with low self-efficacy avoid engaging in career exploration behaviors (Choi & Kim, 2013), especially if such behaviors can cause them further stress and anxiety.

Moreover, individuals with elevated levels of self-efficacy tend to align their self-appraisal with their workability (Sidiropoulou-Dimakakou et al., 2015). Positive correlations exist between individuals' perceptions of their ability to accomplish tasks and their self-efficacy levels, particularly when planning their careers. Therefore, self-efficacy plays a pivotal role in achieving success, especially when individuals possess the necessary skills and have completed tasks related to their profession (Pratiwi et al., 2019).

While self-efficacy is a significant predictor of career exploration, it is crucial to acknowledge that other variables, such as social-cultural background, family environment, peer pressure, guidance, and institutional support systems, can also influence students' career trajectories (Turan et al., 2014; Kayani et al., 2022; Liang et al., 2020). Additionally, external factors like economic conditions, technological advancements, and societal changes can impact students' perceptions of career opportunities and their willingness to explore different paths (Kayani et al., 2022; Liang et al., 2020). In conclusion, while self-efficacy is important in guiding students' career exploration behaviors, it is just one aspect of the broader picture. By taking a comprehensive approach that considers the diverse factors that influence career development, educators, counselors, and policymakers can effectively assist students in navigating their career pathways and achieve their professional goals (Turan et al., 2014; Kayani et al., 2022; Liang et al., 2020).

Consistent engagement with students through career tests, career fairs, seminars, and career counseling sessions is essential to prepare them with career experiences that are appropriate for their developmental age. This implies that higher education institutions should provide more programs and activities involving school students. University career fairs are the best example of engaging interested individuals wanting to enroll in higher education and pursue specific academic specializations. Career knowledge is

also essential for graduate study, especially for those planning to complete postgraduate studies. Hence, concerted efforts between higher education institutions and pre-university institutions are crucial to ensuring a smooth transition for students joining the workforce in the long run. With knowledge and resources, students will be better equipped to successfully plan their careers and pursue further education..

6.   Limitations and Recommendations for Future Studies

It is important to note that the data collected for this study pre-dates the COVID-19 pandemic. Given the current global climate, the educational landscape and the emotional well-being of students have been significantly impacted, which may have repercussions on their confidence levels and career aspirations. As a result, the findings of this research may need to fully capture the nuances of career exploration and self-efficacy in the aftermath of the pandemic. To gain a more complete understanding of the factors that influence career development, future studies should consider the evolving dynamics and obstacles that students face in the post-pandemic era. Comparing the findings between these periods may also be useful to provide more depth and improve understanding of significant contributors to students' career exploration.

This research also did not consider certain factors that can influence the career exploration of secondary school students. For instance, in addition to self-efficacy, socio-cultural, familial, educational, and environmental factors can play a crucial role in shaping students' career aspirations and exploration patterns. As such, it is highly recommended for future studies to broaden their scope to encompass these additional factors to gain a more all-encompassing insight into the career development processes of adolescents.

The study's findings may have limited generalizability due to the small sample size and focus on participants that came solely from one secondary school district. While the study can become representative of its setting, the homogeneity of the sample population and the regional specificity of the study setting may restrict the applicability of the results to a wider population of secondary school students in Malaysia. To improve the external validity of future studies, researchers should aim for more extensive and diverse samples that include participants from various geographic regions and educational backgrounds, including both private and government schools. Furthermore, while the instruments used were tested for their reliability and validity, it is worth noting that the inventory used in this study was created with Western cultures in mind. Future research should focus on adapting and validating assessment tools to improve their relevance to the Malaysian context. By implementing translation and validation processes by experts, it is possible to minimize any potential cultural and linguistic biases and enhance the validity of the measurement instrument.

Furthermore, it is important to mention that the recent study primarily examined the variables that affect career exploration behaviors, specifically self-efficacy, without delving into the underlying factors that contribute to self-efficacy. Although the examination of the correlation between self-efficacy and career exploration is valuable, there may be additional crucial determinants of self-efficacy that could potentially impact the outcomes of career exploration. Additionally, school grade was introduced as one of the independent variables that solely examined the effect between school grade and career exploration. As a future recommendation, the incorporation of school grades or age variables as moderators could be considered to assess their potential impact on the relationship between self-efficacy and career exploration. Concurrently, the same approach may be suggested for students at the university level. Future studies may also consider how academic year and age variable may impact the relationship between self-efficacy and career exploration among Malaysian university students. The findings will be vital to provide empirical evidence for educators and the guidance and counseling unit at both the school and university level to design appropriate intervention plans for students in preparation to enter the career world.

Finally, as the results indicated a significant difference in career exploration among secondary students based on school grades, a future recommendation could involve shifting the focus to students entering university. For example, students in the Malaysian Matriculation Program, or A-level Program, are closer to making final decisions about their tertiary education, which will bring them closer to their career of choice. Examining pre-university students' self-efficacy and career exploration levels can provide valuable insights for counselors in both school and university settings. While school counselors can guide students toward their academic interests and career inclinations, university counselors or academic advisors can assume the role of providing current and consistent information about the academic program available. By accepting school visits and introducing both students and teachers to various course programs offered at the university, students may receive direct guidance and be better guided when deciding to enter specific courses. This will further help direct students to suitable career pathways and avoid enrolling in university courses that contradict their personal needs, values, and career interests and inclinations.

Furthermore, while it is critical for universities to maintain course curricula that are aligned with the demands of the labor market, the transition from school to university in terms of students' academic interests and inclinations while still in school should not be disregarded. Academic advisors at universities play an important role in connecting the university and pre-university communities by ensuring that teachers or instructors at pre-university institutions are well-informed about the students' pre-requisites, program requirements, and academic standards for admission to university. This can be accomplished through coordination between the Ministries of Education and Higher

Education. Attempts at balancing the demands of many academic stakeholders could provide various viewpoints to inform support and guidance initiatives, enhancing career knowledge and exploration among the enthusiastic young population.

7.   Conclusion

The study studied the relationship between self-efficacy and career exploration among upper secondary students in Malaysia. The study focused on the general self-efficacy and respondents' demography, such as school grades, on career exploration. Past literature regarding self-efficacy and the career development theory was reviewed to highlight significant findings for each associating variable. Based on the findings, it was concluded that self-efficacy positively influences career exploration. Therefore, increased self-efficacy among upper secondary school students contributes to an increase in career exploration behaviors. This study proves a significant relationship between self-efficacy and career exploration, which prompts school leaders, administrators, and counselors to take action to enhance students' career satisfaction within the school compound before graduating. The study provided insights and understanding of the importance of self-efficacy and how it affects career exploration among young adolescent groups, which will encourage efficient career planning and facilitate career preparation and readiness. Higher education institutions will also find the current study beneficial to design more comprehensive career exploration interventions. The limitations of this study were discussed, and the authors suggested future studies to identify variables and factors of self-efficacy and career exploration.

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