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Editor's Preface

Dear Contributors and Readers,

We take great pleasure in introducing this Special Edition on Research in Educational Leadership and Innovative Teaching as we believe this is an ideal opportunity for researchers to leverage their knowledge and findings to an international readership. This special edition integrates all components of education, social sciences and humanities in one place to assist researchers and educators, with aim to highlight recurring concerns on 21st century educational issues. It will be useful, informative and inspiring for educators and researchers to exchange ideas that will enrich the transformation of schools through effective leadership and innovative teaching pedagogy.

This special edition is one of the very important components to give exposure to the researchers in disseminating the results of the studies that have been conducted. It offers a selection of papers covering a range of topics that explore leadership in the educational settings and the multiple roles of technology in learning and teaching in diverse educational settings. Leadership is an important function in management to motivate and inspire people to a higher level of performance. Thus, good leadership will maximize efficiency to achieve educational goals. Effective leadership on the other hand, creates path towards success, whereas innovative teaching compels students to be creative in solving life problems. Innovative teaching promotes resilient classroom and pushes students to always be changing, adapting and improving.

All articles in this issue are written based on research to help stakeholders understand the complexities of various issues in the educational settings – focussing on leadership and innovative teaching. The knowledge generated will definitely serve as guidance to increase the efficiency and effectiveness of any educational organizations to universal level.

Best Regards,
Assoc. Prof. Dr. Azlin Norhaini Mansor

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Supporting Students with Autism in Tertiary Education: Malaysian Lecturers' Views and Experiences

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Abstract The increasing pressure to provide inclusive and equitable education and promote lifelong learning for all has enabled a growing number of individuals with disabilities to engage in tertiary education. This article explores the experiences of lecturers supporting students with Autism Spectrum Disorders (ASD) in a Malaysian tertiary education institute. Their views are vital as they are the first point of contact when academic support is needed. Interviews were conducted with six lecturers who had experience in teaching students with ASD. Data were analyzed using thematic analysis. The main findings suggest that these lecturers were restricted in supporting students with ASD due to issues related to knowledge and awareness, the specific educational needs of students with ASD, and the importance of student peers. Lecturers have limited knowledge to draw on when making decisions to support the needs of the students. Nevertheless, they acknowledged that some of the students’ peers created a buddy system where they worked together with the lecturers to support the ASD students' needs in the absence of specialist personnel. The prospect of supporting and providing effective services to all students, regardless of background, ethnicity, gender and ability, is much anticipated by dedicated educators. This has implications for the way professionals are trained in the future.

Keywords Autism, Higher Education, Lecturer, Malaysia

1. Introduction and Background

Education for students with disabilities has evolved worldwide over the last three decades [1]. Before this time, the majority of students with disabilities were segregated from mainstream education and educated in separated classrooms. Owing to global shifts in thinking around special education, policy and legislation have changed the schooling options for students with disabilities, resulting in the inclusion of students with diverse needs in mainstream educational settings. The United Nations Sustainable Development Goal 4 (SDG4) is aimed at ensuring quality inclusive education and promoting lifelong learning opportunities for all. Another goal to be achieved by 2030 is that all women and men must have equal access to technical, vocational, and higher education.

The increasing pressure to provide inclusive and equitable education and promote lifelong learning for all has enabled a growing number of individuals with disabilities to engage in tertiary education [2], [3]. This includes those with Autism Spectrum Disorder (ASD). Individuals with ASD experience difficulties in social
communication and behavioral functioning [4]. The breadth of the spectrum means that individuals with ASD have different learning needs. Some of the characteristics of ASD are difficulties controlling repetitive behavior, aggressive behavior, anxiety, difficulty in following instructions, and a tendency to self-harm. They may also develop difficulties in sensory integration, fine motor skills, and language and communication. The neurodevelopmental nature of the disorder may also cause individuals with ASD to experience difficulties during the transition to tertiary education level [5].

To accommodate the enrolment of students with disabilities in mainstream educational settings, professional development for personnel who work with students with special needs has also been provided [6], [7]. For example, organizations such as [8] in the USA have developed 10 content standards for novice special education teachers. These comprise teachers’ knowledge and skills in the foundational fields, development and characteristics of learners, individual learning differences, instructional strategies, learning environments and social interactions, communication, instructional planning, assessment, professional and ethical practice, and collaboration.

Although pre-service teacher education programs equip teachers with a wide-range of skills so that they can work effectively with students with disabilities, there is limited training for lecturers in tertiary education institutions [9]. The aim of this article is to present the perspectives of lecturers in a Malaysian tertiary education institute on their experiences with students with ASD. Their views are vital, as they are the first point of contact when academic support is needed. First, the provision of educational services for students with disabilities in Malaysian education system is described.

In Malaysia, the welfare of individuals with a disability is the responsibility of the Ministry of Education (MOE), Ministry of Higher Education (MOHE), and the Ministry of Women, Family and Community Development (MWFC). The MWFC provides services for children with severe and multiple disabilities in Community Based Rehabilitation Centers; however, these are not included in the formal education system [10]. The tertiary education system is centralized with only one ministry, the MOHE, responsible for all public and private tertiary education institutes. According to reference [11], Easy Access to Education states that students with disabilities are eligible for education in public or private institutions of higher learning, including training and vocational education. They are also encouraged to work at government agencies as part of the one percent policy [12].

Although education for students with disabilities in Malaysia began prior to its independence in 1957, formal training programs and accreditation and licensure for special education teachers only commenced in the 1980s [13]. The first accreditation in Special Education at degree level was established by the National University of Malaysia, locally known as ‘Universiti Kebangsaan Malaysia’ in 1996. The provision of high quality education for students with a disability is now considered a top priority [12]. Through inclusive Malaysian education programs, an increasing number of students with ASD are placed in mainstream classes and are given the chance to further their studies through access to the mainstream curriculum and examinations. Tertiary education institutes must be prepared to accept such students. The need for inclusive practices within higher education will increase, as more students with ASD successfully complete their schooling [14].

Experiences in higher education are crucial in preparing students for the reality of working life. Although the enrolment of students with ASD in tertiary education has increased, recent research in this area indicates they encounter difficulties adjusting to this setting. This is partly because individuals with ASD may experience low self-esteem and struggle to form new relationships [15]. Specific learning support which differs from that provided at school level is therefore crucial in ensuring they are able to graduate. Accessibility has emerged as the main theme among the barriers often faced by individuals with disabilities in tertiary education, including access to higher education, access to information, physical surroundings, assumptions of ‘normality’, and low level of disability awareness [16]. Research on positive university experiences among students with ASD reported university support, training for staff, access to learning materials, and mentorship programs as helping students adapt to these settings [14], [17].

Students with ASD have increasingly been attracted to the science, technology, engineering and math (STEM) field globally [18]. The trend is similar in Malaysia where strong support from the government has increased the number of students with ASD undertaking technical and vocational programs. Higher acceptance rates at technical and vocational tertiary education institutions means students need to be able to work in groups where collaboration and communication are among the most important skills. Although lecturers have technical knowledge regarding the content of the course, they lack specific pedagogy with respect to the needs of students with disabilities [19].

2. Methodology

The overarching research question guiding this qualitative study was “What are lecturers’ experiences in teaching students with ASD?” To answer this question, a small sample of six lecturers at a private tertiary education institute offering technical programs was recruited. To
describe a subgroup in depth and reduce a phenomenon to its essence, reference [20] recommends the use of homogeneous sampling. This means the participants have similar characteristics that will help to illustrate the issues under investigation. The selection of participants was thus based on their experience teaching two students identified as having ASD. The first student produced excellent academic results, while the other exhibited low academic performance. To elicit the information required, data were collected through individual semi-structured interviews [21]. Interview sessions were conducted face-to-face in a location convenient to the participants. Each interview lasted approximately 40 minutes.

All interviews were transcribed and the interviewer sent a copy of the transcription to the participants to verify its accuracy. Data were analyzed using thematic analysis to identify relevant themes [22]. A comparative analysis was conducted between participants that allowed broad themes to be drawn out for detailed discussion and further analysis. The data analysis followed reference [22] six ‘phases of thematic analysis’: familiarization with the data; generating initial codes; searching for themes; reviewing themes; defining and naming themes; writing the report. Data were analyzed in Malay and the findings then translated into English while striving to remain as close as possible to the original words used by the participants [23].

3. Findings

All participants are given pseudonyms to protect their identity. The characteristics of the participants are presented in Table 1. All have an educational background in the field of engineering. Except for Amy, five had industrial experience prior to teaching. None of the participants have family members with ASD except for Adam who has a 6-year-old niece with ASD. Four of the lecturers taught a student with ASD who is performing well academically. One taught a poor performing student with ASD and one lecturer taught both students with ASD.

Data were read several times and then compared to extract emerging themes. Topics and patterns in participants’ responses were identified by looking for regularities and phrases [24]. If two or more responses within a question were similar, they were coded into a topic. Data were scrutinized by noting interrelationships and connections between topics for each theme.

Three main themes emerged from participants’ responses regarding their experience with students with ASD. These were ‘Knowledge and awareness’, ‘Specific educational needs’ and ‘Peers’. To describe the lecturers’ experiences in depth, the findings within each theme are discussed. To contextualize the responses, each quotation includes a description of the participant’s pseudonym, the student they taught, and their teaching experience in years.

<table>
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<th>Description of the ASD student participants have taught</th>
<th>Participants</th>
<th>Gender</th>
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<th>Highest education level</th>
<th>Teaching experience (years)</th>
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<td>Low academic performance</td>
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<td>32</td>
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<tr>
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<td>Female</td>
<td>37</td>
<td>Bachelor</td>
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3.1. Knowledge and Awareness

Knowledge and awareness emerged as a theme in which participants expressed concern about the lack of information they had to support the ASD students they teach. Although five of the six lecturers taught the ASD student whose performance was excellent, all participants expressed similar comments, an example of which is as follows:

“We need a talk on autism... Give awareness to lecturers so that they have concerns about those with autism, how to support their needs, to facilitate our teaching and learning activities” (Ema, taught the high performing ASD student, 5 years teaching experience).

Although there is a higher rate of enrolment of students with ASD in tertiary education institutes, no training is provided for lecturers to prepare them. This means they have less information available to guide decisions supporting the needs of students, as is the case for Amy, who taught a student with low academic performance:

“At that time, I had no knowledge of autism, I didn’t know if he had family problems or social problems. When I asked his classmate, they said he is usually like that” (Amy, taught the low performing ASD student, 6 years of teaching experience).

One of the participants who taught ASD students with both high and low academic performance thought that experience with individuals with ASD matters in helping build expectations:

“[we need to know] how to manage this student's behavior because we have no experience, so we cannot imagine how this student will behave” (Suri, taught both ASD students, 8 years of teaching experience).

Suri has been teaching for longer than Ema and Amy and her experience teaching both high and low performing students highlighted the importance of understanding the behavioral characteristics of individuals with ASD. This also suggests that including students with disabilities at the tertiary education institute opens up opportunities for staff to learn about ASD, despite the lack of in-house training provided by the university.

3.2. Specific Educational Needs of ASD

In addition to the importance of knowledge and awareness, another issue that repeatedly emerged from the data was the specific learning needs of the ASD students. Although a general description exists of high and low performing students with ASD, the lecturers acknowledged the specific characteristics of the students affect their experiences in class. In particular, all lecturers highlighted the different behavioral and emotional needs demonstrated by the students. Din and Ady taught the same ASD student twice:

“The important thing is we want to control his emotions because a special student’s emotions are easily disturbed, even slight pressure will disturb him. If he feels disturbed, he may do something that impacts his learning.” (Din, taught the high performing ASD student, 9 years of teaching experience)

Din had the longest teaching experience of all the participants. Din did not realize the student had ASD when he first taught him. He acknowledged that such students are different from other students and raised the importance of specialist knowledge in supporting students with ASD more effectively. Whilst acknowledging that differences among students may lead to stigmatization, recognizing the specific characteristics of the students helped lecturers to adapt to their teaching approach, as argued by Ady:

“The lecturers here have technical knowledge, but they have less knowledge about education for those with autism. Maybe there are appropriate techniques or methods [to support the ASD student]” (Ady, taught the high performing ASD student, 8 years of teaching experience).

Ady is the only participant with a doctoral degree. Although knowledge and skills are important for lecturers to teach in the technical tertiary education institute, he realized that students with ASD require specific teaching methods so that they can be better understood and supported. At school level, these specific educational needs were primarily supported by special education teachers. There were no specialist personnel available to assist the lecturers. Therefore, lecturers have to be trained in both content and pedagogical skills and knowledge. Another lecturer described the different characteristics of her student as follows:

“Different from a typical student in terms of their conversation, action, or reaction. For example, when we ask a question or we try to interact with him, there is something different about him; we don’t know what the thing is that makes him different, but he is not same as others” (Amy, taught the low performing ASD student, 6 years of teaching experiences).

Amy could not explain the differences between the students but recognized there are some atypical characteristics of the student she taught. Staff members need to develop opportunities to nurture friendships between students so that diversity can be addressed appropriately. The increasing pressure to include more students with disabilities in mainstream settings means that educational institutions will be increasingly diverse in the future. Developing friendships at tertiary education is vital for students with ASD to expand networking and build confidence and social capital. This is particularly important for these students as they often struggle with social and communication skills.
3.3. Peers

The third theme that emerged from the analysis was ‘Peers’. All participants acknowledged that it is not only lecturers who are facing difficulties supporting students with ASD. They also emphasized the importance of support from other students. Students with ASD felt more comfortable talking to other students instead of the lecturers:

“...he was rarely alone, he had a close friend who understood his attitude, so the way for us to understand the student with ASD is to ask his friend. His close friend, most trustworthy friend...when his classmates joke around with this ASD student, this student will defend him” (Adam, taught high performing ASD student, 5 years of teaching experience).

Identifying individuals who were close to the student with ASD was crucial in enabling the lecturer to obtain information about the student. Adam was observant enough to identify the person who could help him support his ASD student. The following example also indicates that other peers need to be educated about autism to avoid teasing and bullying.

“When they feel uncomfortable with the lecturer, at least they have friends. So, I’ll make sure these students work in a group with someone who gets along well with them. Sometimes they did not answer my questions directly when I asked them, but I can refer to their friends.” (Suri, taught both ASD students, 8 years of teaching experience).

Nurturing trust and respect may also facilitate interactions among peers which is necessary in technical courses where group work is often conducted. Having peers with whom students with ASD are comfortable is also helpful for the lecturers, as described in the following extract:

“In group work, I need to ensure that he is in the same group as his best friend or else the work is not done” (Adam taught the high performing ASD student, 5 years of teaching experience).

Although peers were recognized as an important support system for students with ASD, the lecturers also recognized that on some occasions, other peers were the reasons students with ASD experienced behavioral or emotional problems. They may then disrupt teaching and learning activities for the rest of the class and, more importantly, harm their own social and academic progress. Two of the lecturers talked about incidents that had happened in their class:

“...I was upset with some students in my class...the ASD student didn’t like the situation when I was angry...before that I didn't know he was autistic. I noticed he got distressed, but I was not angry with him, I was angry with the others” (Ema, taught the high performing ASD student, 5 years teaching experience).

It is typical for students in Malaysia to be informed when they do something wrong in class. Although only a few students may be involved in the wrongdoing, the whole class will usually be reminded not to repeat this behavior. This forms part of life experiences with peers. The lecturer’s lack of awareness about the sensitivity of an individual with ASD to an intense environment can trigger emotional distress. Suri described her experience as follows:

“One day I said, 'today we are going to do this practical, tomorrow we will have a practical test', he [student with ASD] went back to his table mumbling sadly 'why today, why today, tomorrow test'. He was talking to himself not to his friend. When I saw him like that, I asked him 'what's wrong?' but he ignored me and continued with his mumbling. Then his friend said, 'Ms. he has a sickness', the ASD student heard this, and said 'I am not sick.'” (Suri, taught both ASD students, 8 years of teaching experience).

A change of routine in classes is a common experience in tertiary education. When this happens, lecturers often have to ensure students can adapt to the changes. In the above example, the lecturer tried to understand why the student was sad; however, his distress was caused by insufficient understanding of the strategies needed to introduce changes to individuals with ASD. The student’s peers were also unhelpful because they did not have sufficient knowledge about ASD. The label ‘sickness’ mentioned by the peers upset the student even more and thus the labelling issue should be addressed accordingly.

4. Discussion

This article has argued there is immense value in listening to the lecturers’ experiences as they are the first point of contact when academic support is needed in tertiary education. Previous research has reported the increasing enrolment of students with ASD in STEM-related fields and our findings indicate a similar trend. Ensuring participation in tertiary education for all aligns with the SDG4 goal to promote lifelong learning opportunities for all. In line with higher enrolment, there is an increasing body of research on stakeholders’ experiences supporting these students.

Our findings showed that the increased diversity in tertiary education classrooms was not accompanied by a transformation in the way learning environments are organized. Hence, insufficient support for the physical inclusion of individuals with ASD in the institute promotes their exclusion from lessons [25]. The lecturers reported struggling to support the needs of students as they lacked the knowledge and skills needed to manage their behavioral and emotional distress. At the same time, the inclusion of
students with ASD alongside other students opens up opportunities for friendships in which students spend most of their time together and learn to understand each other’s needs, despite not being taught by special education staff. Furthermore, the development of friendship creates a sense of belonging that in the long run becomes an internal motivation for students to negotiate their differences.

The fact that some characteristics of ASD are not easily visible, especially to those with limited knowledge and awareness of autism, often means that the needs of such students were neglected or unnoticed [5]. The lecturers in this study were not informed about the condition of the students with ASD in their class and were therefore unaware of their specific needs. Those who taught the students more than once or met other individuals with ASD were found to have increased knowledge and awareness about their needs.

The content standards for teachers working in an inclusive setting in reference [8] are not adequate because there are no specialist personnel to support the lecturers. The establishment of a disability unit at tertiary education institutions may fill the gap in knowledge as disability experts can better support the staff members and students. In the absence of such support, proactive initiatives will be needed to ensure lecturers’ skills and knowledge address the needs of the students [9].

Teaching strategies such as clear instructions, pacing, organizational skills, processing time, group work and motivation were often regarded as specific pedagogy but these skills are also needed for those without disabilities [26]. Skills learnt at tertiary education level such as learning to form new relationships, adapting to sudden changes in routine, and group work are all necessary to prepare students for employment and life in general. Investments in personal development at this level also have influence on individual’s future endeavors [27]. The young adults of today are the citizens of tomorrow with all the rights and responsibilities to contribute to the ‘people and planet’ [28]. Ensuring they are able to participate fully in the learning environment is crucial in ensuring they benefit from these experiences. Access to higher education, access to information, physical surroundings, assumptions of ‘normality’, and disability awareness are all necessary components of the support provided for students with disabilities in tertiary education [16]. This study however, found that the tertiary education institute is still far from providing sufficient levels of support and that a concerted effort from all stakeholders is necessary to develop an inclusive learning environment.

This study also indicated that high academic performance is not the only important issue for lecturers at tertiary education level. Students are expected to be able to deal with challenges and collaborate with other peers to complete given tasks as part of a course. Lecturers who are aware of the difficulties ASD students face will be able to help them in their studies and ensure the students are not left out. Furthermore, identifying teaching approaches that do not help students learn will help lecturers support those with low academic performance. An awareness that students with ASD require several adjustments will prevent lecturers from underestimating their potential [29].

In class, lecturers play a key role in supporting the learning processes of students with ASD [17]. While the lecturers in this study rated themselves low in knowledge and awareness of ASD, it was clear that collaboration with other students had helped them discover strategies to understand the needs of students with ASD better. Dedicated lecturers often want to ensure they are employing the appropriate teaching strategy for student with special needs [30].

Characteristics of ASD such as sensory integration problems and sensitivity to changes are not easily addressed [26]. This study found that the lecturers were worried they did not have sufficient knowledge on behavior modification to meet the needs of ASD students who exhibited unexpected behavioral as well as emotional distress. A way forward to address this issue is to celebrate differences and learn to tolerate each other. Some of the students’ peers were able to create a buddy system where they worked together to support each other’s needs. This is important as friendships may not always develop, even if the students sit next to each other. Lecturers need to ensure an actual buddy system is allocated to every student so they can learn to support each other, which is in line with the wider agenda to develop an inclusive society [31].

5. Conclusions

The main findings of this study suggest that the lecturers at a tertiary education institute were restricted in supporting students with ASD due to issues related to knowledge and awareness, the specific educational needs of students with ASD, and the importance of student peers. Increasing enrolment of students with ASD has not been accompanied by sufficient training for staff members to adequately support the needs of these students. Effective inclusion of students with ASD in tertiary education institutes will require inter-ministerial collaboration, as well as a step-change in the awareness of professionals regarding disability equality in education.

In recent years, the Malaysian government has proclaimed its commitment to support the education of individuals with disabilities in tertiary education. However, limited expertise in guiding practices means it is unlikely the implementation of inclusion can be effectively achieved in the immediate future. The fact that the majority of students with disabilities are educated in separate educational settings at school level presents considerable barriers to their inclusion at tertiary education level. This study confirms the complexity inherent in ensuring the right of everyone to inclusive education.

A key strength of this study lies in its focus on the
experiences of lecturers teaching students with ASD. However, the study was small in scale, given the diversity of tertiary education settings in Malaysia. More research is, therefore, needed to understand how students with ASD experience tertiary education and the outcomes of their experiences. It has implications for developing suitable training for professionals in the future.

Acknowledgement

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REFERENCES


Computational Thinking among High School Students

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Abstract Computational thinking is a set of 21st-century skills that can be applied in problem-solving processes and daily activities. The significance of computational thinking skills in the 21st century has opened educators’ eyes and minds to apply these skills to teaching and learning processes. Therefore, a survey was conducted to identify the level of computational thinking skill among high school students and the difference in computational thinking in terms of students’ gender and education level. Ultimately, 343 students from secondary schools around the Pasir Mas district in Malaysia were selected as respondents using the cluster sampling method. Data obtained were analyzed using descriptive statistics (i.e., mean score and standard deviation) and inferential statistics (i.e., t-test). The findings show that students’ computational thinking skill is at a high level. In terms of gender comparison, female students’ computational thinking skill is higher than that of male students. In addition, students’ computational thinking skill by level of education is the same. Thus, teachers should emphasize computational thinking skills in teaching and learning processes, whether through computer-based or unplugged activities. Proactive measures are needed to improve students’ level of computational thinking skills so that students equip themselves with the basic skills to face the challenges of the 21st century.

Keywords Computational Thinking, Problem Solving, Creativity, Algorithm, Critical Thinking

1. Introduction

The advent of supercomputers, robotics, automation vehicles, neurotechnology advances, and genetic editing that helped individuals optimize their mental abilities marked the development of the fourth industrial revolution [1]. The rapid advancement of these technologies indicated a convergence of the priorities in the field of education given to the effectuation of 21st-century skills. As such, the integration of science, technology, engineering, and math (STEM) education in teaching and learning is gaining prominence and importance in the education system in Malaysia.

The 21st-century job market desperately needs skilled manpower equipped with problem-solving skills, creative and innovative thinking, and team players [2]. STEM education is one way to produce the required skilled manpower. The implementation of STEM educational methods that involve active learning, which indirectly incorporates the application of 21st-century skills, especially digital literacy aspects, will expose students to careers in the science and technology field, thereby preparing and increasing the amount of skilled manpower for the job market.

Computational thinking comprises a set of 21st-century basic skills that are applied in solving problems in daily life, including basic skills for analytical thinking, such as mathematical thinking, engineering thinking, and science thinking [3]. Computational thinking also has the potential to sharpen critical and creative thinking skills in designing technology tools and problem-solving processes [4,5]. Therefore, with the emergence of various job opportunities that are closely linked to computing in today’s digital age, it is necessary to equip students with computational thinking skills.

The implementation of STEM education teaching methods requires students to solve problems through
discovery and exploration. According to Yagci [6], this method helps students to master computational thinking skills (e.g., problem-solving techniques, creativity techniques, algorithmic thinking techniques, cooperative learning techniques, and critical thinking), which are essential to ensure that learning objectives are achieved. Therefore, teachers must know the level of students’ computational thinking skills in order to design and implement teaching methods that give meaning and impact to students. This research examined the level of computational thinking among high school students.

Yadav et al. [4] found that women are currently not gaining enough attention or opportunities in STEM fields, indicating a lack of balance in the involvement of males and females. To avoid gender discrimination, this gap should be minimized. Previous studies have demonstrated that, in terms of computational thinking skills, no differences exist between male and female students [7,8], but the gender differences are inconsistent [7]. To achieve the same computational thinking skill level as males, females usually require additional training sessions [7], even though these skills encourage women to pursue careers in STEM fields. The study by Djambong and Freiman [9] also reported that level of computational thinking varies by educational level, which includes different technology access. Therefore, there is a need to study the level of computational thinking skills in terms of both gender and education level, as both men and women have a common interest in improving their computational thinking skills.

STEM education involves teaching and learning activities by implementing and applying four key areas—science, technology, engineering, and mathematics—in the real-world context. Its implementation is carried out using a variety of strategies, such as problem-, project-, game-, and inquiry-based learning [10-12]. This STEM education approach involves a more realistic and practical way of learning as it focuses more on hands-on activities that enhance thinking ability and problem solving [10]. At the same time, the STEM education learning strategy also has the potential to train students in applying 21st-century skills, particularly in the area of digital literacy, by emphasizing the concept of designing projects to solve real-world problems [2,13,14].

Recent studies have identified various definitions of computational thinking, yet scholars are still unable to reach an agreement on a singular definition. Nevertheless, scholars generally agree that computational thinking is a very important set of skills and is used to solve difficult problems in human life [3,15,16]. Computational thinking is a broad concept, and its application helps develop thinking skills so individuals can be more creative and think critically, especially in problem solving.

Barr and Stephenson[16] concluded that computational thinking is a problem-solving process involving several steps: (i) formulate a specific problem that involves the use of a computer or other device as a tool for solving the problem; (ii) organize, analyze, and represent data through the use of abstraction as a model or simulation; (iii) understand the problem using an algorithm; (iv) organize and analyze data logically; (v) identify, analyze, and apply several possible ways to determine the most effective combination of solutions; and (vi) generalize and use effective solution processes for other similar problems. Based on these steps, computational thinking consists of several components. Even so, the components found by Wing [3] are the most relevant and widely accepted by factors: problem solving, algorithm thinking, critical thinking, cooperative learning, and creative thinking [17].

Gelbal [18] interpreted the problem as all the things that confuse and give challenge to humans in daily life. Each individual has a different problem-solving strategy, depending on the level of that individual’s problem-solving skills. In order to apply problem-solving skills, structured and systematic learning must be done by practicing basic skills. According to Mayer [19], a common step in problem-solving skills is to analyze each problem using the cognitive skills needed to solve the problem and then apply those skills systematically until proficient.

The concept of an algorithm is now widely used in various fields involving processes that require certain procedures, protocols, or techniques. The term algorithm refers to a set of steps or sequences to ensure that work or information is performed in an organized manner using the skills of understanding, applying, evaluating, and generating a new algorithm [20,21]. Algorithmic thinking skills have the potential to enhance an individual’s ability to process information more efficiently as well as develop the ability to think in more detail and focus.

Critical thinking is one of the elements of higher-order thinking. The definition of critical thinking by Halpern [22] is the utilization of cognitive skills or techniques to promote the likelihood of a preferred behavior. Critically minded individuals are able to follow and apply every change in information efficiently [23]. Critical thinking is also defined as an active, ordinary, and meaningful process that can be used to leverage an individual’s understanding and skills or the ideas and thoughts of others [24].

Slavin [25] states that cooperative learning refers to students’ cooperation in small group learning, where an individual student’s performance is evaluated based on group development and performance. Cooperative learning is one of the efficient ways of learning due to its contribution to students’ academic achievement, information sharing, and the development of social skills between students [26]. This method also helps students achieve the maximum level of learning as students with different abilities and strengths cooperate in a small group to attain the same goals.

The concept of creativity encompasses different perspectives from different societies. Korkmaz et al. [27] stated that creativity is a skill in producing products that are
not in the market yet or a new product, capable of imagining or performing work that is different from others’ thinking as well as capable of generating new ideas. Sternberg and Lubart [28] viewed creativity as the potential to create something new and useful for the public; it also helps individuals solve everyday problems and access new and original information.

As computational thinking is expected to be one of the fundamental skills required for every individual in the 21st century and STEM education, which emphasizes learning strategies based on real-world problem solving, requires students to master and apply computational thinking skills, students’ level of computational thinking skills needs to be evaluated to determine the extent to which students master these skills. This study discusses the level of computational thinking among students and their differences in terms of gender and education level. The results are expected to help teachers plan more effective teaching and learning methods after determining students’ computational thinking levels.

2. Materials and Methods

This study was conducted using a quantitative research method. The researchers conducted a survey using questionnaires to determine the level of computational thinking among students. However, due to difficulties in identifying the exact number of the population, the cluster sampling method was used. Three out of 20 national secondary schools located in the Pasir Mas district in Malaysia were randomly selected to obtain samples for this study. All students in the three chosen schools were heterogeneous. A total of n = 343 upper-form and lower-form students participated as respondents of this study. This sample was chosen because these students have gained exposure to computational thinking through the subject of computer science.

The questionnaire used to gather data was adapted from Yağcı [6]; its validity and reliability have been tested. A questionnaire was chosen as the instrument for data collection because of its effectiveness in obtaining accurate data from a large number of respondents as well as being easier to administer and analyze. The questionnaire consists of two sections: Part A and Part B. Part A includes questions about respondents’ demographic characteristics whereas Part B asks about students’ level of computational thinking skills—namely, problem-solving techniques (16 items), cooperative learning and critical thinking (5 items), creativity techniques (9 items), and algorithmic thinking techniques (4 items).

A 5-point Likert scale (strongly disagree = 1, strongly agree = 5) was used to determine each item’s score. Data were then analyzed using a descriptive analysis (mean and standard deviation). The interpretation of each construct was divided into three levels (i.e., low, medium, high). The mean interpretation used in this study is based on a study by Lapamumu and Mahamod [29], as shown in Table 1.

### Table 1. Mean interpretation

<table>
<thead>
<tr>
<th>Mean Range</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.00–2.33</td>
<td>Low</td>
</tr>
<tr>
<td>2.34–3.67</td>
<td>Medium</td>
</tr>
<tr>
<td>3.68–5.00</td>
<td>High</td>
</tr>
</tbody>
</table>

The instrument used in this study was also reviewed and validated by experts in the field of information, communication and technology (ICT) and STEM education. A pilot study was conducted with 30 students to determine the reliability of the instrument used. The pilot study participants had the same characteristics as those in the main study. Fifteen students each from the lower form and upper form were randomly selected as respondents. An analysis using Cronbach’s alpha was conducted (see Table 2). According to Fraenkel [30], the reliability value of the instrument (i.e., Cronbach’s alpha) must be at least 0.70 to be acceptable for use in research. The Cronbach’s alpha value analysis shows that overall the instrument used was reliable (Cronbach’s alpha = 0.899). As it has high validity and reliability, the data obtained from this study are more accurate and reliable.

### Table 2. Cronbach’s alpha value for each construct

<table>
<thead>
<tr>
<th>Construct</th>
<th>Number of Items</th>
<th>Cronbach’s Alpha Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem Solving</td>
<td>16</td>
<td>0.866</td>
</tr>
<tr>
<td>Cooperative Learning &amp; Critical Thinking</td>
<td>5</td>
<td>0.725</td>
</tr>
<tr>
<td>Creativity</td>
<td>9</td>
<td>0.803</td>
</tr>
<tr>
<td>Algorithmic Thinking</td>
<td>4</td>
<td>0.751</td>
</tr>
</tbody>
</table>

3. Results

Data were analyzed both descriptively and inferentially. The descriptive analysis, involving the mean value and standard deviation, was carried out to identify students’ computational thinking level. Meanwhile, the inferential statistical analysis used the t-test of two independent samples to identify differences in students’ level of computational thinking based on gender and education level. To determine the parametric or non-parametric nature of data, some t-test assumptions were considered—namely, data should be approximately distributed, and the homogeneity of variances has been reviewed and complied with before conducting the t-test.

Normality tests and histograms were used to ensure that the data were normally distributed. The results of the normality test analysis showed that the significant value for the Kolmogorov-Smirnov test was p=0.200, which is p>0.05. Therefore, the data are considered to be normally distributed. The data distribution of students’ computational thinking level is shown in Figure 1. The
Levene test was conducted to determine the homogeneity of the variance. The test results show that the significant value for the variable of gender is \( p=0.739 \), which is \( p>0.05 \), indicating that the homogeneity of the variance is met. As for the education level variable, the homogeneity of the variance is \( p=0.012 \), which is \( p<0.05 \), so a separate \( t \) variance test is used.

3.1. Level of Computational Thinking among Students

This study examined several elements of computational thinking: problem solving, cooperative learning and critical thinking, creativity, and algorithmic thinking. The results show that students’ computational thinking techniques are at a high level (M=3.69, SD=0.32). Table 3 shows that students’ problem-solving techniques (M=3.80, SD=0.38), creativity techniques (M=3.80, SD=0.47), and algorithmic thinking techniques (M=3.70, SD=0.49) are at a high level whereas their cooperative learning techniques and critical thinking (M=3.16, SD=0.49) are at a moderate level.

3.2. Differences in Students’ Computational Thinking Based on Gender

\( H_{01} \): There is no significant difference in the mean score for computational thinking based on gender.

An independent sample \( t \)-test analysis was used to identify the differences in computational thinking skills among students based on gender. As Table 4 indicates, a significant difference emerged in the level of computational thinking (\( t=-2.557, p=0.011 \)) between male and female students. Thus, \( H_{01} \) is rejected at the level of significance (\( \alpha=0.05 \)).

![Figure 1. Normality test for computational thinking skills test](image)

**Table 3.** Levels of computational thinking among students

<table>
<thead>
<tr>
<th>Construct</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem Solving</td>
<td>3.80</td>
<td>0.38</td>
<td>High</td>
</tr>
<tr>
<td>Cooperative Learning and Critical Thinking</td>
<td>3.16</td>
<td>0.49</td>
<td>Moderate</td>
</tr>
<tr>
<td>Creativity</td>
<td>3.80</td>
<td>0.47</td>
<td>High</td>
</tr>
<tr>
<td>Algorithmic Thinking</td>
<td>3.70</td>
<td>0.49</td>
<td>High</td>
</tr>
<tr>
<td>Computational Thinking</td>
<td>3.69</td>
<td>0.32</td>
<td>High</td>
</tr>
</tbody>
</table>

**Table 4.** Differences in students’ computational thinking based on gender

<table>
<thead>
<tr>
<th>Construct</th>
<th>Gender</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem Solving</td>
<td>Male</td>
<td>3.72</td>
<td>0.38</td>
<td>2.691</td>
<td>0.350</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>3.83</td>
<td>0.37</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooperative Learning and Critical Thinking</td>
<td>Male</td>
<td>3.12</td>
<td>0.54</td>
<td>1.023</td>
<td>0.066</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>3.18</td>
<td>0.47</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Creativity</td>
<td>Male</td>
<td>3.76</td>
<td>0.49</td>
<td>1.121</td>
<td>0.723</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>3.82</td>
<td>0.46</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Algorithmic Thinking</td>
<td>Male</td>
<td>3.62</td>
<td>0.52</td>
<td>2.108</td>
<td>0.161</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>3.74</td>
<td>0.46</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Computational Thinking</td>
<td>Male</td>
<td>3.63</td>
<td>0.32</td>
<td>2.557</td>
<td>0.011</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>3.72</td>
<td>0.31</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Overall, students possess a high level of computational thinking, suggesting that they are able to master computational thinking techniques well, especially problem-solving techniques, creativity techniques, and algorithmic thinking techniques. These findings are in line with those of Korocu [31], who also showed that the level of computational thinking for students is high. Several teaching and learning methods implemented through STEM education involving hands-on activities help stimulate computational thinking skills. These applications of computational thinking skills help train students to think creatively and critically, especially when solving a problem. In addition, students can understand the concepts of learning well if they are able to master and implement computational thinking techniques in the learning process [32]. Thus, students with a high level of computational thinking skills tend to be more creative and think critically when solving difficult problems encountered in daily life.

A high level of mastery in problem-solving skills is very important when solving complex problems. Problem-solving techniques involve the skills to evaluate, understand, and analyze the problems encountered in addition to planning the strategies to resolve the problem [33,34]. Therefore, students who master problem-solving techniques will be able to manage and solve complex problems, take risks, and become capable of thinking at a high level in solving problems [11]. In the problem-solving process, possessing a high level of creativity skills enables students to use a variety of ideas and methods to complete tasks and solve problems. According to Kong et al. [35], the fundamentals of STEM learning, which emphasize finding solutions to real-world problems in daily life activities and environments, can be honed, thereby shaping students’ creativity, which is based on existing experience and knowledge. Thus, STEM learning methods can enhance students’ creativity in problem solving.

Algorithmic thinking skills are important in developing strategies for solving problems. According to Rodriguez et al. [36], students can understand problems well, but find it difficult to develop appropriate and effective strategies to solve the problems because the algorithmic form of formulas, techniques, rules, or steps must be based on information gathered from two or more similar problems. In this regard, STEM learning methods are able to train and improve the students’ algorithmic thinking techniques and, thus, assist them in designing more effective and systematic solutions. Cooperative learning emphasizes the cooperation and active involvement of students in a small group. Cooperative learning techniques encourage collaboration among students with different capabilities in achieving the targets and benefits together [37]. Less skilled individuals are able to develop better understanding and skills than he/she ought to independently through cooperation, guidance or assistance, or an expert or more capable peer [38]. In addition, through cooperative learning, students can be trained in critical thinking that includes the ability to draw conclusions and generalizations, the ability

### Table 5. Differences in students’ computational thinking based on education level

<table>
<thead>
<tr>
<th>Construct</th>
<th>Education Level</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem Solving</td>
<td>Lower form</td>
<td>3.78</td>
<td>0.41</td>
<td>0.703</td>
<td>0.086</td>
</tr>
<tr>
<td></td>
<td>Upper Form</td>
<td>3.81</td>
<td>0.35</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooperative Learning and</td>
<td>Lower form</td>
<td>3.16</td>
<td>0.51</td>
<td>0.057</td>
<td>0.209</td>
</tr>
<tr>
<td>Critical Thinking</td>
<td>Upper Form</td>
<td>3.16</td>
<td>0.48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Creativity</td>
<td>Lower form</td>
<td>3.80</td>
<td>0.49</td>
<td>-0.126</td>
<td>0.899</td>
</tr>
<tr>
<td></td>
<td>Upper Form</td>
<td>3.79</td>
<td>0.45</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Algorithmic Thinking</td>
<td>Lower form</td>
<td>3.67</td>
<td>0.54</td>
<td>0.985</td>
<td>0.325</td>
</tr>
<tr>
<td></td>
<td>Upper Form</td>
<td>3.72</td>
<td>0.42</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Computational Thinking</td>
<td>Lower form</td>
<td>3.68</td>
<td>0.35</td>
<td>0.540</td>
<td>0.590</td>
</tr>
<tr>
<td></td>
<td>Upper Form</td>
<td>3.70</td>
<td>0.29</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 3.3. Differences in Students’ Computational Thinking Based on Education Level

H₀: No significant difference in mean score exists in computational thinking based on education level.

An independent sample t-test analysis was used to identify the differences in computational thinking skills among students based on their education level. As Table 5 demonstrates, there was no significant difference in the level of computational thinking (t= -0.540, p= 0.590) between lower form students and upper form students, suggesting that H₀ is rejected at the level of significance (α=0.05).

#### 4. Discussion

##### 4.1. Levels of Computational Thinking among Students

A high level of mastery in problem-solving skills is very important when solving complex problems. Problem-solving techniques involve the skills to evaluate, understand, and analyze the problems encountered in addition to planning the strategies to resolve the problem [33,34]. Therefore, students who master problem-solving techniques will be able to manage and solve complex problems, take risks, and become capable of thinking at a high level in solving problems [11]. In the problem-solving process, possessing a high level of creativity skills enables students to use a variety of ideas and methods to complete tasks and solve problems. According to Kong et al. [35], the fundamentals of STEM learning, which emphasize finding solutions to real-world problems in daily life activities and environments, can be honed, thereby shaping students’ creativity, which is based on existing experience and knowledge. Thus, STEM learning methods can enhance students’ creativity in problem solving.

Algorithmic thinking skills are important in developing strategies for solving problems. According to Rodriguez et al. [36], students can understand problems well, but find it difficult to develop appropriate and effective strategies to solve the problems because the algorithmic form of formulas, techniques, rules, or steps must be based on information gathered from two or more similar problems. In this regard, STEM learning methods are able to train and improve the students’ algorithmic thinking techniques and, thus, assist them in designing more effective and systematic solutions. Cooperative learning emphasizes the cooperation and active involvement of students in a small group. Cooperative learning techniques encourage collaboration among students with different capabilities in achieving the targets and benefits together [37]. Less skilled individuals are able to develop better understanding and skills than he/she ought to independently through cooperation, guidance or assistance, or an expert or more capable peer [38]. In addition, through cooperative learning, students can be trained in critical thinking that includes the ability to draw conclusions and generalizations, the ability
to critically evaluate the logic and accuracy of a decision [6], as well as improving communication skill by exchanging ideas among themselves and with their teachers [39]. However, cooperative learning techniques and students’ critical thinking are still at a moderate level. Students’ interest and attitude toward cooperative learning also play an important role in enhancing their self-efficacy toward cooperative learning. STEM education teaching and learning strategies can help and improve students’ abilities, self-efficacy, productivity, and related understanding [40,41]. In addition, student-centric, inquiry-based, and hands-on learning approaches were proven to be effective in boosting students’ motivation and their engagement in classroom participation [42]. Thus, positive attitudes and high interest in cooperative learning can stimulate students’ ability to master cooperative learning techniques and critical thinking.

4.2. Students’ Computational Thinking Based on Gender and Education Level

The results highlight significant differences in the level of computational thinking between male and female students, which differs from findings by Chongo et al. [8] and Atmatzidou and Demetriadis [7]. In the current study, the mean score indicates that the level of computational thinking is higher among female students than male students. However, Atmatzidou and Demetriadis [7] reported that females need more time than males to become proficient in skills. In many cases, during training sessions female students required more time to attain the same computational thinking skill level as male students. In addition, according to Weintrup et al. [43], female students have a positive attitude and a higher degree of confidence in computational thinking than male students. Thus, positive attitudes and high self-efficacy motivate students to try new things in solving problems. Furthermore, the attitude of male students toward problem solving using computational skills is still at a moderate level, and they show less interest in trying to solve difficult problems [44].

Based on the results, the level of computational thinking based on students’ education level did not show any significant differences. This finding is in line with the findings of Atmatzidou and Demetriadis [7]. In addition, the development of computational thinking skills requires continuous training over time. Indeed, Korucu[31] explained that an individual’s level of computational thinking skills can be influenced by the duration of the possession of technology. In addition, Korucu[31] and Grover et al. [45] stated that students who possess a technology device for a longer period have a higher level of computational skills. Hence, exposure to the controlled use of technology is one of the appropriate forms of training in developing computational thinking skills regardless of education and age. As such, it is the teacher’s responsibility to discover, promote, and fully utilize technology in teaching and learning activities to familiarize students with the use of technology. Such an emphasis on computational skills in the teaching and learning process can enhance students’ computational thinking skills.

5. Conclusions

This research examines high school students’ computational thinking and the differences is such thinking in terms of gender and education level. Students have a high level of computational thinking in problem solving, creativity, and algorithmic thinking whereas the level of mastery for cooperative learning and critical thinking is at the medium level. The study also found that significant differences in the level of computational thinking occurred between the genders, but there was no significant difference based on education level.

The rapid growth of the digital world has made a huge impact on the education system in producing globally competitive and skilled workers. Therefore, 21st-century skills, especially computational thinking skills, are a necessity in the current era. To ensure that computational thinking skills can be improved, teaching and learning processes need to be designed in a more direct and detailed way to become more meaningful. To ensure that the components of computational thinking are consistently implemented, assessment-based learning activities are required. A proper and well-planned assessment ensures a successful integration of computational skills within teaching and learning processes. The findings of this research imply that students have high levels of computational thinking skills. As such, the Ministry of Education Malaysia (MOE) can leverage this information to introduce innovation for education in Malaysia. This study is also intended to serve as a guide for educators, especially STEM teachers, in generating ideas to incorporate computational thinking in teaching and learning processes. The dynamic involvement of students in solving problems through learning activities not only helps them master the concepts and theories quickly and easily, but also promotes their interest in STEM education.

The results of this research only cover a small sample size, so further studies are warranted using a large-scale sample size to obtain more accurate and reliable results. In addition, various activities can be carried out in integrating computational thinking skills within teaching and learning processes, such as unplugged activities, scratch game design, game-based learning, and problem-based learning. Future research should determine the extent to which such teaching and learning activities involve active learning that can support the process of integrating computational thinking skills into STEM education. Qualitative research, such as by conducting interviews, can also be conducted to gain feedback from teachers and students on their understanding and knowledge of computational thinking.
Acknowledgements

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Level of Readiness of Daily Secondary School Students for Use of Augmented Reality in Form 2 Science Textbooks

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Abstract  Augmented reality (AR) applications are an agent of change in how students learn by taking the learning process beyond the physical space of the classroom. AR applications have begun to be integrated into high school textbooks to enable students to visualize real phenomena from the textbooks to enhance the learning experience. This study sought to determine the level of readiness of daily secondary school students for the use of AR applications in Form 2 science textbooks. The findings indicate a high level of readiness among students to use AR applications (mean=3.92, SD=.439), and a moderate level of hindrance in AR applications (mean=3.17, SD=.652). Pearson correlation tests of the relationships among all of the variables suggested that the use of AR applications would be acceptable among secondary school students. This study provides an important indicator that the future educational environment in Malaysia must take into account and integrate elements of the latest technology. Educational institutions must move forward innovatively and adapt to aspects related to the curriculum and learning infrastructure creatively.

Keywords  Augmented Reality, Readiness, Hindrance, Science Texts Book

1. Introduction

Malaysia is a fast growing and proactive country in line with the boom of globalization today. To ensure high economic performance, the country needs a dynamic, proactive, and competitive workforce. Facing the increasingly challenging waves of change, the country needs a paradigm shift that could help make the economy more resilient and stable in tandem with developed countries, thus forming a successful and competent nation. To achieve this, Malaysia needs to produce a generation that is competitive, creative, rational, and capable of bringing about change in various aspects, especially in the field of education and technology related to the Industrial Revolution 4.0 (IR 4.0). Based on appearance of the IR 4.0 in mid-2016, the government formulated a policy framework that outlines a comprehensive action plan covering strategies and programs in various fields, including education [1]. The IR 4.0 is based on advances in the fields of autonomous robots, big data, augmented reality, artificial intelligence, cloud computing, internet of things, smart sensors, digital system integration, 3D printing, simulation and cyber security, which have begun to be integrated into national education systems through cooperation between educational and industrial institutions. This goal coincides with the initiative of the Ministry of Education Malaysia (MOE) to improve the education
system, through the Malaysia Education Blueprint (MEB) 2013–2025, which includes the policy of using information and communication technologies (ICTs) to improve the quality of learning in Malaysia [2].

The development of technology has changed methods of learning among students throughout the world. It has taken the learning process beyond the classroom space and made it more global in nature. The transformation of the use of ICT shows that the Malaysian government is committed to increasing the impact of student learning [3]. Through the latest technological approaches, the learning environment is becoming more attractive, which has indirectly motivated students to learn further, thus contributing to better educational outcomes [4] and further expanding the use of wireless computing technology and mobile devices [5].

Current learning scenarios encourage students to be more inclined to self-learning, self-access, and self-paced education. This is because the students who are in schools today are composed of generation Z—also called the iGeneration, internet generation, or net generation [6]. It is also driven by the existence of a system that can record all learning activities through the use of digital materials and materials obtained online. These elements are a new trend for teaching and learning in schools in the 21st century. Along with the use of smartphones, teachers are being asked to design active learning experiences by involving real-world problems and project activities that can engage students, as well as supporting learning that is more democratic, flexible, autonomous, and comprehensive, both formally and informally [7]. The advent of smart technology in various applications can help the teaching and facilitation process; one of the applications used is augmented reality (AR). AR applications allow students to see real-world environments with digital information overlapping at the same time to enhance the experience [8]. The use of AR applications can help learning activities be carried out collaboratively, support memory-related learning activities, and enable personal and self-oriented learning [9]. In the IR 4.0 Policy Framework, the government of Malaysia has stressed the importance of AR in the delivery of information and learning today. The Ministry of Education has begun to integrate the application of AR with school textbooks as an added value element [10].

2. Research Background and Problems

Students’ motivation and involvement in learning are often associated with the difficulty of the subject [11]. Although there are various technologies that have been applied in the field of education, there are still students who have difficulty in understanding the learning content of the subject. People have different desires and preferences when choosing new smart gadgets to use. These desires are mainly rooted in gender, personality, interest, values, and social status [12]. Use is dependent on accessibility, ease of use, availability, and flexibility for its adaption to different contexts [13]. Most students have difficulty understanding complex concepts and need strong visualization [14], especially in science subjects. AR applications have great potential because they are able to represent phenomena visually in three dimensions [15]. However, in Malaysia, this AR technology has not yet been widely applied [16]. The AR application integrated into the Form 2 Science textbook is a new element created by the MOE. Studies related to the level of readiness for the acceptance of this new technology are still limited. There have been several studies related to AR application development [17], level of understanding and interest [18], measurement of cognitive load, motivation and attitude [19], as well as the application of AR in biology textbooks [20]. This study therefore sought to identify the level of readiness of daily secondary school students in the Malaysian context for the use of AR applications in Form 2 Science textbooks using the unified theory of acceptance and use of technology (UTAUT) model. The UTAUT model includes four main constructs: performance expectancy (3 items), effort expectancy (4 items), social influence (3 items) and facilitating conditions (4 items). These were tested as a direct determinant of intention and behavior to use a technology [21–24]. Three simplification factors were used: gender, duration of device usage, and device ownership. This study also sought to identify to what extent the relationship level of readiness related to hindrance faced in the use of AR applications (8 items).

3. Research Objectives

3.1. The Objectives of the Study are as Follows:

a). Identify student readiness levels (performance expectations, effort expectations, social influence, and facility condition) and hindrances to using AR applications.

b). Measure differences in students’ levels of readiness to use AR applications based on gender, duration of device usage, and level of device ownership.

c). Measure the relationship between readiness level and hindrances faced by students in the use of AR applications.

3.2. Hypothesis

The study tested the following hypotheses:

- Ho1: there was no significant difference between the levels of readiness to use AR applications based on gender.

- Ho2: There was no significant difference between the readiness levels for AR application use based on the duration of device usage.
4. Research Methodology

This study was a quantitative survey using questionnaires. Data were analyzed using SPSS Version 23. The population of this study was a total of 3,137 Form 2 students in daily secondary school under the MOE in Sepang district, Selangor [25]. The Sepang district in Selangor was chosen because of the number of schools using the science textbook with integrated AR applications. A total of 346 samples were selected, based on the sample determination schedule [26]. This study uses a simple random group sampling method by selecting six of the ten secondary schools in Sepang district, Selangor, following the selection guidelines of 50%–60% for random groups [27]. Questionnaire items were constructed and modified and pilot tests were conducted to determine the value of Cronbach’s alpha [23,28,29]. Items were scored on a point Likert scale ranging from 1, strongly disagree, to 5, strongly agree. For the purpose of analyzing the students’ level of readiness, results were interpreted according to the mean score, shown in Table 1 [30].

A pilot study was conducted with 32 Form 2 students from a secondary school in Nilai Negeri Sembilan district. The Cronbach’s alpha value for all items was 0.868, (>0.7), which shows a high level of reliability [27,31]. Skewness and kurtosis normality tests indicate that it was normally distributed, with variable test results between ± 2.5 for statistic and standard error (Table 2).

5. Results and Discussion

5.1. Respondent Demographics

The demographic distribution of respondents is shown in Table 3.

<table>
<thead>
<tr>
<th>Construct</th>
<th>Number</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>105</td>
<td>30.3</td>
</tr>
<tr>
<td>Female</td>
<td>241</td>
<td>69.7</td>
</tr>
<tr>
<td>Duration of use of mobile devices</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 1 year</td>
<td>99</td>
<td>28.6</td>
</tr>
<tr>
<td>2–3 years</td>
<td>174</td>
<td>50.3</td>
</tr>
<tr>
<td>4–5 years</td>
<td>73</td>
<td>21.1</td>
</tr>
<tr>
<td>Mobile device ownership level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Own</td>
<td>205</td>
<td>59.2</td>
</tr>
<tr>
<td>Belongs to Mother</td>
<td>103</td>
<td>29.8</td>
</tr>
<tr>
<td>Belongs to Father</td>
<td>38</td>
<td>11.0</td>
</tr>
</tbody>
</table>

5.2. Students’ Level of Readiness to Use AR Applications

Table 4 shows students’ level of readiness to use AR applications according to the four constructs, all of which are at a high level: performance expectations (mean=3.75, SD=.679); effort expectations (mean=3.75, SD=.663); social influence (mean=3.97, SD=.441); and facility conditions (mean=4.21, SD=.440). Overall, the mean score for students’ level of readiness is high (mean=3.92, SD=.439).

<table>
<thead>
<tr>
<th>Construct</th>
<th>Mean</th>
<th>SD</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance expectations</td>
<td>3.75</td>
<td>.679</td>
<td>High</td>
</tr>
<tr>
<td>Effort expectations</td>
<td>3.75</td>
<td>.663</td>
<td>High</td>
</tr>
<tr>
<td>Social influence</td>
<td>3.97</td>
<td>.441</td>
<td>High</td>
</tr>
<tr>
<td>Facility conditions</td>
<td>4.21</td>
<td>.440</td>
<td>High</td>
</tr>
<tr>
<td>Overall</td>
<td>3.92</td>
<td>.439</td>
<td>High</td>
</tr>
</tbody>
</table>

5.2.1. Performance expectations

Table 5 shows the frequency, percentage, mean, and standard deviation scores for each expected performance item. The results indicate that two items had high scores, while another item had a moderate score. Based on the findings of this study, item B1—“I found the use of AR effective for the latest teaching and learning sessions”—recorded the highest mean (mean=3.88, SD=.558), while B2—“The use of AR helps me understand the topic quickly”—had the lowest mean (mean=3.50, SD=.930). The overall performance expectations score was high (mean=3.75, SD=.679).
Table 5. Performance Expectations

<table>
<thead>
<tr>
<th>No</th>
<th>Statement</th>
<th>SDA</th>
<th>DA</th>
<th>UD</th>
<th>A</th>
<th>SA</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1</td>
<td>I found the use of AR effective for the latest teaching and learning sessions.</td>
<td>—</td>
<td>—</td>
<td>76</td>
<td>234</td>
<td>36</td>
<td>3.88</td>
<td>.558</td>
</tr>
<tr>
<td>B2</td>
<td>The use of this AR helps me understand the topic quickly.</td>
<td>—</td>
<td>70</td>
<td>70</td>
<td>170</td>
<td>36</td>
<td>3.50</td>
<td>.930</td>
</tr>
<tr>
<td>B3</td>
<td>The use of this AR can increase my ideas or creativity.</td>
<td>—</td>
<td>35</td>
<td>42</td>
<td>199</td>
<td>70</td>
<td>3.88</td>
<td>.846</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>3.75</td>
<td>.679</td>
</tr>
</tbody>
</table>

Table 6. Effort Expectations

<table>
<thead>
<tr>
<th>No</th>
<th>Statement</th>
<th>SDA</th>
<th>DA</th>
<th>UD</th>
<th>A</th>
<th>SA</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>Learning through the use of AR is easy.</td>
<td>—</td>
<td>35</td>
<td>100</td>
<td>175</td>
<td>36</td>
<td>3.61</td>
<td>.806</td>
</tr>
<tr>
<td>C2</td>
<td>The content of the topic using AR is clear and easy to understand.</td>
<td>—</td>
<td>—</td>
<td>140</td>
<td>169</td>
<td>37</td>
<td>3.70</td>
<td>.651</td>
</tr>
<tr>
<td>C3</td>
<td>Topic content that uses AR is easy to use.</td>
<td>—</td>
<td>—</td>
<td>76</td>
<td>197</td>
<td>73</td>
<td>3.99</td>
<td>.657</td>
</tr>
<tr>
<td>C4</td>
<td>Learning a topic using AR can enhance my skills on the subject.</td>
<td>—</td>
<td>—</td>
<td>36</td>
<td>201</td>
<td>37</td>
<td>3.69</td>
<td>.798</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>3.75</td>
<td>.663</td>
</tr>
</tbody>
</table>

Table 7. Social Influence

<table>
<thead>
<tr>
<th>No</th>
<th>Statement</th>
<th>SDA</th>
<th>DA</th>
<th>UD</th>
<th>A</th>
<th>SA</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>D1</td>
<td>Individuals who are important in my life (whether teachers or parents or guardians or friends) think that I need to learn using AR.</td>
<td>—</td>
<td>—</td>
<td>85</td>
<td>174</td>
<td>87</td>
<td>4.01</td>
<td>.706</td>
</tr>
<tr>
<td>D2</td>
<td>Individuals who greatly influence my behavior (whether teachers or parents or guardians or friends) think I need to learn using AR.</td>
<td>—</td>
<td>—</td>
<td>73</td>
<td>234</td>
<td>39</td>
<td>3.90</td>
<td>.561</td>
</tr>
<tr>
<td>D3</td>
<td>Individuals whose views I welcome (whether teachers or parents or guardians or friends) are happy when I use AR in my learning.</td>
<td>—</td>
<td>—</td>
<td>40</td>
<td>270</td>
<td>36</td>
<td>3.99</td>
<td>.469</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>3.97</td>
<td>.441</td>
</tr>
</tbody>
</table>

5.2.2. Effort expectations

Table 6 shows the frequency, percentage, mean, and standard deviation scores for each item of effort expectation. The results showed that three items had a high score, while another item had a moderate score. Based on the findings of this study, item C3—“Topic content that uses AR easy to use”—recorded the highest mean (mean=3.99, SD=.657), while item C1—“Learning through the use of AR is easy”—had the lowest mean (mean=3.61, SD=.806). The overall effort expectations score was high (mean=3.75, SD=.663).

5.2.3. Social influence

Table 7 shows the frequency, percentage, mean, and standard deviation scores for each item of social influence. All three items had high scores. Based on the findings of this study, item D1—“Individuals who are important in my life (whether teachers or parents or guardians or friends) think that I need to learn using AR”—recorded the highest mean (mean=4.01, SD=.706), while item D2—“Individuals who greatly influence my behavior (whether teachers or parents or guardians or friends) think I need to learn using AR”—had the lowest (mean=3.90, SD=.561). The overall social influence score was high (mean=3.97, SD=.441).

5.2.4. Facility conditions

Table 8 shows the frequency, percentage, mean, and standard deviation scores for each facility condition item. All four items had high scores. Item E1—“I have the necessary resources (whether mobile device or iPad or tabs) to use AR in my learning”—recorded the highest mean (mean=4.51, SD=.501), while item E2—“I have the knowledge needed to use AR in my learning” recorded the lowest (mean=3.90, SD=.688). The overall facility condition score was high (mean=4.21, SD=.440).
5.2. Hindrances Encountered by Students in the Use of AR applications

Table 9 shows the hindrances faced by students in the use of AR applications. All eight items had a moderate score. Item F1—“Low internet/Wi-Fi coverage source” had the highest mean (mean=3.37, SD=1.263), while item F5—“No self-motivation to use AR in learning” had the lowest (mean=2.80, SD=.606). The overall score for hindrances was moderate (mean=3.17, SD=.652).

5.4. Differences in Student Readiness to Use AR Applications Based on Gender

The results of the t-test for the null hypothesis Ho⁴ is shown in Table 10.

There was a significant difference in students’ level of readiness to use AR applications based on gender [t=2.383, p=0.018]. Therefore, Ho⁴ is rejected. These findings also show male students tend to have a higher level of readiness (mean=3.99, SD=.282) than female students (mean=3.89, SD=.490).

5.5. Differences Student Readiness to us AR Applications Based on the Duration of Device Use

The ANOVA test was used to test the null hypothesis Ho²; the results are shown in Table 11.

<table>
<thead>
<tr>
<th>Level of Readiness of Student</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>31.531</td>
<td>2</td>
<td>15.766</td>
<td>154.110</td>
<td>.000</td>
</tr>
<tr>
<td>In Group</td>
<td>35.089</td>
<td>343</td>
<td>.102</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>66.620</td>
<td>345</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There appears to be a significant difference in students’ level of readiness to use AR applications based on duration of device use [F (2, 343) = 154.110, p = 0.000]. Therefore, Ho² is rejected. Next, a Scheffé post-hoc test was conducted to identify the level of readiness of students to use the AR applications in the Form 2 Science textbook based on the duration of device use. The test results are shown in Table 12.
The results of the Scheffé post-hoc test indicate that there is a significant mean difference of $p < 0.05$ in students’ level of readiness to use AR applications based on device ownership.

### Table 12. Post-Hoc Scheffé Test of Student Readiness to Use AR Application Based on Duration of Device Use

<table>
<thead>
<tr>
<th>Level of Readiness of Student</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>Less 1 year</th>
<th>2-3 years</th>
<th>4-5 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less 1 year</td>
<td>99</td>
<td>3.80</td>
<td>.246</td>
<td>.063</td>
<td>-</td>
<td>.697*</td>
</tr>
<tr>
<td>2-3 years</td>
<td>174</td>
<td>3.74</td>
<td>.368</td>
<td>-.063</td>
<td>-.760*</td>
<td>-</td>
</tr>
<tr>
<td>4-5 years</td>
<td>73</td>
<td>4.50</td>
<td>.283</td>
<td>.697*</td>
<td>.760*</td>
<td>-</td>
</tr>
</tbody>
</table>

*p < 0.05

The results of the Scheffé post-hoc test indicate that there is a significant mean difference of $p < 0.05$ in students’ level of readiness to use AR applications between those who have used their device for 4–5 years (mean=4.50, SD=.283) or less than 1 year (mean=3.80, SD=.246) and those with 2–3 years of device use (mean=3.74, SD=.368).

### 5.6. Differences in Student Level of Readiness to Use AR Applications Based on Device Ownership

The ANOVA test was used to test the null hypothesis $H_0^3$, and the results are shown in Table 13.

The results of the one-way ANOVA in Table 5.6 indicate that there is a significant difference in student readiness based on device ownership [$F (2, 343) = 116.414, p = 0.000$]. Therefore, $H_0^3$ is rejected. Next, a Scheffé post-hoc test was conducted to identify students’ level of readiness based on device ownership. The test results are shown in Table 14.

### Table 13. One-Way ANOVA for Student Readiness Based on Device Ownership

<table>
<thead>
<tr>
<th>Level of Readiness of Student</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>26.937</td>
<td>2</td>
<td>13.469</td>
<td>116.414</td>
<td>.000</td>
</tr>
<tr>
<td>In Group</td>
<td>39.683</td>
<td>343</td>
<td>.116</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>66.620</td>
<td>345</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 5.7. Hindrances to the Use of AR

Pearson Correlation analysis was used to test the null hypothesis $H_0^4$, and the results are shown in Table 15; data from Table 9 were recorded before running the analysis.

The results indicate that performance expectations ($r=0.287$, $p <0.01$), effort expectations ($r=0.174$, $p <0.01$), and social influence ($r=0.419$, $p <0.01$) had a significant relationship to the hindrances encountered by students in the use of AR applications. However, the condition of facilities ($r=0.049$, $p >0.05$) did not. Overall, as shown in Table 5.7 shows the students’ overall level of readiness ($r=0.269$, $p <0.01$), as shown in Table 5.7, has a significant relationship with the hindrances encountered, so $H_0^4$ is rejected.

### Table 14. Post-Hoc Scheffé Test of Student Readiness Based on Device Ownership

<table>
<thead>
<tr>
<th>Level of Readiness of Student</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>Own</th>
<th>Belongs to Mother</th>
<th>Belongs to Father</th>
</tr>
</thead>
<tbody>
<tr>
<td>Own</td>
<td>205</td>
<td>3.86</td>
<td>.402</td>
<td>—</td>
<td>.113*</td>
<td>-.840*</td>
</tr>
<tr>
<td>Belongs to Mother</td>
<td>103</td>
<td>3.75</td>
<td>.235</td>
<td>-.113*</td>
<td>—</td>
<td>-.953*</td>
</tr>
<tr>
<td>Belongs to Father</td>
<td>38</td>
<td>4.70</td>
<td>.178</td>
<td>.840*</td>
<td>.953*</td>
<td>—</td>
</tr>
</tbody>
</table>

*p < 0.05

### Table 15. Student Readiness and Hindrances Encountered to the Use of AR Applications

<table>
<thead>
<tr>
<th>Hindrance Encountered</th>
<th>r</th>
<th>Sig. P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance Expectations</td>
<td>-0.287**</td>
<td>.000</td>
</tr>
<tr>
<td>Effort Expectations</td>
<td>-0.174**</td>
<td>.001</td>
</tr>
<tr>
<td>Social Influence</td>
<td>-0.419**</td>
<td>.000</td>
</tr>
<tr>
<td>Facility Conditions</td>
<td>.049</td>
<td>.364</td>
</tr>
<tr>
<td>Students’ level of readiness to use the AR application</td>
<td>-0.269**</td>
<td>.000</td>
</tr>
</tbody>
</table>

**p < 0.01
6. Conclusions

The findings of this study show students have a high level of readiness to use the AR application in the Form 2 science textbooks (mean=3.92, SD=.439), which may be a good indicator of students’ readiness to use other new technologies. This may have to do with the latest generation (generation Z) being exposed to information anywhere and at any time. Although the gender differences slightly favor male students, this should not be overemphasized, as it contradicts a previous study that these are not significant for AR features in chemistry lessons [32]. Students’ skills, confidence, and comfort with learning resources can influence their readiness for online learning [33]. Therefore, the AR application developed must meet the needs of students so that they are ready to use it [15].

The findings show that there are hindrances at the moderate level (mean=3.17, SD=.652) in the readiness of students to use AR applications. The government is in the process of upgrading the learning environment to be on par with developed countries in the world, which may explain the presence of these moderate hindrances. Learning barriers have been found to have an impact on learning and level of satisfaction at the individual level [34,35]. There are technological barriers (including slow internet access or high computer costs [36]), personality barriers (i.e., the perception that there are barriers), situational barriers (including lack of access), and institutional barriers, including lack of teacher support and instructional design quality. This is in line with prior research that indicates students not only need support, but also need a place to study without interruption [37].

Overall, the results of this study indicate that the barriers to the use of AR applications are at a moderate level, while the level of student readiness is at a high level. Users with high self-readiness will experience fewer obstacles in virtual learning [38]. There appears to be a significant relationship between the barriers to use of AR applications and students’ level of readiness to use them with Form 2 Science textbooks in the Malaysian context. These findings provide an important justification for the idea that the future educational environment in Malaysia must take into account the latest technological integration closely related to IR 4.0 and 21st-century education. According to the study [39, 40] had been seen that AR application is effective in terms of the academic achievement and has positive contributions to student success and satisfaction. Educational institutions must dare to pursue a paradigm shift and modify elements of the educational environment in terms of curricula and educational infrastructure. Readiness to accept a change, particularly regarding new teaching and learning technology, is important and needs further study.

Acknowledgements

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Investigating the Relationship between Parenting Styles and Juvenile Delinquent Behaviour

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Cite This Paper in the following Citation Styles

Abstract Parenting style is very important in influencing students’ juvenile delinquent behaviour so that it will not go against the norm of society and rules regulated. Therefore, this study examined on parenting styles and its relationship to juvenile delinquent behaviour using mixed method design. Surveys were distributed to 187 students and interview sessions were conducted to five students to explore the relationship between parenting styles (authoritative, authoritarian, permissive) and delinquent behaviours (verbal, physical, sexual, anti-social). Study result shows that there is a significant relation between authoritarian parenting style and juvenile delinquent behaviour. However, authoritative and permissive parenting styles do not show any significant relationship. This means that parents who like to control and restrict the freedom of their children influence the behavior of juvenile students. Data collected from the interview shows that authoritarian type of parents have a lot more influence towards juvenile delinquent behaviour. This is because authoritarian parenting style prioritizes a high control level to make the children listen to them in making decisions causing the children to feel conflicted, less communicative and lost their trust in parents. Therefore, this study will explain on how parents play an important role in having faith in their children so that they will be responsible and smart in limiting and preserving their behaviour.

Keywords Parenting Styles, Juvenile Delinquent Behaviour, Students

1. Introduction

Parents play an important role in making sure their child’s psychology is well-developed especially in terms of behaviour, emotions, cognitive, social interaction, moral and academic achievement. Parents’ failure in educating their children will affect their future and open up risks for them to engage in behavioral problems [5,14,21]. This is because lack of knowledge and parenting skills may disrupt family system from functioning well and lead to problematic behavior among children [25,30]. Moreover, rigid working schedule that limits communication between parents and child, autocratic traits shown while educating their child and neglecting childrens’ needs can also result in problematic behaviours [26,30]. Hence, parenting styles are the right key in ensuring family institution’s stable functioning as well as avoiding the children from going astrayed into the delinquent behaviour situations.

According to past researches, parenting styles play a main role in deciding the morph of a child’s attitude, behavior and thought [4]. Authoritative parenting style has a strong influence towards students’ attitude and behaviour [11]. Parenting styles that stress on openness and two way communication between parents and children will shape the persona of the kids. It happens because these parenting styles hold power in shaping the character, growth, development and commitment as well as trust in a child[13]. Besides, it is also because these parenting styles are also used in educating children which in turns will affect their behaviour and development [29].
However, parenting styles that are practiced nowadays do not really befit the children’s development which later gives effect on their psychological stress, social and moral functionings [19,41]. The inability of parents to guide their children’s upbringing might end up producing children with less self-confidence in making decisions, low self-pride, passive actions, no physical and mental strength to control themselves and insufficient guidelines that they could opt for delinquent behaviours [28,40]. That is why family institutions must be enhanced because family is the basic social unit that provides the human capital for the growth of a country.

The shortcoming in educating children sparks interest for them to seek their parents’ attention and release stress by taking action without thinking of the consequences which will lead to a severe criminal act [19]. A criminal act is a behaviour that goes against the moral values, societal norms or rules that have been fixed by a particular institution. If this issue is not given the right surveillance it will exhibit the signals of unstability and unsustainable well-being of a community. In fact, it will pave their way as a threat to the safety of the country [35,38]. This is aligned with past researches that explained students who involved in misbehaviour conducts such as murder, theft, rape and so forth have shown an alarming increase in crime rates which can threaten a country’s safety [45].

In this research, researcher investigated the relationship between parenting styles and juvenile delinquent behaviours. Past research focused on parenting styles among families with low socioeconomic status, academic achievement and social behaviour issues [26,27,37]. However, the research are providing inadequate insight on students who committed risky behaviours among juvenile students. This is significant because parenting style is one of the factors that contribute to problematic behaviours among juvenile students. Past research explained that autocratic parenting styles influence the students’ behaviours, verbal and physical [19].

Moreover, permissive parenting style leads their children to engage in social misconducts such as drugs abuse, property crimes and vandalism. Therefore, it is clear that juvenile students are a group of people that requires attention as they pose possible threats to the peace of the society and country [16, 38].

This study is an effort from researchers to study the relationship between parenting styles and delinquent behaviour of juvenile students. This is because parenting style which is used is really important in shaping the children’s behaviour. If parents fail to educate their children in the right way, there will be more cases of children with anger management issues, passive attitude and further contribute to a lot of troubles to adapt themselves in the real world [4,19]. The effects will give a big impact on school as an educational institution and social control agent [44] and they could become a threat towards the human resource and the sustainability of a country [19,26].

2. Literature Review

Parenting style is a process of care, nurturing, guiding and educating from parents to their children. Parenting style is an important aspect that influences the well-being of children and creating a functional family [4]. According to Baumrind [7] and Maccorby [18], practice and behaviour that are implemented to educate children will have a direct effect towards emotion, social and intellect of the child. This shows that parents should adopt a suitable parenting style to secure the psychological state and socio-emotion of a child [32,41]. Therefore, parenting style is very crucial in making sure children’s development especially when it comes to nurturing good behavioral aspect and have a high level moral value.

Baumrind [8] stated that there are three parenting styles which are authoritarian, authoritative, and permissive. All of these parenting styles affect students’ psychological development specifically behavioral aspect in different ways [11]. Authoritative parenting style is found to suit the children’s needs the best. This parenting style has a high responsive level but low demand as parents put more focus on care, autonomy and negotiate rules with the child [12,25]. Meanwhile, authoritarian parenting style has a low responsive level yet high demand because it concerned with the compliance towards parents, practiced control approach, punishment and rigid rules. In addition, permissive parenting style gives full freedom to children in making decisions and taking action without any restrictions but at the same time does not neglecting the children’s basic needs.

Past researches explained that authoritarian parenting style affects children’s behavior as they have to obey the parents’ instructions without being given the freedom to make their own decision [12,20]. This causes the children to feel constrained and did not get enough control over activities that they love. Later on, it could result to lower confidence among children in exploring new opportunities, inability to adapt themselves to a challenging social network and feeling bored with their life[33]. Other than that, permissive parents do not really pay attention in setting rules and limits in the house [12]. The consequence of permissive parenting style is that it invites the internalisation problems, be it in their house, school, community or even academic performance [9].

Based on the past researches, it showed that parenting style is significant in determining the shape of behaviours of students[23,42]. Parents’ failure in giving attention to the parenting styles will lead to the feeling of lack of love, dissatisfied towards parents’ action and rebellious attitude until they start to resort to a place or friend to express their thoughts and behaviours. Expressed behaviours such as skipping schools, engaging in vandalism, theft, and drug
abused are the results of latent which can lead to the increment of crime rate all over the country [30,36,41].

Juvenile behaviour refers to failure of a student in obeying rules that are set and committing in actions that do not abide the law. A student can be categorized as delinquent when they act in a contradicting, misleading and negative manner to break the rules and crime laws [36]. This behavioural misconduct contradicts the societal norms and cannot be accepted as they are still students. Problematic behaviours portray the image of bad action, damaged morality and negligence of being responsible [31]. Meanwhile, problematic behaviours are also deciphered as actions that violate the ethics in religion and life norms that bring harms to soul and damage good values in one’s self [1].

That is why parents play a significant role in ensuring family institution that is working well. It is because parents are the responsible persons to shape and nurture the good values in children’s life [43]. Unconcerned family and lack of communication between parents and children could create a gap and unhealthy emotions [24]. This ended up making the children’s souls to become fragile and vulnerable to negative social attraction. They are unable to cope and defend themselves from the challenges and stress. In line with that, parenting knowledge is really needed in educating the children. Children’s education should be fitted parallelly to behaviour development so that they can have good personality and produce youth that will contribute to the nation’s productivity.

3. Methodology

This study employed mixed method, sequential and explanatory design. According to Creswell and Clark [9], mixed method is a procedure of data collection and analysis that combine both quantitative and qualitative research in one study to understand and answer the research questions.

Participants

Survey

We collected survey data from a purposive sample of juvenile students (N = 187). To obtain study participants, we contacted four juvenile schools management via email and invited their students to participate in this survey. We also required participants to fill the informed consent form before conducting this research.

Qualitative Interviews

Participants were asked to join for the interview. However, only twenty three of them accepted the interview session and were asked to fill the invitation form. Unfortunately, only five individuals responded to the invitation form and agreed to participate in the interviews. Five participants involved in behavioral issues stated that their parents exercised authoritarian parenting style.

Instrument

Survey

Questionnaire that was used in this research was adapted from Baumrind Questionnaire (1966) [6] to measure parenting styles which consisted of 30 questions and Inventory Delinquency Scale Junger (1997) [15] to measure risky behaviours which consisted of 40 questions. Baumrind’s Parenting Style Questionnaire (1996) were divided into two parts: Part A was the three components of parenting styles which are authoritarian, authoritative and permissive; and Part B was the four components of risky behaviours which are verbal, physical, sexual and anti-social.

Parenting style instrument was scored on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). A higher score indicated a higher competence in parenting skills and vice versa. Meanwhile, Junger’s Delinquency Scale was scored on a 5-point Likert scale (1 = never, 5 = always). A higher score indicated a higher frequency in committing behavioural misconduct and vice versa.

All 70 items from existing instruments which were used in the questionnaire were checked and verified by the experts. The reliability analysis yielded a high Cronbach’s alpha of more than .70 for each components (Landell, 1977) [17]. It supports the use of this reliable and valid instrument for this research purposes.

<table>
<thead>
<tr>
<th>Parenting Styles</th>
<th>Alpha Cronbach Value</th>
<th>Delinquent behaviours</th>
<th>Alpha Cronbach Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Authoritarian</td>
<td>.841</td>
<td>Verbal</td>
<td>.745</td>
</tr>
<tr>
<td>Authoritative</td>
<td>.822</td>
<td>Physical</td>
<td>.914</td>
</tr>
<tr>
<td>Permissive</td>
<td>.827</td>
<td>Sexual</td>
<td>.868</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Anti-social</td>
<td>.930</td>
</tr>
<tr>
<td>Total</td>
<td>.900</td>
<td>Total</td>
<td>.967</td>
</tr>
</tbody>
</table>

Qualitative Interviews

For the qualitative data, researcher did an interview with five respondents that were chosen from juvenile students’ grouping who stated that their parents used an authoritarian parenting style. Respondents provided feedback to the protocol questions that were stated. Through individual interview, researcher collected in depth information from the individuals. According to Morgan [10], through an interview, researcher can receive a more comprehensive data and it gives a higher chance for the respondents to express their opinion openly and freely while reducing the bias from others’ opinion. Questions that were presented in this protocol were open-ended questions and it was run in the form of discussion. Therefore, respondents were free to give their feedback according to their own view. Table 2
below shows the protocol questions that were given to the respondents.

However, qualitative data were collected based on two semi-structured for individual interviews. Galletta’s [2] work guided the development of the interview questions which include building rapport with participants, effective phasing and timing of probing questions. Researchers conducted interviews in the school. The interviews were recorded and took approximately 40 minutes. As an exploratory, mixed-methods study, the interview prompts were developed based on an analysis of students’ quantitative response. The interviews emphasized on gathering inputs on “How is your parents’ authoritarian parenting style?” and “How can authoritarian parenting styles influence delinquent behaviours until you are charged with prison sentence?” (Table 2 shows semi-structured interview questions). The framework guided the qualitative analysis, which involved familiarizing with data, identifying main themes, indexing themes, coding, mapping and charting themes for interpretive purposes [34]. In addition, researchers used open, axial, and selective coding to organize and interpret interview data. Researchers gathered both quantitative and qualitative responses to highlight the main research questions and compared participants’ responses to check for disconfirming evidence and discrepancies. Besides, we had triangulated the data across participants to see the reliability and validity of the survey data. Lastly, we also used member check to verify and explore the interpretation of participants’ responses.

<table>
<thead>
<tr>
<th>Table 2. Semi – Structured Interview Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interview Questions</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
</tbody>
</table>

4. Findings

The findings reported three aspects which are i) types of parenting style that was practiced, ii) types of delinquent behaviours among juvenile students and iii) relationship between parenting styles and delinquent behaviours among juvenile students.

<table>
<thead>
<tr>
<th>Table 3. Types of parenting styles among juvenile students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parenting Styles</td>
</tr>
<tr>
<td>Authoritarian</td>
</tr>
<tr>
<td>Authoritative</td>
</tr>
<tr>
<td>Permissive</td>
</tr>
</tbody>
</table>

Table 3 shows parenting styles which are authoritarian, authoritative and permissive. The result shows the mean score of authoritative parenting style which is 3.76 (SD = 0.482), followed by mean score of authoritarian parenting style which is 3.49 (SD = 0.454) and permissive parenting style which is 3.49 (SD = 0.463). The results show that mean score for authoritative parenting style is high, while authoritarian and permissive parenting styles are average. Based on the study analysis, it indicates that authoritative parenting style is the style that was practiced in educating the juvenile students rather than authoritarian and permissive.

<table>
<thead>
<tr>
<th>Table 4. Types of Delinquent behaviours among Juvenile Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage of Delinquent behaviours</td>
</tr>
<tr>
<td>Verbal</td>
</tr>
<tr>
<td>Physical</td>
</tr>
<tr>
<td>Sexual</td>
</tr>
<tr>
<td>Anti-social</td>
</tr>
</tbody>
</table>

Table 4 shows delinquent behaviours that consist of four components which are verbal behaviours, physical behaviours, sexual behaviours and anti-social behaviours. The result shows the mean score and standard deviation for verbal behaviour (Mean = 2.39, SD = 0.824), physical behaviour (Mean = 2.23, SD = 0.672), sexual behaviour (Mean = 2.07, SD = 0.683) which are low and anti-social behaviour score (Mean = 2.61, SD = 0.683) which is average. This means that anti-social behaviour is the common behaviour that is done by juvenile students rather than verbal, physical and sexual behaviours. Anti-social behaviour is aggressive acts such as smoking, addicted to marijuana, abusing drugs, taking ecstasy pills and hallucinogens, riding motorcycle without license and not wearing helmet.

<table>
<thead>
<tr>
<th>Table 5. Relation between Parenting Styles and Delinquent behaviours among Juvenile Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parenting Styles</td>
</tr>
<tr>
<td>Authoritarian</td>
</tr>
<tr>
<td>Authoritative</td>
</tr>
<tr>
<td>Permissive</td>
</tr>
</tbody>
</table>

Table 5 shows the relationships between parenting styles and delinquent behaviours among juvenile students. The result shows that there is a negative significant relationship between authoritarian parenting style and verbal behaviour (r = -0.175, p = 0.016), physical behaviour (r = -0.158, p = 0.031), sexual behaviour (r = -0.274, p = 0.000) and anti-social behaviour (r = -0.148, p = 0.043). It means that parents who practiced authoritarian parenting style are associated with lesser behaviours on verbal, physical, sexual and anti-social among juvenile students.

For authoritative parenting style, it shows there is a positive relationships with verbal behaviour (r = 0.160, p = 0.028). However, there is no significant relationship between authoritative parenting style and physical behaviour (r = 0.064, p = 0.388), sexual behaviour (r =
-0.55, p = 0.457), and anti-social behaviour (r = 0.042, p = 0.564). It means that parents who practiced authoritative style can influence the delinquent verbal behaviour rather than other delinquent behaviours among juvenile students.

On the other hand, permissive parenting style shows that there is no significant relation with verbal behaviour (r = 0.109, p = 0.137), physical behaviour (r = 0.080, p = 0.278), sexual behaviour (r = -0.003, p = 0.966) and anti-social behaviour (r = 0.129, p = 0.077). This shows permissive parenting style does not associate with juvenile students’ behaviours.

How is your parents’ authoritarian educating style?

Based on the qualitative research, it shows that the education pattern used by parents is authoritarian style. The participants in this study stated that they had a good relationship with their parents, but were not friendly and they had to abide to their parents’ rules. This is aligned with R4 findings... My parents are strict... so I’m afraid to say what I want... and R3... my mother loves to nag and babble... sometimes I become stress because I have to listen to them... From these findings, it is clear that their parents controlled their children’s behaviours as the children had to follow the orders and had no autonomy in making their own decisions.

How can authoritarian parenting styles influence delinquent behaviours until charged with prison sentence?

This study shows that the participants were having difficulty in communicating with their parents especially when it came to feelings and problems that they faced. Parents’ behaviours that just gave orders and controlled the participants had inflicted pressure on them. This is because parents do not listen to the needs of their children until they had to resort to people who they think could be trusted. This problem has made parents as no longer a choice for them to depend on as they no longer feel comfortable and trust in their parents. R2...My mother is busy managing my siblings until I was not given any attention... I feel stress and seek for friends that are more fun to be with... R3 Mom does not care about anything that I do... like loitering around and smoking outside... as long as I get back home if not she will get mad...R1 my father loves to label me as a useless son and scolds me in front of other people... based on all three responses, it shows that parents’ failure to communicate and be a good listener are some of the factors that influenced the delinquent behaviours of the participants.

5. Discussion

Parenting styles give psychological effect towards children especially with their behaviours [29]. Results show that juvenile students stated that the most common parenting style is authoritative. It means that their parents give them their trust and chance to make their own decision, have tolerant, and strict. Past researches explained that parents involvement in guiding their children helps children to develop positive thinking, high confidence, creative and excel in education when their authoritative parents are more rational, tolerant and always give them support [11,41]. This is because this parenting style will give comfort to their children as they are always loved, given attention and a way of democratic parenting style.

However, findings show that authoritarian style is a parenting style that contributes towards the starting of the delinquent behaviours among students. This study comes in line with the research [22,42] where they found that authoritarian parenting style tends to instil negativity among children as they received education that is too constrained and forceful. Based on this findings, it shows that this parenting style has become one of the factors that produced delinquent behaviours among juvenile students. This is because authoritarian parenting style puts the discipline first, sets the standard behaviours that should be followed, inclines to strictness, prioritizes rules and gives little chance for them to plan for themselves on their own [12,20,29]. Moreover, this parenting style caused the child to abide to the rules fixed for them to avoid being punished and get penalized from parents. Therefore, the behaviours that they show are temporary and they did it without full effort nor willingness.

The result from qualitative research also shows that authoritarian parenting style leads to delinquent behaviours of juvenile students. This is because parents do not give their attention towards the needs of their children’s emotions, thus making children feel the tensions in communicating with their parents until they lost their trust. These are a few of the factors that affect children’s behaviours. This situation has caused them to seek for space to release their tension and involved themselves with peers who shared the same experience to express their feelings and beliefs. This could somehow lift up the burden that they carry in their heart as they now have a place to pour out their feelings. Armsden and Greenberg (1987)[3] argued that soul’s emptiness felt and freedom sought by them have exposed them to the negative elements. The freedom they seek is occupied by breaking the law without reflecting on the consequences of their actions. These flaws have led to a bigger criminal act.

Juvenile students are undergoing the learning process to understand their life without knowing that they did a lot of mistakes because of their poor judgement. Juvenile students who are driven to commit in delinquency do such things because of conflict and psychological stress that they received and are unable to perceive parents as a safe haven [31,39]. Interference and lack of communication between parents and children caused them to rebel and lead them to delinquent behaviours. The desire to try out new things, wanting to have freedom and attention have
unintentionally raised the act of skipping school and other dangerous activities that risk others and their own life. Therefore, by involving themselves with this delinquent behaviours, students will just waste their life, put their family to shame and affect their academic achievement.

Hence, it clearly shows that parenting styles have influenced the development of children’s behaviours. The findings of this study also show that authoritarian parenting style has a significant relation with the increasing level of delinquent behaviours. Other than that, peer is also one of the factors that influenced the students to be entangled in this delinquent behaviours. That is why each and every parents should be alert with their children’s needs, responsible, educate them appropriately and show them the epitome of good people so that the children will be excellent and have a noble character to lead their future.

6. Conclusions

Parenting style is a process of educating and keeping the children’s behaviours in control. Parents should choose the suitable way according to the situations to educate their children. This is because children nowadays are more exposed to foreign cultures and inputs which are beyond their expectation. Parents do not only play a role as a family member, but also as a friend for their children so that intimate and close relationship can be nurtured easily. Children will always be our responsibility to guide and speak with them about problems or rules that must be obeyed to avoid them from feeling like they are being forced or constrained. Cooperation and tolerance between parents and children will reduce the risk of being embroiled with immoral culture. Thus, it is expected that this study will give an awareness to the parents especially, so that they can add more knowledge about suitable parenting styles to ensure that their children are on the right track and can mould correctly. Besides, future research is suggested to look into the relationship between authoritarian parenting style and anti-social behaviour of juvenile students. In addition, further study shall be conducted on the environmental factors that influence juvenile students and their delinquent behaviours. This study is strictly needed to investigate the dispositions that lead juvenile students to commit the anti-social behaviours. Hopefully this study can help all related parties to handle and prevent delinquent behaviours among juvenile students.

Acknowledgement

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Identifying Technology Competency of Green Skills in the Fourth Revolution Industries amongst Teacher Trainee

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Abstract Green Skills are a gateway to turning Fourth Industrial Revolution (4IR) into a low carbon economy and innovation. Technology competency of Green Skills is one of the competencies that are essential to the driving force behind effective teaching and learning. Thus, this study seeks to identify the readiness level technology competency of green skills in 4IR amongst TVET teacher trainee. This study will also identify the needed level technology competency of green skills in 4IR towards TVET teacher trainee from the perspective of educator. A total of 154 teacher trainees and 44 educators were selected as samples by using disproportionate stratified random technique. The questionnaire has been developed and adapted from the Model of Green Skills Competency by Pavlova and Skills in 4IR consists of 8 indicators. Mean score and standard deviation for statistical measurement were used to report the findings. Findings from the analysis show that the readiness level technology competency of green skill in 4IR amongst TVET teacher trainee are at a moderate level. However, the needed level technology competency of green skills in 4IR towards TVET teacher trainee from the perspective of educator are at high level. This shows that technology competency of green skills is important to teacher trainee in order to face the challenge of Fourth Industrial Revolution (4IR). Findings from this study will benefit Institute of Teacher Education and Ministry of Education in order to prepare teacher trainees as well as in-service teachers with technology green skills so that our Sustainable Development Goals will be achieved and equip themselves in a way of Fourth Industrial Revolution.

Keywords Sustainable Development, Fourth Industrial Revolution (4IR), Green Skills, Technology Competency

1. Introduction

Technology competence in the Fourth Industrial Revolution is also increasingly interlinked; as a convergence of digital, physical and biological realms in particular (Ruohomaa, Kantola & Salminen, 2018). The 4IR for sustainable development is designed to demonstrate the potential of Innovations of the Fourth Industrial Revolution and their applications to the most pressing environmental issues in the world. (Oosthuizen, 2017). Hence, by ensuring inclusive and equitable quality education and promoting opportunities for lifelong learning for all, is the fourth sustainable development goal on the UN agenda. Achieving this goal involves diverse projects and effective approaches in various educational areas. Therefore, Education for Sustainable Development (ESD) is characterized as education, according to UNESCO-UNEVOC (2017), which promotes changes in knowledge, skills, values and attitudes to make a more
prosperous and equitable society. ESD as education for sustainable development (Hensley, 2017) and green skills are key to the Fourth Industrial Revolution towards a low-carbon economy and innovation (4IR) (Mansell, Philbin & Konstantinou, 2019).

The issue of solid waste management, water systems, wastage of energy and environmental resources and unemployment is addressing the important of having technology competency of green skills in the industrial revolution 4.0. This is because Green skills can control resource efficiency through smart networks that will improve the quality of life as well as protect the economy of a country. With the latest digital technology, it can bridge the gap between rural and urban as well as avoid marginalizing the poor. Innovation of the Fourth Industrial Revolution will be integral to provide a better quality of life to the environment especially in urban areas. With the help of IoT, blockchain and VR can detect water quality and solid waste types for recycling processes, and educate the public on proper practices to minimize water and solid waste consumption (Herweijer et al., 2017).

This technology competency in green skills is important because it pushes the economic growth of the country towards sustainable development by generating human capital that can economically, socially and politically develop the country without neglecting environmental aspects (Dlimbetova et al., 2016). Thus, technology competency of green skills is one of the constructs studied to see to what extent this technology competence plays a role in generally shaping green skills model for TVET teacher trainee. However, study in Vietnam’s Greening TVET, teachers must be educated on green issues TVET (Klaus-Dieter & Huyen, 2016). Because of the lack of capable TVET teachers, teachers need to be prepared with requirements for green skills such as technologies applications, technical skills and knowledge, pedagogical components, workplace experiences and also relevant environmental knowledge. They also had to teach and instill green skills to increase their students’ awareness of the environment (Diep & Hartmann, 2016).

According to Pant & Delhi (2015), teaching environmental subjects with outdoor technologies encouraged students to observe nature more closely and thus increase their knowledge of the environment, improve their environmental knowledge and attitudes, and to “overcome one of today’s fundamental challenges for environmental education, namely, learners’ alienation from nature” (Cheng et al., 2013, p. 105). The possibility of witnessing real life phenomena outside the classroom through the use of technology handheld devices allows children to create personal relations to the natural world which, on the other hand, is suggested to influence the attitudes of learners towards nature (Heinonen, 2015). As a conclusion, (Pant and Delhi 2015) summarizes that novel technology-mediated education offer a great potential for environmental education. Since the students are already advanced users of the devices, they feel natural to participate in direct experiences with a portable computer in nature.

In Malaysia, Education for Sustainable Development (ESD) stresses the incorporation of key sustainable development concerns in education and learning, i.e. climate change, catastrophe risk reduction, biodiversity, poverty reduction and sustainable consumption. This initiative includes successful pedagogy to ensure a participatory learning and teaching approach that will inspire and encourage future leaders to ensure sustainability of their social structures. (Reza 2016). Malaysia has adopted the ideals of Agenda 21 as one of the essential documents on sustainable development into its national planning process. Nevertheless, the efficacy of these teaching-learning systems and their successful pedagogical methods and endpoints are not adequately guaranteed. It is because, the technology competency is crucial needed in order to make sure there are no mismatch skill in industrial revolution era. (The Ministry of Human Resources; Skills development Department; National University of Malaysia 2017). Besides that, agenda of Asia-Pacific Training Kuala Lumpur 2015 also highlights the needs for green skills for the sustainability of TVET program development in one of its eight agendas. (UNESCO and Kementerian Pendidikan 2015).

The government is seeking to implement green technologies that can be seen from the point of view of two innovation elements: the process of design and development of green technology. School students are taught and encouraged to create something: design and produce products that are environmentally friendly and practical for our country. At a higher level, we can develop technologies that can produce useful articles without wasting resources such as electricity and water. The new eco-friendly design must be practical that can be commercialized for local and export needs (Arasinah et al., 2016). Therefore, competence in ICT technology and knowledge is critical for a TVET teacher trainee, as it helps teaching and learning progress smoothly, creates interesting teaching environments, helps teachers prepare teaching materials and enables teachers to explore new knowledge (Abdullah et al. 2016). This is also supported by study of Alwi, Kamis & Rus (2017), where teachers must have technology competency of green skills in ensuring that the teaching and learning process is smooth and updated with the current technologies. For example, in the subject of TVET, Technology Design, competent teachers in the technology green skills will expose to the students on how to manage solid waste systematically and monitoring the waste management by using technologies in 4IR like IoT, big data and so on.

Teachers, in particular trainee teachers, therefore need to be strengthened by mastery of technological competence, because without technological competence, teachers find it difficult to cope with learning that involves the use of
technology in line with 4IR education, especially in the field of TVET related to design subjects. The goal of this paper is therefore to define the readiness level technology competence of green skills in the Fourth Industrial Revolution (4IR) from the perspective of the TVET teacher trainee as well as the appropriate level technology competence of green skills needed by the educator for the TVET teacher trainee at the Institute of Teacher Education. Teacher trainees have been selected as a focus study as they play a key role in achieving the 2030 Sustainable Development Goals (SDGs) for quality education as a prerequisite for sustainable learning and human growth.

2. Conceptual Framework

The conceptual framework of this study is consistent and relevant to the applicable literature in this field. Figure 1 is the diagram of the conceptual framework which will be discussed in this article.

Theory of Ecological Modernisation founded by Huber, Simonis and Janicke of Germany, Arthur Mol, and Spaargaren of the Netherlands in the 90s are explained the basis concept for the formulation of environmental policy and as a basic theory of Sustainable Development Model. It is the core of an industry which can be said to be a guideline in ensuring that the environment can be taken care of well, while ensuring economic growth is not stunted (Mol et al. 2002). In the context of this article, this theory would expand on some of the elements relevant to green skills competence in the 4IR and also in education system especially for teacher trainee.

In this theory, there are five elements which are environment education, green technology, eco-innovation, zero-waste concept and environmental awareness has strong impetus in ensuring economic development and environmental sustainability can be preserved well or vice versa.

The Green Skills Competency Model is a study model of Pavlova (2016) where green skills are the agenda for the transition of competencies in the field of TVET. This model requires a balanced of four competencies which are cognitive competency, technology competency, intrapersonal competency and interpersonal competency. However, in this study it just focuses on technology competency. In technology competency, the elements of the construct are environmental technology knowledge, environmental technology management, environmental awareness, analysis skills; ICT application by minimising the use of materials in physical form, innovation skills to identify opportunities and create new strategies to address green challenges; solving problems on economic, social and green technology issues; and innovative solutions for green technology strategies (Pavlova, 2016).

According to Mohd Zuhair Azuar (2015), elements of green technology skills need to be applied into the Engineering Technology syllabus (now rebranded to the subject of Basic Sustainability) where the aim is to produce creative and technology literate students and teachers and to give society knowledge of the importance of environmental sustainability through education. For example, TVET students from automotive course, need not only to learn how to build or repair traditional types of cars that have harmful consequences, but also to have the expertise to operate different types of vehicles, hybrid models. Meanwhile, green skills in designing green concept houses, using environmentally friendly building materials and utilities are required for students involved in building design and construction courses (Paryono, 2017).
Thus, from the Model of Green Skills Competency, technology competency is one of the important aspects of green skills development (Pavlova, 2016). Technological competency is the ability to create and use a particular field of technology effectively, which is gained through extensive experimentation and learning in its research, development and employment in production (Fai & von Tunzelmann, 2001). According to Pavlova (2016), technology competencies in green skills encompass elements of quantification and monitoring of either waste, energy or water management systems of either waste, energy or water, selection and acquisition of goods and services from external sources that are appropriate in terms of quality and environmental impact, material use and impact quantification, impact assessment, minimization of environmental impact, minimization of materials used, what can be recycled, environmental laws and regulations, environmental risk management and how learnt skills contribute to greening of industry. Therefore, the technology competencies in green skills are important to proficient by TVET teacher trainee as well as needed for them.

This study also integrates the basic skills of the industrial revolution 4.0 to produce a variety of green skills competencies based on new technologies that impact on various disciplines, economies and industries. Wilfried Aulbur, CJ & Bigghe (2016) emphasized four key skills relevant to technology competency in the industrial revolution 4.0 which are technical knowledge & IC, ability work with data, system analysis and complex problem-solving skills. In conjunction, all these skills are embedded in the Model of Green Skills Competency. Thus, it is emerging to combine and rephrase those skills to develop the indicator of items.

3. Methodology

Research Design

This research - employs a survey research design that intended to assess the perspective of teacher trainee regarding to the level of competency of technology green skills in the fourth revolution industries (4IR). The needed of technology competency of green skills in 4IR for teacher trainee also will assess in this study from the perspective of educator.

Participants

The population of this study consisted of TVET teacher trainee and educators from Institute of Teacher Education in Malaysia. Of the 27 campus, there are three campus that offer TVET courses which are Institute of Teacher Education Tuanku Bainun Campus, Institute of Teacher Education Temenggong Ibrahim Campus dan Institute of Teacher Education Technical Education Campus. The sampling process was performed by a disproportionate stratified random technique. Raosoft Software has been used to get the minimum sample from the population targeted.

From the 202 TVET teacher trainee and 47 educators surveyed, about 154 (76.2%) teacher trainee and 44 (93.6%) educators were chosen as a sample. This amount of sampling was adequate since it just 133 minimum sample required based on Raosoft Software with margin error 5% and confidence level 95%.

Table 1. Demographics of TVET Teacher Trainee

<table>
<thead>
<tr>
<th>No.</th>
<th>Demographics Item</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>63</td>
<td>40.9%</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>91</td>
<td>59.1%</td>
</tr>
<tr>
<td></td>
<td>18 -23</td>
<td>153</td>
<td>99.4%</td>
</tr>
<tr>
<td>2.</td>
<td>Ages</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>24 - 29</td>
<td>1</td>
<td>0.6%</td>
</tr>
<tr>
<td></td>
<td>30 above</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>Temenggong Ibrahim</td>
<td>43</td>
<td>27.9%</td>
</tr>
<tr>
<td>3.</td>
<td>Campus</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pendidikan Teknik</td>
<td>97</td>
<td>63.0%</td>
</tr>
<tr>
<td></td>
<td>Tuanku Bainun</td>
<td>14</td>
<td>9.1%</td>
</tr>
<tr>
<td></td>
<td>2015/2016</td>
<td>49</td>
<td>31.8%</td>
</tr>
<tr>
<td>4.</td>
<td>PISMP intake</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2018</td>
<td>71</td>
<td>46.1%</td>
</tr>
<tr>
<td></td>
<td>2019</td>
<td>34</td>
<td>22.1%</td>
</tr>
<tr>
<td></td>
<td>Practical teaching undergone and taught RBT subjects</td>
<td>49</td>
<td>31.8%</td>
</tr>
<tr>
<td>5.</td>
<td>Practical teaching experience</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Practical teaching undergone but has not taught RBT subjects</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Not yet practical teaching</td>
<td>105</td>
<td>68.2%</td>
</tr>
</tbody>
</table>
Table 1 shows the frequency and percentage of TVET teacher trainee who were respondents in this study. Based on the table, it was found that the number of male respondents was 63 (40.9%) while the number of female respondents was 91 (59.1%). In terms of age, almost the majority of 153 (99.4%) respondents involved are between 18 to 23 years, while the remaining 1 respondent (0.6%) is in the range of 24 to 29 years.

The distribution of participating respondents is from three Institute of Teacher Education that are from Campus of Temenggong Ibrahim as many as 43 (27.9%), Campus of Technical Education 97 (63.0%) and Campus of Tuanku Bainun as many as 14 (9.1%). In terms of student intake, 2015/2016 intake consisted of a total of 49 (31.8 percent) of the Ijazah Sarjana Muda Perguruan Program (PISMP). While a total of 71 (46.1 percent) was PISMP intake in 2018 and the remaining 34 (22.1 percent) were PISMP intake in 2019. Meanwhile for practical teaching experience, a total of 49 (31.8%) respondents have undergone teaching training and have taught related subjects TVET, while the remaining 105 (68.2%) have not yet undergone teaching training. In total, a total of 154 respondents (76.2%) responded to this questionnaire.

Table 2 indicates the frequency and percentage of respondents who are the educators. There were 32 (72.7%) male respondents while 12 (23.7%) were female respondents. Educators participating in this study had more than 10 years of experience with the highest percentage of 32 (72.7%) while the remainder with experience between 5 and 10 years are 12 (27.3%).

The participating respondents are from the three selected Institute of Teacher Education which are Temenggong Ibrahim Campus as many as 8 (18.2%), Technical Education Campus as many as 29 (65.9%) and Tuanku Bainun Campus as many as 7 (15.9%). The Agriculture field, Accounting and Entrepreneurship field reported the highest number of 10 respondents in terms of expertise (22.7%). Followed by the 8 (18.2 percent) field of mechanical engineering, the 6 (13.6 percent) and 5 (11.4 percent) field of Civil engineering and Electrical and Electronic engineering. In the Hospitality field, the number of educators involved in this study was 2 (4.5 per cent). The fields that reported the lowest number and percentage were Household Economics which was 1 (2.3%), Engineering Development 1 (2.3%) and Nutrition Science sector 1 (2.3%) respectively.

Table 2. Demographics of educator

<table>
<thead>
<tr>
<th>No.</th>
<th>Demographics</th>
<th>Item</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Gender</td>
<td>Male</td>
<td>32</td>
<td>72.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Female</td>
<td>12</td>
<td>23.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt;5 years</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt;10 years</td>
<td>32</td>
<td>72.7</td>
</tr>
<tr>
<td>2.</td>
<td>Experience in related field</td>
<td>6-10 years</td>
<td>12</td>
<td>27.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt;10 years</td>
<td>32</td>
<td>72.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Temenggong Ibrahim</td>
<td>8</td>
<td>18.2</td>
</tr>
<tr>
<td>3.</td>
<td>Campus</td>
<td>Pendidikan Teknik</td>
<td>29</td>
<td>65.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tuanku Bainun</td>
<td>7</td>
<td>15.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Agriculture</td>
<td>10</td>
<td>22.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Civil engineering</td>
<td>6</td>
<td>13.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Electrical and electronic engineering</td>
<td>5</td>
<td>11.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mechanical engineering</td>
<td>8</td>
<td>18.2</td>
</tr>
<tr>
<td></td>
<td>Expert in field</td>
<td>Design and Technology</td>
<td>1</td>
<td>2.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Accountancy and Entrepreneurship</td>
<td>10</td>
<td>22.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Science Nutrition</td>
<td>1</td>
<td>2.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Household economics</td>
<td>1</td>
<td>2.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hospitality</td>
<td>2</td>
<td>4.5</td>
</tr>
</tbody>
</table>

N=44
Identifying Technology Competency of Green Skills in the Fourth Revolution Industries amongst Teacher Trainee

**Instruments**

This study used quantitative approach whereby questionnaires were distributed to the respondents using Google Form. The assessment is based on a quantitative approach using statistical procedures. Quantitative research can be done through descriptive studies or inferential (Chua, 2015). Chua (2015) stated basic descriptive statistics such as frequency, percentage, mean, standard deviation and the distribution of scores were used to report the findings. In this study, data from the questionnaire were collected and the scores mean and standard deviation were used to report the findings. A Total of 9 questions was used and analyzed. The questionnaire has been developed and adapted from the Model of Green Skills Competency by (Pavlova 2016) and key skills in 4ir by Wilfried Aulbur, Arvind CJ (2016). The detail of how the construct in questionnaire was developed has been explained in Table 3.

<table>
<thead>
<tr>
<th>No</th>
<th>Sources</th>
<th>Indicator</th>
<th>Details item in questionnaires</th>
<th>Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>4IR key skills:</td>
<td>Environmental technology knowledge</td>
<td>Ability to explain the concepts of solid waste, energy, and water monitoring using blockchain technology, artificial intelligence and IoT</td>
<td>Using ordinal scale: 5 point Likert scale</td>
</tr>
<tr>
<td>2.</td>
<td>4IR key skills:</td>
<td>Current technology applied</td>
<td>Environmental technology knowledge: Ability to describe solid waste, energy, and water quantification applications using blockchain technology, artificial intelligence and IoT.</td>
<td>1- Strongly Disagree</td>
</tr>
<tr>
<td>3.</td>
<td>4IR key skills:</td>
<td>Environmental technology management</td>
<td>Knowledge of solid waste management system</td>
<td>2- Disagree</td>
</tr>
<tr>
<td>4.</td>
<td>4IR key skills:</td>
<td>Environment awareness</td>
<td>Selection of goods and services meet environmental standards</td>
<td>3- Neutral</td>
</tr>
<tr>
<td>5.</td>
<td>4IR key skills:</td>
<td>Application of ICT</td>
<td>Technology: Minimize the use of materials in physical form</td>
<td>4- Agree</td>
</tr>
<tr>
<td>6.</td>
<td>4IR key skills:</td>
<td>Innovation skills</td>
<td>Innovation skills: Cultivate the concept of eco-innovation</td>
<td>5- Strongly Agree</td>
</tr>
<tr>
<td>7.</td>
<td>4IR key skills:</td>
<td>System skills</td>
<td>System Skills: E-waste system skills</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>4IR key skills:</td>
<td>Problem solving skill</td>
<td>Problem solving skill: Ability to explain the concept of the use of technology in waste management</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>4IR key skills:</td>
<td>Element across curriculum</td>
<td>Can relate with elements of green industries technology with other topics or subject teaching (how everything is connected)</td>
<td></td>
</tr>
</tbody>
</table>
Reliability and Validity

The face and content validity of this instrument was carried out by three experts from Higher Education Institute in the field of technical and vocational. The reliability of this instrument was been measured with internal consistency, Cronbach Alpha coefficient 0.82. The five-point Likert scale has been used to measure the questions that represent perspectives of teacher trainee towards the readiness level of technology competency of green skills in 4IR and the level needed technology competency of green skills towards teacher trainee from the educator’s perspective.

Measurement

Finally, basic descriptive statistic such as mean scores and standard deviation were used to report the findings. Based on the interpretive mean values proposed by Landell (1977), each element studied will be at the strength of its interpretation value indicating that the level of technology competency green skills in 4IR. Though, the mean score between 1.00-2.33, shows low level interpretation, mean score between 2.34-3.67 shows intermediate and 3.68-5.00 show high level of interpretation.

4. Results

Tabulated data from Table 4 shows that there were nine (9) elements of technology green skills that have been considered in order to achieve the competencies of technology green skills. The 5-point Likert scale was used to identify the readiness and importance level of green skills competency element in the fourth industrial revolution.

Table 4. The readiness and importance level of technology green skills competency in 4IR

<table>
<thead>
<tr>
<th>No.</th>
<th>Items</th>
<th>TVET Teacher trainee</th>
<th>Educators</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean Score (m)</td>
<td>Standard Deviation (SD)</td>
</tr>
<tr>
<td>1.</td>
<td>Environmental knowledge: Ability to explain the concepts of solid waste, energy, and water monitoring using blockchain technology, artificial intelligence and IoT</td>
<td>2.86</td>
<td>1.048</td>
</tr>
<tr>
<td>2.</td>
<td>Environmental knowledge: Ability to explain applications for solid waste, energy and water quantification using blockchain technology, artificial intelligence and IoT</td>
<td>2.73</td>
<td>0.970</td>
</tr>
<tr>
<td>3.</td>
<td>Environmental management: Knowledge of solid waste management system</td>
<td>2.84</td>
<td>1.006</td>
</tr>
<tr>
<td>4.</td>
<td>Environment awareness: Selection of goods and services meet environmental standards</td>
<td>3.36</td>
<td>0.942</td>
</tr>
<tr>
<td>5.</td>
<td>Application of ICT Technology: Minimize the use of materials in physical form</td>
<td>3.42</td>
<td>0.975</td>
</tr>
<tr>
<td>6.</td>
<td>Innovation: Cultivate the concept of eco-innovation</td>
<td>3.45</td>
<td>0.915</td>
</tr>
<tr>
<td>7.</td>
<td>System analysis: E-waste system skills</td>
<td>3.38</td>
<td>1.097</td>
</tr>
<tr>
<td>8.</td>
<td>Problem solving skill: Ability to explain the concept of the use of technology in waste management</td>
<td>3.14</td>
<td>1.055</td>
</tr>
<tr>
<td>9.</td>
<td>Element across curriculum Can relate with elements of green industries technology with other topics or subject of teaching. (how everything is connected)</td>
<td>3.48</td>
<td>0.909</td>
</tr>
<tr>
<td></td>
<td>Total average</td>
<td>3.18</td>
<td>0.991</td>
</tr>
</tbody>
</table>
Based on Table 5, the interpretation of the mean score by Landell (1977) shows that all the nine elements technology competency of green skills amongst TVET teacher trainee is at a moderate level with a mean score of 3.18 (SD = 0.991). Meanwhile, the level technology competency of green skills needed towards TVET teacher trainee is at high level with a mean score of 4.02 (SD = 0.672). From the perspective of TVET teacher trainee, the readiness element of “Environmental knowledge: Ability to explain applications for solid waste, energy, and water quantification using blockchain technology, artificial intelligence and IoT” should be noted as it shows the lowest mean score of 2.73 (SP = 0.970) while the educator’s level of need for TVET teacher trainee is at a high level with a mean score of 3.93 (SD = 0.759). However, the readiness elements of “Element across curriculum- can relate with elements of green industries technology with other topics or subject of teaching (how everything is connected)” amongst TVET teacher trainee shows the highest score mean compare to others element with a score mean of 3.48 (SD=0.909) and the importance level is at a high level with a score mean of 4.09 (0.603).

5. Discussion

Findings from this study shows that most TVET teacher trainees at the Institute of Teacher Education have a moderate readiness level of technology competency of green skills consisting of elements of environmental knowledge, environmental management, environmental awareness, application of ICT and technology, innovation, system analysis, problem solving and element across curriculum. This is worrying as most of these green skills elements of technology are highly needed for TVET teacher trainees. Technology competency of green skills is important because it is the driving force of the country's economic growth towards sustainable development by creating human capital that can improve the country's economy, social and political without neglecting environmental aspects (Dlimbetova et al. 2016). It is also realigned with the concept of Pavlova (2016) where competencies in green skills encompasses elements of environmental awareness and readiness in the development of sustainable development.

From the findings, the element of ICT application and technology shows the moderate readiness level by TVET teacher trainee while it is in high demand from the perspective of educator. In this regard, this element should be polished by TVET teacher in order to teach and facilitate, as well as to improve learning, productivity, and performance. According to Norazlinda Saad & Sankaran (2020), proficiency of technology seems relevant to many aspects of the teaching profession, such as lesson preparation and development of teaching kids. These is important as by applying ICT and technology, teacher will minimize the use of materials in physical. Other aspects that impact teacher decisions to introduce technology into teaching and learning activities are teachers’ beliefs about the way the subject should be taught and the skills associated with teacher competence in managing classroom activities using technology tools and devices. Therefore, teachers must be able to apply the technological knowledge and skills required in professional job roles and responsibilities in order to achieve the expected outputs.

In addition, all teacher trainees should have the innovation element, as they will foster the idea of eco-innovation for their school students. This is because this item also shows the highest level required from an educator's point while it is moderate readiness level by TVET teacher trainee. The innovation elements are important to teacher trainee as until posting to school, they do need to train themselves as a real teacher with an element of system analysis (Izzat, Siti Mistima & Fariza, 2020). E-waste wants teachers to learn how the program functions, so that they can explain to their potential students, for environmental education. Ability to illustrate the idea of using technology in waste management would give teacher trainee the elements of problem-solving skills.

As the Fourth Industrial Revolution (4IR) gathers pace, teacher needs the ability to solve complex problems effectively in real-time using a unique and carefully designed solution (Naidoo and Singh-Pillay,2020). They must be able to face anything risk and know how to analyze the future obstacle in education. Therefore, the technology competencies in green skills are important to proficient by TVET teachers. In addition to this, problem-solvers can work independently from higher supervision. They also learn from those mistakes, and habitually debrief their processes to create more efficient and economical solutions(Watanabe, 2016). For this reason, as suggested in the study conducted by Mohd Zuhair Azuar (2015), elements of green technology skills need to be added to the syllabus of Engineering Technology (now rebranded to the subject of Basic Sustainability) where the main objective is to produce students and teachers who are creative and competent in technology, and to make society aware of the importance of environmental sustainability.

In overall, the level of importance towards competency of technology green skills amongst TVET lecturers in Fourth Industrial Revolution (4IR) was at high level while the readiness level was at a moderate level. It seemed perfectly reasonable result as an increasingly competitive environment to provide better education specially to face revolution of education 4.0, higher education institution should focus on improving and preparing students with technology abilities. One of the important factors which can contribute to improving technology abilities is teacher professional competencies. Teacher should have a wide and deep knowledge and technical skills regarding the courses they teach (Prasetio and Dindi 2017).
6. Conclusions

Green skills are crucial for sustainable development to ensure the Fourth Industrial Revolution is turned into a low-carbon economy and innovation. Meanwhile, education plays a major role in improving green economy skills, 4IR skills, social skills and environmental competences. Thus, technology competency is one of the important aspects of green skills development. Technology competency of green skills in fourth industrial revolution encompasses elements of quantification and monitoring waste, energy or water management systems, energy or water selection and acquisition of goods and services from external sources that are appropriate in terms of quality and environmental impact, material use and impact quantification, innovation in waste management, minimization of environmental impact, minimization of materials used, what can be recycled, environmental risk management and how learnt skills contribute to greening of industry. This study has significant implications in terms of practice, field of education and application where technology competency of green skill is much needed to complement the low-carbon economy in line with the needs of industry 4.0. Teachers with technical competence in green skills will be comfortable in the use of technology, especially in subjects related to design. With the technological skills they possess, they will use their skills to reduce the use of natural resources and switch to the use of more digital materials. Thus, findings from this study will shed some light among TVET teacher trainee and educators on the initial technology competency of green skills in the Fourth Industrial Revolution (4IR). In addition, this paper focuses on TVET teacher trainee at the Institute of Teacher Education so that it is important to concentrate on this institution as teacher trainee shares green skills in their teaching skills and is a role model in shaping new generations to support humanity, the environment and the economy. Next for future research, it is recommended that potential studies concentrate on the development of instruments assessing the degree of technical competence in green skills and module development on how to apply green technology skills to trainee teachers.

Acknowledgement

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Video Usage among Secondary School Students during the COVID-19 Pandemic

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Citation Styles


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Abstract The COVID-19 pandemic has intensified the already rapid pace of global development, including technological advances. Teachers are therefore required to adapt to, and update themselves on, the types of pedagogy needed to make teaching and learning attractive to students. However, the pandemic outbreak continues to threaten the education system and has closed schools worldwide. Consequently, the education system has changed dramatically, with teaching and learning increasingly being undertaken remotely on digital platforms. Video is one of the tools that can be used during this pandemic phase. This paper identifies secondary school students’ perceptions of the use of video in teaching and learning. Data were analyzed using descriptive statistics, Independent t-tests, and Pearson Correlation tests. The findings indicated that the majority of the respondents had positive perceptions of video usage in the classroom. These findings are useful for English teachers and may be useful for other educators in the same field. Because there are different types of students, this study will be beneficial in enabling educators to understand their students' preferences when learning English. Educators can also optimize the use of video to enhance their students’ proficiency in the use of English.

Keywords Secondary School Students, Teaching Learning with Video, Visual Aids: 21st Century Living, COVID-19 Pandemic

1. Introduction

Students lose interest in learning in class when there is no enjoyment to be had [1]. Educators must therefore make an additional effort and utilize technology, rather than depend solely on textbook material. Ebrahimi and Yeo [2] found that 57% of teachers used technology for education, whereas 39% of teachers admitted not having received any training in using technology. However, this situation drastically changed because of the COVID-19 pandemic outbreak three months into 2020. On 26 March 2020, UNESCO announced that 1.6 billion students from 165 countries were no longer attending school [3]. Education leaders have therefore had to resort to multiple strategies to ensure the continuation of learning, the most effective of which has been the use of digital technology.

The Malaysian Education Blueprint 2013-2025 [4] is an initiative launched by the Ministry of Education to assist Malaysia in the final part of its journey towards becoming a high-income nation. This blueprint outlines eleven transformational shifts that would be required to accomplish the objective of national education. One of these is to use information and communication technology (ICT) to scale up learning quality across Malaysia to produce creative, independent lifelong learners who achieve highly and are prepared for the challenges of 21st century living.

With videos specifically edutainment video, the teaching and learning process becomes enjoyable and engaging for teachers and students. However, studies [5] found that
educators continue to rely on traditional methods in the teaching and learning process, rather than use technology such as videos. However, the results of this study indicate that students have more positive attitudes towards the use of video than typical traditional classroom methods and have no problem understanding lessons delivered using videos.

According to another study [6], teachers have begun using videos and multimedia presentations in their classes, as they are an effective method to reach students. For instance, videos help to attract students’ attention, generate interest, boost concentration, enhance understanding, and increase the retention of content. This view is supported by the Director of the Academic Development Management Division who stated that, "We should take advantage of the great things technology can bring which were not possible before" [7].

Despite the clear benefits of edutainment videos for both teachers and students, some teachers are reluctant to use it in the classroom. Siti Hadijah [8] stated that this is because they encounter numerous challenges utilizing videos. One of these is that the teacher may fail to arouse students’ interest in learning owing to technical problems related to running the video. However, such a problem will sometimes occur and teachers therefore need to have a back-up plan.

The communication process that occurs between humans and computer software, known as interactivity, can help students and teachers manage the flow and pace of the lessons [9]. For instance, teachers can easily pause, play, or rewind the material. Multimedia and visual aids can have a positive effect on students’ comprehension of content, helping them to overcome learning difficulties with videos, photos, websites, Smart Boards, and other technological tools [10]. Technology can also be a helpful instrument in the language classroom as it assists teachers to deliver, and students to understand, the lesson better. Furthermore, traditional classes can sometimes bore students as they focus on textbooks and primarily rely on face-to-face interaction in the classroom.

Several studies have been conducted in Malaysia on the use of Facebook, WhatsApp, Twitter, and Telegram as popular learning tools. However, there have been few studies on the use of videos in secondary schools. Moreover, most of the studies that have been undertaken have primarily focused on higher education learners. According to Siew et al. [11], the most commonly used tools across universities are Facebook, emails, and online self-tests/quizzes/practices. Therefore, this study aimed to explore perceptions of video usage among secondary school students.

2. Materials and Methods

This study employed a purposive sampling technique to recruit the participants. Purposive sampling is a non-probability sampling method that is employed when individuals selected for the sample are chosen by the researcher. This technique is also known as judgment, selective, or subjective sampling as the researcher relies on his or her judgment when choosing members of the target population [12]. There are several types of purposive sampling, including heterogeneous purposive sampling, homogeneous purposive sample, typical case sampling, extreme or deviant case sampling, total population sampling, and expert sampling. This study employed homogeneous purposive sampling. This method focuses on one specific subgroup in which all the sample members are similar. The target population for this study comprised Form 4 students from two schools. There were 100 students in the population, of whom 93 participated in the study. The two selected schools represented a school in the city and one in a rural area.

To answer the research question, participants were required to complete a questionnaire. This comprised three sections: Section 1 (A) gathered information on students’ personal background through a demographic profile; Section 2 (B) collected information on students’ preferences with respect to learning English; Section 3 (C) focused on students’ perception of video usage in the classroom. The Likert scale designed for this questionnaire was as follows: “1” for strongly disagree, “2” for disagree, “3” for somewhat agree, “4” for agree, and “5” for strongly agree. The questionnaire was also translated into Bahasa Melayu (the Malay language).

The reliability test is a method for checking a scale’s internal consistency. Cronbach’s alpha is used as the indicator, the value of which should be above 0.7. The overall Cronbach’s alpha value for the instrument was 0.928. The constructs for all variables had a Cronbach’s alpha coefficient of more than 0.9. Face validity and content validity were also verified before data collection and reliability testing to ensure the validity of the instrument.

3. Results and Discussion

Technology has evolved rapidly over the years. The government has therefore instructed educators to integrate technology into teaching and learning processes. Video technology should be used, as it is one of the key interactive teaching methods. The findings (Table 1: Item 23) indicate that 88 (94.7%) respondents strongly agree, agree and somewhat agree that video allows them to view material at their convenience; only 5 (5.4%) respondents disagree and strongly disagree with the statement. The use of video is a convenience as long as users have their technology available, which can be a device such as a computer, a laptop, or even their mobile phones or smartphones. The most important requirement is to have a strong Internet connection. Thus, students need these two important items with them wherever or whenever they want to watch a video to learn a particular lesson. The
video will remain available unless the owner literally deletes it from their account.

The findings (Table 1) also suggest that a majority of the respondents agree that video (entertainment video) creates an engaging sensory experience (Item 22) with 87 (93.6%) respondents indicating they agree, strongly agree and somewhat agree with the item. This is most probably because the content of the video can improve their level of proficiency. With regard to the time spent watching videos, the findings from Item 1 indicate that 73 (78.5%) respondents agree, strongly agree, and somewhat agree that they spend more than two hours per day watching videos. They use this time to watch videos that help to improve their studies and it motivates them to learn the language. The findings from Item 2 suggest that 79 (84.9%) respondents agree, strongly agree and somewhat agree that they spend time to watch video that improve their studies and it motivates them to learn the language. The use of effects, elements, and animations in the video, especially educational videos, will ensure the viewers focus more on the lesson. Audiences can become so engrossed that they do not even notice the time passing. By watching videos from across the world, students can learn the correct pronunciation for words. Sometimes pronunciations from other countries can sound different; thus, students will grasp a considerable amount of useful information simply by watching video. It also motivates them to learn more, especially in relation to languages.

### Table 1. Video usage in the classroom

<table>
<thead>
<tr>
<th>Item</th>
<th>Distribution of Responses (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I spend more than two hours per day on video</td>
<td>1- Strongly Disagree: 13(14.0)</td>
</tr>
<tr>
<td>2. I spend time to watch video that improve my studies</td>
<td>7(7.5)</td>
</tr>
<tr>
<td>3. Video fosters deeper learning</td>
<td>4(4.3)</td>
</tr>
<tr>
<td>4. Video makes learning fun</td>
<td>1(1.1)</td>
</tr>
<tr>
<td>5. Video grabs my attention to learn about something</td>
<td>4(4.3)</td>
</tr>
<tr>
<td>6. Video helps me to understand when learning new things</td>
<td>1(1.1)</td>
</tr>
<tr>
<td>7. Video helps increase my imagination based on the contents</td>
<td>1(1.1)</td>
</tr>
<tr>
<td>8. Video creates memorable visual images</td>
<td>8(8.6)</td>
</tr>
<tr>
<td>9. Video decreases my anxiety in the classroom</td>
<td>7(7.5)</td>
</tr>
<tr>
<td>10. Video decreases tension while learning in the class</td>
<td>4(4.3)</td>
</tr>
<tr>
<td>11. Video enables me to learn many new things</td>
<td>3(3.2)</td>
</tr>
<tr>
<td>12. Video makes learning languages easier</td>
<td>1(1.1)</td>
</tr>
<tr>
<td>13. …easy to search language learning materials</td>
<td>2(2.2)</td>
</tr>
<tr>
<td>14. …to help them learn new language</td>
<td>2(2.2)</td>
</tr>
<tr>
<td>15. …achieve language proficiency faster using video</td>
<td>3(3.2)</td>
</tr>
<tr>
<td>16. …motivated to learn language when video is used</td>
<td>3(3.2)</td>
</tr>
<tr>
<td>17. …comfortable using video when learning a language</td>
<td>0(0)</td>
</tr>
<tr>
<td>18. …video to learn a language is worth the time</td>
<td>2(2.2)</td>
</tr>
<tr>
<td>19. The use of video in learning a LL is worth the effort</td>
<td>1(1.1)</td>
</tr>
<tr>
<td>20. …fair even to the less technology-savvy students</td>
<td>4(4.3)</td>
</tr>
<tr>
<td>21. …video in LL does not add an extra burden</td>
<td>3(3.2)</td>
</tr>
<tr>
<td>22. Video creates a more engaging sensory experience</td>
<td>1(1.1)</td>
</tr>
<tr>
<td>23. …to view at my convenience from wherever I am</td>
<td>1(1.1)</td>
</tr>
<tr>
<td>24. Video increases my knowledge retention</td>
<td>0(0)</td>
</tr>
<tr>
<td>25. Video increases my digital literacy</td>
<td>2(2.2)</td>
</tr>
<tr>
<td>26. Video increases my digital communication</td>
<td>4(4.3)</td>
</tr>
<tr>
<td>27. …creates more engaging sensory experience for me</td>
<td>2(2.2)</td>
</tr>
<tr>
<td>28. …assistance when I learn a complex subject</td>
<td>4(4.3)</td>
</tr>
<tr>
<td>29. …assistance when I learn a highly procedural subject</td>
<td>0(0)</td>
</tr>
<tr>
<td>30. Video gives me great assistance in learning any subject</td>
<td>1(1.1)</td>
</tr>
<tr>
<td>Video increases student engagement with the materials</td>
<td>0(0)</td>
</tr>
</tbody>
</table>
The usage of video specifically edutainment is improving daily and educators are now taking the initiative to help their students enhance their concentration while at the same time assisting them to understand the lesson better. Video usage has several merits and few demerits. Previous and present research has indicated that video fosters deeper learning, increases understanding when learning new things, increases the use of imagination based on the contents, and creates memorable visual images. The usage of video in the classroom also affords students a chance to immerse themselves into the content. For instance, although they may never have been to a particular country, they can simply watch the video to appreciate what this country is like. It enables them to learn about the people, the culture, and the language of a particular country without needing to travel. The findings for Item 7 indicate that video helps increase imagination based on the contents as 85 (91.5%) respondents agree, strongly agree, and somewhat agree with the item. The finding is consistent with the results of a previous study [13].

The findings for Item 4 indicate there was only one respondent (1.1%) who strongly objected to the use of video to make learning enjoyable; almost all the respondents perceived otherwise. Educators always need to improve their teaching skills so that students are engaged and focused on the lesson. One strategy is to ensure the teaching and learning process is always up-to-date. In so doing, the most important consideration is to ensure the materials used are relevant to modern education and are enjoyable for students to learn. The choice of materials is extremely vital because this will determine the success of the teaching and learning process. The use of video should become essential for teachers in order to make the teaching and learning process enjoyable in a technologically advanced world.

Krishnasamy [14] reported in New Straits Times (NST) on 30 October 2015 that one of the editors, Mustapha Kamil, had underlined the importance of teachers bringing creativity into the English language classrooms and not being overly dependent on textbooks or materials provided in schools. Mustapha Kamil described his experiences learning English during his school days, which included watching movies. According to the present findings, 87 out of 93 respondents (93.5%) agree, strongly agree and somewhat agree that video makes learning enjoyable. Dependency on the textbooks or materials provided in schools was no longer seen as relevant and does not enhance the credibility of educators. Teachers need to challenge themselves to prove they are worthy of being educators. The entertaining part of learning will flourish as creativity is introduced into the teaching and learning process, especially in the classroom.

A five-point Likert scale ranging from 1- strongly disagree to 5 - strongly agree was also used to measure the level of video usage among Form Four (4) students. Respondents who scored 1 to 2 were considered to have a low level of video usage, 3 a moderate level of video usage, and 4 to 5 a high level of video usage.

Table 2 presents the level of video usage among secondary school students. This shows that 54 respondents or 58.1% have a high level of video usage, 20 respondents, 21.5% have a moderate level of video usage, and only 19 respondents, or 20.4% have a low level of video usage. This means that majority of the respondents reported a high or moderate level of video usage. This study also determined whether there was a significant difference in the level of video usage based on school area. An independent t-test was used to compare the means of students living in city and rural areas. Table 3 and Table 4 present the differences in the level of video usage according to school area.

| Table 2. Level of video usage among secondary school students |
|-------------------|------------------|-----------------|---------------|-----------------|
|                   | Frequency | Percent | Valid | Cumulative Percent |
| Valid             |           |         |       |                  |
| High              | 54        | 58.1    | 58.1  | 58.1             |
| Moderate          | 20        | 21.5    | 21.5  | 79.6             |
| Low               | 19        | 20.4    | 20.4  | 100.0            |
| Total             | 93        | 100.0   | 100.0 |                  |

Table 3. Descriptive statistics for video usage by school area

<table>
<thead>
<tr>
<th>Level of Video Usage</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>City</td>
<td>38</td>
<td>1.6316</td>
<td>.78572</td>
<td>.12746</td>
</tr>
<tr>
<td>Rural</td>
<td>55</td>
<td>1.6182</td>
<td>.82756</td>
<td>.11159</td>
</tr>
</tbody>
</table>

Table 4. Differences in video usage by school area
There is no relationship between school area and the level of video usage.

The area in which a school is located has always been an excuse for teachers and students not to use technology. Teachers have complained that they experience difficulty using the technology in the teaching and learning process. However, over the years the government has provided facilities such as laptops, projectors, and even the Internet to each school, including those in rural areas, to provide better educational experiences for all students. For instance, the Ministry of Education has spent more than RM 6 billion on ICT over the past decade – in education initiatives [4]. Although some facilities may still be lacking, there is no excuse not to use technology. Schools in both urban and rural areas receive the same provisions in terms of facilities from the government to involve teachers and students in the use of technology and, most importantly, maximize the usage of video in the classroom.

This research has found no significant relationship between school area and the level of video usage. This is because even those respondents living in a rural area can easily access the Internet without any trouble. The findings also indicate that most respondents access videos using their own smartphones and the Internet using their own mobile data. They utilize the Internet to watch videos either in the classroom or outside. Even though most of the respondents are from rural schools, the results still indicate a high level of video usage. This demonstrates that, regardless of their location, secondary school students can watch and enjoy videos. However, the findings contrast with research conducted by [15] in Masvingo, Zimbabwe, which found that students in city areas reported significantly higher levels of video usage than students in rural areas where computers were nothing more than decorations. There are several possible reasons for this discrepancy in the findings. The first may be that there were more respondents from rural schools than from city schools in this study. Therefore, the results might not have been very precise in representing a particular school area. Another possible reason could be that respondents might have given the answers based on their feeling at a particular time even though this is not how they feel in actual learning situations or in their daily lives.

According to Levene’s Test, if $p > .05$, it means the two variances are approximately equal. No significant differences were observed in the scores for rural ($M = 1.63$, $SD = 0.79$) and city ($M = 1.62$, $SD = 0.83$) respondents. The Independent Samples Test results (Table 5) indicate that $p = .94$ is greater than 0.05, and therefore no significant difference was found in the reported level of video usage between city and rural area conditions ($t (91) = .078$, $p = .94$). The data provides sufficient evidence to reject $H_0$ ($p > 0.05$). Thus, the hypothesis is that there is no significant difference between city and rural areas with regard to level of video usage is supported. This means that city and rural students are likely to display a similar amount of video usage.

Because the level of video usage depends on students’ access to facilities, this is the most important factor in determining whether they can watch videos. Without facilities, students will have a problem accessing videos on their own. The findings in the present research indicate a statistically significant relationship between students’ access to facilities and the level of video usage. The findings are consistent with those by other researcher [16] in a sample of senior high school students in Ghana – which found that most students in rural areas have access to mobile phones.

Similarly, the current findings also revealed that most students use their smartphones to watch videos as 68 out of 93 respondents (73.1%) owned the device. This finding is not surprising somehow as even children at present also have the access to smartphones as parents tend to give their child the gadget as a way to stop them from crying or to stop them from causing disturbance while working. Therefore, they were exposed to the smartphone ever since they were still young. At this current point in time, when the COVID-19 pandemic is forcing schools to close down, numerous countries, including Malaysia, are resorting to online learning with substantial video usage, which means children will need to have access to their parents’ devices. All houses today must have at least one gadget. It is now seen as normal for almost all respondents to use their smartphones to watch videos and engage in a wide range of other activities. For instance, parents now use their smartphones to show their infant children videos such as Didi and Friends, Boboiboy, Upin & Ipin, and other similar edutainment videos.

<table>
<thead>
<tr>
<th>Facilities Used</th>
<th>Frequency</th>
<th>percent</th>
<th>Valid percent</th>
<th>Cumulative percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laptop</td>
<td>15</td>
<td>16.1</td>
<td>16.1</td>
<td>16.1</td>
</tr>
<tr>
<td>Smartphones</td>
<td>68</td>
<td>73.1</td>
<td>73.1</td>
<td>89.2</td>
</tr>
<tr>
<td>Computer</td>
<td>3</td>
<td>3.2</td>
<td>3.2</td>
<td>92.5</td>
</tr>
<tr>
<td>School Computer</td>
<td>6</td>
<td>6.5</td>
<td>6.5</td>
<td>98.9</td>
</tr>
<tr>
<td>Others</td>
<td>1</td>
<td>1.1</td>
<td>1.1</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>93</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

**Table 5.** Descriptive statistics of facilities used

<table>
<thead>
<tr>
<th>Students Access to Facilities</th>
<th>Pearson Correlation</th>
<th>Level of Video Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>93</td>
<td>93</td>
</tr>
<tr>
<td>Level of Video Usage</td>
<td>Pearson Correlation</td>
<td>Sig. (2-tailed)</td>
</tr>
<tr>
<td></td>
<td>.220*</td>
<td>.034</td>
</tr>
<tr>
<td>N</td>
<td>93</td>
<td>93</td>
</tr>
</tbody>
</table>

*Correlation is significant at the 0.05 level (2-tailed).
The Pearson Correlation Test results identified a statistically significant relationship between student access to facilities and the level of video usage ($r = .22, p < 0.05$). While access to technology can provide valuable learning opportunities to students, it does not guarantee successful outcomes. Nevertheless, without access to technology for video usage there is no point in designing and developing excellent technology. This is supported by the National Center for Education Statistics on student access to digital learning resources outside the classroom report [17].

4. Conclusions

This research has shown that the majority of the respondents loved watching videos as they spend more than two hours per day doing so. English teachers in the classroom should consider this, as many of the students' responses in this study were positive. The findings of this study are useful, not only for English teachers working in a school, but also to lecturers in the same field. Because there are different types of students, this study will be beneficial for educators in understanding what their students' preferences are with respect to learning English. As the world continues to evolve, educators should be capable of introducing a more stimulating and dynamic range of teaching techniques. Similarly, policy-makers can utilize this study to consider a range of additional strategies that can be implemented as part of 21st-century education to help both educators and students. For instance, collaboration with administrators, educators, students, parents and other policy-makers will help ensure the education syllabus is updated with 21st-century educational practices. Most importantly, the government should also provide classes with an adequate number of computers connected to the Internet as this will make it easier for students to access videos and ensure a more effective teaching and learning process.

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Malaysian Secondary Students' Resilience and Entrepreneurial Readiness

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Abstract This study aims to identify the level of entrepreneurship readiness and resilience of secondary school students in Selangor, Malaysia. This is measured through three elements—the student’s readiness of attitude, readiness in learning, and spiritual readiness—with resilience measured using six elements: social skills, problem solving, autonomy, optimism, humor and spirituality. This study also identifies the correlation between students’ entrepreneurship readiness and entrepreneurship resilience with a quantitative, survey-based approach involving 442 secondary school students. The data obtained were analyzed by descriptive and inference forms; the study’s findings reveal moderate levels of entrepreneurship readiness and resilience among the surveyed secondary school students. Meanwhile, Pearson’s correlation analysis demonstrates that a positive relationship exists (r=0.747) between entrepreneurship readiness and resilience among secondary school students. This study provides assistance to the parties involved with secondary school education, or specifically, in designing and planning entrepreneurship education, entrepreneurship training to improve entrepreneurial learning practice, students’ interest and enthusiasm towards entrepreneurship. Consequently, this will enhance students’ self-resilience, which indirectly creates competent and sophisticated societies.

Keywords Entrepreneurship, Entrepreneurial Readiness, Resilience, Secondary Students, Self-efficacy, Self-discipline, Self-esteem, Self-control, Self-determination, Self-employment

1. Introduction

Malaysia’s Shared Prosperity Vision 2030 (SPV) policy was launched in October 2019 to replace the nation’s vision 2020 policy. The 2030 policy plans for the nation’s economic development and distribute Malaysian national wealth to all levels of society, regardless of ethnicity, income or supply chain. This new policy was developed to solve any remaining unsolved issues from the previous policy, such as: Malaysia’s weak, lagging economic growth compared to other East Asian countries; low technological mastery; and low participation by Malaysia’s Bumiputera people in various developed sectors. This latter point is especially important, as the Bumiputera’s corporate equity portfolio is still low (16.2%) compared to the National Economic Plan’s target of 30%. Further, Malaysia’s foreign equity rose to 45.3%, and over 60% of existing jobs over the last decade offered income of less than RM 2,000 per month [1]. As such, the SPV has been set as a benchmark for Malaysia to become a developed, high-income nation.

The nation’s previously developed policies demonstrate Malaysia’s capability to become a developed nation and drive its superior national economic growth; consequently, Malaysia desperately needs a highly knowledgeable and skilled workforce [2]. Zainuddin [3] also emphasized that all citizens—including students—must have the skills to fit
the needs of the 21st century. The Ministry of Education (MoE) has also taken the initiative to design a suitable curriculum that meets the country’s current needs so students have skills comparable to those of international students. This national curriculum was designed to create a balanced, resilient, curious, principled, informed, patriotic student with successful communication skills and problem-solving ability.

The government has established its Human Capital Development Policy (HCDP) to ensure resilient and competitive national human capital by 2030, on par with foreign countries. The Strengthening Lifelong Learning policy; the third policy in particular as found in the HCDP relates to the development of students’ resilience and entrepreneurial readiness and aims to enhance their skills. The policy focuses on: i) improving job skills and ii) building entrepreneurial excellence and expanding communities for high-income sectors. Part (ii) directly connects with entrepreneurship, as its strategies are implemented to enhance the effectiveness of entrepreneurship training programs and empower communities that focus on the development of entrepreneurship through training. Additionally, the fourth policy aims to improve the quality of education for a better student outcomes and institutional excellence in producing students who are resilient and competitive. Therefore, the HCDP is crucial in generating and sustaining the country’s economic growth, and the availability of a highly skilled workforce is essential in transitioning all economic sectors toward knowledge-, technology- and innovation-intensive activities [4,5].

In the pursuit of producing high-quality, resilient and competitive human capital to achieve the nation’s aspirations, literature has also seriously focused on entrepreneurship through empowering entrepreneurship training [5,6]. This is because entrepreneurship is an important variable in Malaysia’s economic development and growth, and is key in helping its local communities [7,8]. Thus, education is key in developing highly skilled, charismatic and successful human capital with an entrepreneurial mind-set, and ultimately, to achieve the nation’s SPV aspirations. In fact, quality education and the mastery of skills are critical to nations’ formation [9], and their true strength lies in the level of knowledge and skills possessed by its people [10].

Will these policies open students’ minds and make them more resilient, competitive and ready for entrepreneurship? This question arises given the low percentage of students who choose entrepreneurship as a career, or less than two percent of all students each year, as various questionnaires have revealed the students’ perceptions of entrepreneurial careers [11]. Therefore, this study is highly relevant given that resilience and entrepreneurial readiness are symbiotic, and especially in the wake of Malaysia’s Industrial Revolution 4.0.

2. Background

The entrepreneurial field has spurred the country towards the Industrial Revolution 4.0, which parallels current technological advancements, with the potential to accelerate the country’s economic growth and provide favourable technological advancements, the emergence of new technologies and a global technological revolution all present the need for resilient, competitive youth.

One challenge for Malaysia in facing these changes involves producing productive, creative and innovative students who are willing to directly face the challenges ahead. This revolution demands that students be more prudent in preparing themselves to meet current demands and overcome increasingly difficult challenges [13]. This is because entrepreneurship in this era of globalisation is more challenging as technology becomes more sophisticated, competition is increasingly fierce, and workers’ demands are more complex [14].

Statistics of the Malaysian labour force [15] reveal a steady unemployment rate in 2018 and 2019 of 3.3%. However, the nation’s youth are working jobs that do not reflect their educational fields, with salaries less than RM 3,000; this amount is not sufficient to support their daily needs. The situation appears worse when considering the increased growth of the Malaysian population over the years. According to the Department of Statistics Malaysia [16], the Malaysian population in 2019 was estimated at approximately 32.6 million people, with a population growth rate of 1.1% compared to 2018. This growth has made it difficult for the nation’s youth to find employment.

The government-and especially the MoE-has become aware of this situation, and has launched various entrepreneurship initiatives to enhance business skills and readiness among young people. This effort also involves improving the quality of education by incorporating entrepreneurial elements into both formal and informal educational curricula [11,17,18].

Other than the MoE, external agencies are also working collectively to instil an entrepreneurial element among students through various entrepreneurship programs. These include the Bumiputera Youth Entrepreneurs’ Program, which is a special development program in collaboration with SME Corporation Malaysia and the Ministry of International Trade and Industry. This program in particular aims to mentally and physically prepare youths who want to start businesses by exposing them to the landscape and challenges of the real business world [19]. Further, Majlis Amanah Rakyat [20] also offers special aid to new entrepreneurs through its Technical Entrepreneur Program, an initiative designed to assist entrepreneurs who want to venture into the technical field by offering training towards self-reliance in operating their own businesses.
3. Literature Review

3.1. Entrepreneurship and Entrepreneurial Readiness

The National Entrepreneurship Policy (NEP) was introduced to provide a holistic framework or ecosystem for entrepreneurship development in Malaysia, which is rapidly growing [6]. This policy and its overall core strategy are a cornerstone of the country’s resilience and competitiveness under global economic competition and the exploding technological advancements that are causally linked to the Industrial Revolution 4.0. As Malaysia must be more responsive and proactive in overcoming these challenges, the NEP was developed to achieve the following five different objectives:

1. Creating a holistic entrepreneurial ecosystem conducive to supporting Malaysia’s inclusive, balanced and sustainable socio-economic development agenda.
3. Increasing the number of high-quality, viable, resilient, global and competitive-minded entrepreneurs.
4. Enhancing the capabilities of micro, small and medium-sized enterprises and cooperatives.
5. Making entrepreneurship a widespread career option.

Producing an entrepreneurial society is also fundamental in making Malaysia a leading entrepreneurial nation by 2030. Adopting an entrepreneurial culture by implementing the NEP’s five core strategies will facilitate a transformational process in the nation’s inclusive economy and entrepreneurial community. Moreover, the NEP has been designed to establish a comprehensive strategic direction to develop Malaysia’s entrepreneurial ecosystem. In developing Malaysia into a thriving, competitive entrepreneurial nation, it must also possess some of the following characteristics: high talent, innovation-driven, with a collaborative economy, entrepreneurial community, successful governance, market leadership and sustainable development. Two topics are to be considered and cultivated for this to be a success. First, the government should focus on promoting entrepreneurship in the entrepreneurial environment. Specifically, they should offer training, infrastructure and facilities to support entrepreneurial activities as well funding and financing and research and development to enhance entrepreneurial skills. Programs and initiatives should also be enhanced to promote these efforts’ success.

Second, an entrepreneurial survey should be conducted regarding Malaysians’ perceptions of entrepreneurship. An entrepreneurial culture is fostered in schools to shape students’ attitudes as potential job-creators and not job-seekers [17,21]. The government established its Young Entrepreneur Program—currently the Business Growth Program—to produce more young entrepreneurs among secondary school students. The program is inspired by the United States’ Junior Achievement Program [22]. Further, the government fosters entrepreneurial culture among secondary school students through the Business Growth Program so they can engage in all fields and modern economic activities and work with non-Bumiputera citizens to develop the country [23]. Students with knowledge of training, mentorship, product marketing and capital financing can independently start their own businesses after finishing school. This knowledge can also influence their entrepreneurial success [24].

An emphasis on the Business Growth Program among secondary school students is a first step towards providing entrepreneurship guidance and knowledge. This is because students can no longer solely rely on the government to provide job opportunities and work is currently geared towards self-employment; thus, students must seize such entrepreneurial opportunities [25]. Students with an interest in business can pursue support and assistance from such existing agencies such as the Majlis Amanah Rakyat. Students can also obtain financial aid, expert guidance, training and facilities from these participating agencies after graduation. A report from the Department of Statistics Malaysia [26] reveals that few Malaysians work as entrepreneurs, with a relatively small percentage of the total population in this profession over a 25-year period (no more than 26%). The number of entrepreneurs has trended downward, from 25.1% in 1982 to 20.9% in 2008. The low percentages of people working as entrepreneurs indirectly indicate that the Malaysian people are less likely and willing to venture into entrepreneurship, and more likely to pursue government or private sector employment.

Why has this situation occurred? Have youths—and especially secondary school students who have participated in an entrepreneurial co-curriculum—not been adequately prepared to venture forth as the future of entrepreneurship? The Department of Statistics Malaysia [26] demonstrates that a high percentage of those applying for entrepreneurship come from the nation’s schools and universities. For example, the wholesale and retail, motor vehicle, motorcycle and personal and household repair sectors still offer employment opportunities to the younger generation, and especially graduates with a Malaysian Certificate of Education. These sectors offered employment opportunities for 26,315 (2006), 30,647 (2007), 43,948 (2008), 88,822 (2009) and 22,730 (2010) graduates [26]. Even students who have participated in entrepreneurship programs, such as the Business Growth Program, have also reported a dependency on jobs in the public or private sectors. Hence, few entrepreneurs exist among students between 15 and 34 years of age.

A similar situation can also be found overseas. For example, [27] have demonstrated that Catholic private school students have fewer and weaker entrepreneurial aspirations. Students also tend to become entrepreneurs because their schools organise entrepreneurial activities that enhance their entrepreneurial readiness and increase...
their interest in entrepreneurship. The Danish Foundation for Entrepreneurship [28] also showed that few students in Denmark (32%) receive entrepreneurship training, although almost all students (95%) exhibited a positive attitude towards entrepreneurship.

Globally, a 2012 statistics report from the Global Entrepreneurship Monitor found that Malaysia is still among the lowest-scoring countries in choosing entrepreneurship as a career choice, with only 51.5%. The countries with the highest or moderate scores were Colombia (89.4%), Brazil (86.3%), China (73.1%) and Thailand (77.0%) [29].

3.2. Resilience

Resilience refers to the ability to cope with challenges in one’s journey [30]. Further, Rutter [31] stated that resilience is a general ability that involves high flexibility and adaptability when handling internal or external pressures. He also observed that resilience is a universal ability to resist influences that can prevent oneself from accepting failure. Ruiz et al. [32] stated that individuals’ readiness for entrepreneurship is defined as the confluence of a set of personal traits or features that distinguishes individuals with readiness for entrepreneurship. They are especially competent in observing and analysing their environments to channel their high creative and productive potential and deploy their capability to dare and need for self-achievement.

Generally, resilience is the ability to bounce back from adverse life events [33]. It is an important trait in students’ well-being and success for both long-and short-term outcomes, as adversity helps children become resilient. According to Study International [34], the support children receive while experiencing adversity—and the extent to which that support meets their needs and circumstances—helps develop resilience. Building resilience involves an ability to adapt well to adversity, trauma, tragedy, threats or even significant sources of stress. These abilities can help children manage stress and feelings of anxiety and uncertainty; however, resilience does not mean that children will not experience trouble or distress. Emotional pain and sadness are common when suffering major traumas or personal losses, or even learning of someone else’s loss or trauma. Resilience can be developed in children, and involves behaviours, thoughts and actions that can be learned over time.

The aspects of resilience adapted from Masten and Reed’s [35] model emphasize five key elements that reflect students’ levels of resilience: self-esteem, self-discipline, self-efficacy, self-control and self-determination. The model also introduces five ‘self-element’ components: peer-to-peer, resilience-building, and event navigation elements. This study model denotes job success as depending on both underlying and proximal factors, including one’s personality (self) and human capital. Personality is comprised of the individual’s cognitive characteristics and capabilities, while human capital consists of expertise, experience, education and training, knowledge and individual skills. Integrating these basic factors can impact such proximal factors as cognition, action processes, motivations and leadership. Masten and Reed’s [35] resilience model has five different dimensions derived based on the components of self-efficacy, cognition and social competence. Resilience in the efficacy element consists of various personality traits, such as optimism, persistence and great mental, physical and spiritual fitness. These personality traits dynamically influence job formation and success [36].

Masten et al. [37] also stated that resilience is ‘the ability process to succeed in adapting towards changes regardless of challenging or threatening circumstances. Resilience is a word that is epistemologically derived from salire, the Latin word for ‘springing up’, or appearing upwards. The original word also refers to resilire, which means ‘to spring back’, and refers to an object’s elasticity. Therefore, resilience can be regarded as the ability to rebound and endure adversity; individuals with great resilience and abilities can be described as ‘tough’, ‘strong’ or ‘invincible’, as well as ‘tenacious’ [38].

Irmohizam and Muhamad [39] discovered that students are incredibly resilient, with the following highly scoring resilience constructs: self-confidence (mean 3.78), self-efficacy (mean 3.78), self-control (mean 3.92) and determination (mean 3.81). However, the self-discipline construct scored at a moderate level (mean 3.50). The study also indicates that male students were more resilient than females ($t = 3.211$ test, $p < 0.001$).

4. Current Issues and Challenges

The speed of the world in chasing the Industrial Revolution 4.0 calls for the rapid seizing of opportunities that can be explored to boost Malaysia’s income and economic development. However, a 2018 report by the Global Entrepreneurship Research Association (GERA) [40] indicates that Malaysia is one of the few countries that still lags in its entrepreneurial readiness. This statement was obtained when the data on entrepreneurial intentions among Malaysians exhibited a low percentage of 17.6% compared to other Association of Southeast Asian Nations members, such as Indonesia (28.1%), Vietnam (25%) and Thailand (37.4%) [40]. Therefore, few Malaysians are ready to enter into the field of entrepreneurship as a career, despite the government’s various efforts.

Issues with entrepreneurial involvement and readiness have also been addressed among college students. For example, among community colleges, the 2017 Graduate Validation Study for Community College reported an
increase in students’ start-up their own company, with 560 students in 2016 (6.5%) to 676 students in 2017 (6.6%). Although students in the personal business sector increased, this occurred at a low rate, or only 0.1% [41]. This relates to the attitude of the students themselves, as noted in a study by Wahid et al. [42] of Jas in Community College final semester students; the authors’ work noted that students are less confident in starting their own businesses (mean 2.50), despite an interest in entrepreneurship. This lack of involvement in entrepreneurship occurs in college as well as all other educational institutions, such as polytechnics schools or universities. For example, Mohd Halid’s [43] study of South Zone Polytechnics reveals that students’ entrepreneurial readiness is moderate, while the element of restraint in their attitudes is significant (mean 2.56) compared to the elements of knowledge, skills, encouragement, interest, experience, leadership and encouragement. Additionally, Madar and Abdul Hamid [44] examined the critical success factors for entrepreneurial programs in community colleges to reveal a similar issue with students who have entrepreneurial potential but lack a knowledge of entrepreneurship, confidence, creativity and innovative ideas in facing global challenges. However, Othman and Hussain’s [45] study of 105 students from six different community colleges found that students are interested in becoming entrepreneurs (mean 4.01), but are not ready for such a career path because they believe entrepreneurs must overcome challenges and risks before becoming successful; therefore, these students still lack resilience. These issues are likely to affect the government’s efforts in producing entrepreneurship-minded graduates and converting Malaysia into an ‘entrepreneurial nation’.

Despite the government’s various efforts, a lack of student involvement remains. According to Mohamad’s [21] study, entrepreneurial readiness among students is only moderate, which parallels reports obtained from the Department of Labour’s Employment Services Division in the year 2016. Statistics reveal that high numbers of registered job-seekers among youths who passed the Malaysian Certification of Education; the numbers of such graduating job-seekers who are still waiting for employment have fluctuated, at 28.9% (2006), 30% (2007), 26% (2008), 35% (2009) and 31.9% (2010). Meanwhile, Abd Rahim [46] stated that only moderate numbers of students tended to venture into the entrepreneurship field. Issues related to student engagement and entrepreneurship development were also debated and discussed among an entrepreneurship panel at the National Conference on the 4th Industrial Revolution 2017; clearly, students in the technical field have mastered their field of study, but still exhibit a low ability or readiness to start businesses [47]. This also reportedly relates to teachers’ exposing of their students to entrepreneurship knowledge and job opportunities. Literature has also reported that teachers are unprepared, with doubtful entrepreneurial competence themselves, and consequently they fail to nurture their students’ entrepreneurial readiness, resilience and competitiveness [48].

The impacts of this lack of knowledge and exposure will lead to lower students’ resilience, and thus, lower entrepreneurial readiness [49]. Hence, this study was conducted among school students to 1) identify secondary students’ levels of entrepreneurship, 2) identify their resilience, and 3) assess the relationship between resilience and student readiness.

5. Methodology

This study is concerned with issues of resilience and entrepreneurial readiness among Malaysian public school students. It aims to determine their levels of resilience and entrepreneurial readiness to ultimately produce graduates ready to launch their own entrepreneurial careers. This study was performed using a quantitative approach, with a study population of 63,308 Form Four students in Selangor, Malaysia [41] given suggestions from the MoE. Specifically, Form Four students are not involved in any major exams, and this study would not significantly interfere with their learning progress. The Malaysian state of Selangor was chosen for the study setting given its many schools compared to other states. It also has students who are homogeneous with students of other states, and the sample is much easier to access.

Many studies were referenced to determine the optimum sample size, including works by Krejcic and Morgan [50] and Sekaran and Bougie [51]. Ultimately, 460 respondents were selected, or larger than the proposed 383-student sample size. A questionnaire was used as the main instrument for estimating resilience and entrepreneurial readiness among secondary students. Resilience in this study is defined as the ability to overcome adversity and strengthen oneself through experience [52]; further, resilience is necessary for students to overcome obstacles and challenges and ensure success [41]. The resilience questionnaire was adapted from Othman et al. [53], and is divided into six parts:

1. Social skills (5 items). This includes observing one’s social communication skills and exhibiting empathy, compassion and the ability to obtain other people’s cooperation.
2. Problem-solving (5 items). This includes observing one’s problem-solving skills, having the ability to plan and exhibit flexibility and critical, creative thinking.
3. Autonomy (4 items). This includes observing one’s level of self-efficacy and exhibiting self-awareness, the ability to act independently, a locus of internal control, and adaptability towards stress; the respondent can also master something or concentrate.
4. Optimism (5 items). This includes observing one’s insights towards the future, their motivation, will to change, or ability to positively accept life and remain hopeful.

5. Humor (6 items). This includes observing one’s ability to minimize stresses and difficulties with humor.

6. Spirituality (4 items). This includes observing one’s belief in ‘good fortune’ or their culture.

Entrepreneurial readiness refers to students’ desire and willingness to develop their entrepreneurial potential [23]. Self-efficacy in particular can be obtained through school programs or co-curricular or other activities aimed at gaining knowledge and developing entrepreneurial attitudes. This study defines readiness as relating to students’ desire and willingness towards entrepreneurship, with three dimensions [23]: attitude readiness, learning readiness and spiritual readiness. In terms of the attitude readiness dimension (14 items), researchers wanted to discover students’ attitudes toward their interests and their tendency to venture into entrepreneurship. The learning readiness dimension (15 items) involves students’ processes of seeking and enhancing their entrepreneurial knowledge to build confidence and self-efficacy in becoming entrepreneurs. The spiritual readiness dimension (15 items) involves the process of identifying students’ religious values in entrepreneurial traits through a spiritual fitness approach, and to discern their beliefs as reflected in their religious or spiritual values. All scales in this study were five-point Likert scales, ranging from one (‘strongly disagree’) to five (‘strongly agree’), due to the accuracy and reliability of this type of scale [51].

Data were collected from a sample of 460 secondary students at various Malaysian secondary schools in Selangor. A self-administered questionnaire including a cover letter was delivered to the respondents during the data-collection process. Questionnaires were distributed and randomly collected by researchers during their regular classes. Of the 460 questionnaires, 442 questionnaires were deemed usable for analysis, with a response rate of 96.1%.

Before the field study was conducted, a pilot study was performed to measure the questionnaire’s validity and reliability. Correlations between the item and total scores were used to test validity, while Cronbach’s α was used to test the instrument’s reliability. Once analyzed, the pilot test’s findings revealed that every dimension has a reliability greater than 0.7 and validity of greater than 0.3. Therefore, the instrument is a suitable fit for this study’s objectives [51]. Entrepreneurial readiness and resilience are this study’s dependent and independent variables, respectively, to test their impact on secondary students’ levels of entrepreneurial readiness.

6. Findings and Discussion

The following three research questions have been developed to identify the sample students’ levels of entrepreneurial readiness and resilience while examining the relationship between them:

6.1. What is the Level of Entrepreneurial Readiness among Secondary School Students?

The data displayed in Table 1 reveals high entrepreneurial readiness among students, or 3.80, with a standard deviation (s.d.) of 0.45. Only spiritual elements had a high mean of 4.05 (s.d. 0.59), while other elements were moderate, such as attitude and learning readiness. Therefore, the nature of entrepreneurship is highly influenced by the students’ religious values, given their spiritual fitness and the nature of their spirituality, while their interests, attitudes and readiness towards entrepreneurship are moderate. This finding reflects previous studies [54-56], which state that students generally exhibit entrepreneurial readiness in terms of their attitudes and moderate levels of readiness to learn about entrepreneurship. They generally know the importance of entrepreneurship, but are still lacking in terms of implementation experience. Tables 2, 3 and 4 provide detailed information on each element’s entrepreneurial readiness.

<table>
<thead>
<tr>
<th>No.</th>
<th>Element of Entrepreneurial Readiness</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Attitude Readiness</td>
<td>3.51</td>
<td>0.52</td>
<td>Moderate High</td>
</tr>
<tr>
<td>2</td>
<td>Learning Readiness</td>
<td>3.51</td>
<td>0.49</td>
<td>Moderate High</td>
</tr>
<tr>
<td>3</td>
<td>Spiritual Readiness</td>
<td>4.01</td>
<td>0.59</td>
<td>High</td>
</tr>
<tr>
<td>Overall Entrepreneurial Readiness</td>
<td>3.80</td>
<td>0.45</td>
<td>Moderate High</td>
<td></td>
</tr>
</tbody>
</table>

Table 2 reports information on entrepreneurial readiness in terms of spirituality. The data clearly demonstrates that the percentage of students who agree and strongly agree (A + SA) on each item exceeds 50% except for the first item, which is 42.5%. The percentages for this table range between 42.5% (lowest) and 79.8% (highest). Therefore, the students in general are spiritually prepared for entrepreneurial activity. They are aware that entrepreneurship is a positive activity and should be conducted fairly, honestly, and ethically. This finding indirectly indicates that Malaysia’s educational policies have successfully produced holistic students as required in the National Educational Policy, which aims to produce ethical, knowledgeable students with positive attributes [57].
Table 2. Students’ Spiritual Readiness

<table>
<thead>
<tr>
<th>No.</th>
<th>Items</th>
<th>SD</th>
<th>D</th>
<th>MD</th>
<th>A</th>
<th>SA</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>I believe that 90% of sustenance occurs through business.</td>
<td>20</td>
<td>33</td>
<td>201</td>
<td>112</td>
<td>76</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(4.5%)</td>
<td>(7.5%)</td>
<td>(45.5%)</td>
<td>(25.3%)</td>
<td>(17.2%)</td>
</tr>
<tr>
<td>31</td>
<td>I believe that sustenance has been determined by God.</td>
<td>11</td>
<td>30</td>
<td>72</td>
<td>65</td>
<td>264</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2.5%)</td>
<td>(6.8%)</td>
<td>(16.3%)</td>
<td>(14.7%)</td>
<td>(59.7%)</td>
</tr>
<tr>
<td>32</td>
<td>I believe every practice starts with intent.</td>
<td>5</td>
<td>12</td>
<td>75</td>
<td>115</td>
<td>237</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.7%)</td>
<td>(2.7%)</td>
<td>(17.0%)</td>
<td>(26.0%)</td>
<td>(53.6%)</td>
</tr>
<tr>
<td>33</td>
<td>I believe entrepreneurial involvement is an obligation to provide for the community’s needs.</td>
<td>5</td>
<td>29</td>
<td>145</td>
<td>183</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1.1%)</td>
<td>(6.6%)</td>
<td>(32.8%)</td>
<td>(41.4%)</td>
<td>(18.1%)</td>
</tr>
<tr>
<td>34</td>
<td>I often conduct myself ethically.</td>
<td>4</td>
<td>22</td>
<td>168</td>
<td>183</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.9%)</td>
<td>(5.0%)</td>
<td>(38.0%)</td>
<td>(41.4%)</td>
<td>(14.7%)</td>
</tr>
<tr>
<td>35</td>
<td>I am willing to do anything to achieve my goals.</td>
<td>4</td>
<td>12</td>
<td>120</td>
<td>186</td>
<td>120</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.9%)</td>
<td>(2.7%)</td>
<td>(27.1%)</td>
<td>(42.1%)</td>
<td>(27.1%)</td>
</tr>
<tr>
<td>36</td>
<td>I must avoid illegal and inappropriate activities.</td>
<td>6</td>
<td>14</td>
<td>75</td>
<td>101</td>
<td>246</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1.4%)</td>
<td>(3.2%)</td>
<td>(17.0%)</td>
<td>(22.9%)</td>
<td>(55.7%)</td>
</tr>
<tr>
<td>37</td>
<td>I always perform ethical activities.</td>
<td>2</td>
<td>16</td>
<td>159</td>
<td>199</td>
<td>66</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.5%)</td>
<td>(3.6%)</td>
<td>(36.0%)</td>
<td>(45.0%)</td>
<td>(14.9%)</td>
</tr>
<tr>
<td>38</td>
<td>I will work hard to avoid practices that are considered bad in religion.</td>
<td>2</td>
<td>19</td>
<td>86</td>
<td>125</td>
<td>210</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.5%)</td>
<td>(4.3%)</td>
<td>(19.5%)</td>
<td>(28.3%)</td>
<td>(47.5%)</td>
</tr>
<tr>
<td>39</td>
<td>I believe that God will reciprocate for our bad behaviours.</td>
<td>12</td>
<td>23</td>
<td>85</td>
<td>116</td>
<td>206</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2.7%)</td>
<td>(5.2%)</td>
<td>(19.2%)</td>
<td>(26.2%)</td>
<td>(46.6%)</td>
</tr>
<tr>
<td>40</td>
<td>I believe that if sustenance is blessed, God will reward us with something good.</td>
<td>9</td>
<td>13</td>
<td>74</td>
<td>91</td>
<td>255</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2.0%)</td>
<td>(2.9%)</td>
<td>(16.7%)</td>
<td>(20.6%)</td>
<td>(57.7%)</td>
</tr>
<tr>
<td>41</td>
<td>I believe that every source of sustenance must be halal.</td>
<td>4</td>
<td>13</td>
<td>85</td>
<td>98</td>
<td>242</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.9%)</td>
<td>(2.9%)</td>
<td>(19.2%)</td>
<td>(22.2%)</td>
<td>(54.8%)</td>
</tr>
<tr>
<td>42</td>
<td>I feel grateful for all the ease in my life.</td>
<td>-</td>
<td>11</td>
<td>78</td>
<td>139</td>
<td>214</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(2.5%)</td>
<td>(17.6%)</td>
<td>(31.4%)</td>
<td>(48.4%)</td>
</tr>
<tr>
<td>43</td>
<td>I must obey religious demands to show gratitude.</td>
<td>2</td>
<td>12</td>
<td>80</td>
<td>112</td>
<td>236</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.5%)</td>
<td>(2.7%)</td>
<td>(18.1%)</td>
<td>(25.3%)</td>
<td>(53.4%)</td>
</tr>
<tr>
<td>44</td>
<td>I am always on time.</td>
<td>11</td>
<td>27</td>
<td>165</td>
<td>161</td>
<td>78</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2.5%)</td>
<td>(6.1%)</td>
<td>(37.3%)</td>
<td>(36.4%)</td>
<td>(17.6%)</td>
</tr>
</tbody>
</table>

Mean = 4.01, S.D. = 0.59; Level = High

The second element of entrepreneurship readiness is learning preparedness. More than 50% of respondents answered Agree and Strongly Agree to their questions, ranging from 53.9% to 86%. Items 24, 17 and 27 provided low data. All of the statements in this item illustrate that students still have retained little knowledge of how to become entrepreneurs, despite the fact that they have been exposed to such knowledge from as early as age 12. The situation worsens when the respondents conveyed that they did not enjoy visiting exhibitions (item 17), as such exhibitions can convey information about entrepreneurship and entrepreneurial activities. This relates another problem, as students tend to dislike interacting with actual entrepreneurs (item 28). In conclusion, these points must change from a learning perspective to produce entrepreneurially ready students.

This finding reflects previous research results, in that students are less interested in discovering entrepreneurial information, which is why entrepreneurial involvement is lacking among youth; they prefer traditional careers rather than entrepreneurship [21,55,56].

Entrepreneurial readiness also involves students’ attitudes; Table 4 provides detailed information to indicate that students are less likely to agree with the item statements. This means that they still do not have positive attitudes towards developing a business, although they are generally aware that it is beneficial. This reflects findings, both locally and from overseas, of low entrepreneurial attitudes among students [27,28,40,42]. This attitude has indirectly contributed to a high unemployment rate among youths who were waiting for job opportunities and were less dedicated to creating jobs themselves.
I know what I need to learn to become an entrepreneur. I often surf the Internet to find any information I need. I admire people who always learn something new. I am interested in becoming an entrepreneur as a career. My friends would agree with and accept my decision to venture into the business world. Among many options, it is best for me to venture into the entrepreneurship field.

In Table 3, the entrepreneurial readiness—learning scale is presented. The items include:

- I enjoy reading books to improve my knowledge.
- I believe that problems are challenges that do not hinder my efforts.
- I often use mass media to find the information I need.
- I often surf the Internet to find any information I need.
- I know what I need to learn to become an entrepreneur.
- I am ready to learn from successful entrepreneurs.
- I will try to find time to learn something that I feel is important, although I am very busy.
- I enjoy interacting with successful entrepreneurs.
- I know when I need to learn something in more depth.
- I am always curious about something.

The table shows the mean, standard deviation (SD), and level of readiness for each item. For example, for item 15, the mean is 3.51, the standard deviation is 0.52, and the level is moderately high.

In Table 4, the entrepreneurial readiness—attitude scale is presented. The items include:

- I find it easy to start a new business.
- I find it easy to develop ideas in business.
- I am interested in becoming an entrepreneur as a career.
- I believe I have the ability to start a business.
- I have the ability to control the process of starting a new business.
- I know all the details of how to start a business.
- Being an entrepreneur will give me great satisfaction.
- Being an entrepreneur brings more benefits and advantages than disadvantages to me.
- My friends agree with my decision if I choose to be an entrepreneur.
- My friends would agree with and accept my decision to start a business.
- My immediate family would agree with my decision to venture into the business world.
- If I had the opportunity, I would love to start my own business.
- If I started a business, I would have a high chance of success.

The table shows the mean, standard deviation (SD), and level of readiness for each item. For example, for item 1, the mean is 3.51, the standard deviation is 0.49, and the level is moderately high.
6.2. What is the Level of Resilience among Secondary School Students?

Table 5. Levels of Resilience

<table>
<thead>
<tr>
<th>No.</th>
<th>Resilience Element</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Social Skills</td>
<td>3.94</td>
<td>0.57</td>
<td>Moderately High</td>
</tr>
<tr>
<td>2</td>
<td>Problem-Solving</td>
<td>3.58</td>
<td>0.58</td>
<td>Moderately High</td>
</tr>
<tr>
<td>3</td>
<td>Autonomy</td>
<td>3.76</td>
<td>0.63</td>
<td>Moderately High</td>
</tr>
<tr>
<td>4</td>
<td>Optimism</td>
<td>3.85</td>
<td>0.63</td>
<td>Moderately High</td>
</tr>
<tr>
<td>5</td>
<td>Humour</td>
<td>3.73</td>
<td>0.72</td>
<td>Moderately High</td>
</tr>
<tr>
<td>6</td>
<td>Spirituality</td>
<td>4.21</td>
<td>0.80</td>
<td>High</td>
</tr>
</tbody>
</table>

Resilience is divided into the following six elements: social skills, problem-solving, autonomy, optimism, humor and spirituality. Upon analysis, the students’ resilience was found to be high, with a mean of 3.84 and standard deviation of 0.48. The data acquisition reveals the same results as with the entrepreneurial readiness data, in that the spiritual element has the highest mean. The mean level of resilience in the spirituality aspect is 4.21, with a standard deviation of 0.80. This is followed by social skills, while problem-solving exhibits the lowest values of these six elements, as demonstrated in the following Table 5.

The following Tables 6 through 11 provide a clearer illustration of each item. Regarding the social skills element, items 1 and 2 had the highest percentages, which indicates explains that students can work together and build good relationships with those around them, regardless of race or religion. This process will increase students’ confidence and resilience even when in the public eye.

Table 6. Social Skills

<table>
<thead>
<tr>
<th>No.</th>
<th>Items</th>
<th>SD</th>
<th>D</th>
<th>MD</th>
<th>A</th>
<th>SA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I can work with anyone regardless of race or religion.</td>
<td>2</td>
<td>14</td>
<td>82</td>
<td>204</td>
<td>140</td>
</tr>
<tr>
<td></td>
<td>(0.5%)</td>
<td></td>
<td></td>
<td>(3.2%)</td>
<td>(18.6%)</td>
<td>(46.2%)</td>
</tr>
<tr>
<td>2</td>
<td>I cooperate with people around me.</td>
<td>-</td>
<td>13</td>
<td>78</td>
<td>239</td>
<td>112</td>
</tr>
<tr>
<td></td>
<td>(2.9%)</td>
<td></td>
<td></td>
<td>(17.6%)</td>
<td>(54.1%)</td>
<td>(25.3%)</td>
</tr>
<tr>
<td>3</td>
<td>I always forgive other people’s mistakes.</td>
<td>4</td>
<td>13</td>
<td>117</td>
<td>205</td>
<td>103</td>
</tr>
<tr>
<td></td>
<td>(0.9%)</td>
<td></td>
<td></td>
<td>(2.9%)</td>
<td>(26.5%)</td>
<td>(46.4%)</td>
</tr>
<tr>
<td>4</td>
<td>I have good relationships with other people.</td>
<td>-</td>
<td>8</td>
<td>115</td>
<td>216</td>
<td>103</td>
</tr>
<tr>
<td></td>
<td>(1.8%)</td>
<td></td>
<td></td>
<td>(26.0%)</td>
<td>(48.9%)</td>
<td>(23.3%)</td>
</tr>
<tr>
<td>5</td>
<td>I can easily gain others’ cooperation.</td>
<td>4</td>
<td>10</td>
<td>143</td>
<td>205</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>(0.9%)</td>
<td></td>
<td></td>
<td>(2.3%)</td>
<td>(32.4%)</td>
<td>(46.4%)</td>
</tr>
</tbody>
</table>

Mean = 3.96, S.D. = 0.57; Level = Moderately High

Table 7. Problem-Solving

<table>
<thead>
<tr>
<th>No.</th>
<th>Items</th>
<th>SD</th>
<th>D</th>
<th>MD</th>
<th>A</th>
<th>SA</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>I react quickly when faced with a crisis.</td>
<td>3</td>
<td>22</td>
<td>200</td>
<td>168</td>
<td>49</td>
</tr>
<tr>
<td></td>
<td>(0.7%)</td>
<td></td>
<td></td>
<td>(5.0%)</td>
<td>(45.2%)</td>
<td>(38.0%)</td>
</tr>
<tr>
<td>7</td>
<td>I act at the right time.</td>
<td>1</td>
<td>16</td>
<td>159</td>
<td>215</td>
<td>51</td>
</tr>
<tr>
<td></td>
<td>(0.2%)</td>
<td></td>
<td></td>
<td>(3.6%)</td>
<td>(48.6%)</td>
<td>(11.5%)</td>
</tr>
<tr>
<td>8</td>
<td>I always plan my activities.</td>
<td>3</td>
<td>25</td>
<td>177</td>
<td>171</td>
<td>66</td>
</tr>
<tr>
<td></td>
<td>(0.7%)</td>
<td></td>
<td></td>
<td>(5.7%)</td>
<td>(38.7%)</td>
<td>(4.9%)</td>
</tr>
<tr>
<td>9</td>
<td>I always have the confidence to act even if others may reject my ideas.</td>
<td>2</td>
<td>27</td>
<td>180</td>
<td>175</td>
<td>58</td>
</tr>
<tr>
<td></td>
<td>(0.5%)</td>
<td></td>
<td></td>
<td>(6.1%)</td>
<td>(40.7%)</td>
<td>(39.6%)</td>
</tr>
<tr>
<td>10</td>
<td>I always finish a task immediately even if there is no pressure to finish it immediately.</td>
<td>4</td>
<td>33</td>
<td>199</td>
<td>158</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td>(0.9%)</td>
<td></td>
<td></td>
<td>(7.5%)</td>
<td>(45.0%)</td>
<td>(35.7%)</td>
</tr>
</tbody>
</table>

Mean = 3.58, S.D. = 0.58; Level = Moderately High
Similar results are observed regarding resilience and autonomy in Table 8. All items indicated that over 50% of the respondents responded with agreement and strong agreement. However, the percentage of Agree + Strongly Agree ranges from 54.3% to 66.3%, which indicates that secondary school students have autonomy, but at a moderate level. Their resilience in this aspect can be enhanced with teachers’ help in the classroom.

Table 9 provides further detail regarding secondary school students’ resilience based on optimism. All items indicate that over 65% of the respondents chose Agree + Strongly Agree, resulting in a mean of 3.85, closer to high, and a standard deviation of 0.63. The percentage range for Agree + Strongly Agree ranges from 65.2% to 73.5%. Item 19 exhibited the highest percentage (73.9%). Collectively, these items reveal students’ high confidence in themselves.

Regarding humor (Table 10), the percentages of respondents who chose Agree ranged from 49.3% to 62.7%. The percentage of respondents who chose Disagree was also high, ranging from 29.9% to 40.7%. These results are evident from the mean score of 3.85 and standard deviation of 0.63, which may indicate that students still cannot perceive the problems they are experiencing as normal. These students still require more time to adapt and familiarize themselves with various types of adversity so they can adequately recover if they encounter any challenges.
As Table 11 illustrates, a high percentage of people agree with the spirituality aspect, ranging from 67.5% to 81.5%. Further, students’ resilience regarding the spirituality aspect was higher than with the other five aspects, a finding that reflects entrepreneurial readiness from the spirituality perspective. Although the percentages of resilience and entrepreneurial readiness are moderately high, the spirituality aspect is also high; therefore, secondary school students possess the faith and beliefs to face various obstacles in their lives. This aspect also closely connects to the effectiveness of the education that the government seeks to implement by establishing values in its educational system [57].

### 6.3. Does a Significant Relationship Exist between Secondary School Students’ Entrepreneurial Readiness and Resilience?

**H01: No significant relationship exists between secondary school students’ entrepreneurial readiness and resilience.**

Table 12 presents the findings related to the relationship between secondary school students’ entrepreneurial readiness and resilience, with values of $r = 0.747$ and $p < 0.05$. Therefore, a strong relationship exists between resilience and entrepreneurial readiness, and thus, the null hypothesis is rejected. This study parallels statements from Mohamad [21], and Ab Wahid [55], as these authors also mentioned that a correlation exists between entrepreneurial readiness and student resilience; Fatoki’s [58] study of small and medium-sized entrepreneurs in Africa revealed the same results. Subsequently, the relationship between these two variables impacts both the students and entrepreneurs.

#### Table 11. Spirituality

<table>
<thead>
<tr>
<th>No</th>
<th>Items</th>
<th>SD</th>
<th>D</th>
<th>MD</th>
<th>A</th>
<th>SA</th>
</tr>
</thead>
<tbody>
<tr>
<td>26</td>
<td>I depend on God to control my life.</td>
<td>102</td>
<td>26</td>
<td>108</td>
<td>143</td>
<td>155</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2.3%)</td>
<td>(5.9%)</td>
<td>(24.4%)</td>
<td>(32.4%)</td>
<td>(35.1%)</td>
</tr>
<tr>
<td>27</td>
<td>I know God is always there to help.</td>
<td>5</td>
<td>12</td>
<td>67</td>
<td>122</td>
<td>236</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1.1%)</td>
<td>(2.7%)</td>
<td>(15.2%)</td>
<td>(27.6%)</td>
<td>(53.4%)</td>
</tr>
<tr>
<td>28</td>
<td>I am sure that there is wisdom behind everything that is happening in my life.</td>
<td>2</td>
<td>11</td>
<td>69</td>
<td>121</td>
<td>239</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.5%)</td>
<td>(2.5%)</td>
<td>(15.6%)</td>
<td>(27.4%)</td>
<td>(54.1%)</td>
</tr>
<tr>
<td>29</td>
<td>After praying to God, I feel strong or excited.</td>
<td>41</td>
<td>12</td>
<td>72</td>
<td>120</td>
<td>234</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.9%)</td>
<td>(2.7%)</td>
<td>(16.3%)</td>
<td>(27.1%)</td>
<td>(52.9%)</td>
</tr>
</tbody>
</table>

Mean = 4.21, S.D. = 0.80; Level = High

#### Table 12. Pearson’s Correlation for Secondary School Students’ Entrepreneurial Readiness and Resilience

<table>
<thead>
<tr>
<th>Resilience</th>
<th>Pearson’s correlation</th>
<th>Sig. (two-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entrepreneurial readiness</td>
<td>0.747</td>
<td>0.000</td>
</tr>
</tbody>
</table>

#### 7. Conclusions

More research is needed in the entrepreneurial field in a Malaysian context, as the nation is experiencing unprecedented demand and business growth. Therefore, programs on entrepreneurship and entrepreneurial training should be considered to improve the situation in secondary schools. Further, the secondary school curriculum should be examined and revised, with new courses on entrepreneurship introduced into the curriculum.

Entrepreneurship has been found to be an important driver of economic growth, productivity and social development [59]. Moreover, Bakotic and Kruzic [60] noted that the promotion of entrepreneurship has become a primary issue in most industrial countries’ public policies. In this context, many countries’ governments have increasingly fostered entrepreneurship through education and training. As one critical element to increase students’ involvement in the entrepreneurship field is resilience, this study focuses on two factors: students’ resilience and their entrepreneurial readiness.

Excellent academic achievements do not guarantee employment due to currently intense industry competition [61]. An increasing number of university graduates in Malaysia has led to more intense competition, and secondary school graduates are less likely to gain the jobs they desire. Therefore, venturing into the entrepreneurship field is the best solution for the nation’s unemployment as people will no longer depend on a monthly salary, but can create additional job opportunities by owning their own business.

The most significant issue in terms of education and skills involves the difficulty in balancing supply and demand in the various sectors. The excessive number of graduates with only academic certificates, but no additional skills, has compelled employers to select only a few students for hire. Simultaneously, many graduates are forced into choosing a career that does not match their qualifications. Highly skilled graduates must foster their innovative abilities and creativity to explore new fields and shift their perspectives from job-seekers to job-creators. This is particularly significant given the increasingly competitive job market. Therefore, students’ resilience and entrepreneurial readiness should be strengthened, and especially as this study has discovered secondary students have moderately high levels of entrepreneurial readiness and resilience. These findings also reveal a strong correlation between these two factors. Thus, Malaysia’s
Ministry of Education, policy-makers and entrepreneurship educators must re-evaluate their programs and academic to positively impact students who have not yet demonstrated any favorable results.

Meaning, the parties involved with secondary school education, or specifically, in designing and planning entrepreneurship education, entrepreneurship training need to re-evaluate or reconstruct the curriculum or syllabus in order to improve entrepreneurial learning practice, students’ interest and enthusiasm towards entrepreneurship. These changes will enhance students’ self-resilience and entrepreneurial readiness which indirectly creates competent and entrepreneurial societies that fit with the needs of the 21st century or Industrial Revolution 4.0.

Acknowledgements

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REFERENCES


The Relationship between Teachers' Competency and Fourth Industrial Revolution (4IR) Learning among Economics Teachers

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Abstract Economic development of a country may not be achieved when the quality of its human resources is low. Therefore, teachers with high competencies contribute to the quality of the learning process in schools, especially in the era of Fourth Industrial Revolution (4IR) learning. This paper aims to examine the relationship between teachers' competencies and 4IR learning among economics teachers. A quantitative approach using self-administered questionnaires was employed. The units of analysis of the study were economics teachers in the central city of Jakarta, Indonesia. A total of 256 respondents from the sampling frame were selected using a simple random sampling technique. The data were analyzed by correlation and regression tests using IBM SPSS, Version 25. The results indicate that teachers’ competency has a positive correlation and a significant effect on 4IR learning. The findings from the study contribute to the future development of economics teachers by shaping the quality of education. Teachers can also have more flexibility in designing their lessons creatively in the 4IR learning era.

Keywords Teacher Competency, Economics Teachers, Quality of Education, The Fourth Industrial Learning Era

1. Introduction

The role of teachers today is increasingly challenging. They play a crucial role as communicators of knowledge and skills to students and are responsible for increasing students’ interests and developing talents and abilities. Teachers are also relied upon to build analytical, critical, and creative thinking skills, in line with the education system’s direction, to form individuals who can adapt to the changes that occur around them. The quality of education is inseparable from the quality of teachers. One effort used to improve the quality of education is to improve the professionalism of teachers. Teacher competence is needed to improve teacher professionalism and to improve the quality of national education. Indonesian Law No. 14 of 2005 was implemented to meet teacher professionalism demands.

Based on Indonesian Law No. 14 of 2005, teachers are required to have several competencies: pedagogical competencies, social competencies, personality competencies, and professional competencies. These competencies can be used to support the improvement of teachers’ competencies in 4IR learning. In the time of the 4.0 industrial revolution, teachers are expected to be a vital part of improving the quality of education by firstly improving the competencies of teachers themselves. In order to ensure success in facing the Fourth Industrial Revolution, the ability to adapt to new technologies and global challenges is required, particularly for economics teachers. Every educational institution must provide new information and literacy in education, especially those
related to preparation for the Fourth Industrial Revolution.

This paper provides a detailed explanation of the competence of economics teachers’ conceptual framework for 4IR learning, starting with four teacher competencies. These are pedagogical competence (which is teachers’ ability in the teaching and learning process of learning management), social competence (the ability of teachers to communicate and interact effectively and efficiently with students, fellow teachers, parents/guardians, and society), personality competencies (personal abilities that reflect a stable, mature, intelligent, and authoritative personality, acting as an example to students, and having a noble and solid character) and professional competence (the mastery of learning materials extensively and deeply). At the same time, all the competencies which impact 4IR learning are dependent on technology and school environment factors.

Today, challenges to teachers – especially economics teachers besides having to have 4 competencies (pedagogical, social, personality, and professional competence); can also include efforts to equip themselves with information and communication technology skills because, in this era, it is necessary to enable students to follow learning using technology. Therefore, teachers need to change their ways of teaching to make it more fun and interesting. Similarly, the teacher’s role has changed from being a transmitter of knowledge to students, to becoming facilitators, motivators, inspirers, mentors, and developers of imagination, creativity, character, teamwork, and social empathy; otherwise, the role of teachers could be replaced by technology. The Industrial Revolution 4.0, which comprises extremely fast technology, is bringing about big changes in Indonesia’s education system. Changes in the education system have an impact on the role of teachers as educators. Teachers must have high competencies to produce students who can answer the challenges of the Industrial Revolution 4.0.

The present study intends to provide information for relevant personnel in schools that can be used to improve the teaching of students. The study objectives are formulated as follows:
1. To identify the level of competency of economics teachers in terms of 4IR learning.
2. To examine the effect of economics teachers’ competencies on 4IR learning.

2. Literature Review

Afrianto (2018) discusses how professional teachers in Indonesia can maintain their professionalism in a rapidly evolving world due to the developments caused by revolutionary information technology in the industrial world that has led to the rise of the Industrial Revolution 4.0 (IR 4.0). Some features of the IR 4.0 era are digitalization, the Internet of things, the Internet of people, big data, iCloud data, and artificial intelligence. All these new developments have had an impact on various sectors of life, including education. IR 4.0 can be negative, because it can threaten the existence of schools and teachers.

Meanwhile, in his study, Rosmani Ali (2018) states that IR 4.0 provides exposure to and explanations about the role of entrepreneurial competence as a mediator for readiness to apply entrepreneurial elements for teacher’s educational instituted (TEI) lectures. The study’s implications support the importance of internal entrepreneurial attitude and entrepreneurial competence in affecting the readiness of TEI lecturers to apply entrepreneurial elements. Overall, this study provides an alternative answer to how entrepreneurial competence among TEI lecturers can determine their readiness to apply entrepreneurial elements.

The concept of teacher competence is mostly discussed in very narrow dimensions, such as teacher planning, implementation, curriculum evaluation, and curriculum or school standards related to the task of teachers teaching in schools (Muh Khaizer et al., 2020: Kiymet Selvi, 2016). Teacher competence should continue to be the subject of research and analysis, and it should be developed and updated. Therefore, pre-service teachers and in-service education should focus on understanding and applying teacher competencies. The future will be different from the past and present in some respects. Therefore, teachers need new competencies to overcome all these changes, and it is necessary to redefine teacher competencies.

The research paper of Hewagamage (2014) expressed that ICT based competency must be addressed irrespective of their core curriculum of study streams and it may help to improve the relevance and better employability. It is evident from the literature that unless the issue of ICT competency is addressed, it can itself be a barrier to students’ learning. They have suggested that special funds be created to revamp the e-learning support centres at the faculty level for students and faculty/staff use. The findings in Tasir (2012) show that teacher’s competency, teacher’s confidence level and teacher’s satisfaction toward ICT programmes are correlated among each other. And also it has indicated that teacher’s satisfaction toward ICT training programme is a crucial factor that can increase the levels of the competency and confidence. Therefore, teachers in the industrial revolution era of 4.0, especially among economic teachers, should have four competencies such as Pedagogical Competency, Professional Competency, Social Competency and Competency Of Personality based on the Law in Indonesia No. 14 of 2005 to stimulate courage in achieving the learning objectives available in the framework of improving the quality of resources of the teachers themselves.

2.1. Pedagogical Competency

Pedagogical competency can be defined as the ability to understand students, design and implement learning,
evaluate learning outcomes, and develop students to practice their various potentials. According to Law in Indonesia No. 14 of 2005 Pedagogical Competencies including:

a. Understanding the vision or goals of education, Developing curriculum, Learning Design, Evaluating learning outcomes, Mastering learning theory and educating learning principles.

b. Understand the various learning theories and learning principles that educate those related to the teaching subjects.

c. Implement various approaches, strategies, methods, and learning techniques that educate creatively in teachable subjects.

d. Leverage information and communication technology for the importance of maintenance of expansion activities that educate and facilitate the expansion of the potential of educated participants to analyze the various potentials that students have and can communicate effectively, forcibly, and engage with students.

e. Leverage on the results of assessment and evaluation for the importance of learning to perform reflective actions for increased learning qualities.

2.2. Social Competency

An effective Teacher Competency is a teacher who successfully brings their students to achieve teaching goals. Teaching in front of the classroom is an expression of interaction in the communications process. According to Teacher Law and Lecturers, social competency is the ability of teachers to communicate and interact effectively and efficiently with students, fellow teachers, elderly or guardians of students, and the surrounding community. Expressing social efficiency is the ability that a person needs to succeed in dealing with others. According to The Law in Indonesia No. 14 of 2005, Social Competency includes:

a. Oral and written communications, using communications and information technology

b. Strengthening professionalism through the peer-guidance process, peer studies among teachers, both internally and throughout the education unit.

c. Acting objectively and not discriminated against due to gender consideration, religion, race, fiscal conditions, family background, and socio-economic status

d. Leverage information and communication technology (ICT) to communicate and develop themselves.

2.3. Personality Competency

Personal competency is a personal ability that reflect a stable, mature, intelligent and authoritative personality, be an example to students, and have noble character. The stability which can be an example to students and society an also develop themselves in an effective manner. The Competency of Teacher Personality as an educator whose main task is teaching, has very influential personality traits on the success of human resource development. The personality of a solid teacher figure will provide a good example for students and society, so that the teacher will appear as someone who should be imitated or able to manjadi role model for his students. According to The Law in Indonesia No. 14 of 2005 Personality Competency includes:

a. Demonstrate work ethics, high responsibilities, pride as teachers, and self-confidence.

b. Demonstrate high work ethics and responsibilities and Proud to be a teacher and believe in yourself.

c. Show themselves as a stable, adult, intelligent, and authoritative person.

d. Demonstrate work ethics and high responsibilities and understand the teacher's professional code of ethics.

e. Understanding, applying, and acting appropriately the teacher's professional code of ethics.

2.4. Professional Competency

Professional competency is the mastery of learning materials extensively and deeply, including the meaning of curriculum lessons in schools and scientific materials related to teachings behaviour, as well as mastery of scientific structure and methodology and being able to communicate and develop themselves using the latest technology to make effective and efficient learning in line with technology that is currently developing. Hence, Professional competency is the ability to master the subject broadly and deeply Dayangku Suraya et al. (2020). Stating professional competence is the various abilities necessary to realize itself as a professional teacher. Professional competencies include expertise in the areas of material mastery that must be taught and its methods, a sense of responsibility for the tasks and sense of equality with other peers. According to Law in Indonesia No. 14 of 2005 Professional Competencies include:

a. Develop creative learning materials capable of developing professionalism continuously.

b. Take reflective action and be able to communicate

c. Master materials, structures, concepts, and scientific minds that support the teaching subjects. As an example of economic teachers who can understand the materials, structures, concepts, and science thinking that support the subjects of the economy; display the benefits of Economic subjects so that economic students have more interest in economic subjects.

d. Continuously get performance. And be able to use performance outcomes to improve professionalism.
The Relationship between Teachers’ Competency and Fourth Industrial Revolution (4IR) Learning among Economics Teachers

Figure 1 is the conceptual framework for the present study. The framework was developed based on the Indonesian Law No. 14 of 2005 which explains the competencies that must be possessed by teachers to improve learning, such as pedagogical competencies, social competencies, personality competencies, and professional competencies. Kamarul Azmi (2016) stressed that an effective teacher’s characteristics are to have teaching skills, including the ability to link knowledge, skills, and values in their teaching to the school environment. As such, this study’s framework includes one dependent variable and one independent variable. The conceptual framework for this study is shown in Figure 1.

3. Methodology

3.1. Participants

In the following, the sampling and data analysis methods are identified so that the technique used can be shown to follow the study’s objectives. Othman (2013) explains that, in determining sample size, various methods can be applied. The population concept refers to a group of individuals with criteria similar to the purpose of the study (Creswell 2008). In this study, Indonesian economics teachers were chosen as the population of this study. In selecting a sample, it is critical to determine the sample size to represent a population. The sample is a sub-group of the target population that is reviewed to represent the population. The sample consists of 256 Indonesian economics teachers from the eastern, southern, northern, western, and central parts of Jakarta. In this study, probability sampling was used as a basis for the sampling procedure. It was executed by selecting a subject randomly from the sampling frame; in this case, the subjects in the sample had all the features of the review population. Researchers then performed a simple random selection for each location to obtain the number of schools needed to represent the prescribed number of samples. A total of 50 economics teachers who were not involved in the actual study were selected in the pilot study.

3.2. Research Procedure

In this study, the researchers chose the quantitative screening method, which allows researchers to scrutinize data using statistical approaches. In this way, researchers can know the necessary information and measure identified variables. This study was conducted using a survey method. A survey study was used to obtain information in the form of opinions, attitudes, and perceptions of a population based on selected samples (Creswell 2005). The information in this study was obtained through a modified questionnaire from several previous studies. However, this section’s questionnaire has been processed and modified according to the needs of the study based on EFA testing and expert consent. A pilot study was also conducted (sample n= 50) to determine the validity and reliability of the study instrument. The result of pilot study on Table 1 indicated that all constructs measured in the instrument have a high-reliability value (α ≥ 0.70). At the same time, experienced lecturers and experts in economic studies also gave their feedback on the importance, appropriateness, and accuracy of the content and clarity of the meaning of each item in this study instrument.
Table 1. Instrument Reliability

<table>
<thead>
<tr>
<th>Construct</th>
<th>Cronbach’s Alpha (α)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pedagogical Competency</td>
<td>0.869</td>
</tr>
<tr>
<td>Social Competency</td>
<td>0.835</td>
</tr>
<tr>
<td>Personality Competency</td>
<td>0.790</td>
</tr>
<tr>
<td>Professional Competency</td>
<td>0.793</td>
</tr>
<tr>
<td>Technology Based - Learning</td>
<td>0.837</td>
</tr>
</tbody>
</table>

This study was conducted on economics teachers with regard to 4IR learning in Jakarta, Indonesia. Therefore, this section discusses the demographic background of economics teachers based on gender, age, level of education, total years of teaching experience, use of ICT, and use of social media. Table 2 shows in detail the demographic profile of the respondents for this study.

Table 2. Demographic profile of the respondents

<table>
<thead>
<tr>
<th>Category</th>
<th>Information</th>
<th>F</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
<td>87</td>
<td>34%</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>169</td>
<td>66%</td>
</tr>
<tr>
<td>Age</td>
<td>20-30 years</td>
<td>102</td>
<td>39.8%</td>
</tr>
<tr>
<td></td>
<td>31-40 years</td>
<td>93</td>
<td>36.3%</td>
</tr>
<tr>
<td></td>
<td>41-50 years</td>
<td>35</td>
<td>13.7%</td>
</tr>
<tr>
<td></td>
<td>Above 50 years</td>
<td>26</td>
<td>10.2%</td>
</tr>
<tr>
<td>Education Level</td>
<td>High School/Equivalent</td>
<td>4</td>
<td>1.6%</td>
</tr>
<tr>
<td></td>
<td>Bachelor’s Degree</td>
<td>242</td>
<td>94.5%</td>
</tr>
<tr>
<td></td>
<td>Master’s Degree</td>
<td>9</td>
<td>3.5%</td>
</tr>
<tr>
<td></td>
<td>Doctor of Philosophy</td>
<td>1</td>
<td>0.4%</td>
</tr>
<tr>
<td>Total Teaching Experience</td>
<td>1-10 years</td>
<td>224</td>
<td>87.5%</td>
</tr>
<tr>
<td></td>
<td>11-20 years</td>
<td>9</td>
<td>3.5%</td>
</tr>
<tr>
<td></td>
<td>21-30 years</td>
<td>15</td>
<td>5.9%</td>
</tr>
<tr>
<td></td>
<td>31-40 years</td>
<td>8</td>
<td>3.1%</td>
</tr>
<tr>
<td>Use of ICT</td>
<td>MOOC</td>
<td>47</td>
<td>18.4%</td>
</tr>
<tr>
<td></td>
<td>Blended Learning</td>
<td>75</td>
<td>29.3%</td>
</tr>
<tr>
<td></td>
<td>Project-Based Learning</td>
<td>118</td>
<td>46.1%</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>16</td>
<td>6.3%</td>
</tr>
<tr>
<td>Use of Social Media</td>
<td>Facebook</td>
<td>120</td>
<td>46.9%</td>
</tr>
<tr>
<td></td>
<td>Instagram</td>
<td>110</td>
<td>43.0%</td>
</tr>
<tr>
<td></td>
<td>LinkedIn</td>
<td>11</td>
<td>4.3%</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>15</td>
<td>5.9%</td>
</tr>
</tbody>
</table>

After the relevant data was obtained, the author then analyzed the data descriptively and inferentially using SPSS software. During analysis, comparisons were made between teachers based on gender and other demographic characteristics. Researchers also tested the data collected using statistical analysis techniques such as frequency, mean, correlation, and regression.

4. Findings and Discussion

Objective 1: To identify the level of competency of economics teachers in terms of 4IR learning.

Descriptive analysis was used to achieve the first objective, which was to identify the level of competence of economics teachers in 4IR learning in Jakarta. A self-administered questionnaire consisting 40 items were distributed to the respondents. Descriptive findings for all item are stated in Table 3.

Table 3 shows the mean scores for the level of competency of economics teachers in 4IR learning. All items received a very positive response with 40 items submitted, 40 items were at a high level, Meanwhile, nine items from the pedagogical competency construct had a total mean of 4.22 with the highest mean value belonging to item 3, worth 3.35, and item 6, worth 4.14. The social competency construct had an overall mean score of 4.16, with item 6, worth 4.27, having the highest value and item 2, with a mean value of 4.02, having the lowest value. The professional competency construct had a total mean value of 4.03; the highest mean values belonged to item 2 with a value of 4.37, and item 9 with 3.86 was the lowest. The personality competency construct, with a total mean of 3.97, had a highest mean value for item 3, worth 4.18; item 5 had the lowest mean value, with 3.66.

At the same time, the 4IR learning construct and environmental factors had mean values of 4.00 and 4.17, respectively. The highest value in the 4IR learning construct was for item 6, at 4.19, while item 8 scored lowest, with 3.61. The overall mean values possessed by each construct were at a high level. Therefore, the competence of economics teachers demonstrates a high level of 4IR learning.
Table 3. Standard Deviation, Mean, and Score Interpretation

<table>
<thead>
<tr>
<th>No</th>
<th>Item per Construct</th>
<th>SD</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Pedagogical Competence</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>I make teaching and learning plans, whether short or long term.</td>
<td>.80</td>
<td>4.25</td>
</tr>
<tr>
<td>2</td>
<td>I have targets that support learning activities.</td>
<td>.84</td>
<td>4.20</td>
</tr>
<tr>
<td>3</td>
<td>I do the teaching to the standard that applies.</td>
<td>.83</td>
<td>4.35</td>
</tr>
<tr>
<td>4</td>
<td>I demonstrate practical demonstration skills by connecting things to the realities of daily life.</td>
<td>.80</td>
<td>4.31</td>
</tr>
<tr>
<td>5</td>
<td>I make students feel interested in participating in learning.</td>
<td>.86</td>
<td>4.17</td>
</tr>
<tr>
<td>6</td>
<td>I provide feedback to students about the material presented.</td>
<td>.88</td>
<td>4.14</td>
</tr>
<tr>
<td>7</td>
<td>I conduct a learning evaluation.</td>
<td>.89</td>
<td>4.17</td>
</tr>
<tr>
<td></td>
<td>Overall Pedagogical Competency Score</td>
<td></td>
<td>4.22</td>
</tr>
<tr>
<td></td>
<td><strong>Social Competence</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>I use oral language correctly.</td>
<td>.80</td>
<td>4.18</td>
</tr>
<tr>
<td>2</td>
<td>I participate in activities that make it possible to meet new people.</td>
<td>.91</td>
<td>4.02</td>
</tr>
<tr>
<td>3</td>
<td>I stimulate student motivation in learning.</td>
<td>.87</td>
<td>4.20</td>
</tr>
<tr>
<td>4</td>
<td>I make students active in learning by showing an open attitude towards student responses.</td>
<td>.91</td>
<td>4.23</td>
</tr>
<tr>
<td>5</td>
<td>I cultivate student spirit.</td>
<td>.85</td>
<td>4.11</td>
</tr>
<tr>
<td>6</td>
<td>I communicate with fellow teachers regarding teaching and learning.</td>
<td>.84</td>
<td>4.27</td>
</tr>
<tr>
<td>7</td>
<td>I use online social media chat to interact.</td>
<td>.92</td>
<td>4.24</td>
</tr>
<tr>
<td>8</td>
<td>I use social media as an example for students.</td>
<td>.88</td>
<td>4.06</td>
</tr>
<tr>
<td></td>
<td>Overall Social Competency Score</td>
<td></td>
<td>4.16</td>
</tr>
<tr>
<td></td>
<td><strong>Professional Competence</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>I carry out learning in accordance with the planning.</td>
<td>.84</td>
<td>4.26</td>
</tr>
<tr>
<td>2</td>
<td>I steer learning towards the competencies to be achieved.</td>
<td>.78</td>
<td>4.37</td>
</tr>
<tr>
<td>3</td>
<td>I do meaningful assignments for students.</td>
<td>1.05</td>
<td>3.91</td>
</tr>
<tr>
<td>4</td>
<td>I evaluate learning through academic achievement.</td>
<td>.94</td>
<td>4.21</td>
</tr>
<tr>
<td>5</td>
<td>I attend workshops/seminars/training to enhance my teaching skills.</td>
<td>.88</td>
<td>4.16</td>
</tr>
<tr>
<td>6</td>
<td>I analyze the assessments given.</td>
<td>1.34</td>
<td>3.52</td>
</tr>
<tr>
<td>7</td>
<td>I am fair in teaching and learning.</td>
<td>.94</td>
<td>4.12</td>
</tr>
<tr>
<td>8</td>
<td>I receive feedback from students.</td>
<td>.92</td>
<td>3.93</td>
</tr>
<tr>
<td>9</td>
<td>I make improvements based on the feedback I receive.</td>
<td>.95</td>
<td>3.86</td>
</tr>
<tr>
<td></td>
<td>Overall Professional Competency Score</td>
<td></td>
<td>4.03</td>
</tr>
<tr>
<td></td>
<td><strong>Personality Competence</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>I obey all the rules of the school.</td>
<td>.96</td>
<td>3.99</td>
</tr>
<tr>
<td>2</td>
<td>I solve problems well in teaching and learning.</td>
<td>.89</td>
<td>4.14</td>
</tr>
<tr>
<td>3</td>
<td>I always act honestly in the teaching and learning process.</td>
<td>.96</td>
<td>4.18</td>
</tr>
<tr>
<td>4</td>
<td>I provide an example of the correct attitude to students.</td>
<td>.97</td>
<td>4.00</td>
</tr>
<tr>
<td>5</td>
<td>I act angrily when there are students who do not understand the learning material I teach.</td>
<td>1.11</td>
<td>3.66</td>
</tr>
<tr>
<td>6</td>
<td>I remind other teachers to carry out orders and avoid bans.</td>
<td>1.01</td>
<td>3.89</td>
</tr>
<tr>
<td></td>
<td>Overall Personality Competency Score</td>
<td></td>
<td>3.97</td>
</tr>
<tr>
<td></td>
<td><strong>4IR learning</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>I use learning aids such as projectors, laptops/computers, smartphones, virtual reality (VR), and others.</td>
<td>.89</td>
<td>4.04</td>
</tr>
<tr>
<td>2</td>
<td>I use a computer lab that has Internet access.</td>
<td>.92</td>
<td>3.94</td>
</tr>
<tr>
<td>3</td>
<td>I have skills related to digital technology/the Internet.</td>
<td>.97</td>
<td>4.09</td>
</tr>
<tr>
<td>4</td>
<td>I demonstrate effective facilitation skills in the use of technology.</td>
<td>1.10</td>
<td>4.03</td>
</tr>
<tr>
<td>5</td>
<td>I use online applications such as Kahoot, etc., in learning methods.</td>
<td>1.04</td>
<td>4.03</td>
</tr>
<tr>
<td>6</td>
<td>I use software such as Microsoft Office in the teaching and learning process.</td>
<td>.97</td>
<td>4.19</td>
</tr>
<tr>
<td>7</td>
<td>I search websites as a reference.</td>
<td>1.04</td>
<td>3.92</td>
</tr>
<tr>
<td>8</td>
<td>I provide information on applications that can be downloaded onto smartphones to help improve students' search for information.</td>
<td>1.20</td>
<td>3.61</td>
</tr>
<tr>
<td>9</td>
<td>I use open learning media on the Internet to improve student performance.</td>
<td>.90</td>
<td>4.17</td>
</tr>
<tr>
<td>10</td>
<td>I control the use of digital/Internet technology by students.</td>
<td>.97</td>
<td>4.04</td>
</tr>
<tr>
<td></td>
<td>Overall 4IR learning Score</td>
<td></td>
<td>4.00</td>
</tr>
</tbody>
</table>
Objective 2: To examine the effect of economics teachers’ competencies on 4IR learning.

Based on the correlation results in Table 4, there was a positive correlation between teacher competence and 4IR learning \( [R= .325, n=256, p < .001] \) with moderate levels of teacher competence associated with moderate levels of 4IR learning. Therefore, the quality of education can be supported by a teacher’s ability with regard to learning in 4IR era.

Table 4. Pearson Correlation Analysis Results – The Relationship between Economics Teacher Competencies and 4 IR Learning

<table>
<thead>
<tr>
<th>Teacher Competence</th>
<th>4IR Learning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Correlation</td>
<td>.325</td>
</tr>
<tr>
<td>Sig.2 (tailed)</td>
<td>.000</td>
</tr>
<tr>
<td>N</td>
<td>256</td>
</tr>
<tr>
<td>N</td>
<td>256</td>
</tr>
</tbody>
</table>

Regression analyses were performed to examine the effect of independent variables (economics teachers’ competencies) on the dependent variables (4IR learning). Regression result in Table 5 indicated that there was a significant effect between teacher competence and 4IR learning \( [F(1,254)=37.44, p < .001, R^2 = .478] \).

Table 5. Regression Results

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R^2</th>
<th>Adjusted R Square</th>
<th>Std. Error of Estimate</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.478*</td>
<td>.228</td>
<td>.222</td>
<td>57262</td>
<td>37.445</td>
<td>.000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(Constant)</td>
<td>1.168</td>
<td>.340</td>
<td>3.431</td>
</tr>
<tr>
<td></td>
<td>Teacher Competence</td>
<td>.272</td>
<td>.073</td>
<td>.216</td>
</tr>
</tbody>
</table>

Based on the regression result in Table 5, the influence of economics teachers’ competencies can explain 47.8% of 4IR learning. Other factors explain the remaining 52.2%. The results of the Anova test found that the value of \( F = 37.445 \) and \( p < .001 \) show that the regression model could be used to predict 4IR learning. The regression equation is \( Y = Constant + \beta_1XI \), where \( Y \) is 4IR Learning, \( XI \) is Teacher Competence. Thus, the regression equation for this test is \( 4IR \text{ Learning} = 1.168 + (0.272 \text{ Teacher competence}) \)

5. Conclusions

Based on the above discussion, this study has achieved its objective, which was to determine the level of competence of economics teachers in 4IR learning and also testing of the relationship between competencies of economics teachers and 4IR learning. Descriptive and Inferential analysis answered both research objectives in the study. This study only focused on economics teachers in Jakarta, Indonesia, with a sample of 256 teachers. The result of this study has statistically proved that economics teachers’ competencies have a positive and significant impact on 4IR learning. This study also statistically proves the competency of teachers practiced at a high level with four constructs (specifically, pedagogical competency, social competency, professional competency, and personality competency) can act as a strategy to improve quality in 4IR learning, which also assist economics teachers in determining right learning strategies. However, to have practical and efficient learning in the learning process can be carried out following the prevailing curriculum targets. This study pointed out the essential thing for teachers to enhance their competencies because the more competent teachers it enriches students experiences and knowledge according to what is needed in the industrial revolution 4.0. Furthermore, learning processes can be designed with a focus on the relevant competencies and thereby expand the competency model’s adequacy. The findings from this study can further be used as a starting point for teachers facing the challenges of Industry 4.0.

This situation also applies to the level of teachers’ competence; in the situation the level competency is high, it enhances the quality of teachers. Furthermore, a good school environment can support the 4IR learning process. Indirect effects of teachers has been found related to this...
study that teachers can also have more flexibility in designing their lessons creatively and supporting teachers to have a Critical Thinking to solve the problem in learning process. This study also provides basic implications for academics and industry for further study and it also has contributed as an additional literature on teacher competency in the context of Indonesia education. The researcher notes that research gaps have been identified, which indicate the direction of future research; evidence from industry should also be included.

In conclusion, referring to the above discussions, this study attempts to fill gaps in available knowledge, as discussed in the problem statement. This study also certainly has certain limitations. In this regard, it is hoped that this study can provide a preliminary reference for future studies related to teacher competence, school environment factors, and 4IR learning.

Acknowledgement

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The Level of Readiness among Rural School Teacher in Improving the Language Skills of Preschool Children by Using the Multimedia

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Abstract All children have their right to go to school and learn regardless of who they are. Having an education helps people to access all of their other human rights. Therefore, Ministry of Education in Malaysia made early childhood education compulsory. Literacy development has contributed to the knowledge in early childhood education. In the age of digital technology, 21st century learning is an era of change and innovation in education. Rural preschools in Malaysia have shown their dedication to make 21st century learning a prime medium in increasing literacy. The use of multimedia during preschool children's learning sessions is more interactive by relying on the integration of various media including audio, video, graphics and others to enhance children's language development. This research objective is to find out the level of readiness of pre-school teachers in the development of early childhood literacy based on 21st century learning. The questionnaire has been distributed to 30 samples of respondents in third grade rural primary school teachers in Kapit District, Sarawak was selected randomly. The findings of this study showed that teachers in rural areas are ready to apply the multimedia in teaching literacy. Hence, it is hoped that the findings of this study will assist certain parties, especially the Malaysian Ministry of Education to conduct special training in order to solve the problems that occur in rural primary schools.

Keywords 21st Century Learning, Inner Preschool, Multimedia Approach, Literacy Development, Preschool Teacher

1. Introduction

The National Pre-School Standards (KSPK) curriculum implemented in 2010 was revised in 2017 to meet the new policy requirements under the Malaysian Education Development Plan (PPPM) 2013-2025 and current requirements. The review was conducted to ensure that the quality of the curriculum implemented in preschools is in line with international standards (KSPK, 2017). Teachers play an important role in determining the level of development of children [32]. Teaching and learning methods are an activity that plays a role in bringing about changes for students [22]. Effective, meaningful and enjoyable preschool and learning experience can provide children with the skills, confidence and positive attitude for future learning.

According to [2], the paradigm shift in education has been initiated through the Early Education Development Report 2013-2015 (PPPM 2013-2015) launched by the Prime Minister on September 11, 2012, providing eleven shifts expected to be implemented within 13 years. In addition, all eleven paradigm shifts are intended to enable educational transformation based on needs and aspirations in making education an agent of change to meet the
challenges of the 21st century. To ensure that all levels of education are transformed, pre-school education is also emphasized in the drafting of the KSPK 2017 by integrating knowledge, skills and values, incorporating 21st Century Skills and applying High Level Thinking Skills (EAT) in integrating the six milestones in the KSPK 2017 framework which is Communication, Spirituality, Attitude and Values, Humanities, Physical and Aesthetic Development, Science and Technology and Personal Skills.

The first objective, set out in the KSPK 2017, is for children to use language to communicate effectively. According to [2], most children master the concept of language through informal learning experiences. This informal learning experience is embedded in preschool education. Learning a language through physical games, for example, helps children associate words with pictures or objects to understand the concept of meaning [2]. According to [27], preschool education emphasizes the 'learning through play' approach or also known as 'fun play'. In addition, through this process children will be exploring, discovering and building experiences naturally. Based on 21st century learning in line with the current era of digital technology, the multimedia approach in the classroom can enhance early childhood literacy development in preschool. Studies on early childhood literacy have contributed greatly to knowledge. Researchers such as [13,34] emphasize that students should master reading comprehension at the simplest or basic level before being exposed to higher reading levels [25].

2. Problem Statement

Collaborative teaching and learning culture require stimulation that enables students to enjoy a field [25]. In achieving early childhood education goals, good language proficiency in the field of language is highly emphasized, but it has been shown that this is not prioritized in the pedagogical process in kindergarten or preschool [3]. Most preschool teachers find that the use of children's language is very limited and as such, they will not take into account children's language proficiency. In fact, language proficiency greatly affects preschoolers' performance in classroom learning.

According to the statement of [35], the concept of development in line with the teaching practices outlined in the KSPK is still not fully realized or not adequately practiced by teachers. Due to the lack of teachers' understanding of pedagogical and teaching practices, they hindered the effectiveness of teaching and learning processes in early childhood education as intended in preschool education.

Malaysia is a country that is moving towards a developed nation [3]. Rapid advances in science and technology, critical thinking skills and effective communication skills are essential in 21st century learning [40]. Teaching and learning of the 21st Century has different features to the education of the past [14]. 21st Century Learning has a huge impact on the education system in Malaysia [29]. According to a study conducted by [16], interview results with nine preschool teachers were involved, there were several teaching and learning weaknesses identified. These are based on the direct observation from the study of [38], having shown that the way teachers teach is so tedious that children become bored in teaching and learning sessions. The use of teaching aids is not fully utilized. This was supported by [1] who have used Ngalim's (1990) statement in [22] argue that the reason for children's loss of attention during learning is due to the way teachers explain and use boring teaching materials.

Reference [39] states that, apart from the use of teaching aids, other factors that lead to children's mastery of literacy are ways of teaching and learning that are less sensitive to children's features. Most educators today still use traditional teaching patterns that are more of a didactic approach to teaching and learning [30,33]. To date, the most frequently used activity for teachers in reading instruction is personal training [24,29].

According to [19,31] state that there are ineffective strategies in teaching teachers due to lack of proper knowledge and training in the process of educating and at the same time less evaluating the effectiveness of their teaching. More worrying is that the background of the training and practice received by these teachers does not seem to affect their pedagogical values directly in the classroom [34]. If preschool teachers do not use the specific approach proposed in preschool education or early childhood education, preschool children's learning needs will not be met [12]. If this is not taken into account, these factors can affect the reputation of a teacher.

In Malaysia the issue of pupils lacking literacy and numeracy skills has existed since the beginning of the Malaysian education system and became more critical in the 1960s [24,7,9,22] further pointed out that poor reading ability will affect student achievement in all subjects. According to him, students who are struggling with reading and comprehension skills will also have problems in the academic field. This is supported by the findings [13], having shown that children who do not have good reading skills will have trouble understanding other subjects. [30] also stated that weakness in language learning will affect pupils' progress in other subjects as language is a communication tool for learning all kinds of knowledge.

According to a study conducted by [36], children interviewed expressed less enjoyment in the teaching and learning process of reading in the classroom. When there is a lack of fun in the classroom, the children will lose focus and cause the children to become bored and lack the literacy skills they are trying to apply.
3. Research Question

I. What is the teacher's level of readiness towards the effectiveness in using a multimedia?

II. What is the teacher's readiness level of multimedia aspects of the development of children's language skills?

III. What is the significant between teacher's readiness levels by demographic features and age?

4. Literature Review

4.1. Multimedia

In general, multimedia is related to the use of more than one type of media to convey information [38]. For example, video and music are multimedia forms because they convey information, audio or voice and video is used. Unlike music recordings that use only audio or voice and are referred to as mono-media. Multimedia is a word of multi and media. Multi comes from Latin, meaning many or many. Media also comes from the Latin word medium meaning intermediary or something used to transmit, convey or convey information. Multimedia is a combination of several elements, such as text, graphics, sound, video and animation that produce amazing animations. Multimedia also has a high degree of interactive communication. Multimedia is a combination of data or media to convey something very interesting. For computer or smartphone users it can be interpreted as information that can be conveyed through audio or video, text, graphics and animation.

It can be said that multimedia is a combination of data or media to convey information more interestingly. Multimedia is a combination of computer and video or Multimedia is generally a combination of three elements, namely voice, image and text or Multimedia is a combination of at least two media inputs or outputs from data, media can audio (voice or music), animation, video, text, graphics and images or Multimedia is a tool that delivers dynamic and interactive information that incorporates text, graphics, animation, audio and video images. Multimedia using a computer or smartphone is for creating and incorporating text, graphics, audio, motion pictures (video and animation).

4.2. Learning Multimedia

The term multimedia used in education today can be described as a computer system in which all media; text, graphics, audio or voice, animation and video are all in a program that explains or illustrates educational topics. Multimedia programs designed specifically for educational needs need to be taken seriously in order for the program to be fully utilized or to meet educational needs [26]. The development of multimedia programs or approaches in 21st century education now benefits both quantity and quality for teachers and students. Many researchers say that the teaching and learning process will be more effective if implemented in informal settings such as the use of multimedia in learning. The elements implemented in learning are more entertaining and will have a more positive impact.

Reference [26] states that multimedia learning is a combination of text, art, sound, animation, and video delivered to a person (child or student) with computers and electronic and digital equipment such as smartphones. Through the integration of these media, learning experiences become interactive and reflect the experience of everyday life. Reference [36] added that multimedia learning is an element designed and developed using several programs through computer software used to convey learning resources, how to use, train and so on. These elements are also based on other elements that help to attract attention, such as pictures, colours, music and animations. On the other hand, [6] found that media is practical and applicable for science learning process at elementary school level. By learning an interesting and contextual problem based through media will improve student’s thinking skill. [6] student with specific learning difficulties will be able to learn independently in more fun environment. [23]

5. Methodology

5.1. Research Design

Based on this prospective study, the answers to this question are from teachers' perceptions of the effectiveness of multimedia use in enhancing pedagogical practices of in-school pre-school teachers and thus helping to improve early childhood literacy skills. In addition, the measurement will provide quantitative data which will then be interpreted through analysis and finally generalized to meet the needs of the larger population but has similar characteristics especially in the context of studies involving the practice of pedagogy of preschool teachers.

The quantitative design according to [5] carries the meaning, the number which refers to the discrete number that is precisely stated. Quantitative research is a form of study that uses statistics as well as numerical with measurable parameters aimed at improving the relationship between educational theories and the development of teacher professionalism [7]. This could be related to the study of researchers who want to improve the pedagogical practices of preschool teachers in the interior through 21st-century learning that can help to improve early literacy skills of preschool children.

Therefore, the researcher has chosen a quantitative study designed by conducting a survey method using a set
of questionnaires. The justification of designing the study was based on [9], who stated that the quantitative approach is more structured, has less degree of ambiguity, has a clearer meaning, is linear, has clear scheduling and is focused on the data. Survey study according to [5] is a research method that involves collecting data from a population to understand a current situation of the population and one or more variables. He added that researchers are also interested in getting a large group opinion on an issue or problem. It is thus clear that the choice of survey method in this study is to examine the perception of third-grade pre-school teachers on the effectiveness of using multimedia approaches in improving their pedagogical practices.

5.2. Location and Sample

This study was conducted among 30 national preschools around Kapit district, Sarawak. The schools involved were from third-level rural schools. Based on the population size of the study area, sample size is determined by reference to [5] sample size. The sample selection is based on the purpose of sampling which is the sample of this study consisting of third-grade pre-school teachers in Kapit district, Sarawak.

6. Findings

6.1. The Teachers' Level of Readiness towards the Effectiveness in Using a Multimedia

Researchers analyzed 10 questions about Teacher Readiness Levels of knowledge from the questionnaire form provided. The findings were analyzed based on feedback provided by the respondents. Respondents were required to answer these questions on a likert scale represented by Very Not Ready (STS), Not Ready (TS), Low Ready (KS), Ready (B) and Very Ready (SB).

Based on Table 1, the sixth question shows the average mean is at the highest level (4.11). This indicates that teachers are ready to motivate pre-schoolers to learn about multimedia. The first question shows that the mean is at the lowest level (3.91) indicating that teachers are less prepared to learn about preschool multimedia development.

<table>
<thead>
<tr>
<th>No</th>
<th>Statement</th>
<th>Mean</th>
<th>Std Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>I am excited to learn about the development of preschool multimedia.</td>
<td>3.91</td>
<td>.709</td>
</tr>
<tr>
<td>2.</td>
<td>I am ready to use multimedia in preschool.</td>
<td>4.01</td>
<td>.635</td>
</tr>
<tr>
<td>3.</td>
<td>I am prepared to increase student motivation during multimedia use.</td>
<td>4.00</td>
<td>.595</td>
</tr>
<tr>
<td>4.</td>
<td>I am ready to use various multimedia methods among preschoolers.</td>
<td>4.03</td>
<td>.617</td>
</tr>
<tr>
<td>5.</td>
<td>I look forward to increase student mastery in multimedia development.</td>
<td>4.05</td>
<td>.634</td>
</tr>
<tr>
<td>6.</td>
<td>I want to motivate pre-schoolers to learn about multimedia.</td>
<td>4.11</td>
<td>.590</td>
</tr>
<tr>
<td>7.</td>
<td>I am ready to analyse the achievement of preschool students by their level of achievement.</td>
<td>3.96</td>
<td>.621</td>
</tr>
<tr>
<td>8.</td>
<td>I would like to take a Multimedia course to improve knowledge.</td>
<td>4.07</td>
<td>.621</td>
</tr>
<tr>
<td>9.</td>
<td>I am ready to implement Multimedia in preschool Teachers.</td>
<td>4.00</td>
<td>.649</td>
</tr>
<tr>
<td>10.</td>
<td>I would like to share my knowledge of the use of multimedia among Preschool.</td>
<td>4.04</td>
<td>.673</td>
</tr>
</tbody>
</table>

Table 2. Minimum Analysis and Standard deviation of the Teacher Readiness Levels from Multimedia Use Aspects in Developing Children's Language Skill

<table>
<thead>
<tr>
<th>No</th>
<th>Statement</th>
<th>Mean</th>
<th>Std Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>I am ready to learn how to handle the multimedia for pre-school student.</td>
<td>4.08</td>
<td>.612</td>
</tr>
<tr>
<td>2.</td>
<td>I am ready to clearly understand the multimedia and the use of it in increasing student language skills.</td>
<td>4.02</td>
<td>.599</td>
</tr>
<tr>
<td>3.</td>
<td>I am ready to understand and encourage student to use a multimedia.</td>
<td>3.94</td>
<td>.640</td>
</tr>
<tr>
<td>4.</td>
<td>I am ready to use multimedia to increase my language proficiency.</td>
<td>3.97</td>
<td>.628</td>
</tr>
<tr>
<td>5.</td>
<td>I am ready to apply the use of multimedia while teaching is being implemented.</td>
<td>3.98</td>
<td>.646</td>
</tr>
<tr>
<td>6.</td>
<td>I would like to understand how multimedia is used in improving children's language skills.</td>
<td>4.00</td>
<td>.613</td>
</tr>
<tr>
<td>7.</td>
<td>I am willing to refer to the Learning Standard when preparing RPHs related to multimedia.</td>
<td>4.05</td>
<td>.602</td>
</tr>
<tr>
<td>8.</td>
<td>I am ready to teach using multimedia approaches to improve children's language development.</td>
<td>4.08</td>
<td>.599</td>
</tr>
<tr>
<td>9.</td>
<td>I would like to share my understanding with other teachers about the use of multimedia in improving children's language skills.</td>
<td>4.04</td>
<td>.609</td>
</tr>
<tr>
<td>10.</td>
<td>I look forward to applying multimedia learning strategies in preschool.</td>
<td>4.11</td>
<td>.603</td>
</tr>
</tbody>
</table>
6.2. The Teacher's Readiness Levels of Multimedia Aspects of the Development of Children's Language Skills

In this aspect the researchers analyzed 10 questions about the level of Teacher. This is an analysis made based on the feedback based on likert scale represented by Very Not Ready (STS), Not Ready (TS), Uncertain (KS), Ready (B) and Very Ready (SB).

Based on Table 2, the tenth question shows the highest mean was (4.11). This shows that they are ready to apply multimedia learning strategies in preschool. The third question shows that the lowest mean (3.94) indicated that teachers still do not yet understand how to motivate students when using multimedia.

The hypothesis of the study was to look at the differences and relationships between variables. The hypotheses were developed to measure differences in teacher readiness according to demographic characteristics, to measure differences in teacher readiness according to demographic characteristics and to determine the relationship between teacher readiness level and teacher readiness with multimedia use in preschool. The results are presented in detail as follows:

**Ho1 There Is No Significant Difference Between Teachers' Readiness Levels by Demographic Features.**

In this study, there are five demographic characteristics namely gender, age, academic qualification, term of service and school category, then five separate tests are conducted and the results are as follows:

<table>
<thead>
<tr>
<th>Gender</th>
<th>N</th>
<th>Mean</th>
<th>Std Deviation</th>
<th>t</th>
<th>Significant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>9</td>
<td>3.91</td>
<td>5.66</td>
<td>.138</td>
<td>0.019</td>
</tr>
<tr>
<td>Female</td>
<td>21</td>
<td>3.90</td>
<td>4.66</td>
<td>.138</td>
<td></td>
</tr>
</tbody>
</table>

According to [5], t-test is used to test significant differences between the two groups. It is used to test the difference between the mean of one variable for two groups of non-dependent samples. In this study, the mean between the two variables will be compared. The "p" value was used as 0.05 to determine a significant level for testing the null hypothesis, for which there was a significant difference in the level of teacher integrity in terms of gender demographics.

The t-test analysis in Table 5, below shows the mean scores of male and female teacher readiness scores. The data show that there are differences in the level of integrity between male and female teachers. This could be explained by the mean male mean score was 3.91 (N = 131, SP = 5.66) and the mean score for female was 3.90 (N = 229, SP = 4.66). The difference between the two mean scores is very small which is 0.01. The study found p = 0.019> 0.05. The null hypothesis is successfully accepted and it can be concluded that the level of readiness of male teachers with female teachers shows significant differences.

**Ho2 There was no significant difference between the levels of teacher readiness by age.**

One-way ANOVA results in Table 4 showed no significant mean score difference \[ F = 1.342 \text{ (DK = 4, 355)} \] and Sig. \[ P = 0.254 \] between teacher readiness level and age at \[ P > 0.05 \]. This value is very high to indicate any significant tendency. It can be said that there is no significant difference in the level of teacher readiness based on age.

**Ho3 There was no significant relationship between teacher readiness and multimedia use in preschool**

Based on Table 5, it is found that the correlation coefficient, \[ r \] for the level of readiness with multimedia use in preschool is equal to 0.788 **. This shows a high correlation. Since the value of \[ p = 0.000 \] is smaller than 0.05, this hypothesis fails to be accepted. This means that there is a significant relationship between the level of readiness and the use of multimedia in preschool. Because the correlation test results show a significant relationship, it can be concluded that there is a significant relationship between the level of readiness and the use of multimedia in rural preschool teachers in Kapit District.

### Table 3. t-test about student readiness based on gender

<table>
<thead>
<tr>
<th>Gender</th>
<th>N</th>
<th>Mean</th>
<th>Std Deviation</th>
<th>t</th>
<th>Significant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>9</td>
<td>3.91</td>
<td>5.66</td>
<td>.138</td>
<td>0.019</td>
</tr>
<tr>
<td>Female</td>
<td>21</td>
<td>3.90</td>
<td>4.66</td>
<td>.138</td>
<td></td>
</tr>
</tbody>
</table>

### Table 4. ANOVA Levels of Teacher Readiness by age

<table>
<thead>
<tr>
<th>Between Group</th>
<th>Df</th>
<th>Mean</th>
<th>F</th>
<th>Significant</th>
</tr>
</thead>
<tbody>
<tr>
<td>In group</td>
<td>355</td>
<td>.253</td>
<td>.254</td>
<td></td>
</tr>
</tbody>
</table>

### Table 5. Correlation of Teacher Readiness Levels with Multimedia being used in Preschool

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coloration values (r)</th>
<th>Multimedia Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Significant Values (p)</td>
<td>.788**</td>
<td>.000</td>
</tr>
</tbody>
</table>

N = 360, \( P < 0.01 \)

Based on Table 5, it is found that the correlation coefficient, \( r \) for the level of readiness with multimedia use in preschool is equal to 0.788 **. This shows a high correlation. Since the value of \( p = 0.000 \) is smaller than 0.05, this hypothesis fails to be accepted. This means that there is a significant relationship between the level of readiness and the use of multimedia in preschool. Because the correlation test results show a significant relationship, it can be concluded that there is a significant relationship between the level of readiness and the use of multimedia in rural preschool teachers in Kapit District.

7. Discussion

Through this study, researchers hope to find out the level of teachers' readiness for the effectiveness of multimedia use in improving the pedagogical practices of preschool teachers. The purpose of this study is to determine teachers' perceptions of the use of multimedia in improving preschool children's language skills. In line with the era of the Industrial Revolution 4.0 (4IR), teachers in rural primary schools also respond to the demands of the current educational cycle. It is also hoped that this study will be able to identify the constraints faced by preschool teachers on the implementation of multimedia approaches during teaching and learning in the classroom as well as
understanding the need for interior preschool teachers to implement multimedia approaches. Researchers hope that through this study, they will be able to identify in-house pre-school teachers who are skilled in implementing multimedia approaches and teachers who master the approach to multimedia in preschool. It is hoped that the findings of this study will assist certain parties, especially the Ministry of Education, Malaysia in solving problems that occur in rural primary schools.

8. Conclusions

21st Century Learning (PAK21) is a study based on the development of science and technology [31]. These digital literacy skills are the skills of using digital technology to solve a single problem [4]. These skills are also closely linked to 21st century learning. This skill combines the use of technology to communicate information, communicate and develop digital materials [13]

Awareness of the importance of education, including preschool education in rural schools, is very high. Through education, we can create knowledgeable and highly skilled human capital to continue the survival and development of our nation. In line with the explosion of information technology and communication in the digital age of 21st century learning, the implementation of multimedia approaches in preschools by teachers, especially as teaching and learning (PdP) methods to promote early literacy development in school children, is encouraged. This is because Generation Z is more receptive to change in terms of innovation. The multimedia approach certainly has a positive impact on the PdP process and is well-suited to children's interests and the demands of today's educational development. The multimedia approach, which is the 21st century learning approach, is very effective in inducing positive changes in children's behavior and attitudes towards learning, furthering the development of early literacy. Moreover, this approach is simple and flexible to integrate into the teaching process as activities to achieve specific learning objectives.

REFERENCES


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<th>No</th>
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The Influence of Attitude, Interest, Teachers and Peers on Entrepreneurial Career Intention

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Abstract  The purpose of this study is to identify the influence of interest, attitude, teachers and peers towards entrepreneurial career intention of religious secondary school students in Malaysia. The objectives of this study are to identify the level of interest, attitude, teachers' guidance, peers and behaviour towards students' entrepreneurial career intention, and to identify the influence of attitude, interest, teachers' guidance, and peers towards student behaviour on entrepreneurial career intention. This quantitative study uses a survey design involving 328 religious secondary school students in the Sepang district based on multistage sampling starting from stratified random sampling to simple random sampling. The result of the study showed that the domains of attitude, interest, teachers’ guidance, peers and behaviour of entrepreneurial career intention are at a moderately high level. The result of the analysis also revealed that the domain of attitude, interest, teachers’ guidance and peers have significant influence over behaviour on entrepreneurial career intention at 62.6 percent. The domain of interest is the best way to predict the behaviour of students’ entrepreneurial career intention compared to other domains. On the other hand, the domain of attitude is the worst in predicting the behaviour of entrepreneurial career intention. These findings clearly indicate that religious secondary school students have a moderately high tendency to choose entrepreneurship as a career which is driven by interest, teachers’ guidance and peers. The implications of the study also contribute to the applicability of the Theory of Planned Behaviour by Ajzen (1991). Meanwhile, schools need to play a role nurturing entrepreneurial attitudes through formal and informal education continuously.

Keywords  Attitudes, Interests, Teachers' Teaching, Peers and Entrepreneurship Career Behaviour, Religious Secondary School Students

1. Introduction

The Malaysia Education Blueprint 2013-2025 aims to strengthen the development of vocational education by providing the necessary practical skills, especially in the field of entrepreneurship, and produce students with high leadership skills. Meanwhile, The Secondary School Standard Curriculum (KSS) was introduced to emphasise on High Level Thinking Skills (HTLS) to encourage students to think creatively and critically when solving problems. Thus, it is seen that this new curriculum is able to help students in developing their potential and entrepreneurial attitudes as early as their secondary school years. Secondary schools in Malaysia are a place to nurture young people who can adopt a positive lifestyle and contribute to the country’s economic progress [1]. In order to produce better people, one of the goals set by the government for secondary schools is the establishment of entrepreneurship clubs through the entrepreneurship co-curriculum. An entrepreneurship club gives secondary
school students early exposure to the real entrepreneurship world and helps the government to create a commercialised community and a Bumiputera Industry. The contribution and role of entrepreneurial activities are known to be catalysts of the country's economic growth and act as the main driver in increasing the level of innovation, creativity and competitiveness of the country on the world stage [2]. Students are trained to be creative and innovative, foster their entrepreneurial interest and create job opportunities. This will indirectly produce students who would be directly involved and actively manage their own business [3]. Therefore, the government encourages students to be engaged in various entrepreneurship programs such as training, seminars, short-term courses, conferences and other activities to develop entrepreneurial behaviour among students, thereby developing the economy of the country as a whole. As a proof of its success, the Young Entrepreneur Programme organised in secondary schools successfully cultivates the value of entrepreneurship as the level of entrepreneurship value is high.

The fact is, the level of students selecting the entrepreneurship field has been found to be low [4-7]. Moreover, entrepreneurship as a career is not a popular option among graduates of higher education public institutions [8]. In addition, youth unemployment at a young age has a serious long-term negative impact on their income and risks their marketability after obtaining a university degree [9]. Thus, career dependence in the public sector, private sector, non-governmental organisations and other sectors indirectly affects the unemployment rate of 25.3 percent of graduates at the undergraduate level [10]. This shows that students are still unaware of entrepreneurial career opportunities and fail to realise the abundance of opportunities that exist in the era of technological development [11]. More specifically, the younger generation does not seize business opportunities that exist as a result of current technological developments where these opportunities can be used as alternative careers.

The unwillingness to take the opportunity to make entrepreneurship a career of choice causes this career to be unpopular [11-14]. The existence of negative perceptions towards the field of entrepreneurship among students is also one of the factors students are not interested in venturing into the field of entrepreneurship [15]. Thus, students who have negative thoughts on entrepreneurship will lose confidence and be unaware of the opportunities that exist around them.

In an effort to support and encourage students to venture into entrepreneurial careers, the teacher's role is one of the solutions. Teachers play the main role of equipping the younger generation with business skills as well as entrepreneurial personality traits. According to Nurul Izzati [16], competent teachers are necessary in accomplishing this goal, and quality entrepreneurship education also needs to be implemented to ensure students have a positive perception of entrepreneurship which ultimately increases the level of marketability of students in the employment industry [17]. This means that negative perceptions among students towards entrepreneurial careers need to be altered so that the field of entrepreneurship becomes a career aspiration and a popular choice in the future.

Other studies have stated that most teachers are not experts, and do not have entrepreneurial skills and training [18]. Findings in the Competitiveness and Innovation Framework Programme 2007-2013 comprising of 26 countries which are Belgium, Bulgaria, Czech Republic, Denmark, Germany, Spain, Estonia, France, Italy, Cyprus, Lithuania, Latvia, Luxembourg, Hungary, Malta, Norway, Austria, Poland, Slovakia, Slovenia, Finland, Sweden and the United Kingdom, showed that there are gaps or constraints in implementing entrepreneurship programmes. These constraints include teachers lacking entrepreneurship knowledge, incompetent teachers, no involvement from individuals from the entrepreneurship industry, lack of practical elements and limited student participation and implementation of entrepreneurship programmes which are not associated with specific training or professions [19]. Furthermore, almost half of those countries requested that special training for self-employment be applied in all entrepreneurship courses. Meanwhile in Malaysia, the government offers entrepreneurship training to teachers, but the training provided does not use a systematic approach [16].

Next, some researchers support the argument that peers influence an individual’s attitudes and behaviours. According to Noor Erma [20], if students are friends with students who are interested in business, the student’s tendency to get involved in business is higher. However, the aspect of peers and its relevance to entrepreneurial behaviour has rarely been studied. Very few literature reviews have been done on the aspect of peer influence on one’s entrepreneurial potential. Many researchers focus more on the study of entrepreneurial concepts, internal factors, characteristics and processes that occur in entrepreneurship and emotional intelligence.

According to the problems mentioned above, this study aims to identify the influence of attitudes, interests, teachers’ guidance and peers on entrepreneurial career intention. It is hoped that this study would reduce the research gap that exists as very few studies have been conducted on teachers’ guidance and peer influence on the potential of entrepreneurship [21]. By identifying the problem, it is hoped that the study would provide clearer and more accurate ideas and references for stakeholders and anyone interested in a variety of appropriate initiatives to achieve the government’s aspirations in producing more young entrepreneurs. In fact, strong cooperation and understanding are expected to raise awareness and intention to a higher level among students to choose entrepreneurship as a career in the future. Thus,
research is needed to identify the influence of attitudes, interests, teachers’ guidance and peers on entrepreneurial behaviour. The objectives of this study are to identify the level of attitudes, interests, teachers’ guidance, peers and students’ entrepreneurial career intention behaviour and to identify the influence of attitudes, interests, teachers’ guidance and peers on students’ entrepreneurial decision behaviour. Meanwhile, the research questions are the following:

1) What is the level of attitude, interest, teachers’ guidance, peers and students’ entrepreneurship career intention behaviour?
2) To what extent do attitude, interest, teachers’ guidance and peers influence students’ entrepreneurial decision behaviour?

2. Literature Review

2.1. Attitude, Interest, Teachers’ Guidance, Peers and Entrepreneurial Career Intention

The domains of producing creative, innovative and first-class minded students’ need to be examined in order to evaluate to what extent do they influence and affect students. Attitude, for example, is a domain that is often used to describe entrepreneurial behaviour. Researchers [22-25] found that attitude is strongly related to entrepreneurship. According to them, the attitude of an entrepreneur is always focused on the result of the business while always ensuring that each of their businesses is profitable. Other studies such as [26-28] agreed that attitudes influence entrepreneurial career intention. This trend means that entrepreneurs have self-efficacy [29]. Self-efficacy is having self-confidence, that is, knowing oneself well, believing oneself and having the ability to see one’s strengths and weaknesses accurately [29]. This statement is very much in line with the attitude influencing the choice of entrepreneurial career. Only individuals who have self-efficacy have the courage to choose entrepreneurship as a career. This shows that entrepreneurs need to be confident, positive and always believe in themselves. A study by Ravi [30] showed that attitudes have a significant variant value towards entrepreneurship, which influences entrepreneurial career intention behaviour by 55.9 percent. Reinforcing the discussion, researchers [31] found that attitude is significant as a predictor of entrepreneurial career intention behaviour with an influence of 22 percent (R² = 0.22). The findings of Zairon’s [32] study found that the variance value for attitudes is 67 percent (R² = 0.67), hence the domain of attitude is the main predictor of entrepreneurial intentions of community college students.

Furthermore, the domain of interest predictors on average shows a trend that is almost in line with each of the findings of previous studies. A study on high school students found that the level of interest of entrepreneurial career behaviour is at a moderately high level [33,34]. Other studies stated that students at higher education institutions have a positive attitude towards entrepreneurship, but are not interested enough to venture into the field [18]. This statistical number is similar to a study by Johansen [79], which found that between 48 percent to 50 percent of secondary school students in Norway are interested in entrepreneurship. However, there is a positive relationship between interest and entrepreneurial career [18,33,35]. To further strengthen the discussion, a study by Norfadhilah and Halimah [18] found that interest significantly influenced the entrepreneurial career intention of students by 70.0 percent (R² = 0.70). These literature review trends show that students should be given the opportunity to gain experience in entrepreneurship. Through the experience gained, students become more confident and begin to form positive interests and perceptions about entrepreneurship [36,37]. Students should be able to interview successful entrepreneurs, visit trade fairs and do a variety of activities related to entrepreneurship. These activities have the potential to influence behaviour towards entrepreneurship.

Teachers play an important role in the implementation of a curriculum innovation. Teachers have different backgrounds, teaching abilities and capabilities, attitudes, knowledge and skills which determine the level of guidance being provided for students towards entrepreneurship [38]. The literature review on teachers’ guidance towards various entrepreneurial career intentions points to the fact that teachers take on an important task as an implementing agent to influence students to choose entrepreneurship as a career field. Previous studies found that teachers’ guidance contributes 48.8 percent of the variance to entrepreneurial career intention behaviour (R² = 0.488) [18]. This moderate percentage should be given attention, as this predictor domain is directly related to the intention of entrepreneurial careers among students. Teachers need to diligently master the content, understand the appropriate methods of approach, understand students well, always be positive and provide a high commitment in teaching business subjects until they are able to influence students’ entrepreneurial career intention.


The Theory of Planned Behaviour [39] is used as a basic theory that has significant applicability to entrepreneurial career intention. This theory is also often used by many researchers to examine a person’s behaviour and inclinations. The search for the keywords “Ajzen Planned Behaviour Theory” using Google Scholar was referenced 4550 times in 2010 compared to 22 citations in 1985 [40]. This explains that Ajzen’s theory has achieved the highest
scientific impact score among social psychologists in the United States and Canada [39]. The Theory of Planned Behaviour explains that the proposed behaviour is influenced by attitudes, subjective norms and perceived behaviour control. These three main factors are interrelated and are used to predict and explain the proposed behaviour of an individual. In the context of this study, behaviour is a product of the dynamic interaction between entrepreneurial attitudes, control over entrepreneurial behaviour and the social norms of society and culture. Apart from these factors, behaviour also involves cognitive factors and psychological factors [40]. Examples of cognitive factors are assessing abilities, values and social support. Meanwhile, psychological factors consist of motivation, emotions, thoughts and tendencies during entrepreneurial activities.

The factor of attitude towards behaviour aims to identify perceptions of self-desire to actively engage in a behaviour. This attitude depends on the expectations and beliefs about the personal effects of the behaviour. Ajzen [39] explains that individuals would evaluate whether or not they are happy performing such behaviours. Good assumptions about appraisal will further increase the level of desire to become an entrepreneur, while bad or negative appraisal results in behaviour not being demonstrated [41]. Thus, attitude refers to an assessment of a psychological object, for example good - bad, beneficial - unbeneﬁcial and pleasant – unpleasant [42]. This attitude predictor refers to the level of individual evaluation of whether or not the self-behaviour is fun.

Subjective norms are deﬁned as individual beliefs about what others think about whether they can demonstrate such behaviour or not [43]. For example, this can refer to their family’s perception towards them. Subjective norms can have a strong influence on one’s desire if the individual has a high locus of internal control and also if he has a high orientation to act. The most inﬂuential subjective norms are family members, important people, friends, ‘role models’ and mentors [44]. A predictor of perceived controlled behaviour refers to an individual’s perception of whether or not it is easy to perform a behaviour [39,43]. This evaluation depends on one’s external and internal factors such as experience, skills, resources and opportunities. The higher an individual's behavioural control, the higher his or her perception of opportunity [45]. In other words, if a person has control over those factors, then the intention to act on the behaviours will be weak.

In this context, the predictor domain of attitudes, interests, teachers’ guidance and peers were used to study and predict entrepreneurial behaviour among students. The intention of this domain is related to the predictive factors proposed by Ajzen [39] which are attitudes, subjective norms and perceived control behaviours. The individuals have an interest and plan to start a business while seeking the opinions and advice from parents, siblings, teachers and friends about the benefits and advantages of doing business. The opinions received from these people will influence their perception of how easy or difﬁcult an entrepreneurial career is and ultimately influence their decision of whether or not to start venturing into the entrepreneurship ﬁeld and start a business. If a person has a high level of behaviour control, then his perception of the entrepreneurial career will also be high and will eventually choose entrepreneurship as a career and vice versa.

3. Methodology

This study uses a quantitative design survey that is analysed descriptively and inferentially. Multistage sampling involves stratified random sampling according to selected zones to determine the study sample. After selecting the zones, a simple random voting technique is done to obtain the final sample based on the data source obtained from the Education Office. A total of 2047 business students in religious secondary schools in the district of Sepang, Selangor, Malaysia were involved in the study. This sample size was selected based on a study by Krcjie and Morgan [46] who recommended a sample size of at least 328 students. This sample size was selected because the business subject is offered to all students as an elective. Thus, this group of students was considered suitable as they ﬁt the requirements of the study sample. In addition, they have experience being involved in entrepreneurship programmes organised by the school. Therefore, the perception of these students is very much needed in the study in order to predict entrepreneurial career intention behaviour among secondary school students.

Next, this study uses a questionnaire. This questionnaire is divided into six parts which are Part A, the demographic proﬁle of respondents adapted from Rosna [40]; Part B, the domain of attitude towards entrepreneurship adapted from Nor Aishah & Yap Poh Moi [47]; Part C, the interest domain adapted from Zaimah [48]; Part D and E, the domain of teachers’ guidance and peers adapted from Quek Miow Leng [49]; and Part F, the domain of entrepreneurial career intention behaviour adapted from Nor Aishah [50-52].

Next, the process of validating the content was implemented by taking the consent of experts of the entrepreneurship ﬁeld into account. Experts were selected based on several criteria such as work experience and expertise in the ﬁeld of entrepreneurship. To ensure face validity, language teachers checked the questionnaire to ensure that the order of sentences of each item in the instrument is correct. All views and opinions were taken into account to improve the quality of the items and domains. The credibility process was carried out on 30 students who took business as an elective subject at one of
the religious secondary schools in Sepang district, Selangor. The pilot test results showed that there was a correlation between the score of each item with a total score exceeding 0.30 and a Cronbach Alpha value for each domain exceeding 0.80. This shows that the validity and credibility of this instrument are high and can be used for the actual study.

The descriptive analysis in this study involves data to identify the first research objective, which are the level of attitude, interest, teachers’ guidance, peers and behaviour of entrepreneurial career intention. This data analysis is reported in the form of frequency, percentage, mean score and standard deviation. The level of interpretation is determined by referring to the mean value based on a study by Norasmah [53] which is widely referred to in entrepreneurship studies. The mean value of 1.00 – 2.00 is low, 2.01 - 3.00 is moderately low, 3.01 – 4.00 is moderately high and 4.01 – 5.00 is high. Inference analysis refers to the second research objective involving a multiple regression analysis on the influence of the predictor domain on entrepreneurial career intention behaviour. This analysis was carried out after meeting the assumed requirements in this analysis.

4. Results and Discussion

This section discusses the findings of descriptive and inferential research analysis to answer the research questions. The results of this data analysis are discussed and supported by the findings of previous studies.

4.1. Research Question 1

What is the level of attitude, interest, teachers’ guidance, peers and entrepreneurial career intention behaviour?

To answer this research question, a total of 50 items were used to measure the level of each domain; attitudes (10 items), interests (10 items), teacher education (10 items), peers (10 items) and student entrepreneurial career intention behaviour (10 items). Each item was measured using a five-point Likert scale (strongly disagree, disagree, moderately disagree, agree and strongly agree) and the mean score value of each domain was based on Norasmah’s [53] interpretation. Overall, the domain levels of entrepreneurial career intention behaviour are summarised in Table 1.

The attitude domain (Mean = 3.91, SD = 0.41) recorded the highest score compared to the interests, teachers’ guidance, peers and entrepreneurial career intention behaviour of religious secondary school students despite being in the same moderately high-level category. This finding is supported by [54,55] who obtained the same score. The value of this score indicates that secondary school students have a good and positive perception of entrepreneurial career. This analysis shows that secondary school students have a good and positive attitude towards a career in entrepreneurship. However, the findings of the study are contrary to a study by [56] who recorded a high level of attitude. This proves that the entrepreneurial career has succeeded in gaining favour among secondary school students in Malaysia. Positive confidence in one’s ability will further increase motivation to achieve a goal [57]. The findings of this study also show that while students already have confidence and believe in entrepreneurship, these factors are not sufficient enough for them to start a business. This matter needs to be taken into account because the findings of Mustapha [58], related to the aspirations of students’ entrepreneurial career found that attitude, specifically self-confidence, is a characteristic that influences the choice of entrepreneurial career among students. Therefore, his findings also support this study.

Next, the level of interest among religious secondary school students is moderately high (Mean = 3.64, SD = 0.57). This shows that the majority of secondary school students show commitment and intention to take the first step in venturing into the field of entrepreneurship. This finding is in line with the findings of a study on 91 students of commerce secondary schools in SMK Section 24 (C) which showed that the level of interest in entrepreneurial career behaviour is at a moderately high level [33,34]. This shows that students show interest in becoming entrepreneurs. At school level, knowledge and skills acquired can spark interest in entrepreneurship. However, the entrepreneurship education curriculum at form 4 and form 5 levels only covers 23 percent of the entire commerce syllabus [59]. Thus, it is assumed that the exposure received by the students is not enough to create a concrete sense of interest in entrepreneurship. Therefore, it is suggested that the intention of elective subjects such as Business should go through a certain filtering process such as only selecting students who are interested in becoming entrepreneurs. The use of social media regardless of age is able to positively expand the horizons of students' thinking [40] as well as successfully increase motivation and interest in entrepreneurship which ultimately make them choose entrepreneurship as a career. This is emphasised because interests and inclinations need to be cultivated so that the intention of entrepreneurial career can be nurtured and developed and finally, learning objectives can be achieved. Students with high interest are always striving and diligently improving their self-performance. Their satisfaction can only be achieved when they learn and understand entrepreneurship.

Next, the interpretation of the score shows that the level of teachers’ guidance in secondary schools is at a moderately high level that is (Mean = 3.70, SD = 0.63). This means that teachers need to always learn something so that their knowledge is always relevant to the current situation and needs. The findings of this study further
strengthen the results of previous studies where the education level of Commerce teachers is at a moderately high level [60]. Similarly, the findings of [61] explains that teachers play a role in influencing students' entrepreneurial careers. Meanwhile, the findings of a study by Zulfaka [62] provide better findings where it was shown that teachers' guidance on entrepreneurship is high. This finding is also in line with the study of Nor Aishah and Yap [47]. It proves that teachers have the ability and skills in the learning and teaching process for business subjects. Appropriate knowledge, skills and approaches possessed by teachers are very important to stimulate and attract students to ensure that the teaching and learning process is excellent. The results of this study also require teachers to master the strategies of diversifying teaching methods. Among the strategies proposed are problem-based learning, constructivism, discovery inquiry, decision making and project-based learning. In the process of building skills in critical thinking, problem solving among business students becomes easier. This could lead to more students understanding the concept of entrepreneurship and eventually choosing entrepreneurship as a career. According to a study by Abaho, Olomi & Urassa [63], entrepreneurship students’ most favourable methods include interacting with successful entrepreneurs, self-reading, handouts and presentation. Meanwhile, the most unfavourable method is playing business simulation games. Teachers need to use methods and approaches appropriate to students' abilities to stimulate and attract interest in learning [64]. Therefore, teachers need to constantly learn so that their knowledge is always relevant to the current situation and needs. Teachers also need to know how to manage classrooms and learn about student learning modes as well as appropriate teaching methodologies and technology used.

The domain of peers is at a moderately high level (Mean = 3.46, SD = 0.51). This shows that peers are able to influence an individual if they have the same interests and are able to work together and also motivate each other [65]. These findings further strengthen the findings of [65] towards 140 students who took the subject of Trade and Entrepreneurship. They reported that the level of peer influence was also moderately high. This finding is also in line with [65], where the level of peers influencing students' interest in the field of entrepreneurship was found to be at a moderate level. This means that peers play an important role in influencing a student's decision in choosing entrepreneurship as a career. Praise and appreciation from friends would give an individual self-confidence and strength to venture into the field of entrepreneurship. This benefits the students and encourages them to learn more diligently and persistently about entrepreneurship. Indirectly, students strive to improve their knowledge related to entrepreneurship when they have similar opinions with their peers about entrepreneurship, especially if they get good feedback and feel comfortable and secure working as an entrepreneur [66]. The findings of this study are similar to the findings of studies by [67,68].

The domain of entrepreneurial choice intention behaviour recorded a moderately high level (mean = 3.41, SD = 0.67). These findings show that most secondary school students have the potential to become entrepreneurs. They only need guidance and enhancements in nurturing their entrepreneurship skills as they are not yet able to generate and evaluate ideas that can be realised into a business opportunity [69]. This finding is supported by [11] who also stated that the level of entrepreneurial career intention behaviour is at a moderately high level. These findings illustrate that the average secondary school student has the intention, desire and inclination to venture into the field of entrepreneurship after graduation or during their university studies. This means that only entrepreneurship nurturing strategies need to be revised and improved. This finding is also supported by [44,59,70]. They are of the opinion that entrepreneurship involves cognitive operations as a result of interaction with the environment. Therefore, because time and certain situations can cause behavioural change and decrease in interest towards entrepreneurship, the entrepreneurial career intention behaviour of secondary school students needs to be further polished and nurtured from time to time so that the goal of producing many young entrepreneurs in Malaysia is achieved [71]. Schools, for example, need to hold various entrepreneurial activities to encourage students to start small businesses [72]. Students also need to be equipped with entrepreneurial knowledge and skills to start a business [73]. Thus, it is a challenge for a school to develop students’ potential as well as to motivate students to wisely identify the opportunities available and eventually choose entrepreneurship as a career in future.

<p>| Table 1. Level of attitude, interest, teachers’ guidance, peers and entrepreneurial career intention behaviour |
| --- | --- | --- | --- |</p>
<table>
<thead>
<tr>
<th>No</th>
<th>Domain</th>
<th>Mean Score</th>
<th>Standard Deviation</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Attitude</td>
<td>3.91</td>
<td>0.41</td>
<td>Moderately High</td>
</tr>
<tr>
<td>2</td>
<td>Interest</td>
<td>3.64</td>
<td>0.57</td>
<td>Moderately High</td>
</tr>
<tr>
<td>3</td>
<td>Teachers’ Guidance</td>
<td>3.70</td>
<td>0.63</td>
<td>Moderately High</td>
</tr>
<tr>
<td>4</td>
<td>Peers</td>
<td>3.46</td>
<td>0.51</td>
<td>Moderately High</td>
</tr>
<tr>
<td>5</td>
<td>Behaviour</td>
<td>3.41</td>
<td>0.67</td>
<td>Moderately High</td>
</tr>
</tbody>
</table>

Source: Output SPSS

4.1. Research Question 2

To what extent do attitude, interest, teachers’ guidance and peers influence the entrepreneurial career intention behaviour among secondary school students in the Sepang district?
A multiple regression analysis was used to answer the research questions and identify the influence of attitudes, interests, teaching of teachers and peers on entrepreneurial career intention behaviour. Several linear regression hypotheses such as variance equality test, normality test and collinearity were also conducted according to the recommendations by [74]. All these hypotheses are examined through a table of normal probability plots and distribution plots to ensure that the distribution of scores is normal and linear. This is to ensure that there is no violation of the prerequisites in the hypothesis that have been set.

The results of the analysis showed a significant variance value involving the attitudes, interests, teachers’ guidance and peers in predicting the entrepreneurial career intention of students that is $F = 135.35$, $p < 0.00$ as shown in Table 2. Table 3 describes the results of the multiple regression analysis for the variance value on entrepreneurial career intention behaviour related to the predictor domain which are attitude, interest, teaching of teachers and peers which is as much as 62.6 percent ($R^2 = 0.626$).

Table 4 shows the variables of interest, teachers’ guidance and peers which are the predictive variables of students’ entrepreneurial career intention ($p < 0.05$). Attitude does not influence the choice of entrepreneurial career ($p > 0.05$). Thus, to compare the influence of all these predictors, the value of $\beta$ in the Standard Coefficients is referred to. The findings of the analysis showed that interest has a greater influence which was 46.8 percent compared to the teaching of teachers (8.7 percent) and peers (36.1 percent). In this study, the domain of interest significantly influenced entrepreneurial career intention after influence from other variables in the model was controlled.

### Table 2. Variance analysis of attitude, interest, teachers’ guidance and peers

<table>
<thead>
<tr>
<th>Model</th>
<th>Total Squared</th>
<th>df</th>
<th>Mean Squared</th>
<th>$F$</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>91.361</td>
<td>4</td>
<td>22.840</td>
<td>135.348</td>
<td>.00</td>
</tr>
<tr>
<td></td>
<td>Residual</td>
<td>54.507</td>
<td>323</td>
<td>.169</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>145.868</td>
<td>327</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Predictor: Attitude, Interest, Teachers’ Guidance and Peers  
Dependent Variable: Behaviour of Entrepreneurial Career Intention

### Table 3. Summary of standard Regression Analysis Model

<table>
<thead>
<tr>
<th>Model</th>
<th>$R$</th>
<th>$R^2$</th>
<th>Adjusted $R^2$</th>
<th>Standard Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.791</td>
<td>0.626</td>
<td>0.622</td>
<td>0.41079</td>
</tr>
</tbody>
</table>

### Table 4. Standard regression analysis of attitudes, interest, teachers’ guidance and peers

<table>
<thead>
<tr>
<th>Predictor</th>
<th>$B$</th>
<th>Standard Error</th>
<th>$t$</th>
<th>Sig.</th>
<th>Beta</th>
<th>Influence Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude</td>
<td>-.016</td>
<td>.067</td>
<td>-.233</td>
<td>.816</td>
<td>-.010</td>
<td>1.0</td>
</tr>
<tr>
<td>Interest</td>
<td>.550</td>
<td>.059</td>
<td>9.405</td>
<td>.000</td>
<td>.468</td>
<td>46.8</td>
</tr>
<tr>
<td>Teachers’ Guidance</td>
<td>.092</td>
<td>.042</td>
<td>2.170</td>
<td>.031</td>
<td>.087</td>
<td>8.7</td>
</tr>
<tr>
<td>Peers</td>
<td>.468</td>
<td>.061</td>
<td>7.624</td>
<td>.000</td>
<td>.361</td>
<td>36.1</td>
</tr>
<tr>
<td>Constant variance</td>
<td>-.496</td>
<td>.237</td>
<td>-2.092</td>
<td>.037</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Dependent variable: Behaviour of Entrepreneurial Career Intention
Based on the multiple regression analysis above, it can be concluded that when the interest score increased per unit, the entrepreneurial career intention score increased by 0.468 units. The entrepreneurial career intention score increased by 0.087 units per unit increase of teachers’ guidance score. Meanwhile, the entrepreneurial career intention score increased by 0.361 units per unit increase of peer score. However, as the attitude score decreased, the entrepreneurial career intention behaviour score increased. Based on the statistical analysis above, a linear equation can be constructed i.e. entrepreneurial career intention behaviour:

\[
Y = -0.496 + (-0.016) X1 + 0.550 X2 + 0.92 X3 + 0.468 X4
\]

Where;

\begin{align*}
Y & = \text{Entrepreneurial Career Intention Behaviour} \\
X1 & = \text{Attitude} \\
X2 & = \text{Interest} \\
X3 & = \text{Teachers’ Guidance} \\
X4 & = \text{Peers} \\
\text{Constant} & = -0.496 \\
\text{Variable} & = -0.016
\end{align*}

This proves that interest (β = 0.468, p <0.05) is the best and most significant predictor compared to teachers’ guidance (β = 0.087, p <0.05) and peers (β = 0.361, p <0.05) with an overall \(R^2 = 0.662\). On the other hand, attitude (β = -0.010, p > 0.05) is not able to predict the entrepreneurial career intention behaviour of religious secondary school students in Sepang district, Selangor, Malaysia. This finding contradicts a study by [32]. In that study, it was found that entrepreneurial behaviour among community college students was largely influenced by attitude with a value of \(R^2 = 0.67\) (67 percent). Ravi’s [30] study also showed that attitude contributed a significant variant to entrepreneurship, i.e. 55.9 percent of influence towards entrepreneurial career intention behaviour. However, Fazlina [75] argues that attitude and interest are related to each other. Similarly, the findings of Iklima and Toh [76] found that MRSM students in Kuala Klawang, Negeri Sembilan, Malaysia have a high tendency towards entrepreneurship in terms of attitude and interest. Thus, a person’s attitude towards something can change because it is influenced by what the person is exposed to and not from heredity or nature [77]. Students are not interested in entrepreneurial behaviour when they perceive that entrepreneurship is difficult. However, in this study, it is found that interest is the biggest influence on entrepreneurship, so this advantage is expected to be used to influence and develop an individual’s attitude towards entrepreneurship even though attitude is relatively stable and difficult to change [78].

Research on the influence of interests, teachers’ guidance and peers as a factor of predictor to entrepreneurial career intention is quite limited. However, a study by [18] found that interest was a significant factor in influencing students’ entrepreneurial career intention with a value of 70.0 percent (\(R^2 = 0.70\)). However, in this study, it is found that interest has the biggest influence on entrepreneurship, so the advantage is expected to be used to influence and develop individual attitudes even though attitudes are relatively stable and difficult to change [78, 80]. In addition, teachers’ guidance has a value of (\(R^2 = 0.49\)) while peers have a value of (\(R^2 = 0.57\)). Studies related to the influence of peers towards the predictor of entrepreneurial factor are quite limited, but some studies can be used as a reference to identify the trend of peers acting as a predictor factor of entrepreneurial career intention among students.

5. Conclusions

This study strives to identify the level and influence of attitude, interest, teachers’ guidance and peers on entrepreneurial career intention behaviour among religious secondary school students in Sepang, Selangor, Malaysia. This study found that the level of attitude, interest, teachers’ guidance, peers and entrepreneurial career intention is at a moderately high level. These findings also explain that the domains of attitude, interest, teachers’ guidance and peers have a significant influence on entrepreneurial career intention behaviour among students. Even though attitude had the highest score, the attitude domain was only able to be the lowest predictor of entrepreneurial career intention behaviour. The domain of interest is the best predictor of entrepreneurial career intention behaviour among students compared to teachers’ guidance and peers. Attitude is not a good predictor for behaviour but it can change even though the process of change is quite complex and takes a long time.

The implication of this study is that it contributes to the applicability of the Theory of Planned Behaviour which explains that attitude, interest, teachers’ guidance and peers act as predictors and affect the entrepreneurial career intention behaviour among students. These different domains contribute 62.6 percent to the overall model of this theory. Therefore, in practice, schools need to continue carrying out entrepreneurship programmes on a wider scale by involving the participation of successful local entrepreneurs as motivators for students to become entrepreneurs.

Overall, secondary school students were found to possess entrepreneurial behaviours. However, they need to be exposed to a variety of appropriate skills, knowledge and methods related to entrepreneurship education so that they can develop entrepreneurial thinking and attributes. It is hoped that quality entrepreneurship education as a result of effective and efficient guidance from teachers and positive peer influence can produce competent and courageous students with high leadership skills who can face and overcome the challenges of the business world.
Acknowledgements

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The Level of Special Education Teachers' Technological Pedagogy and Content Knowledge, Teaching Style, Self-efficacy and Competency

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Abstract
Teachers play an essential role in implementing the ultimate goal of education by producing insightful human capital in line with the goals of the Pelan Pembangunan Pendidikan Malaysia (PPPM) 2013-2025. This effort is also the main responsibility of special education teachers in improving a learning process that satisfies the specific necessities of special needs students. Special education teachers require to furnish themselves with a wide assortment of knowledge and skills so that quality education can be applied to students with special needs. Therefore, this study investigates the level of technological pedagogy and content knowledge, teaching style, self-efficacy and competency among special education teachers. This research employs a quantitative approach applying the survey method. In this research, 229 special education teachers from vocational schools are involved as a sample. The collected data were analysed, adopting the SPSS application to get the mean and standard deviation. The results confirm that the technological pedagogy and content knowledge (mean = 4.96), teaching style (mean = 5.44), self-efficacy (mean = 6.92) and competency (4.12) are at high level. This study carries positive impacts on teachers’ task in enhancing the quality of their teaching profession.

Keywords Technological Pedagogy and Content Knowledge, Teaching Style, Self-efficacy, Competency, Special Education Teacher

1. Introduction
Education is an important element in the development of countries and nations. The country’s education system is intended to produce quality citizens and to fulfill the country’s goals. Advances in the educational system are continually growing and necessary as there are differences and demands at the national level and swift growth globally [39]. Influence of changes that will discursively impact student accomplishment, especially at school level and this involves special needs students. Consequently, the government has presented education in a manner to provide the needs of the students in line with the expansion of education at the national level. The curriculum is designed not only to produce knowledgeable citizens but also skillful in various fields. Ministry of Education (MOE) provides the vocational education curriculum for special needs students as they have the physical capacity to be trained in order to practice the skills acquired after graduation [17]. Trained teachers are required to actualize government goals. Besides, teachers must also have the confidence to keep up with the developments in the national education system. Teachers who teach special needs students in schools, especially in vocational education schools have to furnish themselves with a wide array of knowledge and
skills. They should be well-versed of the technological pedagogy and content knowledge, teaching style, self-efficacy and competency as planned in the Standard Kualiti Pendidikan Malaysia Gelombang 2 (SKPMg2)[18].

Additionally, they need to possess the knowledge and skills in the subjects taught, even the teachers need to know about the special needs students themselves and the necessary learning support [29]. Teachers’ mastery in integrating technological pedagogy and content knowledge is necessary because teachers are accountable for the learning activities of special needs students in schools. However, despite the emphasis on the important given to special education teachers, it is found that there are various problems still exist. Among them are teachers who teach special needs students found lacking confidence to diversify teaching styles, lack of knowledge in terms of pedagogy and content, difficulty in integrating the use of technology in teaching and less prepared to teach the students according to their disability which cause teachers’ competency unsatisfaction [7, 8, 33, 36]. This issue clarifies the importance of content pedagogical technology knowledge, teaching style and self-efficacy as well as teacher competency.

Previous studies reveal that special education teachers are less skilled in the adoption of technology in teaching which becomes less attractive and boring [8, 34]. Teachers’ knowledge in technology, pedagogy and content is important to integrate into special education so that the potential of special needs students can be improved and facilitate them to become independent [19]. Teachers need to equip themselves with technology-related knowledge so that these components can be combined with pedagogy and content when teaching. Rather than that, teachers’ teaching style is also one of the elements that need to be considered so that effective teaching can be presented to students. Teachers are found to be less aware of the teaching objectives provided because they do not take into account the special needs students’ ability [33]. Teachers must change their teaching styles if they notice special needs students are starting to lose focus and become stultify [12] during the teaching and learning process. Teachers need to diversify their teaching styles according to the needs and abilities of the special needs students so that the teaching environment is more enjoyable and active learning can be created.

Self-efficacy also plays a vital role because teachers’ personal beliefs can positively impact students’ achievement, especially special needs students. Teachers with low self-efficacy are incapable of presenting quality education in special education [7]. Conversely, if teachers have positive self-efficacy, teachers can offer better teaching strategies [15, 27] and engage special needs students in learning with more effective [24]. High self-efficacy of teachers can promote special needs students’ eagerness to learn more. The same observation applies to competency that is being the principal pillar of the teaching profession. Teachers with less competency will negatively impact the social, emotional and behavioral of special needs students [36]. If teachers are highly competency, an excellent social relationship between teachers and students can be built [3]. Teachers need great levels of academic and professional skills so that special needs students can master new knowledge and practice it after school.

Ergo, research on the level of technological pedagogy and content knowledge, teaching style, self-efficacy and competency among special education teachers are explored. Four research questions were developed:

1. What is the level of technological pedagogy and content knowledge among teachers in vocational special education?
2. What is the level of teaching style among teachers in vocational special education?
3. What is the level of self-efficacy among teachers in vocational special education?
4. What is the level of competency among teachers in vocational special education?

2. Methods

The survey was done at a vocational special education secondary schools in Malaysia. The study sample (N = 229) was selected as the sample for this study. Sample selection is based on proportionate strata random sampling followed by simple random sampling for each school sub-sample. The sample selection is also based on criteria that only teachers who teach in vocational special education schools including academic and technical subjects are involved except administrators.

There were four research instruments applied and adapted in this study. The instruments are Technological Pedagogy and Content Knowledge [23], Grasha Teaching Style [10], Teacher Sense of Efficacy Scale (TSES) [1] and SKPMg2 [18]. This survey includes five parts. Part A is Respondent’s Personal Profile Information with eight items. Part B is Technological Pedagogy and Content Knowledge with four subconstructs. The answer choices for each item were based on a five-point Likert scale, which strongly disagrees to strongly agree. Part C is a Teaching Style with five subconstructs. The answer choices for each item were based on a seven-point Likert scale, which strongly disagrees to strongly agree. Part D is Self-Efficacy with three subconstructs. The answer options for each item were based on a nine-point Likert scale, which is not very confident to very confident. Part E is Competency with five subconstructs. The answer choices for each item were based on a five-point Likert scale, which is not very confident to very confident.
3. Data Analysis

3.1. Paper Title

Questionnaire responses were analysed using the Statistical Packages for the Social Sciences (SPSS) version 23.0. Descriptive statistics of mean and standard deviation were applied to analyse the results of this study. To define the level of each variable, mean values were categorized according to varying mean scores per section, as shown in tables 1 to 3.

<table>
<thead>
<tr>
<th>Subconstructs</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Interpretations Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technological Pedagogy Knowledge</td>
<td>3.93</td>
<td>0.482</td>
<td>High</td>
</tr>
<tr>
<td>Technological Content Knowledge</td>
<td>3.88</td>
<td>0.497</td>
<td>High</td>
</tr>
<tr>
<td>Pedagogical Content Knowledge</td>
<td>4.03</td>
<td>0.476</td>
<td>High</td>
</tr>
<tr>
<td>Technological Pedagogy Content Knowledge</td>
<td>3.94</td>
<td>0.504</td>
<td>High</td>
</tr>
</tbody>
</table>

4. Results

The results of this study are based on the research questions to study the level of technological pedagogy and content knowledge, teaching style, self-efficacy and competency of vocational special education teachers.

4.1. Level of Technological Pedagogy and Content Knowledge

Table 4 shows the mean scores for the level of the technological pedagogy and content knowledge of vocational special education teachers. Generally, it was discovered that the level of technological pedagogy and content knowledge was high (mean=3.96, sd=.340). The technological pedagogy knowledge sub construct had a mean of 3.93 with a standard deviation of .482 while the subconstruct of technological content knowledge had a mean of 3.88 with a standard deviation of .497. The pedagogical content knowledge subconstruct had a mean of 4.03 with a standard deviation of .476 while the sub construct of technological pedagogy content knowledge has a mean of 3.94 with a standard deviation of .504. From the findings, teachers’ level of knowledge was found to be higher in pedagogical content knowledge comparison to other subconstructs. This outcome signifies that teachers in vocational special education have good knowledge of technology, pedagogy and content.

<table>
<thead>
<tr>
<th>Subconstructs</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Interpretations Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expert</td>
<td>5.40</td>
<td>0.764</td>
<td>High</td>
</tr>
<tr>
<td>Formal Authority</td>
<td>5.44</td>
<td>0.799</td>
<td>High</td>
</tr>
<tr>
<td>Personal Model</td>
<td>5.48</td>
<td>0.734</td>
<td>High</td>
</tr>
<tr>
<td>Facilitator</td>
<td>5.51</td>
<td>0.733</td>
<td>High</td>
</tr>
<tr>
<td>Delegator</td>
<td>5.37</td>
<td>0.764</td>
<td>High</td>
</tr>
</tbody>
</table>

Table 5 presents the mean scores for the teaching style of teachers in vocational special education. Overall it was found that the level of teaching style was high for all teaching styles (mean=5.44, sd=.657). The subconstruct of expert had a mean of 5.40 with a standard deviation of .764 while an authority formal subconstruct had a mean of 5.44 with a standard deviation of .799. The subconstruct of personal model had a mean of 5.48 with a standard deviation of .734 while the facilitator subconstruct had a mean of 5.51 with a standard deviation of .733. The subconstruct of delegator had a mean of 5.37 with a standard deviation of .764. Based on the results, the level of facilitator teaching style is found to be higher than other teaching styles. It points out that teachers in vocational special education specialize in teaching using...
variety of teaching styles.

4.3. Level of Self-efficacy

Table 6. Level of self-efficacy

<table>
<thead>
<tr>
<th>Subconstructs</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Interpretations Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student Engagement</td>
<td>6.83</td>
<td>1.023</td>
<td>High</td>
</tr>
<tr>
<td>Instructional Strategies</td>
<td>6.92</td>
<td>1.050</td>
<td>High</td>
</tr>
<tr>
<td>Classroom Management</td>
<td>7.02</td>
<td>1.048</td>
<td>High</td>
</tr>
</tbody>
</table>

Table 6 displays the mean scores for the self-efficacy level of teachers in special vocational education. Overall, teachers’ self-efficacy was found to be high for all the subconstructs (mean=6.92, sd=0.974). The student engagement subconstruct had a mean of 6.83 with a standard deviation of 1.023 while the subconstruct of instructional strategies had a mean of 6.92 with a standard deviation of 1.05. The classroom management subconstruct had a mean of 7.02 with a standard deviation of 1.048. From the data obtained, the effectiveness of teachers in vocational special education is higher in the classroom management aspect.

4.4. Level of Competency

Table 7. Level of competency

<table>
<thead>
<tr>
<th>Subconstructs</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Interpretations Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher as Planner</td>
<td>4.09</td>
<td>0.559</td>
<td>High</td>
</tr>
<tr>
<td>Teacher as Adviser</td>
<td>4.12</td>
<td>0.507</td>
<td>High</td>
</tr>
<tr>
<td>Teacher as Adviser</td>
<td>4.15</td>
<td>0.514</td>
<td>High</td>
</tr>
<tr>
<td>Teacher as Assessor</td>
<td>4.10</td>
<td>0.537</td>
<td>High</td>
</tr>
<tr>
<td>Teacher as Motivator</td>
<td>4.13</td>
<td>0.573</td>
<td>High</td>
</tr>
</tbody>
</table>

Table 7 exposes the mean scores for competency levels of teachers in vocational special education. Generally, teacher competency was found to be high (mean=4.12, sd=0.468). The subconstruct as a planner had a mean of 4.09 with a standard deviation of .559 while the subconstruct as a controller had a mean of 4.12 with a standard deviation of .507. The subconstruct as an adviser had a mean of 4.15 with a standard deviation of .514 while the subconstruct as an assessor had a mean of 4.10 with a standard deviation of .537. The subconstruct as a motivator had a mean of 4.13 with a standard deviation of .573. From the findings, the level of competency of teachers in vocational special education is higher in terms of teachers as adviser in comparison to other constructs.

5. Discussion

The teaching profession is a significant concern that every teacher should take into account. Teachers need to have in-depth knowledge in various aspects so that appropriate teaching can be carried out according to the abilities of students. Technological pedagogy and content knowledge is one of the components that should be incorporated into the daily teaching of all teachers. The findings show that special education teachers have a high level of technological pedagogy and content knowledge. All subconstructs namely technological pedagogy knowledge, technological content knowledge, pedagogical content knowledge and technological pedagogy content knowledge are also high. Subconstruct of pedagogical content knowledge is found to be in the highest rank than other subconstructs. These teachers have extensive knowledge in selecting information technology, hardware and teaching using technological pedagogy and content knowledge in their daily teaching. Teachers are also found to be able to use this technological pedagogy and content knowledge approach to meet the specific needs of students.

The outcomes of this study are parallel with previous research decisions such as [4, 5] which present that teachers’ technological pedagogy and content knowledge is at a high level. The findings of the study by [5] found that teachers are proficient in the use of technology and can apply technology-based teaching in the teaching and learning process. Likewise, a study by [4] found that pedagogical content knowledge subconstructs were an element that teachers had mastered better compared to other subconstructs. References [4] also found that special education teachers who teach special needs students have mastered knowledge that covers technology, pedagogy and content. These studies have found that teachers use technology elements in their teaching as well as knowledge of computer hardware and devices.

In conclusion, it is found that teachers who teach special needs students have good technological pedagogy and content knowledge and are able to apply these elements in their teaching. The findings of this study support the study of [9] which emphasizes the importance of knowledge elements that include technology, pedagogy and content among teachers. Based on the research, technological pedagogy and content knowledge is one of the key elements in the development of teacher professionalism in terms of knowledge, understanding and skills. The study also found that teachers use a lot of knowledge in technological pedagogy, technological content, pedagogical content as well as technological pedagogy content in teaching. The combination of these elements will make teachers more attentive and take into account factors that will help students with special needs to learn more enthusiastically. However, aspects of technological content knowledge need to be taken into account as this subconstruct is found to be at a least rank.

Therefore, to address these shortcomings, teachers need to broaden their knowledge and understanding of the use
of technology with appropriate teaching tools. Moreover, they need to select technologies that can be used to enhance the understanding of the subjects being taught. In addition, teachers also need to use technology more frequently in teaching so that the practical knowledge helps to provide excellence in teaching and quality education to the students. The findings of this study are in line with the recommendations of [21] that emphasize the integration of information and communication technologies. This interest led [21] to add an important component of technology to pedagogical content knowledge, which led to the development of Technological Pedagogy and Content Knowledge Model. Therefore, the findings of this study prove that teachers who teach students with special needs also emphasize knowledge that includes elements of technology, pedagogy and content.

Next is the teaching style factor that special education teachers need to master as one of the elements required in the development of their professionalism. The teaching style of the teacher here is more on the pattern of teaching or behavior that the teacher promotes during the teaching session. Even this aspect of teaching style comes naturally from the teacher itself and it is difficult to change. The results show that the teaching style of special education teachers who are teaching special needs students is at a high level. In fact, each of the subconstructs namely expert, formal authority, personel model, facilitator and delegator are also at the high level. The teaching style of facilitator was found to be in the highest rank than other subconstructs. These teachers were found to be more likely to use facilitator teaching style and personel model teaching style than other teaching styles. Teachers are also found to be able to respond in their own way of teaching when students need help and set specific criteria to guide students so that they can achieve the appropriate knowledge throughout their learning. Teachers also provide opportunities for students to actively participate in learning sessions.

For the teaching style, the findings are similar to the study by [2, 11] who found that the teaching style of teachers who teach special needs students is at a high level. Similarly, the findings of [30] found that subconstruct of delegator teaching style was at a least rank than other subconstructs. However, the findings of the study by [25] stated that the level of teachers teaching style was in lowest rank for the personel model and facilitator subconstructs, which was the highest subconstruct in this study. Similarly, a study by [22] found that the teaching style of expert, personel model and facilitator was at the average level while the formal authority teaching style was at a low level. The findings of this study showed that every teacher has their own teaching style and teachers present that style in their own style.

The summary found that teachers who teach students with special needs are able to present a creative and variety of teaching styles. The findings of this study support the study of [2, 11] that discusses the importance of teaching style elements among teachers and students. According to their research, teaching style is an important element in the development of teacher professionalism in terms of values and skills. This aspect is similar to this study where the teaching style is at a high level because teachers can adapt the teaching style to the specific needs of students. In fact, the study also found that various teaching styles such as expert, formal authority, personel model, facilitator and delegator can attract students to give their full attention to the process of teaching and learning. This is due to the variety of teaching styles that can influence students' academic and psychological learning performance when teachers use their favourite teaching styles. However, the element of teaching style of the delegator should be noted as this subconstruct is found to be at the lowest rank.

Therefore, to overcome this problem, teachers need to use the delegator's teaching style more effectively so that students do not rely solely on the teacher instead of trying to do the assigned tasks with minimal supervision. In addition, teachers need to be consulted only when needed and teachers need to provide the opportunity for students to act on their decision making for more flexible learning. The findings of this study are in line with [10] model which argues that each teacher has his or her own style of teaching with varying degrees of ability. In fact, according to [10], this style of teaching has its own essence and purpose that will help to increase students focus and attention. Therefore, the findings of this study support [10] finding that special education teachers who teach special needs students to practice different teaching styles according to the personal characteristics of the teachers as well as their potential.

In addition, self-efficacy is also one of the factors that help teachers improve their self-confidence in facing various challenges in education. Teacher self-efficacy means teachers' personal beliefs about what can be controlled and implemented in daily life. When a teacher has high self-efficacy then the teacher can perform whatever task he or she is assigned successfully. Teacher with high self-efficacy is able to diversify teaching styles according to the abilities of students [6]. Findings on the self-efficacy of teachers who teach special needs students are at high level. The findings show that the three subconstructs of self-efficacy namely student engagement, instructional strategies and classroom management are also at high level. The classroom management subconstruct is ranked highest compared to other subconstructs. This shows that the ability of teachers in managing special needs students’ classes is excellent. Although this class is made up of various categories of students, teachers are able to control students’ behaviour and ensure that there is appropriate classroom management for all categories. At the same time, teachers
can also predict students' behaviour that may disrupt other students or the teaching process and take appropriate steps by equipping themselves with positive self-efficacy or self-confidence.

References by [3, 20] found that high levels of teacher self-efficacy actually had a strong impact on special needs students' stance. The findings of this study are parallel with their findings where the level of teacher self-efficacy is at a very high level. Teachers' high self-efficacy is required to diminish the weaknesses when teaching special needs students [24, 37]. Self-efficacy represents a vital position in every teacher because his/her confidence can grant an engaging learning atmosphere. The study by [14] is consistent with the results of this study which have high mean values for all subconstructs. However, the study found that subconstruct of instructional strategies had the highest rank compared to other subconstructs. Similarly, a study by [31] found that subconstructs of classroom management and student engagement had a high level. However, [31] study found that subconstruct of instructional strategies had a moderate level. Although the findings showed that each subconstruct has different levels but the findings showed that these teachers had positive self-efficacy.

In conclusion, it was found that these teachers had good self-efficacy and were able to present the features needed in teaching to the special needs of students. The findings of this study supported the study of [3] who emphasized the importance of self-efficacy elements among teachers. According to their research, self-efficacy is an important element in the development of teacher professionalism in terms of practice and values. This aspect is in line with this study, where the effectiveness of teachers is high because teachers can modify their teaching to the students' abilities. Even teachers teach by taking into account aspects such as student engagement, using a variety of instructional strategies and managing the classroom as best they can. However, the aspect of student engagement is to be taken in account because the level of the subconstruct is found to be in the least rank than other subconstruct. Teachers need to be more aware of their students' abilities and so that a learning environment that engages all students can be created.

This is important on dealing with students who have problems in learning and for helping students to actively engage throughout the lesson. Teachers can also foster student creativity especially among less motivated students and help enhance students understanding of what they are learning. The findings of this study are in line with the recommendations of [35] who developed the Self-Efficacy Model based on the importance of teachers' positive attitude or behavior in performing any given task. Even the Model of Self-Efficacy by [35] also considers teachers' abilities in what teachers can do with confidence. Therefore, the findings of this study prove that teachers who teach students with special needs have a high degree of self-efficacy which is high confidence in themselves.

Next is a factor of competency that encompasses the values of professionalism, knowledge, understanding and skills. These elements are needed to produce a teacher who is able to overcome any challenges and obstacles in education with a positive attitude [28]. Findings on the factors of competency of education teachers who teach special needs students are found to be as high as other constructs. All the five subconstructs which were teacher as planner, controller, adviser, assessor and motivator. The subconstruct teacher as adviser is ranked highest compared to other subconstructs. These teachers are found to have a character as adviser than other characters. In fact, teachers are more likely to be able to teach and assist students in their teaching. Teachers are also more concerned with giving praise, words of encouragement and stimulating the minds and abilities of students to deepen the lessons taught.

Reference [2] emphasizes the importance of the element of competency among teachers. According to their research, competency does not only need attention in regards to the development of professionalism but also on ways in which a teacher should emphasize and assess the skills. This aspect is similar to this study where the level of teacher competency is very high as teachers can implement and evaluate teaching in the capacity special needs students. Studies by [13] also found that all subconstructs of this competency were at a high level. In fact, the findings of the study are in line with the findings of this study for the subconstructs as adviser and motivators which are at highest rank than the other subconstructs. In addition, the findings of the study by [38] also found that competency of teachers was at a high level for the entire subconstructs. The study by [38] stated that subconstruct teacher as controller is at first ranked while subconstruct as assessor at the second ranked. The findings of this past study showed that teachers have good and high competencies that assist them in improving their teaching profession.

The conclusion is that these teachers have good competencies and are able to apply the features needed to improve their quality of teaching. The findings of this study support the study of [2] which emphasizes the importance of the element of competency among teachers. According to the research, competency not only needs to be given attention in terms of the development of professionalism but also how a teacher should practice and evaluate a skill. This aspect is in line with this study where the level of teacher competency is at a high level because teachers can implement and evaluate teaching according to student ability.

However, the characteristics of teachers as planner need to be taken as the subconstruct is found to be at the lowest rank. Teachers as planner is important because teachers begin each lesson by preparing the lesson plans every day. The importance of this character should be take into
account so that teachers can prepare good teaching materials for the students. The findings of this study are also in line with [32] Iceberg Model that emphasizes the elements of competency needed to achieve positive professionalism. In fact, the Iceberg Model [32] highlights the elements of skill, knowledge and personal values that a person must attain in order to succeed. In line with the recommendations of [32], the findings of this study also prove that special education teachers actually have a high degree of competency in themselves.

6. Conclusions

Overall, the research carried out among vocational special education school teachers is at a great level for all the variables. Teachers are perceived to be aware of their respective responsibilities in reaching the significant aims of their teaching profession. Teachers need to keep striving for knowledge in all phases of academics and skills. Therefore, teachers need to be more conscious of the types and specifications of courses needed to keep up with the current momentum.

This study can be referred by disparate parties, especially policy practitioners, informing the implementation of vocational education for special needs students and the teachers. The elements of technological pedagogy and content knowledge, teaching style, self-efficacy and competency need to be highlighted in outlining a guide that will serve as reference material for teachers. Also, the findings present powerful implications for teachers who teach special needs students so that a quality education system can be provided to them. The findings of this study have practical implications for MOE and school administrators. The results of the study found that technological pedagogy and content knowledge, teaching style, self-efficacy and competence contribute to teachers’ excellence as enshrined in SKPMg2 [18]. MOE and school administrators need to take these factors into account when assessing teachers’ capabilities and abilities towards improving teachers’ professionalism. Implementation of quality vocational education needs to be practiced in daily teaching so that skillful and knowledgeable special needs students can be produced. The findings also highlight how the teaching profession can be enhanced in a better way. Teachers need to be more responsible towards their duties as an ideal teacher so that their services are optimized by everyone, including special needs students, parents, schools, community and the country.

As a suggestion for further research, studies related to technological pedagogy and content knowledge, teaching style, self-efficacy and competency of vocational special education school teachers could be expanded by looking at perspectives of educational options, gender and teaching experience. The dominant factors and the influence on the teaching profession can also be analyzed.

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Headmasters' Instructional Leadership and Its Relationship with Teachers Performance

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Abstract  The Ministry of Education’s continuous effort in ensuring the success of education transformation requires the commitment of headmasters with instructional leadership qualities and high performing teachers. The role of instructional leadership is vital and can be a determinant of excellence and achievement of the desired education. There were three objectives of this study: (1) to identify the level of instructional leadership practice by the headmaster; (2) to identify the level of performance of the teachers; and (3) to identify the relationship between the level of instructional leadership practice and teacher performance. This study is a descriptive research using survey design involving 92 teachers of a National Primary School (Tamil) (SJKT) in Jasin, Melaka, Malaysia. The instrument was a questionnaire on teacher leadership instructional styles and teacher performance. Descriptive statistics (frequency) and inference statistics (Spearman's correlation test) have been used to answer the objectives of this study. The result showed that the level of instructional leadership of the headmasters and the level of performance of the teachers were high and there was a significant relationship between the headmaster instructional leadership practice and the performance of the teachers. Based on the findings of the study, it is proposed that the Ministry of Education Malaysian periodically and continuously conduct leadership training for all headmasters including SRJKT to improve the performance of teachers.

Keywords  Instructional Leadership, Headmaster, Teacher Performance, Vernacular Schools

1. Introduction

Several changes have been made by the Ministry of Education Malaysia throughout Malaysia Educational Development Plan 2013-2025 to meet the global educational standard beyond 2020 [1]. To accomplish it, the leadership role played by the headmasters is very important in ensuring the effective management of the schools [2][3][4]. The Malaysian Educational Development Plan 2013-2025 has been formulated to ensure the successful implementation of the education system transformation.

The foundation of leadership in the school is based on instructional because teaching and learning is the main essence in determining student excellence. The Malaysian Ministry of Education has emphasized that instructional leadership plays a role in the development of teacher performance as well as planning, coordinating and evaluating teaching and learning activities in schools [1]. In this study Instructional Leadership is based on the Hallinger and Murphy Instructional Leadership Model [5]. According to [5], Instructional Leadership consists of three main aspects, namely defining school missions, managing instructional programs and creating a positive school climate.

Teacher performance refers to the actions, behaviors of work that can be measured or produced by teachers as well as relevant and contribute to the achievement of school or organizational goals. [6][7][8] found out that work motivation, salary, seriousness of work, knowledge,
leadership and responsibilities, opportunities to pursue higher education, job satisfaction and the environment as factors that influence the performance of teachers. According to Buluyos et al. (2019), work performance is observed from the teacher’s commitment to attend duty, compliance with school rules, work spirit, compilation of work at specified time and relationship with colleagues. In this study, teacher performance is based on the Work Performance Hierarchy Model by Campbell [9]. According to this model, teacher performance is determined based on declaration knowledge, knowledge of procedures and skills as well as motivation.

High-performing schools are significantly influenced by great leadership. Various leadership approaches can be practiced in schools according to the suitability and abilities of the leader [10][11][12]. Instructional leadership is appropriately practiced by school leaders towards bringing school excellence through educational change and innovation. In this regard, teacher performance is one of the dimensions that need to be considered towards building an excellent school [13]. Therefore, schools need to have leaders who practice instructional leadership. There are many past studies that have found that there is a relationship between instructional leadership and teacher performance. A study by [14] found that Headmasters who practice instructional leadership become agents of change and create a conducive school environment that has a positive impact on teacher performance and student achievement. The role of instructional leadership can also enhance the teachers' functional competency [15]. Instructional leadership has a significant impact on student academic achievement and teacher performance [16][17][18][19].

In reality, principals or headmasters are less effective at guiding teachers and sharing school goals [20]. Less clear goals make it difficult for teachers to share and achieve. In this regard, [11] asserts that clear goals can help school leaders ensure the effectiveness of the teaching and learning process by teachers. While [21] explained that school excellence depends on its leaders who share goals with teachers. A study by [22] found that school performance problems are due to weaknesses in leadership practices and lack of focus on curriculum management. Further research by [23] revealed that there are still many school headmasters in rural or small schools who are less proactive, less creative, less innovative, often lose focus as curriculum managers. Rapid changes in the field of education and the increasing workload have had implications for teachers' work performance. In relation to this, teachers actually expect guidance, support, help, encouragement and constructive advice from the headmaster. However, due to the busy factor with other tasks, the headmaster did not have time to discuss and communicate effectively with teachers related to teaching [24]. According to [25], the principal’s supervision was strongly influenced by the ability of the principal to regulate the time and busyness of the work and the readiness of the teacher to be supervised.

This study contributes to the understanding of the relationship between headmaster instructional leadership and teachers’ performance in the context of Tamil vernacular schools in Malaysia. Previous study by [26] only examines level of headmaster leadership in small schools, which includes Tamil National type school (SRJKT).

The objectives of this study are: (1) to identify the level of instructional leadership of headmasters; (2) to identify the level of teachers’ work performance; and (3) the relationship between the level of instructional leadership of headmasters and the level of teachers’ work performance.

2. Methodology

This is a quantitative study using survey methodology. The data were collected through a questionnaire on headmaster leadership instructional practices and their effect on teachers’ work performance at SJKT at Jasin, Melaka.

SRJKT in Jasin district, Melaka was selected as the study location. SRJKT is one of the various types of government primary schools in Malaysia. The justification for this selection is based on the size of SRJKT is small and related to this, a study by [23] found that the performance of most small schools was low due to leadership weaknesses. Meanwhile, Jasin District was chosen because of its position in the State of Melaka which is a developed state in Malaysia. Its position in developed countries, the SRJKT should always show high performance.

The population of this study was teachers in 8 SJKTs located in Jasin district, Melaka, Malaysia. Based on the sample size determination of [27], a total of 92 respondents were selected from the total population of 120 teachers. The sampling technique used is a simple random sampling where sample selection is done based on random number tables. With the assistance and permission from school administration, questionnaires were administered and distributed to oddly numbered teachers based on the list of SRJKT teachers involved. They were given a week to answer and after a week I came back to collect questionnaires from the teachers.

The data obtained from the questionnaire were analysed using the Statistical Package for the Social Sciences (SPSS) version 22. The use of mean value is a widely used method to describe the responses of all participants to the item in an instrument [28]. Statistics used are descriptive statistics of frequency, mean and percent to identify the level of instructional leadership among the headmaster and the level of teacher performance in SJKT around Jasin. While Spearman's correlation test (inference analysis) has been used to identify the relationship between the instructional leadership of the headmasters and the performance of
teachers in SJKT. A pilot study was conducted at an SRJKT in the Central Melaka District where a total of 30 teachers were randomly selected as respondents. The implementation of the pilot study is to test the level of reliability and validity of the constructs in the research instrument so that the data collected from the actual study can be trusted.

Prior to the pilot study, the validity of the questionnaire content was obtained from the review and approval of the instrument expert. Slight modification of the questionnaire items was done based on expert suggestions and comments. Information from the pilot study was analyzed using Statistical Package for Social Sciences version 16. Data were checked for validity and reliability using Cronbach Alpha. The value of the Cronbach Alpha coefficient for headmaster instructional leadership practice instruments as a whole is high at 0.972. Similarly, the Cronbach Alpha coefficient for the teacher performance instrument as a whole is high at 0.959. There were three items that were improved upon when item correlation values were identified as less than 0.6.

The research instrument used in this study is a questionnaire based on the Instructional Leadership Model element by [5] and [29]. This questionnaire consists of Part 1: general information (demographics), Part 2 (Instructional Leadership Practice): i. Creating school goals, ii. Delivering school goals, iii. Supervising and evaluating teaching, iv. Monitoring student progress, v. Protecting instructional time and vi. Promoting professional development. Meanwhile Part 3 (Teacher Work Performance) is made of the following aspects: i. Declaration knowledge, ii. Procedural knowledge and skills, and iii. Motivation.

3. Results & Discussion

The findings of the study analysis show that the level of instructional leadership of the headmaster at Jasin District SJKT is at a high level overall with mean value of 4.52 and the standard deviation is 0.35 (Table 1). For the performance level of teachers, the overall mean value was at a high level of 4.53 and the standard deviation (sd) was 0.43. The strength level of the correlation coefficient value is based on [30].

3.1. Instructional Leadership Level

Result of the first objective is summarised in the following table.

<table>
<thead>
<tr>
<th>Instructional Leadership Dimension</th>
<th>N</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Mean Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developing school goal</td>
<td>92</td>
<td>4.5500</td>
<td>.0829</td>
<td>High</td>
</tr>
<tr>
<td>Delivering school goals Supervise and evaluate teaching</td>
<td>92</td>
<td>4.5391</td>
<td>.1376</td>
<td>High</td>
</tr>
<tr>
<td>Supervise and evaluate teaching</td>
<td>92</td>
<td>4.4848</td>
<td>.4989</td>
<td>High</td>
</tr>
<tr>
<td>Monitor student progress</td>
<td>92</td>
<td>4.4522</td>
<td>.9514</td>
<td>High</td>
</tr>
<tr>
<td>Protecting instructional time</td>
<td>92</td>
<td>4.5304</td>
<td>.7573</td>
<td>High</td>
</tr>
<tr>
<td>Encourage professional development</td>
<td>92</td>
<td>4.5891</td>
<td>.3208</td>
<td>High</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>4.5243</td>
<td>.35457</td>
<td>HIGH</td>
</tr>
</tbody>
</table>

The findings of the study analysis show the level of instructional leadership of the headmaster at Jasin District SJKT, in six dimensions based on [5]. Overall, all six dimensions have a very high mean value (Table 2). Among them, the dimensions of promoting professional development are very high (mean = 4.59, sd = 0.43). This shows that the headmaster plays an important role in the development of professionalism of his teachers. The dimensions devise school goals are the second highest (mean = 4.55, sd = 0.41). While delivering school goals is the third highest dimension (mean = 4.54, sd = 0.41).
3.2. Teacher Work Performance

Table 3 shows the level of teacher’s work performance in three elements consisting of declaration knowledge, procedural knowledge and skills, and motivation. Among them, the declaration knowledge shows a high mean (min = 4.53, sp =.46). This datum explains that the knowledge on how to perform an assignment greatly influences teachers in improving their work performance.

<table>
<thead>
<tr>
<th></th>
<th>Declarative Knowledge</th>
<th>Procedure &amp; Skills Knowledge</th>
<th>Motivation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>92</td>
<td>92</td>
<td>92</td>
</tr>
<tr>
<td>Missing</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Mean</td>
<td>4.5348</td>
<td>4.5283</td>
<td>4.5304</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>.46230</td>
<td>.48772</td>
<td>.51221</td>
</tr>
</tbody>
</table>

3.3. Relationship between Level of Instructional Leadership and Level of Work Performance

Spearman's correlation test results show the relationship between instructional leadership practice and teacher work performance (Table 4). The results of the correlation analysis showed a strong correlation between instructional leadership and teacher work performance ($r = .76$, $p < .01$)

It is found that instructional leadership element of encouraging professional development has a strong influence on the work performance of teachers. The results of this analysis suggest that the instructional leadership of the headmaster is a key factor in improving the performance of teachers in their organizations. The headmaster who encourages professional development of teachers not only guides teachers to a high level of professionalism but directly develops the overall work performance of teachers.

The findings show that there is a significant relationship between the instructional leadership of headmaster and the work performance of teachers in SJKT Jasin District, Melaka. This means that the instructional leadership of the headmaster greatly influences the work performance of the teacher without distinguishing between gender, age, teaching experience and grade of post. Based on the results of the study, it was found that the headmasters strongly encouraged the professional development of teachers. This means that teachers' achievements can be enhanced by encouraging professional development of teachers.

The finding of this study supports the instructional leadership theory which emphasizes that the practice of instructional leadership of the headmaster consists of three main dimensions which are defining the school goals, managing school curricula and teaching and also cultivating a warm teaching and learning environment [5]. Instructional leadership also includes the role of the headmaster as resource suppliers, teaching resources, and communication people [12]. Successful leaders are leaders who have the vision and are capable of developing a solid view, in line with the goals that can bring their organization to success [2]. According to [31], successful school leadership is headmasters who act as leaders which can set the ambient for better teacher quality and performance. In addition, this study supports the findings by [32] that friendly communication with teachers is able to encourage teachers' thinking and development professionally thus more effective. Furthermore, [33] states that the superior leadership of the headmaster is based on the creation of a strong vision and strategy. A visionary headmaster who has a good line of sight is more focus, making careful monitoring, assessing achievements and taking follow-up actions [12]. This behaviour is in line with the study conducted by [34] and [35] who state that the headmaster who involved in various activities could enable them to set up an organizational goal, set the direction of the school and redesign the organization. Therefore, it is no surprise that the headmasters who practice instructional leadership are able to improve the performance of teachers, students and schools. In that regard, if a school wants to enhance the performance of teachers, then the headmaster should practice the instructional leadership. The instructional leadership of the headmaster is the key to determine the effectiveness of teacher performance in a three-dimensional school that defines school goals, manages curriculum and school teaching and fosters a teaching and learning climate. Among them, declarative knowledge (min = 4.53) is an element that greatly influences teacher's work performance. This means that the informative knowledge on the execution of tasks and information about it is very important for teachers to perform the task effectively and as desired. Teachers with clear knowledge of the entrusted assignments can certainly perform easily and well.
### Table 4. Practical Leadership Practices Leadership Practice with Teacher Work Performance

<table>
<thead>
<tr>
<th>Spearman’s rho</th>
<th>Instructional Leadership</th>
<th>Teacher’s Work Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Correlation Coefficient</td>
<td>1.000</td>
</tr>
<tr>
<td></td>
<td>Sig.(2-tailed)</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>92</td>
</tr>
<tr>
<td>Instructional Leadership</td>
<td>Correlation Coefficient</td>
<td>.757**</td>
</tr>
<tr>
<td></td>
<td>Sig.(2-tailed)</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>92</td>
</tr>
<tr>
<td>Teacher’s Work Performance</td>
<td>Correlation Coefficient</td>
<td>1.000</td>
</tr>
<tr>
<td></td>
<td>Sig.(2-tailed)</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>92</td>
</tr>
</tbody>
</table>

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

### 4. Conclusions & Suggestions

All the three dimensions of the instructional leadership represent effective and quality leadership practices among the headmasters who wish to ensure the performance of teachers in schools. The overall findings have been successful in identifying the relationship between teacher leadership instructional practices and their effect on teacher performance in school. The instructional leadership elements of formulating school goals, delivering school goals, supervising and evaluating teaching, monitoring student progress, protecting instructional times and promoting professional development influence teacher work performance. The findings of this study serve as a reference for the headmasters on the practices of instructional leadership and ensure effective teacher work performance.

Based on the findings of this study, it is proposed that the Ministry of Education Malaysia organizes programs related to building instructional leadership skills among school leaders on a regular and continuous basis. Similarly, school leaders need to proactively strive to improve their ability to implement instructional leadership because the findings of the study clearly show that instructional leadership practices have a significant relationship with teacher performance.

Since this study was conducted in only three SRJKTs in the Jasin District of Melaka, it is proposed that further studies be extended to various other schools such as SRJKC and SMKA in other districts or states so that the findings can be generalized throughout Malaysia. Similarly, research methods can be further diversified, for example using both mix method methods, namely quantitative and qualitative methods with appropriate weighting.

### Acknowledgements

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Mastery of Understanding the Meaning of Parables by Orang Asli of the Temiar Tribe Students through Malay Proverb

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Abstract This study aims to explore comprehension mastery for the meaning of parables by the Orang Asli of the Temiar Tribe. The design of this study is a case study involving a total of five Form Two Orang Asli students of the Temiar Tribe as study participants. Form two students were chosen because they have already been exposed to parables at the secondary school level, from when they were in form one. Study data were analysed qualitatively using the adaptation and modification of Semiotic Theory and Social Constructivism Theory. The study participants answered a total of three parable questions in a set of Cermin Minda. Parables are one of the types of proverbs which are listed in the Curriculum and Assessment Standard Document for the Malay Language, for Form Two students. The results of the study found all of the study participants failed to give the correct answer when stating parables and their meanings based on the matching visual objects given in the question. Based on the answer given, the study participants can state the name of the visual object in the matching visual object, but unfortunately, they were not able to state the correct parable. This is because the answers given by the study participants do not reflect the actual parable itself. Only one study participant was able to express the parable correctly. However, all other study participants failed to provide the correct answer for the meaning of each parable. Based on the findings of this study, Orang Asli of the Temiar Tribe students are still weak in stating parable and their meanings. Teachers need to give the special and continuous attention.

Keywords Parables, Temiar Tribe Students, Semiotic Theory, Social Constructivism Theory

1. Introduction

1.1. Malay Language in Education

The Malay language is seen as Malaysia’s unifying language and is recognized as the national language of Malaysia. This is clearly stipulated in Perkara 152, where the national language is Malay. [1] clarifies that the role of educational institutions in Malaysia is to realize the vision of the country in achieving the status of a developed country. Thus, Malaysia has chosen the Malay language as the main medium in schools and all other educational institutions. This matter is supported by [2], where the Malay language has been recognized as the national language for its role as a unifying language.

In education, The Curriculum and Assessment Standard Document Malay Language is the official reference of the Malay language teachers. The Curriculum and Assessment Standard Document supports the role of the Malay
language as the national language, official language, the language of unity, language of knowledge and language of instruction in schools. The proverbs contained in The Curriculum and Assessment Standard Document, namely idioms, parables, sayings, proverbs, numbers and words of wisdom belong to the figurative language, and they emphasise on philosophy, personality and noble values based on the multiracial Malaysian society. In this context, Malaysians or even non-native speakers of Bahasa Malaysia must learn all the items stipulated and contained in the Curriculum and Assessment Standard Document for the Malay Language, and use the Malay language as the main medium during the teaching and learning process. So, what is the level of mastery of understanding the meaning of parables of the Orang Asli students of the Temiar Tribe?

1.2. Orang Asli of the Temiar Tribe

Orang Asli of the Temiar Tribe inhabiting the northern part of Perak and the southern part of Kelantan. Based on [3], this tribe represents about 16 percent of the population of Orang Asli in Peninsular Malaysia. According to [4], the Orang Asli status is given when the mother or father, or both of them are indigenous people, speak Aslian languages, and their ways of life and beliefs are mainly rooted in indigenous customs and beliefs. The Orang Asli or indigenous people are the aborigines of Malaysia. The Orang Asli in Peninsular Malaysia consist of three main tribal groups which are the Orang Asli Senoi group, Orang Asli Proto Malay group and Orang Asli Negrito group, [5]. Each group consists of six tribes, where the Orang Asli Senoi group is further separated into the Semai, Temiar, Semoq Beri, Che Wong, Jahut and Mah Meri tribes. Meanwhile, the Orang Asli Proto Malay group is divided into the Temuan, Semelai, Orang Laut (Kuala), Orang Kanaq, Orang Seletar and Jakun Tribe. The Orang Asli Negrito group consists of the Mendoriq, Kensiu, Bateq, Kintak, Jahai and Lanoh Tribe (Table 1). [6] states that the division of the three major group is based on the justification of views from an ethnological point of view (field method of anthropological study).

<table>
<thead>
<tr>
<th>Orang Asli Senoi Tribe</th>
<th>Orang Asli Melayu Proto Tribe</th>
<th>Orang Asli Negrito Tribe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semai</td>
<td>Temuan</td>
<td>Mendriq</td>
</tr>
<tr>
<td>Temiar</td>
<td>Semelai</td>
<td>Kensiu</td>
</tr>
<tr>
<td>Semoq Beri</td>
<td>Orang Laut (Kuala)</td>
<td>Bateq</td>
</tr>
<tr>
<td>Che Wong</td>
<td>Orang Kanaq</td>
<td>Kintak</td>
</tr>
<tr>
<td>Jahut</td>
<td>Orang Seletar</td>
<td>Jahai</td>
</tr>
<tr>
<td>Mah Meri</td>
<td>Jakun</td>
<td>Lanoh</td>
</tr>
</tbody>
</table>

1.3. Parables in Malay Proverbs

[7] states that proverbs are a set of short conversations spoken by the community because they contain beautiful words, can be used widely and have a clear purpose, which is, to function as comparisons or examples, with (moral) lessons attached. According to [8], the Malay language is rich in idioms that can be described as the ‘pearl’ in Malay proverbs because the proverbs themselves have been described as a reflection of the culture and mindset of the Malay community since time immemorial. The origin of proverbs according to [9] is the figurative language, which is divided into two categories involving proverbs (figuratively established in terms of language form, consisting of idioms, parables, sayings, proverbs and words of wisdom) and non-proverbs (figurative which is not a stable form of language, and its meaning consists of personification, hyperbole and metaphor) (Figure 1).

Figure 1. Division of Figurative Language [9]

Parable is a comparison of human behaviour, nature or environment which contains implicit and explicit meaning. Thus, the words of bagai, bak, ibarat, laksmna, macam, seperti, and umpama can be used as parables to compare something. [10]. [11] defines that a parable as a figurative language or figurative metaphor that gives meaning in two layers, after likening it to something that is comparable to it. This matter is in line with [12], who states that the parable is a proverb that publishes its meaning through allusions to other things.

1.4. Malay Language as a Second Language (B2)

The Mother-tongue (known as mother language) or B1 for the Orang Asli of the Temiar Tribe students is the Temiar language, while the Malay language functions as their secondary language (B2). According to [13], the B2 presents after the speaker has mastered his B1 and this usually takes place through formal learning in school. This matter is supported by [14], that is, after a person has mastered a system, then B2 learning will take place.

So, the Orang Asli of the Temiar Tribe students must master the Malay language as it is used in the teaching and learning process in the classroom. This matter is in line with [15], where the Malay language is the language of communication and language of instruction in schools. During the process of learning and mastering B2, every Orang Asli of the Temiar Tribe student has to go through a complex journey, and this is confirmed by [16] who stated that B2 teaching should be carefully planned, occur naturally as well as emphasize cultural and social contexts...
so that it is spoken and heard frequently.

2. Theoretical Framework

The theory that is used in this study is the adapted and modified Semiotic Theory (1915-1980) by [17] and Social Constructivism Theory (1896-1934) by [18] (Figure 2). In the Semiotic Theory (1915-1980), introduced by Roland Barthes, the semiotics itself has two stages, where the first stage has the reality and signs that served to explain the relationship of signified and signifier in reality that produces the denotative meaning (gives meaning explicitly, directly and precisely). The second stage, meanwhile, carries a culture that creates meaning connotatively (gives meaning implicitly, indirectly, uncertainly), [19] and myth (a sign given connotative meaning, develops into denotative meaning to form myths), [17]. After completing these two stages, an understanding of the meaning can be achieved, that is, the new cognitive production. At the same time, the Theory of Social Constructivism which has merged through existing knowledge (cognitive), is in the first stage of the Semiotic Theory. If existing knowledge is put and placed into good use, then, an individual is able to generate the meaning denotatively. Subsequently, the teaching and learning process continues in line with the detection of signified and signifier in Semiotic Theory. Finally, an implicit understanding of the meaning will be gained in the second stage to produce new cognitive.

Figure 2. Combination of The Semiotic Theory by Roland Barthes and The Social Constructivism by Lev Vygotsky

3. Methodology

The design of this study is a case study because it focused on the mastery of understanding the meaning of parables by Form Two Orang Asli students of the Temiar Tribe. The study was conducted at a regular daily national secondary school in Perak. Participants in this study consisted of five Form Two Orang Asli students of the Temiar Tribe. The participants were labelled as Peserta Kajian 1 (PK 1), Peserta Kajian 2 (PK 2), Peserta Kajian 3 (PK 3), Peserta Kajian 4 (PK 4), and Peserta Kajian 5 (PK 5). The instrument used is only a set of written tests known as the Parable Type Cermin Minda. The instrument has been certified by an expert in the field of language and literature. In this study, the researchers conducted a written test to discover the mastery of understanding the meaning of parables, through Malay proverbs, by students who are the Orang Asli of the Temiar Tribe. The five PKs were asked to answer three parable questions based on the matching visual objects as this method will trigger ideas to the PKs to form correct parables. All the PKs were required to write the parables and state their meaning clearly for each question given.

4. Findings and Discussion

Mastery of understanding the meaning of parables through Malay proverbs is important for students because it is listed as one of the 10 common objectives in The Curriculum and Assessment Standard Document for Malay Language for Form Two [20]. Three parables and their meanings in the findings of this study were taken from the Peribahasa Sekolah Menengah book written by [21], published by Dewan Bahasa dan Pustaka.

Parable 1: Bagai tikus membaiki labu

‘Bagai tikus membaiki labu’ means someone trying to fix something unknown, only to add more damage to it. The denotative or external meaning of this parable is, when the rat approaches the pumpkin, the rat is not able to repair any damages but only makes the pumpkin as its food because the pumpkin is one of its food sources. This statement refers to [22], where the rats are pests and can cause pumpkins to be in bad and useless conditions. When discussing the parable of ‘bagai tikus membaiki labu’ in terms of connotative meaning, it clearly shows that an item will become more damaged if it is to be repaired by an unskilled person. The damage may be minimal at first, but when the unskilled person repairs it, the damage will increase and eventually cause the item to be rendered useless. The description given by the ancient Malay community clearly shows the elevation in their level of thought. The events that exist in the natural environment can be meaningfully alluded to universal human life, in addition to its limitless use of time and age.

Answered by Study Participants (PK):
PK 1: Parable: Bagai tikus jatuh ke buah labu
   Meaning: Kepada orang yang suka mencuri.
PK 2: Parable: Seperti tikus jatuh ke labu
The answer to this second question shows that only one respondent or Peserta Kajian (PK) wrote the parable correctly, namely PK 3. Meanwhile, PK 1, PK 2, PK 4 and PK 5 could not give the correct answer even though they were able to name the matching visual object correctly. This shows that all PKs have the existing knowledge based on their living environment, where farming or cultivation takes place. This is clearly stated based on [23], where the Orang Asli of the Temiar Tribe raise their families by being involved in farming or cultivation, hunting and gathering forest produce. Meanwhile, all PKs cannot give the meaning of the ‘bagai tikus membaiki labu’ parable correctly as it is connotatively intended. However, based on the answers of all PKs, it is found that the essence of the parable already exists but the means of processing its meaning is not reached yet. Drawing from the adaptation and modification of the Semiotic Theory and Social Constructivism Theory, the participants have existing knowledge and can pass the first stage which is the reality and signs. However, the participants have inadequate knowledge for the second stage, which are, the culture to create the connotative understanding in correct interpretation, respectively.

**Parable 2: Seperti kera mendapat bunga/ Seperti monyet mendapat bunga**

'Seperti kera mendapat bunga/ Seperti monyet mendapat bunga' (Just as a monkey being given a flower) is to mean a person receiving something which is virtually useless. The situation was observed by the ancient society and it is based on nature, where the colourful flowers have attracted the attention of the monkeys. However, the flower cannot be used for anything much by the monkeys as flowers are their food. So, this means that the flowers will be damaged. Although the original habitat of apes and monkeys is in the wild, unfortunately the physical changes in the environment have caused the apes and monkeys to live in human residential areas. This is supported by [24], where the habitat-losing wildlife continues to roam and search for food in other places such as in agricultural farms and human settlements. A sharp observation of the behaviour of monkeys shows that they are often present in the housing areas/ villages and the presence of flowers of various shapes and colours often attracts them, thus sparking the idea behind this parable. The meaning of this parable connotatively in real life shows that there are people who do not appreciate something because they cannot/do not know how to use it. The human act of wasting the goods is reprimanded through the character of apes or monkeys to avoid in bringing the disgrace to the perpetrator. This was supported by [25], namely as the Malays used the proverb that supports the role of reprimand, sarcasm, teaching, giving opinions and expressing feelings about something.

**Parable: Seperti kera mendapat bunga/Seperti monyet mendapat bunga**

**Meaning:** A person who gets something that cannot be used.

**Answered by Study Participants (PK):**

PK 1: Parable: Bagai monyet mencari makanan
   Meaning: Seorang yang suka merantau.

PK 2: Parable: Bagai monyet mencari bunga
   Meaning: Orang yang mencari sesuatu tanpa putus asa.

PK 3: Parable: Bagai monyet dengan bunga
   Meaning: Monyet disukai bunga.

PK 4: Parable: Seperti monyet mengandungi bunga matahari
   Meaning: Monyet nampak sesuatu yang berwarna kuning iaitu matahari mengharumi monyet.

PK 5: Parable: Monyet memetik bunga yang cantik
   Meaning: Monyet mahu memetik bunga yang cantik itu.

All the participants were named the first object of the matching visual object as ‘monyet’ without anyone naming the object as ‘kera’, in this parable. This has prompted the researchers to refer to the Kamus dan Terjemahan Ringkas (Bahasa Temiar-Bahasa Melayu) by [26] and it has been discovered that there is no word ‘kera’ in this dictionary. The existing word is ‘monyet’. Thus, these findings are in line with the Social Constructivism Theory which speaks of students’ existing knowledge the five participants of this study, where their existing knowledge in the process of naming the first visual object in this parable is used. However, the complete answer to state the correct parable is still wrong and the study participants also failed to interpret the understanding of its meaning. However, PK 1 and PK 2 have begun to try to enter the second stage in the Semiotic Theory, where the culture of stating the meaning of this parable is connotative, even though the meaning is wrong. This means that the participants need to be exposed to the secondary stage, which involves theoretical notion, in order to be able to interpret the implied meaning accurately. Students need to be given more exposure to solve problems in order to reach a new level of cognitive production. According to [27], students who are able to control cognitive processes will succeed in solving
problems.

**Parable 3: Bagai ayam disambar helang**

‘Bagai ayam disambar helang’ is to mean a person suddenly disappearing without news. The situation is seen externally: it shows the presence of eagles with the intention of grabbing/snatching the chicken very quickly and suddenly, and the chickens are not ready to defend themselves or seek refuge. The agility of an eagle, which is a kind of predatory animal or maging (carnivorous) is high. This is supported by [28], where the eagle is portrayed as an animal that is known to disturb livestock and ambush/attack (silent killer), by approaching the victim without the latter realizing it. An eagle’s main food is small mammals such as rats, squirrels and chickens. The parable of ‘bagai ayam disambar helang’ arose based on the observations of the ancient society on the nature of an eagle. This sharp observation has established the proverb which proposes sarcasm/teasing, advise and allegory and Malay teaching values to all readers or listeners, [29]. The true meaning of this parable is related to the person who suddenly disappears without news. According to logical reasoning, when a person disappears suddenly, the situation occurring is swift, unnoticed by others and when it comes to light, is considered to be too late. Thus, this situation is illustrated by the agility of an eagle in getting its prey.

Answered by Study Participants (PK):

PK 1: Parable: Bagai duri dalam daging
   Meaning: Orang yang suka menimbulkan isu.

PK 2: Parable: Seperti ayam takut dengan helang
   Meaning: Orang yang penakut.

PK 3: Parable: Bagai helang dengan ayam
   Meaning: Helang sering berkejar dengan ayam.

PK 4: Parable: Seperti helang menangkap ayam
   Meaning: Helang sedang menangkap ayam, ayam berusaha berlari.

PK 5: Parable: Bagai ayam dengan burung helang
   Meaning: Burung helang menangkap ayam untuk dimakan.

PK 1, PK 3 and PK 4 had mistakenly named the visual object in the first visual object match for this parable. They have stated the visual object as ‘duri’ (PK 1) and ‘helang’ (PK 3 and PK 4), while the real picture is ‘ayam’. Meanwhile, though PK 2 and PK 5 correctly identified the first visual object as ‘ayam’, they were, however, still unable to write the correct parable. All student participants could not use the word ‘disambar’ which is a word that describes the agility of an eagle to get a chicken using its claws while flying. Since none of the participants were able to write the words ‘disambar’, the researchers think that the study participants’ vocabulary is still limited and this poses as a problem to the participants if they are not aided by the visual images, as the Malay language is their B2. The same things were explained through [30] findings, where the learning of the Malay language as B2 is not an easy process, especially for the students who rarely use the Malay language as their mother-tongue while speaking. Less favourable environment and conditions have caused difficulty for the students to master the Malay language and in turn, this affects the performance of their learning process in the classroom. Clear evidence has been obtained from [15] findings, where most of the Orang Asli students have problems in mastering the 3M skills, namely reading (Membaca), writing (Menulis) and counting (Mengetahui). Although some students can read, not all of them, unfortunately, can understand the meaning of the full sentences. Based on the findings from parable 3, the researchers found the various types of answers clearly show that the participants have not mastered the ‘bagai ayam disambar helang’ parable. So, the effect from this is that they also failed to give the meaning of this parable correctly.

Based on the findings of this study, the researchers found that all PKs from Orang Asli of the Temiar Tribe students do not have any problems to give a name for each matching visual object. All PKs can use the Malay language correctly without using any words from the Temiar language. This is in line with [31], where students use language functionality to communicate with each other, embody ideas and prove understanding of a content. However, all PKs face trouble in writing proverbs and parables in complete sentences, as well as giving answers to the meaning of all the questions on parables. Three question were asked and they were answered by all five PKs. If calculated, the total number of answers which require the participants to state the parables is 15; and the number of questions requiring the meaning is also 15. However, the final results found that there was only one correct answer out of 15 answers from the parable questions, and no correct answers given for the questions on the meaning of parables. This shows that the mastery of the proverbial type of proverbs is still weak and has to be given in special and continuous attention.

5. Conclusions

From this study, it is clear that the mastery of parable meaning in Malay proverbs by the Orang Asli of the Temiar Tribe students, is still low. This matter should be addressed by all Malay language teachers so that this problem can be solved as the proverb is one of the components in the Malay language subject. Teachers need to act immediately to meet the needs of students. This is supported by [32], where teachers have the opportunity to
diversify existing teaching methods with the help of technology. More accurate approaches and efforts need to be implemented so that the Orang Asli of the Temiar Tribe students can dominate the understanding of the parable meaning and Malay proverbs as well. The uniqueness of Malaysia as a country with different colours and races should not be a major barrier for a non-native speaker student to master and dominate the parables as well as Malay proverbs, and subsequently use the Malay language as the national language for the sake of unity. [33] found that there are two types of symbolism elements in Malay proverbs, which are the positive connotations (positive symbolism) and negative connotations (negative symbolism) to the tools, animals, plants and people or title. Thus, the parables which the Orang Asli of the Temiar Tribe students in this study were tested on are categorized as the negative connotations object. However, the parables listed in this study are matching visual objects that are relatively close to the participants’ natural living environment. This matter is in line with [34] which states that the Malay proverbs use the symbol from nature and environment as in order to give the precise meanings based on the experience, observation and also sharp insights.

Acknowledgements

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Needs Analysis of Augmentative and Alternative Communication Knowledge and Skills among Special Education Teachers for Malaysian Primary Schools

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Abstract

Augmentative and alternative communication (AAC), also referred to as supplementary and replacement communication is critical to provide a communication channel for autistic students who find communicating via learning and facilitating the process in a class challenge. The communication competence of educators can promote and improve positive learning behaviours among students who have autism during the learning process. The objective of this research is to determine the augmentative and alternative communication skills possessed by special education teachers for autistic students in a classroom setting. The respondents of this study comprised of 73 Malaysian special education teachers. The pandemic has prompted the needs analysis questionnaire to be administered online to identify the knowledge and skills among the teachers. The findings reported the knowledge and skills among the respondents by percentage in the realization of AAC in a classroom setting. Findings based on the responses discovered an average level of the knowledge and skills among the teachers in the implementation of AAC which emphasizes the need for teachers to receive more extensive guidance.

Keywords

Knowledge, Skills, Augmentative and Alternative Communication, Special Education Teachers

1. Introduction

The literature has reported minimal evidence on the utilisation of augmentative and alternative communication in classrooms by Malaysian special education teachers. Lack of training is not only an issue in Malaysia but is also evident in other countries such as Israel, United Kingdom, India, and the United States [7]. The National Education Policy in 2012 has designed policies to offer support and assistance in the implementation of augmentative and alternative communication to ensure the requirements of special needs students is fulfilled [34]. This plan was assigned to Malaysian special education teachers to incorporate these abilities throughout the learning and facilitating process in classrooms. This plan complies with the strategy reported in the Malaysian Education Blueprint (2013-2025) that are allocated as the leadership role in classrooms to the educators. Hence, educators must set positive examples and act as a mentor in setting a good example for students [19].

Studies with oral speech issues experience language challenges. The first challenge is that they are unable to articulate their needs verbally while the second challenge is that they experience difficulties in comprehending speech. Their educational development will be negatively affected if their difficulties are not addressed at the initial stages of schooling. Numerous issues associated with verbal
communication will also be impacted which hinders autistic students from socializing with their school peers [20,11]. Students with autism find communicating at home and school challenging which impeded the development of positive behaviour in articulating their needs. American Psychiatric Association [3] characterized autism as mixed incompetence and it is often observed among kids less than years old. Neurological disorders are reported to cause autism as they disrupt brain function. Hence, students find communicating challenging at home and schools a difficult task.

Mustonen, Locke, Reichle, Solbrack and Lindgren [22] describe augmentative and alternative communication as an approach and instrument which improve current verbal communication skills. Hence, students who possess communication issues such as verbal communication require individual learning attention. National Research Council [23] categorized communication disability into two types which are attention merger and use of symbols. Porter [30] and Kuder [15] segregated AAC into verbal and non-verbal to substitute for sound and voice, communication disabilities, social difficulties, and behavioural problems. American Speech-Language-Hearing Association [3] refers to AAC as a communication method that utilizes sign language, gestures, photographs, electronic tools, written communication, and speech tools.

Research on communication channels among autistic individuals has been consistently conducted in the previous decade. In 2008, the Malaysian Psychiatric Association approximated that 1 out of 500 Malaysian children experience autism spectrum disorder and the data demonstrated that approximately 47,000 Malaysians are autistic whereby 4 or 5 people of 10,000 patients possess pure autism that contributes to the inability to comprehend their environment and can solely focus on themselves, and this estimation is predicted to increase annually. Nearly 70% of autistic children experience mental retardation at various stages which contributes to reduced learning development, communication difficulties, behavioural issues, and communication disorders.

Numerous developed nations have incorporated the AAC method and the results reported a significant boost in the learning behaviour development among autistic students. Sigafoos and Mirenda [32] indicated that AAC encompasses symbol systems, communication techniques, and communication skills that are catered according to students’ needs. Different AAC approaches can potentially be utilized for non-aided AAC such as body movement, sign language, facial expressions and fingerspell, and aided AAC which involves communicating by means of supplementary devices and high-tech communication system and pictorial communication system [8].

Non-aided AAC communication strategies do not necessitate external and mobile support devices. This strategy employs techniques which include sign language, facial expression, body movements, and verbal speech. These techniques involve competence, sign language ability, memory, and creativity which can be challenging to master. Light & Drager [18] mentioned that aided AAC is a strategy that employed support tools and involved thorough planning for management. There are various support electronic devices that are simple and multifaceted devices. The scope of support devices differs from simple to advance electronic tools that contain complicated systems. Real devices such as mobile phones, laptops, iPods, iPads, go talks, partner 4, hip talks, tech scan, tech talk, and voicePal Pro are involved in this method. This strategy is effective and flexible as it can be adjusted in accordance with the students’ ability and difficulty. These techniques can reveal detailed messages than simply the students’ language competence and also can be used remotely [36, 15].

2. Problem Statement

AAC is a technique that is accessible for everyone including individuals who experience verbal communication difficulties [20]. AAC is a communication technique which measures the adequacy and results of its implementation in a classroom setting [17]. Various communication aids that can used in classroom but have not been maximized which can be attributed to limited awareness, limited creativity, and lack of effort [29]. Not many studies show distinguished vocalizations used communicatively from those not used communicatively [10].

It is generally known that special need students require significant commitment and patience from educators Haliza Hamzah [9] as teachers need to attract autistic students’ attention who possess behavioural learning issues. Yet, teachers were not adequately trained on using images and sign language as a communication technique which subsequently influences student learning [24]. Furthermore, the utilization of this technique promotes social, cognitive, and motor development. Their self-reliance skill differs from normal children Sakinah, Nor Azizah and Muhammad Hibatullah [31].

Students with disabilities in special education classes have higher potential for success by adhering to the module which include co-operative teaching, collaborative learning, peer supervision, and advanced educational system programming that is thoroughly employed in the classroom context [1]. Students with autism possess a behavioural condition that differs from ordinary students. Multifaceted developmental problems concerning socialisation, communication, and behaviour skills are experienced by autistic students. Autistic students generally cannot socialize well with other students and always cause behavioural issues. Several students with autism have never interacted and do not possess the intention to conform to the standardized learning process in classrooms.
Therefore, intervention and alternative augmentative communication skills are needed in enhancing oral communication competence to address failure to communicate among autistic students [33].

It is difficult to balance learning and facilitating without active communication in classrooms [5, 6]. Autistic students tend to sleep in classrooms and do not participate in learning exercises which negatively affect their learning development. Noraini, Zamri & Zahara [25] highlighted that many educators at cohesive special education for Integration classroom do not obtain widespread training and experience to tackle the communication skills issue between the educators and students. Mohd Zuri Ghani & Aznan Che Ahmad [21] provided support by indicating that autistic students possess communication disorders, social interaction issues, sensory disorders, and emotional behaviours, and play patterns disruption. American Psychiatric Association [3] explained that autism disorders can be segregated into three primary categories of stereotyping and controlled social interaction, communication and behavioural distortion.

Special education teachers are required to comprehend and incorporate suitable communication technique throughout teaching and learning process which include utilizing technology that is suitable for the learning needs of autistic children who possess learning issues [26]. The primary aim of this research is to determine the extent of AAC communication knowledge and skills possessed by special education teachers.

3. Research Methodology

Participants

Special Education Teachers

Seventy-three teachers from the Malaysian Ministry of Education participated in this study. The respondents of this study are working as special education teachers for primary schools. The age of the respondents was between 21 and 51 years old. From the seventy-three respondents, fifty-eight were females while fifteen were males. The respondents are native speakers of the Malay Language and use English as a second or third language. All respondents possess at least a Bachelors’ Degree of Education and their experiences ranges from 5 to 27 years. Thirteen teachers was reported to never have iPad as a high tech AAC while 27 reported never joining any AAC training throughout their services as a special education teacher.

4. Data Collection

Questionnaire

A survey research design was employed in this needs analysis study in determining special education teachers’ level of AAC communication knowledge and skills. Creswell [16] indicated that surveys enable the direct collection of data and improve the generalisability of the data. Therefore, survey was chosen as questionnaires are convenient and enable simple distribution process. Three experts evaluated the instrument: 1. Special Education before distributed online. A total of 73 special education teachers with over 5 years of experience in the special education field responded to the online survey. The questionnaire is divided into 4 sections: A (Demographic), B (Knowledge on Augmentative and Alternative Communication), C (Features in Using AAC with the Help (Aided) High Technology That Can Improve Teaching and Learning Practices), D (Using AAC in a Learning and Facilitating process). The text of questionnaire was designed in the Malay Language to ensure a standardized understanding among the respondents. Online surveys were administered due to the Covid-19 pandemic and the findings will give chances to the teachers to get training and resources material mostly in rural areas.

5. Findings

This research investigated the level of knowledge among special education teachers in attaining the teaching skills during the learning and facilitating process. Early identification of students with verbal communication difficulties enables teachers to organize and offer alternatives to promote higher engagement and understanding throughout the learning and facilitating process [10].

This section explains the responses and is illustrated based on augmentative and alternative communication knowledge possessed by teachers in managing the learning difficulties experienced by autistic students. Table 1 further depicts the result.
Table 1. ACC Knowledge Items among teachers of integrated special education for learning difficulties

<table>
<thead>
<tr>
<th>No.</th>
<th>Items</th>
<th>Yes (%)</th>
<th>No (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Can distinguish between augmentative and alternative communication</td>
<td>53</td>
<td>47</td>
</tr>
<tr>
<td>2.</td>
<td>Comprehend augmentative communication as a replacement communication</td>
<td>68</td>
<td>32</td>
</tr>
<tr>
<td>3.</td>
<td>Comprehend augmentative communication as a supplement communication</td>
<td>72</td>
<td>28</td>
</tr>
<tr>
<td>4.</td>
<td>Comprehend AAC can be employed without help (unaided)</td>
<td>33</td>
<td>67</td>
</tr>
<tr>
<td>5.</td>
<td>Comprehend that AAC can be employed with help (aided)</td>
<td>54</td>
<td>46</td>
</tr>
<tr>
<td>6.</td>
<td>Comprehend that low technology can be utilized to employ aided AAC</td>
<td>56</td>
<td>44</td>
</tr>
<tr>
<td>7.</td>
<td>Comprehend that aided AAC can be employed in the classroom</td>
<td>64</td>
<td>36</td>
</tr>
<tr>
<td>8.</td>
<td>Comprehend that unaided AAC can be implemented outside the classroom</td>
<td>56</td>
<td>44</td>
</tr>
<tr>
<td>9.</td>
<td>Comprehend the use of smartphones</td>
<td>97</td>
<td>3</td>
</tr>
<tr>
<td>10.</td>
<td>Comprehend the use of iPad</td>
<td>79</td>
<td>21</td>
</tr>
<tr>
<td>11.</td>
<td>Comprehend the use of laptop</td>
<td>97</td>
<td>3</td>
</tr>
<tr>
<td>12.</td>
<td>Comprehend the use of Go-Talk</td>
<td>32</td>
<td>68</td>
</tr>
<tr>
<td>13.</td>
<td>Comprehend the use of communication boards</td>
<td>56</td>
<td>44</td>
</tr>
<tr>
<td>14.</td>
<td>Comprehend the use of communication books</td>
<td>64</td>
<td>36</td>
</tr>
<tr>
<td>15.</td>
<td>Comprehend the use of Picture Exchange Communication System (PECS)</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>16.</td>
<td>Can search for information using the Internet</td>
<td>95</td>
<td>5</td>
</tr>
<tr>
<td>17.</td>
<td>Can use Google application to search for images</td>
<td>95</td>
<td>5</td>
</tr>
<tr>
<td>18.</td>
<td>Can upload images online</td>
<td>90</td>
<td>10</td>
</tr>
<tr>
<td>19.</td>
<td>Can upload audio online</td>
<td>71</td>
<td>29</td>
</tr>
<tr>
<td>20.</td>
<td>Can upload videos online</td>
<td>76</td>
<td>24</td>
</tr>
<tr>
<td>21.</td>
<td>Can upload videos using YouTube</td>
<td>72</td>
<td>28</td>
</tr>
</tbody>
</table>

The results demonstrate a rise in Internet knowledge (95%), smartphones (97%), and competence in using the laptop (97%). Yet, 47% of the respondents are unable to distinguish the difference between augmentative and alternative communication while 33% of the respondents comprehended that AAC can be employed without technological aids. A total of 68% of the respondents were not conscious of Go-Talk as a device that can be employed in aided AAC methods while only 50% of the respondents used the Picture Exchange Communication System (PECS) that was established to improve communication and minimize behavioural issues among students with autism. Results also revealed that the limitation of their knowledge and skills are caused by their reliance on computers and Internet search for the implementation of AAC in classrooms. Furthermore, thirteen respondents did not receive any exposure to high tech AAC.

6. Discussion and recommendations

United States National Research Council [6] identified that teacher training is the most delicate aspect of educating autistic students. Also, unsuitable teacher training is a significant problem that obstructs the delivery of satisfactory and professional educators specifically for students with autism. Students with Autism Spectrum Disorder (particularly classic autism) are challenging to teach. A traditional education system may be a disadvantage for the students and special education methods may be insufficient.

Hasnah, Mohd. Hanafi, Mohd. Mokhtar & Norani [11] stressed that the limited knowledge of autism amongst special education teachers can be attributed to the minimal comprehensive feedback gained during the teaching practicum during university years. The results illustrated that the teachers received inadequate training on autism qualities, evaluating autistic students, performing teaching techniques for autistic students, participating in practical training with autistic students and working together with other professionals and parents. Hence, teachers must complete their training to fully comprehend autism guidelines which encompass communication, social abilities, support strategies, self-knowledge, interventions,
and behavioural management. The application of AAC skills by primary school special education teachers in classrooms is examined in this study to solve the communication issue among autistic students. The learning growth of autistic students is depend on the quality of communication between teachers and students which cements the importance of teachers’ communication skill [31].

Centre for Disease and Control Prevention published a report in 2010 that elucidated that 1 in 110 children in the United Stated are autistic [12]. This issue escalated quickly within a span of five years whereby 2015 depicted a surge of 1 in 68 children who are autistic. Hazahamima & Norshidah [13] identified that students with autism were not attracted to conventional PdPC sessions performed in classrooms. Autistic students were identified to disregard PdPC sessions by exhibiting defiant actions such as walking, trembling hands, crying, and daydreaming. Special education teachers are necessitated to prepare themselves with optimal communication skills to facilitate positive and effective learning outside and inside a classroom [31].

Minimal information on students with autism has hindered meaningful teaching and learning [26]. This issue has become very critical to the extent that autistic students are labelled as stupid since the teachers do not know suitable methods to educate these students [28]. Many autistic students experience communication issues, imagination problems, and social interaction disorders. Hence, the development of autistic students is weaker than the typical students. Nevertheless, the extent of this condition varies according to an individual [21, 28].

Suitable behavioural control, social and communication skills are needed for autistic students to obtain meaningful learning [26, 28, 21]. Recurrent issues in the classroom throughout the learning and facilitating process are uncontrolled action, uncontrolled behaviour, and undeveloped communication [35, 21, 28]). There are also other conditions whereby autistic students cannot articulate even when they can communicate well, and this condition is referred to as ‘mutism’ [31, 37]. Students with autism involve teachers with distinct teaching abilities to aid and offer students the rudimentary support skills in communication, behaviour, and socialisation [2]. Hence, students’ communication skills must be encouraged in order to promote interest to participate in the learning and facilitating session.

Poor awareness and unsuitable teaching methods may influence students’ achievement. Therefore, a detailed understanding of suitable teaching skills for autistic students is critical in order to initiate the learning and facilitating session and to comprehend their learning behaviour in classrooms. Incorporating augmentative and alternative communication strategies such as sign language, gestures, and picture swapping during learning and facilitating process can be established through formal training and seminars. Incorporating useful communication methods and techniques will assist teachers to promote and aid students to explain their message. This research evaluated the proficiency of AAC communication knowledge and skills among special education teachers throughout the learning and facilitating session in classrooms and determine whether AAC could solve the communication issues among autistic students.

7. Conclusions

Surveys demonstrated that high technologies tools or software are required when AAC training is provided to Malaysian special education teachers. It is critical to developing teaching modules and training to sharpen the knowledge and skills among special education teachers. Teachers’ proficiency in augmentative and alternative communication skills can assist they in mitigating communication challenges among students with learning difficulties issues, specifically students with autism who experience speaking issues throughout the learning and facilitating session in classrooms. Children with autism can improve their learning ability through the AAC method. Proficiency in aided and non-aided AAC communication skills proficiency includes mastery of verbal and non-verbal communication. Special education teachers who can assist students using AAC have higher potential to determine students’ ability and communication growth [7]. AAC communication skills processes and instruments are the finest alternatives for people who experience difficulties in articulating their needs. Nevertheless, if these procedures and instruments are not maximized, no benefits can be obtained by the teachers and students. Hence, this study aims to further develop training AAC programmes at Malaysian primary schools.

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