

Transforming Inclusive Digital Pedagogy in Malaysian Tertiary TVET: Adapting to a New Educational Landscape

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Abstract

The COVID-19 pandemic has greatly sped up the use of Artificial Intelligence (AI) and Information and Communication Technology (ICT) in education. The aim is to create a more inclusive and fair system, especially in Technical and Vocational Education and Training (TVET) for individuals with special needs. This approach focuses on personalized learning, high-quality information, and employer involvement, even though it is challenging to replicate traditional classroom experiences. Using the fuzzy Delphi technique, the methodology adapts inclusive digital teaching to changing needs, stressing infrastructure, accessibility, personalized learning, digital skills development, and teacher capabilities. Malaysia is working to become a global leader in education by using ICT to support student-centered learning and develop digital skills, in line with the National Digital Policy. The results show a strong potential for building a thorough digital education system. This integration has important effects on improving educational infrastructure, accessibility, and teacher skills, helping Malaysia establish itself as a leader in the global education scene.

1. Introduction

The world of educational technology is constantly evolving, with the integration of artificial intelligence (AI) and information and communication technology (ICT) offering exciting opportunities for educators and students (Kundu & Bej, 2021). The COVID-19 pandemic has highlighted the importance of the effective integration of ICT into educational technology alongside sound pedagogical practices (Valverde-Berrocoso et al., 2021).

The Technical and Vocational Education and Training (TVET) sector of higher education is changing rapidly. The integration of digital technologies holds the promise of enhancing accessibility and inclusivity for individuals with special needs (Dube & Williams, 2020). However, challenges persist in replicating traditional classroom education and promoting socialization among graduates. It is crucial to redefine pedagogical theories that accommodate these new changes and leverage digital technologies to create an inclusive educational experience for all students, including those with special needs. Additionally, it is important to ensure that technological advancements are accessible to all students, including those with special needs. This is particularly important in the TVET sector at the tertiary level. Some research studies have highlighted this issue, including Delubom et al. (2020); Hardman and Dawson (2008); Mosalagae and Lukusa (2016); Riyanda et al. (2021); Roach and Elliott (2006).

As the field of education continues to evolve, personalized learning within a digital environment has become an essential component (Alamri et al., 2021; Bernacki et al., 2021). It is crucial to ensure that the information provided is of the highest quality to meet the growing demand for advanced professional competencies. In this regard, it is important to enhance digital resources, encourage transparency, and actively engage employers in TVET within tertiary institutions. While there is ongoing exploration into the use of hybrid computational intelligence for restructuring university information systems, it is important to proceed with caution (Pan & Zhang, 2021). Any negative impact on the human aspect of the learning experience should be avoided. Therefore, it is essential to strike a balance between the use of technology and maintaining the human element in education.

Digital pedagogy is a term used to describe the set of skills and knowledge that teachers need to master to teach using digital technologies effectively. This includes the ability to integrate digital tools and resources into their teaching practice in a way that enhances learning outcomes. With the growing popularity of digital learning, it has become increasingly important for teachers to have a deep understanding of how to use digital technologies to support student learning. To achieve this, teachers need to develop an appropriate pedagogical approach that integrates digital competence into their teaching practice. This requires a deep understanding of how digital technologies can be used to support different learning styles and how to create engaging and interactive learning experiences that meet the needs of a diverse range of learners (Aslan & Zhu, 2016; Tamaro & D'Alessio, 2016).

Inclusive digital pedagogy is a transformative approach that requires adapting to evolving conditions for individuals with special needs in TVET. The integration of electronic resources, practice-oriented adaptive technologies, and automated management of educational organizations plays a pivotal role in creating an inclusive learning environment (Belenkova et al., 2022; Caldwell et al., 2021). A comprehensive understanding of the potential and limitations of digital technologies is essential, especially when catering to developmental challenges through specialized linguistic programs, transformative dialogues, and psychological measures (Dwivedi et al., 2023).

Addressing the challenges faced by individuals with disabilities in the digital realm requires thoughtful consideration. These challenges may include issues related to the accessibility of digital technologies, such as the use of assistive technologies and the availability of accessible digital content (Ahuja et al., 2021; Andrade & Techatassanasoontorn, 2020). In the context of TVET, the modernization of educational technologies must align with the requirements placed on university graduates, ensuring that individuals with special needs are equipped with the skills and knowledge necessary to thrive in the workforce. The integration of digital pedagogy in TVET should prioritize accessibility, accommodation, and personalized learning experiences to cater to diverse learning styles and abilities (Jamil et al., 2023). To ensure that all students can learn effectively through digital materials, it is crucial to consider their diverse learning needs. For example, students with visual impairments may benefit from alternative formats, such as audio or video, that allow them to access and engage with the content more effectively (Gaster & Clark, 1995; Mulloy et al., 2014; Zabrocka, 2021).

Utilizing diverse formats such as audio or video for digital learning materials can enhance accessibility. User-friendly design and interactive multimedia, including simulations and games, contribute to inclusivity by accommodating diverse learning needs and styles (Akbulut & Cardak, 2012; Stylianidou et al., 2020; Watts, 1997). By providing a variety of delivery options, digital learning materials can be made more inclusive and accessible for all students, regardless of their individual needs and abilities. Furthermore, it is important to ensure that the digital learning materials are designed in a user-friendly manner, which can help students with cognitive and learning disabilities comprehend and engage with the content effectively (Nganji, 2018). The use of interactive multimedia, such as simulations and games, can aid in this regard (Rahman et al., 2020).

The Malaysia Education Blueprint 2013–2025 aims to revolutionize the educational system by adopting a student-centred approach that leverages the power of ICT to enhance learning outcomes and interest (Chun & Abdullah, 2021). The blueprint's sixth shift focuses on the integration of ICT in education, with the objective of equipping students with the knowledge and skills necessary for the digital era. The government has extended internet access and e-learning platforms like BestariNet and Virtual Learning Environment (VLE FROG) to 10,000 schools across Malaysia, including vocational colleges such as KV (Ab Jalil et al., 2019). This initiative also includes specialized training for teachers to ensure effective integration of ICT in their teaching Techniques, ensuring a ratio of 10 students to one computer, introducing ICT-based learning Techniques like independent and distance learning, and offering a plethora of e-learning resources through EduWebTV (Ministry of Education Malaysia, 2013).

In the context of technical and vocational education and training (TVET) and inclusion for special needs, the Malaysia Education Blueprint's sixth shift emphasizes leveraging ICT to create an accessible and supportive learning environment. The government has extended the ICT infrastructure, including internet access and e-learning platforms, to technical and vocational education institutions, ensuring that students with special needs benefit from these advancements (Ministry of Education Malaysia, 2018). Specialized training programs for educators within TVET institutions focus on implementing inclusive ICT practices and adapting teaching Techniques to cater to diverse needs. The blueprint also underscores the importance of maintaining an appropriate ratio of ICT equipment to students and facilitating independent and distance learning Techniques

tailored to the unique requirements of individuals with special needs. Additionally, the integration of EduWebTV provides a valuable resource for creating an inclusive and diverse e-learning experience within the TVET framework (Ministry of Education Malaysia, 2018).

The beginning of innovative educational technologies has revolutionized contemporary education. The effective integration of cutting-edge information technologies is now essential for navigating this transformation. As a result, educators must acquire digital competencies and skills, particularly in Technical and Vocational Education and Training (TVET) areas (Razak et al., 2022). These proficiencies are critical in fostering inclusive learning environments that cater to a broad range of needs and abilities (Legg-Jack & Ndebele, 2022; Marope et al., 2015). By embracing the changing educational landscape, we can establish a more efficient and effective educational system that equips students to thrive in a rapidly evolving world.

The Ministry of Education launched the National Digital Policy on November 28, 2023 (Fahmy A Rosli, 2023). This policy is a government initiative aimed at empowering the digital economy and creating a digitally literate generation that will enhance the quality of education in the country and position it as a global leader in education. The policy has three main objectives:

1. Equipping the youth with digital skills.
2. Enhancing the professional development and competency of stakeholders.
3. Bridging the digital divide that exists in the country.

The adoption of Information and Communication Technology (ICT) has transformed the traditional teaching and learning (PdP) system into E-Learning and M-Learning (Mobile Learning), creating a more accessible, flexible, and interactive learning environment that caters to the needs of a diverse student population (Nordin et al., 2023).

In conclusion, the journey towards inclusive digital pedagogy in TVET within tertiary education involves integrating technology, prioritizing research, and innovation, and ensuring accessibility for individuals with special needs. This chapter explores the challenges and opportunities in the evolving educational landscape focusing in Malaysia, emphasizing the importance of educators in navigating the digital shift and fostering inclusivity for all using Fuzzy Delphi Technique.

2. Method

Prominent scholars Adler and Ziglio, (1996); and Jones, H., and Twiss, (1978) have emphasized the importance of well-defined protocols when selecting expert panels for fuzzy Delphi investigations. A purposive sampling method was used in this research to meet the recommended minimum sample size of 10 experts who brought a diverse range of expertise to the table. The demographic information of the experts is presented in Table 1. Most of the experts were male, with 70% of them having more than ten years of experience at the tertiary level. All the experts fulfilled the necessary criteria required for this study to gather valuable information on inclusive Digital Pedagogy in Malaysian Tertiary TVET. This included four specialists in special needs education, four experts in technical and vocational education and training (TVET), and three experts who focused on the digital aspects of tertiary education. All experts had at least a bachelor's degree and showed extensive practical experience, surpassing the required five-year benchmark in their respective fields.

Table 1 Experts' demographic information

No	Demographic	Statement	n	Percentage
1	Gender	Male	7	70%
		Female	3	30%
2	Experience (Academic)	5- 9 years	3	30%
		10 - 14 years	5	50%
		15 years and above	2	20%
3	Expertise	Special education (Lecturer)	4	40%
		TVET educator with Certified SKM level 3	4	40%
		Digitalization in Education (Lecturer)	2	20%

According to Berliner (2004), expertise was acknowledged when someone had gained over five years of experience in their field. This time-based criterion recognizes the level of expertise and real-world understanding that accompany long-term involvement in a specific field. In addition, Gambatese et al. (2008); and Hallowell and Gambatese (2010) emphasize the importance of experts having advanced educational credentials, highlighting the need for them to possess strong academic qualifications. The selection process was designed to choose a panel that not only met the quantitative requirements but also had a diverse and qualified group of individuals who could provide detailed insights into the various aspects of inclusive tertiary education. By considering both practical experience and educational background, the selected experts were able to provide a well-rounded and knowledgeable viewpoint in line with the necessary rigor for conducting fuzzy Delphi investigations.

A detailed literature review was conducted to gather the elements of inclusive digital pedagogy in Malaysian tertiary TVET, which were then used as the basis for developing the instrument for this study. This review provided a theoretical and empirical basis by analyzing relevant research and frameworks (Snyder, 2019). Following this, the elements of the instrument were validated by experts in the field. Their feedback was used to refine the clarity, relevance, and alignment of the questions with current educational practices (Kimberlin & Winterstein, 2008; Souza et al., 2017). This validation process ensured that the instrument was both theoretically grounded and practical for application within the Fuzzy Delphi Technique (FDT).

The Fuzzy Delphi Technique (FDT), known for its ability to handle uncertainty in responses, has become a crucial tool for navigating the complexities of the inclusive tertiary education landscape. This adaptability enabled a reduction in simplistic viewpoints, expanding the possibilities for a thorough examination of expert perspectives. In the field of academic research, two important conditions were smoothly incorporated, strengthening the process of reaching a consensus. The study utilized a meticulous approach to data collection and analysis, employing the Fuzzy Delphi Technique (FDT). This method combines a 7-point Likert scale with triangular fuzzy numbers and a defuzzification process. The first step involved translating the Likert scale responses, which consisted of 7 points, into fuzzy number data. The subsequent analysis was conducted using Microsoft Excel software and the FDT, also known as the Fuzzy Delphi Method (FDM).

The FDT encompasses two key components: the triangular fuzzy number and the defuzzification process. To represent values, a triangular fuzzy number, denoted as (m_1, m_2, m_3) , was used. This structure creates a fuzzy scale like the Likert scale, allowing for the translation of linguistic variables into fuzzy (digital or binary) numbers. The fuzzy scale levels, with odd-numbered levels, correspond to the levels of agreement. Higher fuzzy scale values indicate more precise and accurate data.

The triangular fuzzy number condition presents criteria that guarantee the acceptance of fuzzy inputs. A benchmark was set with a threshold value (d) of 0.2 and a percentage of expert consensus above 75%. This ensured that only opinions that were sufficiently agreed upon and reliable were considered for the consensus. This condition brought an extra level of rigor to the incorporation of subjective opinions, improving the overall dependability of the process of reaching a consensus. The threshold value (d) played a critical role, with a value of ≤ 0.2 indicating unanimous agreement among experts. If this consensus threshold was not met, a second round of evaluation was necessary, following the recommendations of Chen (2000) and Cheng and Lin (2002).

In fuzzy logic, there is a process called defuzzification, which involves an additional level of organization. This requires a fuzzy score (A) that is equal to or greater than the α -cut value of 0.5. This condition has introduced a systematic approach to evaluating fuzzy opinions, resulting in improved accuracy and reliability. This requirement was in line with the recommendations of Chu and Hwang (2008) and Murray and Hammons (1995). The defuzzification processes were instrumental in determining the rank or priority for each item, variable, and sub-variable within the dataset generated by the FDT research. The careful Technique of analysing the data, which includes both quantitative and qualitative inputs, shows how precise and rigorous the fuzzy Delphi technique is when used for this research.

By establishing precise criteria for assessing ambiguous viewpoints, this process ensures that the decision-making process upholds a rigorous standard. Ultimately, a thorough selection process, ethical considerations, and the implementation of DDR principles formed the basis for the study's comprehensive investigation into inclusive tertiary education. When the different parts of the FDT, triangular fuzzy numbers, and the defuzzification process were put together, they created a strong framework for reaching an agreement in the complicated field of inclusive higher education.

This technique, known for its flexibility and accuracy, established a solid foundation for a thorough grasp of the complex field of inclusive tertiary education and enhanced the conversation within the scholarly community.

3. Results

3.1 Analysis of Expert Consensus on The Elements of Inclusive Digital Pedagogy in Malaysian Tertiary TVET

In this research, Table 2 summarizes the elements that were examined via FDT to establish expert consensus. Upon analysis, it was found that the experts came to a 100% agreement on three elements: Accessibility and Accommodation (element 1), Personalized Learning (element 2), and Infrastructure and Training (element 5). The d values for these elements were 0.027, 0.073, and 0.000, respectively. However, Digital Skills Development (element 7) only garnered a 90% consensus with a d value of 0.101. The final three elements, Digital Pedagogy Skills (element 3), Employer Engagement (element 4), and Student-Centered Approach (element 6), all achieved an 80% consensus with d values of 0.118, 0.128, and 0.088, respectively.

Table 2 Expert consensus on the elements of inclusive digital pedagogy in Malaysian tertiary TVET

No	Elements of Inclusive Digital Pedagogy in Malaysian Tertiary TVET	Triangular Fuzzy Numbers Condition		Fuzzy Evaluation Process Condition				Expert Concesus	Ranking
		Threshold value, d	Percentage of Experts Consensus, %	m1	m2	m3	Skor Fuzzy (A)		
1	Accessibility and Accommodation	0.027	100%	0.88 0	0.99 0	1.00 0	0.957	Accepted	2
2	Personalized Learning	0.073	100%	0.78 0	0.94 0	1.00 0	0.907	Accepted	3
3	Digital Pedagogy Skills	0.118	80%	0.74 0	0.90 0	0.98 0	0.873	Accepted	6
4	Employer Engagement	0.128	80%	0.76 0	0.91 0	0.98 0	0.883	Accepted	5
5	Infrastructure and Training	0.000	100%	0.90 0	1.00 0	1.00 0	0.967	Accepted	1
6	Student-Centered Approach	0.088	80%	0.68 0	0.87 0	0.98 0	0.843	Accepted	7
7	Digital Skills Development	0.101	90%	0.78 0	0.93 0	0.99 0	0.900	Accepted	4

Condition: Triangular Fuzzy Numbers [1] Threshold Value ($d \leq 0.2$; 2) Percentage of Experts Consensus $> 75\%$], Defuzzification Process [Fuzzy Score (A) $\geq \alpha$ - cut value = 0.5]

The study at hand conducted a thorough analysis of the seven elements of Inclusive Digital Pedagogy in Malaysian Tertiary TVET, upon which a consensus was reached by the experts with a range of 80% to 100%. The overall elements showed a threshold value of ≤ 0.2 . As per the threshold value standards stated by Cheng and Lin (2002), if the average value and expert's evaluations were less than the threshold value of $d=0.2$, the elements achieved a consensus among the experts. It also shows that Fuzzy Score (A) is equal to or greater than the α -cut value of 0.5 for all the elements and meets the requirements of FDT.

4. Discussion

According to expert consensus ranking, the Infrastructure and Training element is the most important element based on the FDT result. The successful implementation of inclusive digital teaching methods in Malaysian Tertiary TVET depends on having adequate ICT infrastructure. This finding is supported by research conducted by Latha (2022), which indicates that assessments of digital inequality, whether at a national or global level, typically focus on the accessibility of Information and Communication Technologies (ICTs). A few European countries, such as Denmark, Netherlands, and Luxembourg, have made significant progress in providing internet access, thereby narrowing the digital divide.

Good technology infrastructure is essential for successful digital teaching methods in Malaysian tertiary education. It requires a strong network infrastructure, reliable internet, digital devices, and secure platforms tailored for digital learning. The backbone of inclusive digital pedagogy lies in the creation of an environment where access to these resources is seamless (Kaššaj & Peráček, 2024). Robust network infrastructure facilitates smooth communication and interaction in the digital domain, ensuring that educational content is readily available and delivered without interruptions (Čolaković & Hadžialić, 2018). Reliable internet connectivity becomes paramount, enabling real-time engagement with online materials, collaborative activities, and interactive learning platforms. For students to fully engage in digital learning, they must have access to digital devices like computers and tablets. Specialized teacher training is also essential. Teachers must be proficient in leveraging digital technologies to create an inclusive and supportive learning atmosphere (Passey, 2013). By combining good technology infrastructure with comprehensive teacher training, Malaysian tertiary education can establish a fertile ground for the cultivation of inclusive digital pedagogy, ensuring that every learner can thrive in the digital educational landscape.

The expert has identified the second element of Inclusive Digital Pedagogy, which highlights the significance of accessibility and accommodation, especially for people with disabilities. This aligns with the empirical data from previous researchers like Darcy (2010), Schreuer and Sachs (2014), and Smith et al. (2021). To ensure that

everyone has access to digital materials, we must utilize adaptive technologies and make accommodations for diverse needs. This involves customizing the technology to suit the requirements of various individuals. By prioritizing accessibility, inclusive digital pedagogy aims to provide equitable access to educational resources, fostering a more inclusive learning environment. This approach acknowledges that individuals with disabilities may require various accommodations to access digital materials, and it is crucial to provide them with the necessary support to participate fully in the learning process. Ultimately, this element highlights the significance of creating an inclusive digital learning environment that is accessible to all students, regardless of their abilities or disabilities.

Experts rank personalized learning as the third crucial component of inclusive digital teaching that acknowledges students' varied learning styles and requirements. By customizing digital learning experiences, instructors can cater to individual preferences and abilities, fostering a more inclusive learning atmosphere (Ismailov & Chiu, 2022; Monteiro & Leite, 2016). This method deviates from the conventional one-size-fits-all educational model and instead embraces a more adaptable and flexible approach. Personalized learning enables students to engage with educational content in a way that resonates with their unique learning styles, pace, and interests as mentioned by Archambault et al. (2022). This not only enriches their learning experiences but also fosters inclusivity by catering to the individual needs of each student. Ultimately, personalized learning in the digital domain reflects a dedication to acknowledging and addressing the diverse learning needs of students, contributing to a more just and inclusive educational landscape.

Next, the FDT result shows that experts have chosen element seven as the fourth most important rank based on their consensus that "the development of digital skills among students" is an important part of Malaysia's National Digital Policy. Programs focused on distance and independent learning are crucial in bridging the digital divide by equipping students with the skills needed to participate in the digital economy (Kementerian Pendidikan Malaysia, 2023). This goes beyond just enhancing individual skills, as it also helps prepare students for the changing demands of the workforce (Daggett, 2010; Jacobs et al., 2023). By developing digital skills, educational institutions help cultivate a digitally proficient society, which is an important national objective. Providing students with digital competencies not only helps with their personal growth but also ensures that the future workforce can leverage digital technologies as stated by Jacobs et al. (2023). This focus on digital skills development is a proactive approach to meeting the evolving demands of the digital era while promoting inclusivity and readiness among students.

Inclusive digital pedagogy requires engagement with employers to ensure that educational institutions are equipping students with practical and relevant skills that meet industry needs as per a study conducted by Moore (2023). By incorporating employer feedback into the curriculum, students are better prepared for the workforce and can make a seamless transition from academia to the job market (Jackson, 2017). This approach fosters collaboration between educational institutions and employers, resulting in a mutually beneficial relationship that supports the development of a skilled workforce. Ultimately, employer engagement in digital pedagogy reflects a commitment to equipping students with the skills necessary to succeed in the digital economy, contributing to a more inclusive and prosperous society.

Incorporating technology into teaching practices has become increasingly important in today's educational landscape. Digital Pedagogy Skills (Element 3) have been recognized as essential for inclusive Digital Pedagogy in Malaysian Tertiary TVET based on expert consensus. To achieve this, educators must receive effective training on using digital tools to enhance learning outcomes and create inclusive learning environments (Bong & Chen, 2021). By acquiring digital pedagogy skills, educators can adapt to the ever-changing technological landscape and create dynamic and engaging learning experiences that cater to diverse learning styles and needs (Kolb & Kolb, 2006). This not only improves the quality of education but also prepares students for the digital demands of the modern world. Therefore, it is crucial to promote the development of digital pedagogy skills among educators to foster a more inclusive and adaptable educational environment.

Educational experts have recognized the student-centered approach as the crucial and final component of inclusive digital pedagogy. This innovative approach leverages ICT to cultivate learning environments that prioritize individual growth and development. Unlike traditional teacher-centered methods, the student-centered approach offers interactive and captivating learning experiences that are specially designed to meet the unique needs of each student (Whiting, 2021). By tailoring the learning process, inclusive digital pedagogy promotes a holistic education that considers the diverse learning styles and requirements of students. It underscores the importance of creating interactive and engaging learning experiences that are personalized to the individual needs of each student (Doyle, 2023). By prioritizing student-centered learning, educators can establish a more inclusive and adaptable educational environment that encourages individual growth and development. Ultimately, this approach helps to create a more equitable and inclusive educational landscape by recognizing and addressing the diverse learning needs of students (Barnard & Henn, 2023).

5. Implication

Key policy implications include the need for enhanced digital infrastructure to support personalized learning and the adoption of adaptive technologies that cater to students with special needs (Aleksandrova et al., 2021; Efthymiou, 2023). This shift requires robust investment in reliable digital platforms, tools, and internet connectivity, ensuring that all students, particularly those with special needs, have access to high-quality educational resources (Alhosban et al., 2024). However, simply providing access is not enough; it is crucial that educators are trained to use these tools effectively, highlighting the importance of professional development in digital teaching methods (Rojas & Los De Santos, 2016; Santos Guimarães Carvalho, 2020). By fostering a student-centered approach that tailors learning to individual needs, these institutions can better support diverse learning styles and requirements, ultimately leading to improved educational outcomes (Nair et al., 2020).

TVET institutions need to focus on building stronger connections with employers to ensure that digital learning aligns with the skills needed in the current and future job market. Working closely with industry partners helps make sure that what students learn is relevant and useful in real-world situations, making the transition from education to employment smoother (Floyd, 2018; Wohlin et al., 2012). Additionally, creating comprehensive digital education strategies that align with national policies, like Malaysia's National Digital Policy, is crucial for integrating digital skills and inclusive teaching practices (Ministry of Education Malaysia, 2023; Palomino, 2018). These strategies should be flexible and able to adapt to changing circumstances, such as those caused by the COVID-19 pandemic, to keep improving the effectiveness and inclusivity of digital education. By addressing these areas, TVET institutions can take the lead in creating a more inclusive, adaptable, and student-focused educational system that meets the changing needs of both students and employers.

6. Conclusions

This study, based on experts' consensus, has used the Fuzzy Delphi Technique (FDT) to identify crucial elements for inclusive digital pedagogy in Malaysia's tertiary TVET. The highest priorities include Infrastructure and Training, Accessibility and Accommodation, Personalized Learning, Digital Skills Development, Employer Engagement, Digital Pedagogy Skills, and a Student-Centered Approach. These elements underscore the significance of having a robust ICT infrastructure, offering specialized teacher training, catering to diverse learning needs, nurturing skill development, and fostering collaboration between educational institutions and employers. By incorporating these elements, Malaysia can align with national policies and better equip students for success in the digital age.

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Conflict of Interest

Authors declare that there is no conflict of interests regarding the publication of the paper.

Author Contribution

Fieldwork, statistical analysis, writing the approach, interpreting data, and drafting the article were performed by Authors 1, 2, and 3. Researchers 4 and 5 were responsible for writing the literature review and entering the data.

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