

Digitization of Education: Readiness and Challenges of Preschool Teachers in Kuantan, Pahang

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Abstract

The rapid development of digital technology has brought about many direct changes to various fields, including education. Digital education is a form of learning that utilizes technology to make teaching and learning more engaging and to assist students who wish to learn more effectively. Science and technology have brought significant changes to human daily life worldwide. The implementation of digital teaching and learning can have various effects, especially on teachers. Therefore, this study was conducted to assess the readiness and challenges faced by preschool teachers in implementing digital teaching. This research is a quantitative study conducted through a survey method involving 196 preschool teachers around Kuantan, Pahang. The findings of this study were analysed using SPSS (Statistical Package for the Social Sciences) version 26 software. The respondents' findings indicate that readiness and challenges are interconnected in ensuring the successful implementation of digital teaching and learning. Furthermore, the study's results show that respondents are willing to adopt digital teaching and learning due to the accessibility of necessary tools such as the internet and others. However, there are also challenges faced by teachers in implementing digital teaching, such as a lack of training and insufficient internet access. It is hoped that the results of this study provide information to relevant parties, enabling them to continuously enhance their level of preparedness and assist in resolving the challenges faced.

Keyword: Digital Technology, Digital Education, Learning and Teaching, Challenges, Readiness

Introduction

The rapid development of digital technology has brought about significant changes in various fields, including education. Digital education is a form of learning that utilizes technology to make learning experiences more engaging and assist students who wish to learn more extensively. The digitization of preschool education has become a primary focus in the education landscape. At the international level, the development of digitization has resulted in various notable impacts. The United Nations Educational, Scientific and Cultural Organization (UNESCO) has emphasized the importance of integrating technology in early

childhood education. In their report, UNESCO, (2020) acknowledges that technology can enhance accessibility and quality in preschool education by providing sufficient resources for teachers and students. The implementation of digitization also raises global issues related to technological accessibility. UNESCO underscores the need to bridge the digital divide between developed and developing countries. This emphasizes the importance of training preschool teachers to utilize technology in creating valuable learning experiences. Furthermore, the digitization of education at the preschool level on an international scale also relates to the development of content that aligns with the characteristics of young children. The North American Montessori Teachers' Association (NAMTA) emphasizes the necessity of developing digital applications and platforms that consider the physical, cognitive, and emotional aspects of preschool children's development (NAEYC & Fred Rogers Center, 2017).

The development of the Fourth Industrial Revolution (Industry 4.0) represents a revolution aimed at enhancing management, industrial, and commercial structures with a focus on digital technology development. Industry 4.0 can help in saving labor costs and can increase productivity and efficiency in various operations (Khalid, 2019). The progress achieved by Industry 4.0 can provide opportunities and space for various sectors, including education, to save energy and time in delivering knowledge to students. The increased use of Information and Communication Technology (ICT) in all aspects, including e-learning, is driven by the emergence of the COVID-19 infection spread in society, which forced the government to take action to direct people to work from home (Work From Home - WFH). All segments of society, such as workers and students, are directly involved in this directive. Therefore, teachers and students need to use various methods and applications in teaching to achieve the goal of ensuring education for all. In the present time, we can observe that children easily access information from around the world through the internet, which in turn will create a generation that is computer-savvy, expanding educational opportunities and leading to cost savings (Ku, 2013).

Online teaching and learning represent the most significant change in education in Malaysia, encompassing all schools, whether government or private. Broader access allows for the digitization of education, especially for children residing in rural and remote areas. With the help of technology, children can access learning resources from across the country. All teachers need to be prepared for new methods that will lead to a drastic shift in mindset and skills in the digital world. In line with the rapid advancement of technology, by digitally transforming education, it can replace outdated teaching methods and practices, leading to an industrial revolution (Näykki et al., 2019). The education system today needs to be digitized due to the widespread technological progress and should focus on the recovery of the education system after the Covid-19 pandemic. This pandemic has significantly impacted our education system, posing new challenges for the sustainability of early childhood education and causing concerns among parents about sending their children to preschools or kindergartens. Preschool and kindergarten teachers have faced unprecedented challenges in planning and implementing virtual teaching and learning. These educators need to learn how to use digital platforms like Zoom, Google Classroom, and others to teach their young students (Wang et al., 2020).

The digitization of education brings forth complex issues for preschool teachers, including developing digital literacy, curriculum adjustments, and role changes. The emergence of the

Covid-19 pandemic has altered the landscape of teaching and learning (Obrenovic et al., 2021). Studies conducted by (Hill et al., 2003; Valcour & Hunter, 2005) indicate that increased work flexibility and adaptability are dependent on the availability of communication devices that enable users to work from home and provide more flexible work due to the spread of information and communication technology. Social media channels like WhatsApp, Telegram, and others can enhance the effectiveness of teaching and learning (Barreh & Abas, 2015; Nurulaisyah et al., 2022; Chear, 2017). With clear instructions and user-friendly application usage, students no longer face difficulties in exploring the subjects they are learning. Self-directed learning can also be conducted by students to enhance their knowledge (Idawarna et al., 2022). The ability of teachers to use Information and Communication Technology (ICT) can be observed through their proficiency in using it, providing materials suitable for students' development, and enhancing the quality of educational activities in the classroom (Rohita, 2020). There is a demand for teachers' ability to use ICT, where computers have become a necessity for each teacher. Furthermore, teachers are required to continue using computers to fulfill various educational service needs. According to Afrianto (2018), educators today must adapt and make certain changes to successfully utilize all the potential benefits brought by the Fourth Industrial Revolution (Industry Revolution 4.0).

Specifically, this study is conducted to achieve the following objectives

1. To identify the level of readiness of preschool teachers in implementing digital education in the teaching and learning process.
2. To identify the challenges faced by preschool teachers in teaching.

Literature Review

Digital Education

In line with the government's aspiration to advance Malaysia towards 2023, the "Warisan Kemakmuran Bersama 2023" plan has been formulated to aid in achieving this goal. The government has also planned investments to ensure the success of this initiative. The utilization of technology has significantly impacted conventional teaching methods. The integration of technology in education has led to improved student learning activities with a focus on cooperative and collaborative learning (Hamiza et al., 2021). The integration of ICT and media in teaching and learning content aligns with the concept of 21st Century Learning (PAK21). Leadership plays a pivotal role in achieving the goals of an organization. In the context of educational institutions, leadership sets an example for its members (N. Ahmad et al., 2019; Ismail et al., 2021; Noorashid, 2019). The behaviour of leaders influences the behaviour of those they lead in handling various situations and challenges.

The government's decision to close schools during the Movement Control Order (PKP) due to the Covid-19 pandemic led to the use of various resources and online platforms for remote teaching and learning (PdPR). During the PKP, all teachers were directed to implement PdPR, during which teachers dedicatedly learned and deepened their digital knowledge. To make digital learning more meaningful, various online platforms were employed to facilitate implementation (Aslin & Amzah, 2023; Ismail et al., 2021). Educational video content experienced a sudden surge, aiding in the delivery of knowledge to students. The Ministry of Education Malaysia (KPM) conducted early recordings for Didik TV, uploaded on YouTube. The online implementation of PdPR significantly assisted teachers in the teaching and learning process (Mulenga & Marbán, 2020). Several online platforms like Zoom, Google Meet, Skype,

Telegram, and Edupage were identified to facilitate PdPR implementation, enhancing the engagement of students (Basilaia & Kvavadze, 2020; Tasir & Hamzah, 2023). According to teachers, conducting classes online with such applications enhances student interest and makes learning enjoyable. However, a lack of direction and control from authorities hampers the continuation of digital learning (Basar et al., 2021).

Pedagogically suitable approaches, such as utilizing technology like YouTube videos as references, prove effective in classroom learning (Zuki & Khalid, 2016). Videos aid in deepening student understanding and provide various learning activities, supporting student learning (Yudianto, 2017). Interactive media technology learning through platforms like YouTube videos stimulates effective learning and enhances student engagement and achievement (Al-Zboon et al., 2022).

Usage of Information Technology in Education

The utilization of information technology in education has emerged as a significant topic in recent times. Information and Communication Technology (ICT) has brought about substantial changes in teaching and learning approaches. Initially, ICT was employed in education as a tool to aid teaching and learning processes, such as using computers to create more engaging and interactive learning materials (Roblyer & Doering, 2014). However, with technological advancements, its role in education has expanded far beyond. The rapid development of technology in today's era has drastically transformed the landscape. These changes have influenced human thinking. The use of information technology has become integral to an individual's life, regardless of age or geographic location. Presently, individuals possess sophisticated devices and can access the internet from anywhere, a concept unimaginable in the past, now considered normal for everyone (Yusof, 2021). One significant development within ICT is the use of technology for online teaching and learning. With this technology, students can learn from anywhere and at any time, providing unprecedented flexibility not found in traditional teaching and learning methods (Moore et al., 2011). This approach has become especially vital during the Covid-19 pandemic, where remote learning has become a new norm. Moreover, information technology is also utilized to assist in assessment and evaluation. Learning Management Systems (LMS) such as Moodle and Blackboard enable educators to manage assessments and evaluations online, facilitating quicker feedback to students (Watson & Watson, 2007). However, the use of ICT in education also presents challenges for both teachers and students. One such challenge is access and equity. Despite offering novel learning opportunities, information technology can create a digital divide, leaving students without access to such technology at a disadvantage (Selwyn, 2016). For effective utilization of ICT in teaching and learning, teachers must possess suitable skills and knowledge. Nonetheless, various studies indicate that teachers are not comfortable with, or lack the necessary skills for, using technology (Ertmer & Ottenbreit-Leftwich, 2010). The effective use of ICT or media in teaching can help reshape students' learning experiences within the classroom. ICT in education can be understood as a complex process involving individuals, ideas, tools, and organizations to analyze problems, address challenges, implement, and evaluate (Lase, 2019). The development of digital technology in the current Industry 4.0 era has induced changes that influence various aspects of human life, including education (Simanjuntak, 2019). The use of multimedia tools such as laptops, smartphones, and internet networks in education knows no bounds. The success of integrating educational technology in teaching and learning is complex and influenced by multiple factors (Marwan & Sweeney, 2010). Mirzajani et al (2016) found that successful implementation of the Smart

School program in Malaysia depended on distinct characteristics, substantial support, and leadership qualifications of the headmasters for integrating technology in teaching and learning.

Teacher's Readiness for Digital Teaching and Learning

There have been many past studies regarding the readiness of Online Distance Learning (ODL), but not many studies have focused on the readiness of preschool teachers (Azizan, 2020). The study found that preschool teachers are prepared to conduct online learning. The study shows that the majority of teachers have a positive view of online learning through the Home Base Learning (HBL) approach during the Covid-19 pandemic, despite facing challenges in communication and parental commitment. The implementation of online teaching and learning needs to be looked at from various aspects to ensure its effectiveness. Therefore, several considerations are taken into account to ensure proper preparation.

In realizing online teaching and learning, knowledge and expertise in the digital field need to be explored by teachers and students. Some schools take the initiative to organize courses and training related to digital technology and ICT (Information and Communication Technology) for both teachers and students.

The readiness of teachers in digital teaching and learning is a crucial aspect in 21st-century education. According to the Technology Acceptance Model (TAM) by Davis, (1989), there are two main factors that influence technology acceptance: perceived usefulness and perceived ease of use. Teachers who perceive technology as a useful and easy-to-use tool are more likely to integrate it into their teaching and learning (Davis, 1989). Teachers also need to possess sufficient technological skills to effectively use digital tools in teaching and learning. According to Ertmer & Ottenbreit-Leftwich (2010), teachers with high technological skills are more likely to integrate technology into their teaching. Additionally, school support is also important in influencing teacher readiness. According to Ertmer (1999) technical and management support from the school can enhance teacher readiness in using technology for teaching and learning. Teachers' attitudes toward technology also affect their readiness. Teachers with a positive attitude toward technology are more likely to use it for teaching and learning (Teo, 2009).

Teachers need to learn how to use online teaching tools so that they can teach more effectively. When a teacher knows how to use these tools, it helps students learn better and become more engaged in learning (Abu Bakar et al., 2020). When teachers have more knowledge about technology, they feel more confident using it for teaching (Zolkefli et al., 2017). Readiness of teachers for digital teaching and learning is important as it influences the effectiveness of technology use in the classroom. Some factors influencing teacher readiness include technological skills, attitudes toward technology, school support, and available resources (Ertmer, 2005). School support such as training and guidance is also crucial in helping teachers overcome barriers in using technology (Othman & Awang, 2018).

Challenges of Preschool Teachers in Education Digitalization

Since the implementation of Movement Control Orders, there has been a noticeable shift towards the transformation of education, with a strong emphasis on the use of digital applications to ensure that students can continue their learning from home. Various digital applications have been used to facilitate this process. However, the issue of internet accessibility has emerged as a major obstacle, especially for students in rural or remote areas,

where the internet access gap between urban and rural areas is quite significant. In recent years, preschool teachers have faced various challenges when it comes to integrating digital resources into early childhood education. One of the main challenges they face is the need to adapt to the constantly evolving landscape of technology and educational software. As highlighted by Ahmad et al (2021), the rapid pace of technological advancements, from interactive applications to online learning platforms, requires preschool teachers to constantly adapt and provide valuable and purposeful learning experiences for preschool children.

The integration of digital technology into early childhood education offers both promising prospects and challenges for teachers. A key challenge is ensuring that technology can be effectively used in preschool children's learning. According to Hatzigianni et al (2023), educators must be proficient in using various existing digital applications and tools to ensure alignment with the cognitive development needs of children. Additionally, teachers face various obstacles in ensuring an inclusive digital learning environment. It's important to recognize that children come from diverse socio-economic backgrounds and may have varying levels of access to technology. In this regard, Berson et al (2022) emphasize the importance of teachers' earnest efforts to prevent the digital divide from widening in the context of early childhood education. Effective time management is a critical barrier that teachers must overcome when integrating technology into the classroom. Technology integration requires careful preparation and strategic planning. Kucirkova (2018) states that teachers need to provide a balanced mix of digital experiences and direct social interaction.

Furthermore, there is a growing demand for preschool teachers to enhance and elevate their mastery of technological and digital skills. According to a study conducted by Undheim & Ploog (2023), teachers with high levels of technological competence are more likely to encourage the imaginative and useful use of digital tools among children. This not only enhances the importance of preschool teachers being knowledgeable in traditional teaching methods but also proficient in the ever-evolving field of technology to effectively support children's development and learning experiences. In the realm of preschool education digitalization, ethical dilemmas also arise. It becomes the responsibility of teachers to ensure the privacy and safety of children when using technology. As stated by Li et al (2023), teachers must exercise caution when handling data and preschool children's privacy. Given these challenges, it is essential for preschool teachers to actively strive to enhance their proficiency in using digital devices, design comprehensive educational activities, and encourage equality and ethical practices when integrating technology into their teaching methods. By fostering a deep understanding of these concepts and consistently working to implement them, the use of technology in preschool education has the potential to significantly enhance children's growth and development.

Methodology

Research Design

This study is a qualitative research that employs a survey research design for data collection. The survey is a systematic and deductive method utilized by researchers for this study. In the context of this study, a survey is conducted to assess the extent of readiness and challenges faced by preschool teachers in education digitalization. Therefore, the use of a survey method as the research approach is deemed suitable to achieve the objectives of this study.

Population, Location and Sample

The population of this study refers to preschool and kindergarten teachers in and around Kuantan, Pahang, totalling 410 individuals. Therefore, the researcher selected a sample of 196 study participants based on the research objectives, context, and appropriate timing for the study participants. Based on the study by Krejcie and Morgan, the sample size used in the study plays a crucial role in determining the study's reliability. Furthermore, the sample selection process is highly important as it indirectly impacts the validity and accuracy of the study, as the data collected from the respondents will be used for the study's conclusions.

Research Instrument

The researcher has selected a research instrument that can assist in obtaining data to achieve the objectives of this study. The study utilizes a questionnaire to gather information related to the formulated research objectives. The findings of this study can be formulated in numerical data. The collected data will be analysed using the Statistical Package for the Social Sciences (SPSS) software. The distributed questionnaire is designed to obtain feedback, data, or information needed from the respondents, facilitating the analysis process to obtain research results. The questionnaire is divided into three sections: Part A, Part B, and Part C. Part A contains demographic information about the study respondents, Part B assesses the level of readiness of preschool teachers towards teaching and learning, and Part C assesses the challenges faced by teachers. This research instrument employs a Likert scale involving questions that are easy to understand and use language that is comprehensible to the participants.

Table 1
Scale and Five Levels of Agreement

Scale	Levels of Agreement
1	Strongly Disagree
2	Disagree
3	Slightly Agree
4	Agree
5	Strongly Agree

Research Finding

The objective of this study is to assess the level of readiness and challenges faced by preschool teachers in digital teaching and learning.

Table 2
Min, Standard Deviation, Interpretation

Variable	Min	Standard Deviation	Interpretation
Readiness	4.32	.60052	High
Challenges	2.81	.30822	Average

The results of the study presented in Table 3 represent the 196 respondents who participated in this research.

Table 3

\Respondent Demographics (n = 196)

		Frequency	Percentage
Gender	Male	34	17.3
	Female	162	82.7
Age	Under 25 year	43	21.9
	26 - 30 year	55	28.1
	31 - 35 year	70	35.7
	36 - 40 year	20	10.2
	41 year and above	8	4.1
Kaum	Malay	173	88.3
	Chinese	11	5.6
	India	12	6.1
Taraf Pendidikan	SPM	9	4.6
	Sijil	22	11.2
	Diploma	96	49.0
	Ijazah	59	30.1
	Master	9	4.6
	PhD	1	0.5

The Readiness Stage of Preschool Teachers Towards Digital Teaching and Learning

Table 4

Findings of respondents regarding the level of readiness for digital teaching and learning among teachers

No.	Question	(1)	(2)	(3)	(4)	(5)
		SD	D	SA	A	SA
1	I am comfortable receiving Teaching and Learning materials available on the Internet.	0 (0%)	3 (1.5%)	16 (8.2%)	49 (25%)	128 (65.3%)
2	I like using mobile phones to search for teaching materials.	0 (0%)	2 (1%)	12 (6.1%)	49 (25%)	133 (67.9%)
3	I am willing to use digital devices for teaching.	4 (2%)	11 (5.6%)	28 (14.3%)	51 (26%)	102 (52%)
4	I frequently use applications available on the internet during teaching and learning	1 (0.5%)	10 (5.1%)	24 (12.2%)	58 (29.6%)	103 (52.6%)
5	I often use the internet during online teaching sessions.	3 (1.5%)	4 (2%)	14 (7.1%)	64 (32.7%)	111 (56.6%)
6	Digital teaching and learning facilitate my understanding of the delivered instructional content	0 (0%)	8 (4.1%)	19 (9.7%)	71 (36.2%)	98 (50%)
7	I frequently administer quizzes and exercises digitally.	4 (2%)	16 (8.2%)	49 (25%)	57 (29.1%)	70 (35.7%)
Mean = 4.32						

The Challenges Faced by Preschool Teachers in Digital Teaching and Learning

Table 5

Findings related to challenges of digital teaching and learning.

No.	Question	(1) SD	(2) D	(3) SA	(4) A	(5) SA
1	I face difficulties accessing the Internet for teaching from home	37 (18.9%)	86 (43.9%)	25 (12.8%)	36 (18.4%)	12 (6.1%)
2	The level of internet speed disruption is minimal during the teaching process	5 (2.6%)	10 (5.1%)	35 (17.9%)	76 (38.8%)	70 (35.7%)
3	I receive inadequate training and skills exposure during online teaching	15 (7.7%)	55 (28.1%)	63 (32.1%)	44 (22.4%)	19 (9.7%)
4	I am not concerned about teaching digitally.	5 (2.6%)	25 (12.8%)	54 (27.6%)	86 (43.9%)	26 (13.3%)
5	I am not enthusiastic about teaching online.	37 (18.9%)	84 (42.9%)	36 (18.4%)	29 (14.8%)	0 (0%)
6	Assignments given digitally are dull.	48 (24.5%)	71 (36.2%)	35 (17.9%)	23 (11.7%)	19 (9.7%)
7	I struggle to find teaching resources on the Internet.	66 (33.7%)	71 (36.2%)	16 (8.2%)	27 (13.8%)	16 (8.2%)
8	Explanations and clarifications from the Internet are not clear and detailed.	58 (29.6%)	65 (33.2%)	29 (14.8%)	30 (15.3%)	14 (7.1%)
9	I am not enjoying digital teaching due to the absence of students physically with me.	35 (17.9%)	55 (28.1%)	45 (23%)	31 (15.8%)	30 (15.3%)
Mean = 2.81						

Discussion

Based on the analysis of the findings from the conducted study regarding the readiness of preschool teachers in digital teaching and learning, it can generally be formulated that preschool teachers have a good level of readiness in implementing digital teaching. They also possess devices, gadgets, and teaching necessities to ensure that the teaching process can be carried out effectively. Additionally, teachers feel comfortable with receiving virtual teaching and learning, and we can observe that they prefer to search for reference materials online and use mobile phones to gather information. The role of teachers is crucial in delivering effective teaching and instruction to ensure that students can grasp the learning content. Based on the feedback provided, these teachers state that digital teaching facilitates their understanding of the delivered teaching and learning. This clearly indicates that digitally implemented teaching can help them comprehend the learning content.

The level of challenges faced by preschool teachers in digital teaching and learning can be summarized as the speed of internet connectivity being a major challenge in the teaching and learning process. Internet stability is also a challenge faced by preschool teachers. Based on the feedback given, they agree that slow and weak internet speed will disrupt the teaching process. This issue might be caused by teaching materials stored in applications that require fast internet access. As stated in Malaysia's 12th Malaysia Plan, improving the quality of networks and internet access is crucial for progress in various sectors, including education. Internet accessibility is among the crucial topics discussed by all sectors to ensure smooth and systematic operations.

Furthermore, teachers also mention that the lack of training and skills while conducting online teaching is a challenge in integrating digital education. This could occur due to insufficient dissemination of teaching and learning-related information from the internet to them. Face-to-face learning and traditional teaching with students undoubtedly remain more effective methods as they facilitate direct interaction. Based on the responses given, they express that it is more enjoyable if students are physically present with the teacher for a collaborative teaching and learning process. Two-way interaction makes explanations easier to understand. This clearly demonstrates that the influence of conventional methods is still strong and necessary in contemporary teaching and learning.

Conclusion

Preschool teachers play a crucial role in ensuring that these children develop in line with the digital era. The digitalization of preschool education has a significant impact on preschool teachers. By incorporating technology into teaching, preschool teachers can enhance the quality of instruction and learning. Digitalization enables teachers to provide more interactive and engaging learning materials for preschool children. This helps increase the appeal of learning and encourages a positive attitude towards education. The use of educational applications and software allows teachers to create activities suitable for the developmental stage of preschool children. Teachers can select learning materials that capture children's interests, such as interactive games, educational videos, and animated images. This enhances the children's understanding of learning concepts.

Furthermore, the digitalization process brings advantages to teachers as it simplifies the management of records and assessments for preschool children. With specialized software, teachers can carefully document the progress of children's growth, acknowledge their achievements, and monitor the development of children who require extra attention. This aids teachers in making more accurate and comprehensive assessments of children's development. However, the digitalization process requires thorough training and early preparation. Teachers need to be skilled in using technology and ensure that children use digital devices wisely. Additionally, it's important for teachers to balance the use of technology with outdoor activities and face-to-face interactions.

The digitalization of preschool education has opened up numerous opportunities for teachers to enhance children's learning outcomes. By effectively harnessing technology, educators now have the ability to create a more engaging and enjoyable learning environment for preschool children. However, digitalization must be managed wisely to maximize its benefits for children's holistic development.

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