Exploring M-Learning Implementation in Malaysian Preschools

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Abstract. Mobile learning (M-learning) is an increasingly popular education approach worldwide, including Malaysia, which utilising mobile devices to deliver educational content and improve learning outcomes. However, its implementation in Malaysian preschool education is underexplored. This study aimed to investigate the perception of preschool educators in Malaysia regarding the implementation of M-learning in their classrooms. Semi-structured interviews were conducted with 20 educators, and the data was analysed using content analysis. The research question was whether the educators' knowledge and experience of M-learning, as well as the benefits and barriers they have faced, have a direct correlation with their perception of the implementation. The study found that not all educators who had negative experiences with M-learning opposed its incorporation in their classrooms. Educators' knowledge and experience of M-learning were not affected by their demographics, suggesting that educators' perceptions of M-learning may be influenced by factors such as their pedagogical beliefs and teaching experience. The study contributes to the growing body of knowledge on M-learning implementation in preschool education and identifies the challenges that educators face in incorporating it into their pedagogical strategies. Future research should focus on the learning activities of the students alongside the perceptions of the educators. The small sample size of 20 preschool educators is a limitation of this study, and further research with a larger sample size is necessary to generalize the findings to the entire preschool educator community in Malaysia. Effective strategies are needed to improve educators' pedagogical ideas to create a successful M-learning environment.

Keywords: Mobile Learning, Malaysian Preschool Education, Educator's Perceptions.

1 Introduction

1.1 Background of M-learning

The traditional teacher-centred approach to education is being challenged as educators aim to prepare younger generations for further studies and future employment. To achieve these 21st-century educational goals, educators are encouraged to incorporate multimedia and technology tools, including mobile devices such as laptops, tablets, and smartphones, into the curriculum for learners to experience authentic learning [1].

Mobile learning (M-learning) is defined as the utilisation of mobile devices in teaching and learning processes [2]. The concept M-learning began with the emergence of portable technologies and mobile devices in the 1980s [3]. The definition of M-learning has evolved over the years, from a technology perspective [4] to an education perspective. Nowadays, M-learning has become a strategic consideration for lesson delivery, and learners can use mobile devices to create content and experience active learning [5].

1.2   Problems in Current Preschool Education

Previous research has highlighted several problems in current preschool education that necessitate exploring the adoption of M-learning. Traditional preschool education may suffer from limited access to diverse and up-to-date educational resources, impeding children's learning experiences [6]. Additionally, some children may struggle with engagement and motivation in traditional settings, as the teaching methods may lack interactivity [7]. However, M-learning offers opportunities for children to engage with well-designed multimedia presentations, enhancing their involvement [8]. Moreover, traditional classrooms often struggle to provide personalized attention and tailored learning experiences to accommodate each child's unique needs and abilities [9]. Lastly, parental involvement in the learning process is often limited in traditional preschool education, hindering collaboration between educators and parents [10]. By exploring the adoption of M-learning, these problems can be addressed.

1.3   Learning Theories in M-learning

The paper focuses on two learning theories, situated learning and constructivist learning, in the context of mobile learning. Constructivist learning involves learners building and constructing knowledge through active learning, rather than being passively receiving information from external sources [11]. To facilitate this, educators can use mobile technologies to promote active and constructive learning, for example by allowing learners to use mobile devices to access a dictionary and conduct research, providing authentic tasks, and supporting collaborative and cooperative learning.

In addition to constructivist learning, the paper also explored the use of situated learning theory in M-learning. Situated learning is defined as a learning process where learners learn knowledge and skills in contexts that represent how the knowledge will be used in real life [12]. Mobile devices are suitable for situated learning as they allow learners to work on authentic learning tasks in a real-world environment. For instance, a group of young learners aged 6 to 12 used iPads to help them observe and explain during their visit to a natural centre, and they achieved a positive learning outcome with M-learning [13].

1.4   Issues of M-learning

Even if M-learning improves learning experiences, there are still certain challenges and barriers to overcome, thus it is crucial to find out if educators and learners prefer, would, and know how to use M-learning in classroom [14]. For instance, the usage of mobile devices encourages multitasking, which is negatively correlated with the task completion efficiency and academic achievement due to distraction [15]. On top of that, unprepared educators for M-learning are one of the crucial challenges, as it has a significant impact on the integration of educators, learners, learning content, and technology [16]. It is clearly shown that the significant part of M-learning integration is the educator's method of implementation, however, there are insufficient studies that investigate the actual practices of M-learning from the educator's perspective. Most studies focused on the perceptions and attitudes of learners towards M-learning, but not the perceptions and attitudes of teachers [17], [18]. Lastly, there are significantly few studies focused on how M-learning is being implemented by teachers [19].

1.5   Purpose of the Study

The success of M-learning relies on learners' autonomous participation, with educators playing a crucial role in promoting and enhancing learner engagement [20]. However, there is a research gap in understanding how teachers utilise M-learning in educational settings [19]. While M-learning has been extensively implemented in higher education, there is a lack of research on its implementation in younger learners, particularly in formal education contexts from the perspective of educators [21]. Therefore, this study aims to examine the implementation of M-learning in Malaysian preschool education from the viewpoint of educators, addressing the research gap in deploying M-learning among younger learners in formal education settings. The study's main research statement is that educators' uncertainty regarding the benefits of M-learning and their negative experiences with it may hinder the effective integration of mobile devices in the classroom. To address these issues, the study was guided by the following research question:

1. What are the educators' perceptions on implementing M-learning in preschool education?

2   Literature Review

2.1   Background of Technology Immersion in Education

The traditional teacher-centred approach in education is shifting towards preparing students for future careers and providing them with both academic knowledge and workforce skills. According to the Common Core State Standards (CCSS), this is the main educational goal for the 21st century [22]. To support this goal, multimedia and technology tools are being implemented in the education context to encourage innovative

learning and real-world experiences. Students can engage in authentic learning through the utilisation of technological tools, such as YouTube videos, video games, role-play in online simulated environments, blogs, ePortfolios, and Google Site [1]. These tools not only allow students to experience and understand the real world, but they also provide opportunities for students to discuss, collaborate, solve problems, and construct knowledge virtually [22].

2.2   M-learning for Young Learners

According to The Horizon Reports mobile devices can be used to facilitate asynchronous learning, study, and explore new ideas, produce content, and other activities [23]. The report suggests that mobile devices can provide learners with more control over their learning process, allowing them to personalize their learning experience to suit their individual needs and preferences. Additionally, higher education students agree that M-learning enables them to communicate, collaborate, and learn effectively [24]. Additionally, M-learning enables students to access information at any time and from any location, and this flexibility applies to younger learners as well [25].

Younger students can make connections between the course material and their real-world experiences. In fact, they are now familiar with technologies and multimedia, and they do not need to learn how to use a digital device, even before starting preschool [26]. Furthermore, educational software that is developmentally appropriate for young children could help achieve and improve preschool curriculum goals and learning outcomes. Thus, young children have the chance to learn and gain knowledge by doing activities that are related to real-life situations with the aid of technologies in preschool education. When incorporating technology in education, mobile devices are the crucial component. Tablets are the most recommended choice as they suit the lifestyle and behaviours of young children and have an interface that eases the navigation of young children. Exposing young children to touch-screen technologies at an early age can help them develop their digital literacy skills [3]. Tablets also promote active learning by allowing students to express their creativity by creating animations, videos, audio files, and text content [27].

2.3   Challenges of Implementing M-learning

While M-learning has been found to enhance learning experiences, there are still challenges and barriers that need to be addressed before its effective implementation in formal educational contexts. However, insufficient research has been conducted on the actual practice of M-learning in classroom activities.

The use of technological devices in the classroom can lead to cognitive overload and distraction for learners, and push notifications can negatively impact academic performance [15], [28]. Mobile devices in the classroom can also encourage learners' multitasking behaviours, which may result in longer completion time and less accuracy when performing a task [29]. Moreover, viewing images and text on a small screen for a long time may lead to eye strain issues [30]. Infrastructure issues such as data security,

platforms, devices, operating systems, contents, and tools are also significant barriers to M-learning [5].

To successfully implement M-learning, it is crucial for educators to have the necessary capabilities to introduce and encourage learners' participation in M-learning activities [20]. However, there is limited research analysing M-learning from educators' perspectives. Educators' technical knowledge and awareness have a direct correlation with their readiness to apply M-learning in the teaching context [24]. Educators' risk-taking attitudes and their abilities to adapt to new changes are also challenges in incorporating M-learning [31]. Cultural changes among educators are necessary to implement technologies in academic learning [30]. Even though digital devices and technologies were available in the classrooms, some teachers were unwilling to implement M-learning into their activities [32]. Therefore, there is a need for further research to investigate the reasons behind this reluctance.

2.4   Model for Educators' M-learning Adoption

The research instrument used in this study was developed based on the impact model for teacher's adoption of M-learning to observe factors that influence the adoption of M-learning from educators' perspectives [33]. As e-learning becomes more prevalent, M-learning is seen as a valuable approach that allows learners to study outside the classroom and on-the-go, requiring educators to provide engaging and creative learning content with mobile technology [34], [35]. The impact model consists of six variables, including Usefulness, Interactivity, Motivation, Attitude, Facilitating Conditions, and Ease of Use, which are linked to a latent variable, Teacher's Adoption of Mobile Learning. Figure 1 displays the impact model for teacher's adoption of M-learning. The six variables are described as below:

1. Usefulness: The degree of user satisfaction regarding the completion of teaching tasks in the M-learning system [36].
2. Interactivity: Student's participation, teamwork, and interaction with their peers and teachers [37].
3. Motivation: A psychological factor that persuades teachers to use M-learning to carry out educational activities, which is affected by teachers' self-efficacy and digital literacy [33], [38].
4. Attitude: Awareness campaigns are necessary to alter educators' personal ideas and certainty towards M-learning in order to increase their positive attitude towards M-learning [33].
5. Facilitating Conditions: Environment components that help individuals to complete tasks rapidly [39].
6. Ease of Use: A person can implement technology without using any cognitive effort [36].
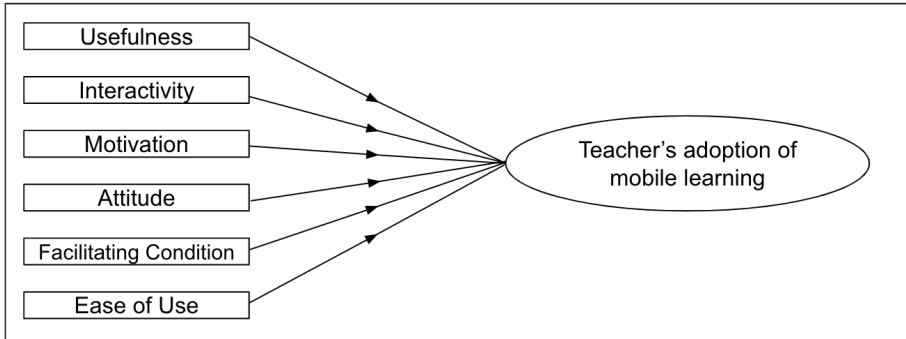
Fig. 1. The impact model for teacher's adoption of mobile learning

3   Method

3.1   Design

In order to address the research question, a qualitative research approach was employed, utilising semi-structured interviews that were conducted either in-person or online. A total of 20 interview sessions were conducted on a one-to-one basis between the researcher and the interviewee. During each session, the researcher used a pre-prepared question list in the form of a Google Form to take notes or record the transcript of the interview.

During the interviews, the researcher occasionally deviated from the predetermined question list and included additional questions based on the natural flow of the conversation. These additional questions aimed to gather more relevant information from the interviewees. Some of these additional questions involved presenting scenarios related to the use of M-learning. For example, the interviewees were asked about their experiences with using mobile devices for project-based learning, learning assessments, and multimedia learning. This allowed for a deeper exploration of the interviewees' perspectives on specific M-learning practices and their implications.

3.2   Sampling Procedure

The study employed purposive sampling, a non-probability sampling technique, to select participants. In Malaysia, formal preschool education enrols children as young as 4 to 6 years old, making preschool educators who teach this age group eligible for voluntary participation in the interviews [40]. 20 interviewees were selected for the study, as 20 to 30 participants are considered appropriate for theory-driven qualitative research [41]. The participants were chosen based on specific criteria that met the research objectives.

To recruit participants for the study, the researcher sent invitations explaining the research objective to various preschools and kindergartens in Malaysia. Upon ac-

ceptance of the invitation, potential participants were required to complete a demographic survey to ensure they met the study's criteria, which included contact details, age group, highest educational level, years of teaching experience, teaching level, class size, teaching subject areas, and teaching location. A consent form was then sent to eligible participants, which included participation and confidentiality terms, researcher and supervisor contacts, and the Personal Data Protection Act notice. Once the participants agreed to participate, the researcher scheduled interview timings with them.

3.3   Research Instrument

The study used eight interview questions as its research instrument, which were based on previous research by [14] and [42]. The questions were adjusted to fit the research context. The study also employed the impact model of teacher's adoption of mobile learning to understand the factors that influence the implementation of technology in the teaching context [33]. Each interview question was connected to the observed variables from the model.

3.4   Data Analysis Technique

The researcher hypothesised that the educator's knowledge and experiences with M-learning, as well as the benefits and barriers they have encountered or anticipated, would influence their perception of implementing M-learning in preschool classrooms. To ensure the collected data could be analysed appropriately, three themes were identified and connected to respective questions. These themes were (1) knowledge and experience, (2) pedagogical benefits and barriers, and (3) perspective on implementation. Content analysis was employed to analyse the collected data, as it allows researchers to make connections between the data and the research background and derive new insights and knowledge from the data. The findings from the data analysis will be presented in the next chapter. Table 1 presents the interview questions along with their corresponding themes and the observed variables derived from the impact model for teachers' adoption of mobile learning.

Table 1. Interview questions along with the corresponding themes and observed variables.

Interview Questions	Themes	Observed variables
1. Are you currently using any mobile devices in the classroom to engage students? If yes, please describe how. If not, please state the reason.	Knowledge and experience	Usefulness, Interactivity
2. What do you understand about mobile learning?	Knowledge and experience	Motivation, Attitude

3. What is your experience in mobile learning? What is difficult? What goes well?	Knowledge and experience	Usefulness, Interactivity, Attitude
4. Please comment on the effectiveness of using mobile devices in education. Can they be a tool to enhance student learning? Do you think it is a good idea to promote learning using mobile devices? Why or why not?	Pedagogical benefits and barriers	Usefulness, Interactivity, Ease of Use
5. Please state a few challenges or disadvantages of using mobile learning in practice.	Pedagogical benefits and barriers	Facilitating Condition
6. Would you like to use mobile devices in some other ways?	Perspective on implementation	Motivation, Attitude
7. Do you have any plans for your future teaching practices with mobile learning?	Perspective on implementation	Motivation, Attitude
8. In your opinion, how would you think the implementation of mobile learning in Malaysia can be improved?	Perspective on implementation	Motivation, Attitude, Facilitating Condition

4 Results and Discussion

4.1 Demographic Information

In this study, demographic data was collected through a survey to describe the sample group of the research. The categories of demographic information collected were age, gender, highest educational level, teaching experience, teaching subject area(s), and location. The age group was divided into four categories, which were 18-25 years old, 26-35 years old, 36-45 years old, as well as 46 years old and above. The interviewees were spread quite evenly across each group. However, gender, highest educational level, teaching experience, teaching subject area(s), and location were not evenly distributed. Almost all the interviewees were female, and most had an undergraduate degree. In terms of teaching experience, most interviewees had 1-5 years of experience. Most interviewees taught language, followed by STEM subjects and music, and only one interviewee taught art. Most interviewees were teaching in West Malaysia.

4.2 Knowledge and Experience

This paper discusses the utilisation of mobile devices in the classroom, and how this may not occur as envisioned if educators are uncertain about the advantages of M-

learning and have unpleasant experiences with it. To investigate this, three themes were identified, the first being Knowledge and Experience. This theme was explored through three interview questions:

Q1: Are you currently using any mobile devices in the classroom to engage students?

Q2: What do you understand about mobile learning?

Q3: What is your experience in mobile learning? What is difficult? What goes well?

The collected responses were coded and analysed. The findings from Q1 revealed that most of the interviewees utilized mobile devices in their classrooms for various purposes. These included engaging students through appealing M-learning content, monitoring children's learning progress, enhancing classroom management, and facilitating communication with parents. However, some interviewees who did not use mobile devices expressed that the provided devices were inadequate, and they preferred hands-on activities for young children instead of relying on mobile devices. These results are aligned with the variables of Usefulness and Interactivity, indicating that interviewees who utilised mobile devices in their classrooms and were satisfied with their functionality and interactive features were more inclined towards adopting M-learning.

Furthermore, in response to Q2, most of the interviewees demonstrated a clear understanding of M-learning by accurately defining its key concepts. The keywords used in their definitions were positive, such as "Mobile devices," "Mobility," "Anytime and anywhere," and "Integrate technology with learning." This indicates that the interviewees' level of digital literacy is connected to their motivation and attitude towards implementing M-learning.

Regarding Q3, the interviewees highlighted several challenges, including issues with unstable internet connection, inadequate mobile devices, classroom management, time constraints, and concerns about excessive screen time. On the positive side, they reported that M-learning's interactive nature facilitated better understanding of abstract content and visualisation. These findings indicate that M-learning holds promise in the classroom, but it is crucial for educators to receive proper training in mobile device usage, and the provision of suitable devices is essential to support their implementation. These results provide evidence that the perceived usefulness and interactivity of the M-learning system significantly influence educators' attitudes towards adopting M-learning.

4.3   Pedagogical Benefits and Barriers

In this section, the data related to the second theme, Pedagogical benefits and Barriers will be examined and discussed. This theme was explored through two interview questions:

Q4: Please comment on the effectiveness of using mobile devices in education. Can they be a tool to enhance student learning? Do you think it is a good idea to promote learning using mobile devices? Why or why not?

Q5: Please state a few challenges or disadvantages of using mobile learning in practice.

Among the 20 interviewees, three expressed disagreements regarding the suitability of mobile devices for preschool education. Their reasons included the belief that mobile

devices are primarily for entertainment purposes and that preschool children require more time for hands-on and outdoor activities. In contrast, 17 interviewees agreed that mobile devices can be utilized to enhance preschool learning in a fun and engaging manner. However, they emphasized the importance of maintaining a balance between the use of mobile devices and hands-on activities. Thus, most interviewees acknowledged the usefulness of mobile devices for promoting preschool learning, emphasising their interactive nature. However, some interviewees raised concerns about ease of use, including technical difficulties and the need for proper training.

Regarding Q5, the pedagogical barriers to M-learning were identified as infrastructure limitations, inadequate teacher training, negative experiences of children, and parental attitudes. Educators who were hesitant to adopt M-learning in preschool education often had prior difficulties with M-learning and lacked awareness of its potential benefits. This demonstrates the significant impact of facilitating conditions on the implementation of M-learning.

4.4   Perspective on Implementation

This section analyses the relationship between the perspective of educators on M-learning and their knowledge, experience, as well as their views on pedagogical benefits and barriers of M-learning. The data is obtained through three interview questions:

Q6: Would you like to use mobile devices in some other ways?

Q7: Do you have any plans for your future teaching practices with mobile learning?

Q8: In your opinion, how would you think the implementation of mobile learning in Malaysia can be improved?

Q6 and Q7correspond to the Motivation and Attitude variables in the impact model of teachers' adoption of mobile learning. Out of the 20 interviewees, five expressed their disinterest in using mobile devices, while 15 responded positively. The responses indicate that educators who showed interest in using mobile devices for M-learning demonstrated a positive attitude and motivation towards its implementation. They shared plans for incorporating M-learning into various aspects of their teaching, such as documentation, additional materials, homework, reinforcement, and research. On the other hand, the educators who expressed disinterest had previous negative experiences or lacked understanding of the potential benefits of M-learning. This illustrates how motivation and attitude play a crucial role in the adoption of M-learning.

Q8 aimed to develop strategies for enhancing the implementation of M-learning in Malaysian preschool education. The results yielded six categories of strategies, including providing sufficient mobile devices, establishing proper teaching guidelines, ensuring a stable Internet connection, offering training for teachers, government subsidies, and increasing parental awareness. The findings indicated that the most crucial step is to ensure educators and children have access to sufficient and appropriate mobile devices. This should be followed by the provision of comprehensive teaching guidelines and materials. Additionally, interviewees emphasized the importance of a reliable and stable Internet connection for effective implementation. They also highlighted the necessity of providing adequate training on integrating M-learning into preschool teach-

ing practices. These suggestions support the idea that facilitating conditions and supportive measure are essential for promoting educators' motivation and positive attitudes towards M-learning implementation.

5   Conclusion

5.1   Findings According to Themes

It was suggested that experienced teachers are more reluctant to implement M-learning due to their negative attitudes towards technology in early childhood education [43]. However, this study found that the educators' demographics were not directly related to their knowledge and experience in M-learning. Some interviewees, regardless of their teaching experience and educational level, did not use mobile devices in the classroom and had negative experiences with M-learning. The study also showed that educators' knowledge and past experiences with M-learning did not have a direct correlation with their attitudes towards implementing M-learning. Educators who did not support the use of M-learning in preschool contexts had difficulties with M-learning and lacked a clear understanding of it. However, not all educators who had negative experiences with M-learning rejected its implementation. Therefore, it can be concluded that the thesis statement is only partially correct. The study supports that teachers who can navigate mobile devices do not necessarily prefer to implement M-learning [32]. The Attitude component of the impact model can help determine the reasons why some educators do not implement M-learning in preschool classrooms [33].

5.2   Implications of the Study

The study highlights the advantages and disadvantages of implementing M-learning in preschool education, based on the experiences and perceptions of the educators. Most of the interviewees agreed that M-learning could enhance children's learning experiences by making learning more interactive and motivating. However, some concerns were raised, such as the potential loss of interest in hands-on activities and social interactions, as well as the increase in screen time. In addition, issues related to infrastructure and teachers' training were identified as barriers to the effective implementation of M-learning. The study suggests that proper teaching guidelines and training support, along with sufficient and appropriate infrastructure, could help to overcome these issues. Parents' awareness of M-learning could also be increased through seminars or workshops. The study underscores the importance of providing educators with sufficient support to incorporate mobile technology in their preschool teaching practices.

The findings of this study are consistent with the impact model, which identifies usefulness, interactivity, motivation, facilitating conditions, and ease of use as key components of the successful implementation of M-learning [33]. This study also highlights the need for further research on the implementation of M-learning for preschool children.

6   Limitations and Future Work

6.1   Limitations of the Study

The size of the sample group used in this study is one of its major limitations. The study collected data from a small group of 20 preschool educators in Malaysia, which may not be representative of the entire preschool educator community in the country. However, despite the small sample size, the collected data is expected to be sufficient to achieve the research objective. The demographic data could not be analysed in greater detail due to the small number of respondents. It would be beneficial to examine the data separately for educators teaching in East Malaysia and West Malaysia since the teaching conditions and infrastructure are different in both regions. One of the interviewees from East Malaysia shared that the unstable Internet connection and blackouts during lesson time were demotivating factors for them to use mobile technologies in class.

6.2   Recommendations for Future Research

This study sheds light on educators' perceptions of M-learning implementation in Malaysian preschool contexts and highlights the need for sufficient support. It demonstrates that educators are willing to incorporate mobile technology into their teaching practices if appropriate guidelines, training, and infrastructure are provided. The study recommends further research to observe and investigate actual M-learning practices, including both learners and educators, for a better understanding of the implementation of M-learning in preschool education. This could provide valuable insights into the real-world use of M-learning and inform the development of effective M-learning interventions.

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