PRESCHOOL TEACHERS' ACCEPTANCE OF GAME-BASED LEARNING TO PROMOTE INTERACTIVE TEACHING AND LEARNING

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Abstract

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The implementation of game-based learning in the educational system has changed to a digital format as a result of Malaysia's technological advancements, which support 21st-century learning abilities. In a similar vein, game-based learning (GBL) has progressed to include digital technology in preschool settings. To enable interactive teaching and learning that improves children's learning, preschool teachers must increase their knowledge, awareness, Information and Communication Technology (ICT) skills, and creativity. This study was conducted to examine the preschool teachers' overall acceptance of the GBL approach in the digital context, as well as the implementation strategies in promoting interactive teaching and learning for the preschool children. In this qualitative study, six participants were chosen from purposeful sampling from the Petaling Jaya region only to collect desired data which will be beneficial for the research conducted. An individual semi-structured interview protocol was conducted to collect data from each participant. The results of the findings show that preschool teachers are keen on the GBL approach to be accommodated in children's daily learning process due to the advantages, as well as it is noticed that with external factors such as proper training and guidance, and facilities, this approach can be beneficial for both preschool teachers and children to promote interactive teaching and learning. Further research should be conducted in digital GBL in primary and secondary schools to understand the differences, as well as examine ADDIE and Gagne's nine-even instructional model for educator training and children achieve their goals step by step. In conclusion, there are significant effects such as active participation, engagement, collaboration, creativity and problem-solving skills in children's learning when the GBL approach is incorporated.

Abstrak

Penerimaan Guru Prasekolah Terhadap Pembelajaran Berasaskan Permainan

Dalam Menyokong Pengajaran Dan Pembelajaran Interaktif

Pelaksanaan pembelajaran berasaskan permainan dalam sistem pendidikan telah berubah kepada format digital hasil daripada kemajuan teknologi Malaysia, yang menyokong kebolehan pembelajaran abad ke-21. Dalam nada yang sama, pembelajaran berasaskan permainan *(GBL)* telah berkembang untuk memasukkan teknologi digital dalam tetapan prasekolah. Untuk membolehkan pengajaran dan pembelajaran interaktif yang meningkatkan pembelajaran kanak-kanak, guru prasekolah mesti meningkatkan pengetahuan, kesedaran, kemahiran teknologi maklumat dan komunikasi *(ICT)*, serta kreativiti mereka. Kajian ini dijalankan untuk mengkaji penerimaan keseluruhan guru prasekolah terhadap pendekatan *GBL* dalam konteks digital, serta strategi pelaksanaan dalam menggalakkan pengajaran dan pembelajaran interaktif untuk kanak-kanak prasekolah. Dalam kajian kualitatif ini, enam orang peserta telah dipilih daripada persampelan bertujuan dari kawasan Petaling Jaya sahaja untuk mengumpul data yang dikehendaki yang akan memberi manfaat kepada penyelidikan yang dijalankan. Protokol temu bual separa berstruktur individu telah dijalankan untuk mengumpul data daripada setiap peserta. Hasil dapatan kajian menunjukkan guru-guru prasekolah berminat dengan pendekatan *GBL* untuk ditampung dalam proses pembelajaran harian kanak-kanak kerana kelebihannya, selain dilihat dengan adanya faktor luaran seperti latihan dan bimbingan yang betul serta kemudahan, ini pendekatan boleh memberi manfaat kepada kedua-dua guru prasekolah dan kanak-kanak untuk menggalakkan pengajaran dan pembelajaran interaktif. Penyelidikan lanjut perlu dijalankan dalam *GBL* digital di sekolah rendah dan menengah untuk memahami perbezaan, serta mengkaji model ADDIE dan pengajaran sembilan genap Gagne untuk latihan pendidik dan kanak-kanak mencapai matlamat mereka langkah demi langkah. Kesimpulannya, terdapat kesan yang ketara seperti

penglibatan aktif, penglibatan, kolaborasi, kreativiti dan kemahiran menyelesaikan masalah dalam pembelajaran kanak-kanak apabila pendekatan *GBL* diterapkan.

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GBL   Game-Based Learning

DGBL   Digital Game-Based Learning

ICT   Information and Communication Technology

ECE   Early Childhood Education

TAM   Technology Acceptance Model

ZPD   Zone of Proximal Development

CRC   Convention on the Rights of the Children

PU   Perceived Usefulness

PEU   Perceived Ease of Use

AU   Attitude towards Usage

BIU   Behaviour Intention to Use

CHAPTER 1

INTRODUCTION

1.1 Introduction

The evolvement of Information and Communication Technology (ICT) with the assistance of digital technology has been widely used in many fields around the world throughout the past years (Hussain, 2018). The whole world revolves around the evolvement of technology at the moment, as well as in many fields ICT with digital technology playing its part very well and people are achieving amazing things and multiple benefits out of it (Halili, 2019). Similarly, both the technologies plays vital role in the education system from pre-school to university, which has changed the system in and out by introducing new methods of learning opposed to the teacher-centred method, in other words traditional learning method (Lamrani et al, 2020). The incorporation of ICT and digital technologies into education system of the children promotes essential skills that they need to perceive in this 21st century such as, higher order thinking skills (HOTS), communication and collaboration skills (Ismail et al, 2018). Precisely, this involvement has become the common method to the new education system which promotes uncountable benefits for both the teachers and children, not only that it has been proven there are improvements in the education.

Game-based learning (GBL) is one of the tools or approach that has been introduced to the new education system by the incorporation of ICT with the assistance of digital technology. However, to be precise GBL can be both with and without the incorporation of digital technology in the educational field (Ying, 2021). As mentioned earlier, this approach has quite a number of supports in the education system mainly from both the teachers and children, as it promotes better learning procedures and environment.

The main purpose for this approach to be used lately among the children is as motivational purpose and encourage them to exhibit involvement in the learning process (Lamrani et al, 2020). Studies have found that, GBL approach is an effective method to use in order to facilitate the teaching learning procedures and attain quite a number of benefits. For instance, it enhances the learners' motivation, cognitive abilities and engagement (Alabbasi, 2018). However, there are some studies that have addressed few disadvantages regarding the chosen learning method such as health issues, losing interest in other physical learning methods, hesitant of learning outdoor, reduce in attention span (Petty, 2023) and few others, yet the advantages are more compared to the negative views.

GBL with the incorporation of digital technology has been used in early childhood education over the past few years. In fact, many schools equipped with at least one Smart Board in the school. Smart Board works almost the same as a computer and preschool teachers and learners can use their fingers and pen to work around the screen. Not only that, young children can practise their writing skills on the board too as it provides the lines (Van Dijken, 2022). Moving along, early years is a crucial period of time for every child because it is the stage in their life where they learn to make sense the world around them by using their senses and via experiential learning (Graber et al, 2021). Young children love to play and they attain skills and knowledge through play. Due to the technology evolvement, play also evolved to game-based learning which actually more likely similar to traditional play method is.

Besides that, preschool teachers' acceptance is vital to implement an effective lesson through game-based learning approach. This is because, preschool teachers play one of the important roles in learners' learning phase (Halili, 2019). Researchers have found that, most of the preschool teachers are fond of this approach and provided positive feedbacks such as teachers witnessed active participation, engagement, collaboration and motivated to learn (Lamrani, 2020). In early childhood setting, young children seem to

be excited and their duration of attention spent increase drastically (Ying, 2021). Hence, it is true that game-based learning approach is effective when implement it with and without the digital technology.

1.2 Background of the Study

In this 21st century, the advancement of technology in education emphasises on better quality of education to all learners including the young children in the pre-school. According to Ismail (2018), "This 21st century learning requires effective teaching aids in order to achieve this learning target; learning objectives achieved through the use of these tools must demonstrate the achievement of elements of technical skills related to material content and skills of the 21st century". When a child is brought into this world, everything around him/her is surrounded by varieties of technology. They grow up using technologies no matter how young they are, as the parenting style and environment they grew up in is totally different compared to those days. Nowadays, children all over the world including in Malaysia, as young as two years old is able to get access to digital technologies such as laptop, iPad and other devices which enables them to master their technology knowledge. For instance, a four years old child is able to access the iPad and search for YouTube and play his/her favourite songs or watch their favourite shows. Not only that, their type of play is no more outdoor exploration or experiential learning but within the digital technology (Lindeman et al, 2021). Technically, the word 'play' has evolved to 'games' for this generation of children. In Malaysia, learning has also begun within the digital technological tools where preschool teachers are equally spending time as traditional learning method, such as, for recognising numbers, alphabets and other skills (Lamrani et al, 2020). For instance, there are many apps for learning is available out there to be downloaded and make use of it in the gadgets such as for alphabets and

number tracing which are used by parents and preschool teachers at both home and some pre-schools in Malaysia but with a limited time. The learners just have to use their finger to trace the alphabets or numbers according to the number direction and this is the new way of learning with the incorporation of digital technology. Meanwhile, in traditional method, the preschool teachers have to teach the children step by step on how to trace the alphabets or numbers by tracing in the air and followed by tracing alphabets and numbers on the sandpaper letters (Berson et al, 2022). Based on previous research, apps such as Kahoot, PBS Kids, Word wall, quizzes and many others are widely been used in pre-school education to improve children's learning progresses (Nicolaidou et al, 2022). In Malaysia, the government places a strong focus on early childhood education because it is seen as the critical time for children to learn all the skills necessary for their growth (Abdelwahed, 2019). Preschool education is also given the same emphasis as primary, secondary, and postsecondary education. Furthermore, the National Key Performance Indicator (NKPI), which measures children's acquisition of fundamental literacy abilities after three years of conventional primary education, is a clear indicator of the Malaysian government's recognition of the value of early literacy instruction and intervention (Ministry of Education Malaysia, 2013). Additionally, acquiring necessary skills are critical and significant at the preschool level because it is a prerequisite for learning, as well as prepares them for school readiness.

1.3 Problem Statement

GBL approach has been used widely most in secondary and higher education in Malaysia and researchers have found that, this learning approach has positive impacts on the learners as well as the teachers' interaction with their learners (Bali et al, 2021; Ying, 2021). It is also found that this approach promotes positive learning, collaboration,

engagement, active participation, as well as act as motivation to improve the learners learning process (Alabbasi, 2018). Precisely in early childhood setting, the children tend to be more attentive and their attention spent limit has increased due to incorporation of GBL approach, as it keeps them excited about the rewards and feedbacks (Lamrani et al, 2020). Positive reinforcement plays vital role in younger children's life, simple reinforcements such as cheering and clapping, telling them 'I'm so proud of you', giving them a hug and rewards gives them the motivation to perform better (Bali et al, 2021). As traditional games or computerised games generally attracts children due to the concepts, elements, music and animation, younger children feel more motivated and it makes them compete with their peers. Eventually, it gets the children to become better on the focused area.

Besides that, the issue faced by current preschool education is that, awareness among preschool teachers in digital environment are still low despite the teaching methodology. It is always best to find out the perception and their acceptance of preschool teachers on the learning method to understand their views (Graber et al, 2021). This will ensure that the preschool teachers are aware of what the method is about and how to incorporate into educating young learners. There are various ways of incorporating game-based approach in the early childhood setting to promote effective teaching and learning process. To understand this concept of teaching, the preschool teachers must possess knowledge and skills required such as intellectual and creativity, as well as keep up with the current trend of ICT. Preschool teachers require appropriate assistance, arranged by the association or school, to accomplish this task. According to studies, preschool teachers are hesitant to employ this strategy that involves digital technology, particularly the more senior teachers who may not be as familiar with computers and the potential harm to the children (Herout, 2016). Regardless of whether they are more experienced or

recent graduates, preschool teachers can effectively manage this by receiving the necessary training.

Furthermore, another issue that was addressed by recent findings is that, preschool teachers were not genuinely persuaded that games would improve their jobs, which is why they were reluctant to employ digital game-based leaning (DGBL) (Kaimara et al., 2021). A significant factor in determining teachers' attitudes about DGBL is their own experiences, including their own limited playing experience, workload, sense of their own ICT efficacy, and views of important others, including parents, experts, students, and other teachers. According to several studies, a small percentage of preschool teachers dislike this approach because of its drawbacks, which include health problems, difficulties with communication when playing alone, short attention spans, and numerous other challenges (Pratiwi et al, 2020; Nurmash, 2022). Parents of the children are concerned about the drawbacks that can affect their learning develops (Lamrani et al, 2020), even if teachers are aware of them and plan their classes in accordance with the requirements. Because of this, preschool teachers find it demotivating and are reluctant to take the chance, which prevents them from utilising collaborative technology to its full potential (Nguyen, 2020).

Moving along, lack of financial support in the preschool setting is also one issue preschool teachers face when implementing games in teaching and learning. In terms of financial resources, schools' antiquated technological infrastructure is linked to the expense of buying games and the absence of financial assistance; as a result, budgetary constraints seem to be the main obstacle to implementing DGBL (Kaimara et al., 2021). Consequently, preschool teachers believe that even with their optimistic outlooks and plans to utilise digital games for educational purposes, it is anticipated that there will be inadequate financial assistance. The absence of ICT training for preschool teachers is a challenging aspect of the preschool environment. Inadequate ICT training for teachers, a

lack of awareness of the advantages of digital games from workshops and training programs, a lack of cooperation on the part of teachers, problems with children collaboration during games, and a lack of professional development opportunities for preschool teachers are all examples of a lack of ICT training (Mikrouli et al., 2024).

The other challenge faced by preschool teachers in teaching and learning is that, the shift of traditional learning to GBL learning using ICT. According to research, teachers' preconceptions and unfavourable opinions about GBL are one of the main barriers preventing the widespread use of educational games in classrooms (Kaimara et al., 2021). This situation is caused in part by the drawbacks of applying GBL with digital technology, including a dearth of practical experience, difficulty understanding the actual world, difficulties interacting socially with peers, and numerous other issues. Aside from that, this concern is compounded by preschool teachers' lack of training and expertise in implementing ICT abilities. Additionally, they think that the benefits of the traditional learning strategy outweigh the drawbacks of DGBL, which primarily have negative effects (Widayati et al., 2023).

In order for preschool teachers to be aware of and motivated to implement lessons to develop digital natives, further research is needed regarding the acceptance of the game-based learning approach, particularly among preschool teachers in the area of implementing effective and interactive teaching and learning (Raptopoulou, 2020). Since the educational system is changing in tandem with technology, it is critical to have additional studies demonstrating early childhood educators' approval of the integration of game-based learning within the particular context. The topic's study limitations draw attention to the need for additional research to expand on and strengthen the body of existing material. Therefore, the purpose of this study is to investigate preschool teachers' perceptions on their acceptance of game-based learning strategies.

1.4 Purpose of the Study

Pre-schoolers' learning processes are positively impacted by game-based learning approach (Lamrani, 2020; Bali et al., 2021), and preschool teachers are currently experimenting with integrating digital learning resources and technologies into the classroom (May, 2021). However, as more research is needed in this particular area, the goal of this study is to investigate the preschool teachers' acceptance of Game-Based Learning (GBL) to promote interactive teaching and learning.

1.5 Research Objectives

1. To examine preschool teacher's acceptance towards Game-Based Learning teaching approach.

2. To identify the strategies used to promote interactive teaching and learning using Game-Based Learning.

3. To investigate preschool teacher's perception in terms of knowledge, awareness, training and facilities on the implementation of Game-Based Learning into their teaching practices.

1.6 Research Questions

1. What is preschool teacher's acceptance on the implementation of Game-Based Learning approach?

2. What are the strategies used to implementing interactive teaching and learning using Game-Based Learning?

3. What are the preschool teacher's perception in terms of knowledge, awareness, training and facilities on the implementation of Game-Based Learning into their teaching practices?

1.7 Rationale of the Study

This study will be conducted to gain an insight on the exploration of preschool teachers' perception on the acceptance of game-based learning approach. According to few researches, not all the educators are into this method as they are concern about the disadvantages towards the young learners (Pratiwi et al, 2020; Nurmash, 2022). Generally, screening time for young children cannot be longer as it will affect their development and learning progress. Even though, GBL approach has its benefits towards learners' learning process, it might affect them. However, the disadvantages of this method is still less compared to advantages (Ying, 2020). Most of the educators of higher education supports this method and this study would like to explore the acceptance of preschool teachers in the preschool setting. Apart from that, the purpose is also to find out the strategies of incorporating GBL approach to promote interactive teaching and learning environment for the little ones. Not only that, this research and the findings will be able to contribute academically to the current preschool system and policy.

1.8 Significance of the Study

Some of the significance of this study is that it will be beneficial mainly for any preschool teachers who are keen in applying GBL approach, as this will provide them a gist all about the method. There are different ways and techniques to conduct game-based learning approach in order to achieve the targeted goal for young children. Different

learners learn differently, so the preschool teachers can do trial and error with the children to identify the suitable techniques into the learning process. Hence, the mission can be accomplished.

Secondly, preschool teachers who has not experienced or no deeper understanding of this game-based learning approach will be able to get an insight of what it is about, understand and get to know about the strategies on implementing it into their lesson. Many preschool teachers' awareness on the GBL approach are still low. However, theoretical wise they are aware but not fully incorporating the skills into teaching to promote holistic developments for the younger age group. Hence, this study will improve their skills and develop further on incorporating the game elements into the learning process.

Apart from that, this study can be helpful for other researchers who would like to conduct their study on this method, because there isn't enough study or literature review found especially on the acceptance of early childhood educators (Lindeman et al, 2021). So, the upcoming researchers can proceed from where this research has stopped or get some benefits from literature review and discussion to support their study for further details. Academicians can use this research to explore further into the acceptance of preschool teachers and propose suggestions to make the learning process for young learners more effective. Not only that, they also can suggest and train the preschool teachers who are not so fond of this method to see the benefits that the young learners can attain from this learning method.

1.9 Limitation of the Study

There are several limitations to this study. The first and most important factor is the teacher's comprehension of the terms used, as several teachers may interpret the same concepts differently. By the time this research study ends, the researcher's goals will not have been met due to variations in how terms are interpreted. As a result, it's critical that participants fully comprehend the terminology in order for them to respond appropriately to the findings that follow.

Next factor will be the number of participants that can be obtain for this study as it is a qualitative research and the researcher will be using semi-structured interview protocol as the instrument for data collection. In order to proceed with that method, a minimum of six participants needed and those participants are supposed to match the criteria that the researcher looking for, such as, awareness of game-based learning approach and experience of at least two years with the young children, as well as has certain degree of GBL approach in terms of incorporating into the young learners' education. This is to make sure the data collected later on has validity and reliability towards the study conducted as the preschool teachers' acceptance are important, as well as easy to find references to support the writing. This research is conducted among preschool teachers in Petaling Jaya area only so, the finding cannot be generalised to all preschool teachers.

Other limitation is the time. The allocation of time will be a factor for data collection process as all the preschool teachers are now back to school and each one of them from different location, and their availability might be clashing with one another which will be a bit of troublesome for the researcher. Besides that, since semi-structured interview method has been chosen for the study, it might be time consuming as the participants might have a lot to say regarding their views. Not only that, it is time

consuming in term of its process because it might take several weeks or months to collect data. Finding is not statistically representative because, it is a perspective-based method of research, the responses given are not measured. However, the data collection method chosen for this study is highly reliable and provide valid data which will be useful for the study.

1.10 Definition of Terms

Acceptance:

Acceptance is the act of agreeing to accept or do anything that is offered (Ninaus et al, 2017).

In this research, acceptance means trying to explore the preschool teachers' perception on whether they accept or do not accept the Game-Based Learning approach in the children's learning process.

Game-Based Learning:

Learning facilitated with the use of games and by playing (Whitton, 2012).

In this research, the term GBL means learning with the incorporation of game elements that facilitates learning for the young children in digital context.

Preschool teacher:

An educator who is specialised in early years education, facilitate learning process by planning and implementing lessons for younger children (Lindeman et al, 2021).

In this research, a preschool teacher is the person who facilitate learning for the children of the age group of 2-6 years old.

Interactive teaching:

It is known as the teaching strategies that priorities getting learners involved as possible in all kind of learning that involves their engagement (Giorgdze et al, 2017).

In this research, interactive teaching means strategies used by the preschool teachers to promote effective learning using GBL approach which increase children's participation in the overall learning process.

Preschool teacher's perception:

The propensity of a preschool teacher's comprehension, viewpoints, and opinion regarding the relevant subject is referred to as perception (Göçen et al, 2020).

In this study, perception means understanding and opinion of a preschool teacher related to the knowledge, awareness, training, facilities that related to digital Game-Based Learning approach.

1.11 Conceptual Framework

The purpose of this study to adapt the framework of TAM is to investigate the preschool teachers' acceptance of GBL to promote interactive teaching and learning. The conceptual framework of this study and how the variables interact with one another in the context of GBL are depicted in figure 1.11.1 below.

Figure 1.11.1

Conceptual Framework of the Study
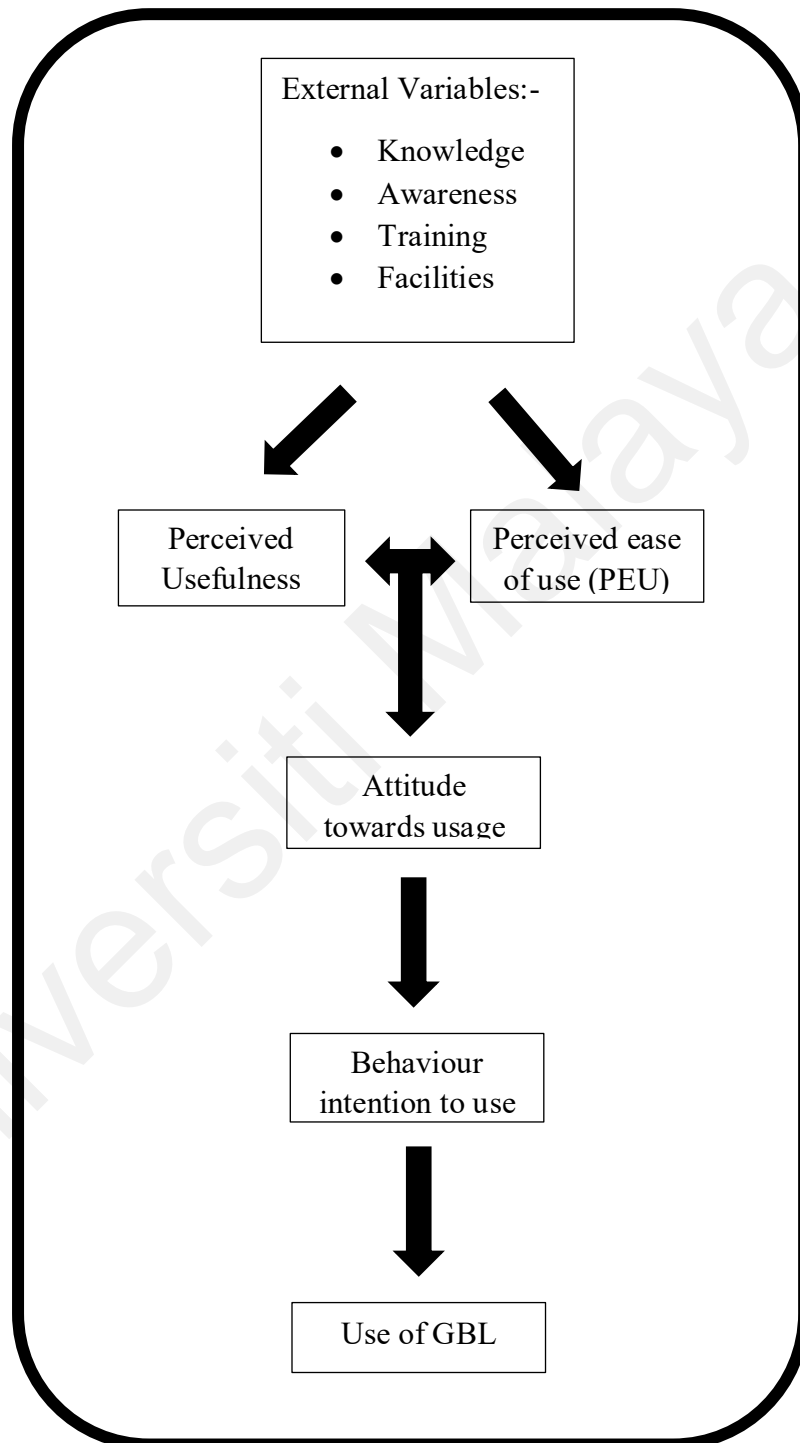
Note. Conceptual framework on acceptance of pre-school teachers on GBL approach

The researcher believes that external variables such as awareness of GBL in digital environment, knowledge, training and facilities plays a role in driving the teachers' motivation (perceived usefulness, perceived ease of use, attitudes and behaviour of intention) to incorporate the technology learning via this approach. In another words, external variables strongly affects one another one, when teachers not only have the knowledge, training and experience of GBL with available facilities or resources in school, it will eventually will strive to collaborate GBL approach using digital technology.

Within this framework, knowledge refers to the extent of preschool teachers' exposure, comprehension, beliefs, and attitudes towards GBL. This is dependent on how tolerant the teachers are and how willing they are to use the techniques to help the children learn. The creation of a lesson requires the preschool teacher's knowledge because it will be comprehensive (Van Dijken, 2022). Now that we're moving along, a teacher's awareness of GBL approach refers to the application of GBL in conjunction with fact and event observation. This variable is important because a skilled preschool teacher will know exactly where in the session to include the abilities and procedures that the children need to modify in order to meet the course's ultimate objective (Nurmash, 2022). Not only that, their awareness is vital as it will benefit on accommodating the children's learning using variety of interactive teaching and learning. In other words, awareness of GBL approach allows the preschool teachers to be creative in designing lessons, despite the advantages and disadvantages.

Then, training is one of the variables that is important to take note when it comes to applying GBL approach into the learning of children. By receiving adequate training, preschool teachers get a variety of suggestions from experts on how to incorporate GBL using digital technology in the lesson for the children as well as worries about both positive and bad outcomes for the children. Furthermore, a qualified preschool teacher

will be able to gauge the developmental stage of the children and design lessons that suit them. As mentioned earlier, senior teachers are hesitant in incorporating this approach in digital environment as their skills of using technology is limited and they are more positive of using GBL in non-digital environment. Thus, training for all teachers are important to ease this process for make the learning and teaching interactive, as well as exciting for the children (Pandya & Lodha, 2021).

Last but not least, facilities that a school prepare for the preschool teachers and children to utilise would be a good impact on their teaching and learning. In order to incorporate GBL using digital technology, the preschools ought to have been equipped with technology so that the preschool teachers could encourage upper-class lessons for the children, including smart TVs, tablets, computers, and other electronic devices (Petty, 2023). This is to guarantee that every child has the opportunity to study and develop a feeling of understanding for their surroundings via the use of GBL approach. Hence, all these four variables will develop an attitude towards the preschool teachers on accepting the approach, then followed by if they accept, it will develop their attitude to positive behaviour where, the preschool teachers will eventually start practicing with confidence.

1.12 Summary

Learning has altered as a result of education's emphasis on creating lifelong learners. Preschool teachers are starting to provide the young children fresh opportunity to develop new talents alongside their peers. Game aspects and components are included in GBL approach. These have made it possible for the skills required to learn in the twenty-first century to develop. Though opportunities as such, young children are able to exhibit and reflect the positive skills such as motivation, engagement and many others in their life for long term. If GBL approach have a good impact on young children's engagement, then preschool teachers should implement these instructional techniques and practises in their learning system.

This research paper consist of five chapters. The first chapter contains a brief introduction on the topic of the study, including background, problem statement, purpose, research questions and objectives, limitation and definition. Chapter 2 will discuss on the literature review regarding GBL approach in pre-school education, as well as explore some of the strategies used by the preschool teachers to make the teaching and learning interactive and effective. Research methodology will be discussed in Chapter 3, while Chapter 4 provides results from the interviews. Lastly, in Chapter 5 conclusion and implications of the research findings will be discussed.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter discusses the in-depth details related to Game-based learning approach. Then, information related to the benefits of the methods, acceptance of the preschool teachers regarding the mentioned learning approach to understand their exposures, understanding, experiences as well as tools and techniques used to accommodate learning to the young children.

2.2 Play in Early Childhood Education

Researches had been done over the years to show beyond doubt that play is an essential component of learning and part and parcel of the young children's life. As it is mentioned that, children acquire knowledge and make sense of their world through play. This statement is supported by theorist such as Maria Montessori and Vygotsky. Maria Montessori believes that children are absorbent minded, where they observe their environment and learn independently by experimenting the things around them (Anvarovna, 2022). In order to promote conducive learning environment, one should prepare an appropriate environment for the learning to take place, as such environment promotes collaboration, critical thinking, creativity and communication. Besides that, Vygotsky mentioned in Zone of Proximal Development (ZPD) that learning through play get the children to tackle problem-solving situations but under adult guidance or collaboration with skilled peers, as children play in many ways (Huang, 2021). Play can be many type which facilitate young children's learning, such as constrictive play, solitary play, exploratory play, word play, so on and forth (Lambrani et al, 2020).

According to Jean Piaget's Theory of Cognitive Development, children go through four phases as they play and use experiential learning to make sense of the environment (Piaget, 1962). Known as the sensorimotor stage, it lasts from birth to two years of age. During this time, newborns learn basic motor abilities as well as how to detect and interact with their surroundings through their bodies and their sense of touch. Through their perceptions and their actions, moving around and investigating their surroundings, the child learns about the world (Anderson et al., 2023). A variety of cognitive skills emerge throughout the sensorimotor period. Object permanence, postponed imitation, self-recognition (the infant realises that other people are different from them), and representational play are a few of these. The preoperational stage, which lasts from two to seven years, is the second stage of intellectual development according to Piaget. Since the infant does not yet employ operations, a system of logical rules, their thinking is impacted more by appearance than by logic at this early stage of development (Hopkins & Lillard, 2021). Let's pretend play becomes increasingly significant as children reach the preoperational stage, egocentrism decreases, and they start to enjoy when other kids play with them. The third stage is referred to as the concrete operational stage, during which the children can exhibit improvement in inclusion activities, conserve quantities, and recognise that people have various perspectives on the world (decentring) by using operations, which are a set of logical rules (Venukapalli, 2023). Because the concrete stage heralds the emergence of logical or operational thought, Piaget saw it as a significant turning point in the cognitive development of the child (McLelland, 2024). This indicates that the child can solve problems mentally rather than by doing so on a real-world scale. Finally, is the formal operational stage which is more on adolescents develop higher-order reasoning skills, the ability to integrate and classify objects in a more sophisticated manner, and the capacity for abstract thought (Piaget, 1962). Hence, this is how play evolve during childhood, moulds the children to a better future.

Play is important in every child's life, as it promotes holistic developments such as physical, intellectual, language, and creativity, social and emotional skills that needs to be obtained by the children before they are ready for their elementary school education. According to Alharbi & Alzahrani, "Play is holistic and provides children with a range of support including mental and emotional well-being, social interactions, and physical challenges" (2020, p. 9). In fact, the Convention on the Rights of the Child (CRC) mentioned that every child in this world has their rights towards play and learning and actions should be taken on adults who prohibits it (Kjørholt, 2019). Not only that, it stated that equality in education should be given to both girls and boys and it should begin from early years of every child as it is the crucial period for learning to take place.

2.3 Play in 21st century

The current generation's learning method has been modernised and the phase has been shifted to the digital learning method (Lambrani et al, 2020). In other word, traditional learning method has been converted to digitalization due to the technology advancement in education. In this era, the incorporation of ICT has been widely used in all stages of education including early years (Fang et al, 2022). This is due to that, this generation civilians are raised with technological devices since birth. For instance, as soon as the child is born the whole world of the child revolves around things that's been created using technological features. To be more precise, parents back then used to sing rhymes or use manual toys or objects to stop the child from crying, whereas parents in this generation uses their phones or other electronic gadgets to prevent the child from this circumstance. In term of learning, one would be introducing the alphabets or numbers by drawing in the air, flash cards or even tracing on the paper. However, due to the incorporation of digital technology young children are introduced to learning via gadgets, such as tracing the

letters or numbers on the screen accommodated by many other ways of acquiring knowledge (Van Dijken, 2022). There are many other sources available on these gadgets to facilitate learning for young children.

Moving along, Bali et al (2021) and Berson et al (2022) agreed to the term 'play' has evolved to 'games' or 'serious games' due the advancement of technology. Nevertheless, learning via digital technology for children in early years are still limited as it has negative effects in their learning progress, as well as to their physical and social-emotion despite the benefits (Giarcia et al, 2021). However, benefits such as critical thinking, problem-solving, collaboration, motivation, and attention spend, and many others are still acquired by the children (Lambrani et al, 2020). Not only that, it accommodates all the necessary "21st century skills" which are vital for their overall learning development (Liu et al, 2020). Furthermore, pre-schools nowadays are equipped with digital technology to facilitate learning for children to meet their needs to acquire the 21st century skills. Researchers have found that incorporating games in children's learning has higher effects compared to traditional learning where it enables them to think out of the box, increases their motivation to learn, as well as keep them excited to see what's coming up next for them to achieve. Besides that, it is stated that traditional method of learning has less impact on their learning as children are mostly guided by their teachers and there is not much components to explore (Vidal-Hall et al, 2020). It is proven that children perform better when it self-centred as they get to make their own decisions on how they want to acquire the lesson, trial and error new ways of capturing things around as every child has their own creativity. Fang et al (2022), agreed that children aged between 3 and 8, prefer learning with the incorporation of games in their lessons. Traditional method of games included flashcards, number and alphabet tracing, role-playing and many other, yet with the collaboration of digital technology seems more advanced and interesting for the children which results in better learning outcomes for

every children by end of the lesson (Ying, 2021). Moreover, teachers are advised to be creative to implement 'games' or 'serious games' into their lesson plan to facilitate better learning to the children (Sailer et al, 2021). Not only that, preschools are promoting Science, Technology, Engineering, and Mathematics (STEM) lessons weekly in order to meet the current generations' requirement in learning, so that there are more exploration to be done.

2.4 Game-Based Learning (GBL)

Learning process in early years has been advanced due to the incorporation of digital technology in this century via game-based learning approach. Even though, early years' education is not fully based on this approach, however, in this era some of the pre-schools started using this method to accommodate children's learning as children are growing up in such circumstance (Giarcia et al, 2021). Most importantly, not all the educators are fond of using this approach in digital context, yet, some uses game-based learning approach as they know how to handle it (Lamrani et al, 2020). On the other hand, some educators capable of using GBL efficiently depending on their experience nor adaptability to the methods and also based on the lessons. Even so, incorporating GBL have its own benefits in children's learning experiences. GBL has been used efficiently in both digital and non-digital environment for the young children to ease their learning process through interactive teaching in the preschools.

Game-Based Learning (GBL) is defined as the integration of video games and components associated with game reality, content, subjects, and pictures in the educational process (Liu et al, 2020), which can be in both digital and non-digital settings. This statement was supported by other researchers such as Cai et al (2022) and Krouska et al (2022) that learning facilitated with use of games or also knows as 'serious games'

and playing it which improves learners' social skills and behaviours towards their learning process. Moreover, as an evidence, the studies of last 5 years stated that there is a tremendous amount of improvement in terms of the children's interaction, learning and also encouragement to grasp the concept of topics of interest (Fang et al, 2022). Thus, GBL is both intrinsically and extrinsically rewarding for the young children. There are many applications and tools available for the digital technology learning such as PBS Kids, Kahoot, Jolly Phonics, Busy Shapes, ABCMouse.com, BrainPOP, Wordwalls and many others. Each apps have its own key benefits such as improving the children's critical thinking skills, creativity, reading skills, as well as instils confidence and encouragement. To add on, these apps are highly recommended for the young children as the curriculum and lessons were created by the guidance of the experienced early childhood educators.

Some examples of GBL applications are shown below.
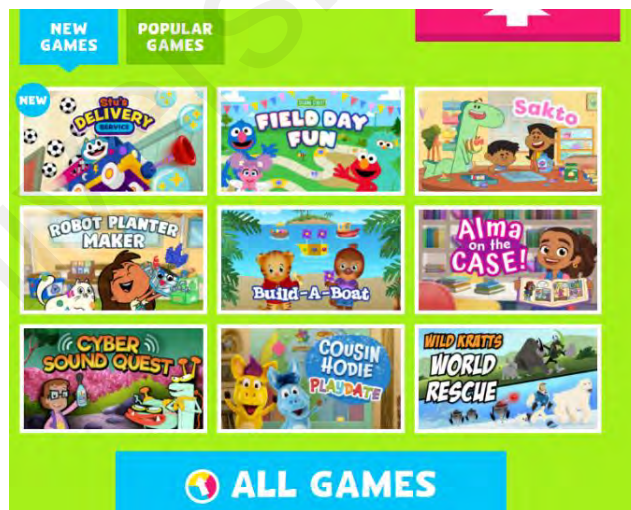
PBS Kids

Wordwall

BrainPop

Kahoot!

On the other hand, the term 'GBL' involves incorporating game features into non-gaming contexts (Riska et al, 2021). Ribeiro et al (2021) and Nguyen (2020) agreed to the statement by adding the fact it incorporates didactic contents, as well as points, badges, and leaderboards are examples of GBL components in both digital and non-digital environment that encourage friendly competition and provide engaging learning and training opportunities. Three performance-improving variables can be used to summarise the benefits of games: an increase in both individual and group motivation, a strengthening of community cohesion, and an increase in academic accomplishment (Balint-Svella, 2021). In order to increase children's motivation and provide them more freedom in choosing where to discover and how to learn knowledge, it is helpful to extend the learning process or expand it outside of the classroom (Liu et al, 2020). Numerous studies on GBL also take into account participant situational leadership and cooperative decision-making for gaming activities (Behnamnia et al, 2022). It also allows the preschool teachers and guardians to keep track on the children's learning and achievements. To be more precise, these learning tools enable the teachers to observe the children's learning phase in terms of understanding and capabilities of acing in the topic of interest (Giarcia et al, 2021).

2.5 GBL Implementation in Preschool

In a world where global technology is snowballing and immersive learning is currently being overwhelmed, game-based learning (GBL) is an interactive educational strategy that can promote children's learning growth (Aslan et al., 2022). This strategy is in line with research showing children may master certain learning objectives by playing games and doing activities that help them explore and understand their environment (Wang et al., 2020). Children will be inspired to learn and explore by the range of educational

materials that GBL may provide in interactive environments and user interfaces. For this reason, GBL is being used in education to support children's cognitive development, whether it be in the classroom or online (Zolkipli et al., 2023). In a preschool setting, this approach includes enjoyable activities, opportunities for concentrated attention, accessibility and organized games, exploration and interaction with the environment, and self-experimentation. Put simply, this method necessitates the children participate fully in the lessons at all times. By giving them the freedom to explore the game environment, the GBL approach can help children satisfy their curiosity while also enhancing their cognitive function, gross and fine motor skills, imaginative and creative abilities, and ability to overcome anxiety and depression in a learning environment (Meier et al., 2020). By offering an engaging and dynamic experience, it aids in the children's retention of interest and motivation during a teaching and learning session.

Furthermore, it is essential to have high-quality instructional materials that cover every facet of children's education and pique their curiosity. Children must be engaged and involved in the learning process throughout the GBL courseware's interactive learning settings. For the purpose of reinforcement or memorization, the GBL learning process necessitates the use of a variety of media, including visuals, sounds, videos, symbols, and letters and numbers (Menesis, 2020). Additionally, it uses visualization technologies to enhance the expression and utilization of spoken commands by utilizing both static and dynamic graphics (Aslan et al., 2022). Thus, effective multimedia components are necessary for effective courseware to be used as teaching tools. Any multimedia technology used in a child's education must be developmentally appropriate for the child's level of knowledge acquisition. Three stages comprise the development of learning, according to Newton et al. (2019): concrete, pictures, and symbols. This is consistent with the three modalities of representation identified by Bruner's Cognitive Development Theory: enactive (based on action), iconic (based on visuals), and symbolic

(based on language). According to this constructivist paradigm, children go from enactive to iconic to symbolic representation when they encounter new material. Another conclusion is that any content can be learned by even the young children if it is structured to meet their current proficiency level. However, the majority of preschool teachers are more likely to choose a teaching strategy that offers no cumulative exposure to either of the preceding levels and instead introduce children to the symbolic learning materials of Level 3 (text reading and arithmetic operations), because they wouldn't have fully mastered the earlier levels, the children would be forced to go on to a more advanced one (Newton et al., 2019). If the preschool children discover the subject to be very challenging for their level, this will indirectly make them lose interest in learning.

The development of GBL courseware would allow for the introduction of the correct learning sequence in the preschooler's learning process through the integration of educational technologies, including both new and old media that are suited for children's skills and capacities. The hallmark of the present generation is internet-based real-time technology, which may offer young children many chances to participate in age-appropriate, meaningful learning experiences (Wang et al., 2020). It can encourage children to interact impulsively with teachers and peers, which will increase their level of engagement with the activities. This closely aligns with contemporary teaching paradigms that support learner autonomy and interactive task-based learning. Children would be more engaged and motivated to study more if interactive material modules were used in conjunction with today's educational technologies (Zolkipli et al., 2023). These approaches would also serve to reinforce children's current skills and help them progress to the next level gradually.

Moving along, the literature on GBL and Early Childhood Education (ECE) has shown how educational digital games can support learning when they are created and used in a pedagogically acceptable way, creativity, social interaction, cognitive

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development, healthy behaviour and higher-order thinking skills (Mikrouli et al., 2024). These days, integrating GBL into ECE is crucial for assisting in the professional development of instructors. Preschool teachers can be crucial to the effective implementation of GBL in preschool environments and to the development of developmentally appropriate abilities in young children (Raptopoulou, 2020). Because there are no explicit GBL standards for preschool teachers in the preschool curriculum, preschool teachers are expected to create and carry out a set of GBL activities as part of their teaching techniques independently (Chang & Yang, 2023). As a result, preschool teachers play an equally vital and helpful role. According to a review of the literature, preschool teachers' attitudes and beliefs about GBL, their competency and skills with technology, and their perceptions of barriers to using GBL in preschool settings all have an impact on the adoption and use of ICT and digital games in teaching and learning (Manesis, 2020).

2.6 Previous Research on GBL

In Malaysia, GBL is well-received in the fields of primary, secondary, and university education. These techniques have been included into preschool education to support learning in accordance with 21st century competencies. There was a study conducted by Behnamnia et al (2020), related GBL approach mentioned that by incorporating digital technology into pre-school childrens' syllabus have tremendous benefits in their overall holistic development such as cognitive, creativity, physical, language and socio-emotional skills. The author did, however, make a special mention of pre-schoolers' creativity, stating that she feels that children should be strengthened in their imaginative abilities and creativity between the ages of two and six. Children are therefore able to engage in creative activities through these two ways, preparing them for future adaptation

to real-life situations. The finding of the study states by emphasising the creative process, digital games that teach creativity can also help children achieve better academic results and develop 21st century abilities like critical thinking, problem-solving, creativity, and teamwork. Moving along, similar study conducted by the author Bali et al (2021), discuss about the effectiveness of GBL approach in promoting socio-emotional development of pre-school children in Malaysia. Teaching positive behaviour patterns and inhibiting negative behaviour patterns are two ways to enhance social-emotional learning abilities. In this study, the participants mentioned that, GBL approach consists of many strategies, such as collaboration, taking turns, learning from one another, tendency of helping each other and regulates their emotion which allows the children to become a better person in general.

2.6.1 GBL Apps and Tools

Educational play instruments can be used to investigate children's abilities and confidence. It is thought that educational gaming technologies can help young children's social-emotional development. This study mainly focuses on the 3D maze game and elaborated the benefits and how it supports in developing children's socio-emotional skills. Based on the findings, the author mentioned that playing the 3D maze game helps children develop all areas of their development. The children can help his or her friends find a way there while patiently waiting for his turn to play, as well as develops the feelings empathy, sympathy and cooperation. Thus, this maze game helps train the child's emotional and social development. Moving along, the researcher named Ying (2021), conducted a study on the impact of games in enhancing language skills among pre-school children. GBL apps like Wordwall appear to be effective in helping preschoolers understand language in the context of growing their vocabulary and language skills. The author added that before starting primary school, children between the ages of 4 and 6 should work on their language abilities and expand their vocabulary. GBL gets children

ready for further education. Furthermore, GBL combined with technology improves vocabulary counts in addition to memory, creativity, and problem-solving abilities. According to Ying (2021), GBL has greater advantages for young children than traditional teaching approaches when it is implemented on a regular basis.

Moreover, Hidayat et al. (2023) investigated the efficacy of GBL tools at the preschool level located at Mekarmulya. The study indicates that educational game tools are very beneficial in piqueing young children's interest in learning. The reason for this is that early childhoods are, psychologically speaking, a time of play. Considering the educational game tools, APE was forwarded. This type of learning media is highly suggested for use in every learning session, particularly for early childhood education. APE serves to stimulate young children as they participate in classroom instruction. APE is a tool that can be seen with the eyes and heard with the ears, according to an expert study, and it helps preschool teachers conduct the teaching and learning process more effectively and efficiently (Safitri et al., 2020; Risman et al., 2022; Dwi Safitri et al., 2022). Therefore, APE provides all the advantages for early infancy during the process of teaching and learning, particularly for their advances in psychomotor and cognitive domains. Additionally, both within and outside of the classroom, APE helps preschool teachers facilitate the teaching and learning process for young children (Hidayat, Hidayat, et al., 2022). This study's findings indicated that APE tool stimulate the children's cognitive, physical motor, language, and social-emotional competencies; boosts the children's curiosity and enthusiasm when they are participating in the learning process; giving the children a stimulus to understand the learning material given; and increasing enthusiasm, both for the teachers during teaching and the children during learning. Put another way, the process of teaching and learning gets more pleasurable.

Based on the researcher's findings, a study conducted in Greece by Laranjeiro (2021) highlighted the advantages of game-based tools collaboration in helping pre-

schoolers learn critical abilities. Author's findings stated, the tablet as a tool, was utilised for literacy exercises, and apps for building stories and learning new words were installed. Children demonstrated positive moods, actively participated in games, shared the tablet, understood the programmes, and spoke. The exercise improved speech abilities and encouraged language acquisition. Furthermore, results from using math apps were superior to those from teaching traditional math. Using applications to create multimedia in groups sparked curiosity, improved communication and teamwork, and improved fine motor, hand-eye coordination, and creative thinking. Children were able to mimic conventional play, practise spatial organisation, and understand item relationships with an app that mimicked dollhouse decoration games. It encouraged creativity and teamwork at the same time. Graphic compositions could be made with an app for photo editing. These encounters demonstrated how game-based apps may affect children's cognitive growth, sense of autonomy, and inventiveness.

Similar research was done in EU nations by Nicolaidou et al. (2022) on games and its advantages for teaching young children how to control their emotions, including rage. Interpersonal and intrapersonal abilities that help pupils comprehend and control their emotions, create and meet constructive goals, feel and demonstrate empathy for others, build and sustain healthy relationships, and make responsible decisions are all included in the category of social and emotional skills. Three of the most frequent reasons for referrals to mental health services for children are anger, impatience, and violence. If negative emotions like rage are not well controlled, they may lead to arguments or even violent outbursts. Active emotion regulation, or the ability to identify, regulate, and manage one's emotions, is therefore crucial for fostering positive and healthy relationships with others and is a social and emotional skill that kids should start learning at a young age. According to the researcher's findings, gamified learning in the classroom through the use of apps minimises severely negative behaviour in children and increases

their emotional intelligence and capacity for situational awareness. For instance, there are many stories related to emotions and anger management in the gamified apps which allow the children to explore and understand the different emotions as well as the coping techniques. Based on his study's results, seven of the ten children have profited from using GBL as a learning tool to regulate their emotions and have also shown improvements in their peer relationships when working in groups. For this reason, the author thinks it's critical to include gamified learning in the educational process so that children can learn in a better setting.

A research conducted by Pulungan & Hariati (2022), in Indonesia discusses on Development of Game Tool to Improve Reading Ability of Early Childhood. In this study, the authors focused on the tool called 'Word Tree'. The researchers mentioned that, the ability of educational games to sustain children's motivation and interest by customising learning and gaming experiences according to individual needs, preferences, goals, and talents is one of the key components that contributes to their success. Games have a good effect on users because they provide them the chance to change a lot of things, can pique their curiosity, and impart basic knowledge through enjoyable experiences. The following are some markers of reading proficiency: phonemic awareness, letter knowledge, and comprehension of printed letters. The Minister of Education and Culture's Regulation No. 146 of 2014 regarding the Curriculum 2013 for Early Childhood Education, on the other hand, states that early childhood reading abilities, from birth to age six, can be measured based on two basic competencies: demonstrating receptive language skills (listening and reading) and identifying early literacy through play. The participants of this study who are known as the expert validator concluded that, because children want to play and still think in concrete or real terms, educational gaming tools really enhance the process and learning outcomes in early childhood education. Therefore, media or tools are needed to deliver abstract concepts in a real and enjoyable form. In order to facilitate teaching and

training, schools provide children with manipulative materials, such as game movements. Playing these cooperative games helps children develop their motor, cognitive, arithmetic, literacy, and communication skills. In preschool and early childhood education, learning activities are carried out as the children play since it makes the information easier for them to understand and makes learning more enjoyable. Playing games or utilising play tools is a pleasant way for children to learn.

GBL applications often used as a mode of motivational factor for the learning process among children in preschool. A past study conducted by Rashid & Noor (2023), discussed on enhancing preschoolers' learning motivation in *Jawi* subject in Malaysia. In this study, authors mentioned that, applications for GBL are growing in popularity as a successful way to increase children's motivation to learn. Due to a lack of technological tools, children's enthusiasm to learn about *Jawi*, a topic they frequently find boring, has reduced. In order to boost children's motivation to learn *Jawi*, the "*Dunia Jawi*" mobile application was created as a game-based platform. A pretest-posttest design was used to assess 32 preschoolers who were part of the pre-experimental group in the study. The mean for the posttest (43.50) was greater than the mean for the pretest (31.47), indicating an increase in the motivation of preschoolers, according to the data. Preschoolers' motivation to learn *Jawi* increased significantly as a result of using the "*Dunia Jawi*" mobile application, according to the statistically significant rise. The findings suggest that GBL programs, like "*Dunia Jawi*," can improve each element and raise children's enthusiasm to learn. Due to the preschoolers' potential lack of perception of the content's relevance to their daily life, the "*Dunia Jawi*" mobile application may not have had the greatest impact on this component. To sum up, this study demonstrates how preschoolers' motivation to learn Jawi can be increased when they use game-based learning applications in conjunction with the ARCS model. Thus,

the results show that children's motivation to learn *Jawi* was effectively improved by the "*Dunia Jawi*" mobile application.

2.7 Current Practices among Malaysian Preschool Teachers

Since the world now revolves around technology, early childhood educators are aware of the current trend of creating "digital natives" by integrating digital technology into the educational system. In addition, the government is of the opinion that, game-based learning, and online learning promote critical thinking, creativity, and problem-solving skills in young learners (Behnamnia et al, 2022). This is because it places a greater emphasis on the education of pre-schoolers. As this new practise has benefits that will assist children improve their entire development, teachers are the mediators in encouraging youngsters to adopt this new trend in terms of education.

Moving along, Kahoot! is the most popular gamified software among preschool instructors since it enables them to plan and organise their lessons in more engaging ways. Additionally, it enhances the learning process and strengthens the bond between the teacher and students by enabling them to interact with one another in a more enjoyable way in the classroom (Idris et al, 2020). Researchers discovered that Kahoot! has a positive effect on children's learning because of its general features, which include music, colourful multiple choice options, and a leader board that encourages children to compete with one another and improve their knowledge.

Teachers construct a variety of interactive and interesting online and in-person class activities for their students using Wordwall, an online platform. Teachers can choose from a variety of templates on this platform. Wordwall will create the course materials for an instructor; all they have to do is provide the content. Select from an array of templates, which include matching pairs, anagrams, sorting out, cloze, and standard

multiple-choice quizzes like Kahoot! (Ying, 2021). These exercises can be completed by students as homework or as interactive assignments during class. After an exercise is finished, teachers can monitor the results. This platform can facilitate student-paced learning, minimise the need for paper worksheets, save teachers time during preparation, increase online learning, and let teachers monitor their students' progress (Alam, 2022).

In game-based learning, puzzle play is often used by the teachers as they believe playing with puzzles helps children learn while they play and supports their cognitive, verbal, motor, social, and emotional development (Pratiwi et al, 2020). They also help children become more creative and build self-care skills. In order to promote children's growth and academic abilities, it is crucial that parents and professionals employ puzzles. Nevertheless, as technology advances, educators are using digital resources to play puzzle games following classes. Applications like PBS Kids, PowerPoint, and many more have been utilised. Children can intentionally collaborate with their peers by using these instruments, which fosters collaboration (Abdelwahed, 2019). Furthermore, since all of the children are at the same learning stage, the children may learn from each other and benefit from this structured approach. In addition, the inclusion of such aspects makes the children pay attention, which helps the teachers assess the children's intellectual progress.

2.8 Advantages and Disadvantages of Game-Based Learning (GBL)

More and more students today use technology for nearly every activity as they grow up, including computers, smartphones, and gaming consoles. Young children play video games for 7 hours per week on average (Forbes, 2019). Because of this, it is essential to inspire and include young children in learning activities by converting traditional teaching techniques like lectures and printed materials into more digital forms, including games

that seem to capture their attention. Children can engage in practise that helps them become experts by acquiring professional skills and imaginative thinking through computer and video games. Digital games are the ideal instrument for supporting childrens' learning without them even realising it. Through the use of virtual words and symbols, these games allow children to interact with the physical spaces that these words refer to. In this approach, children may comprehend complicated ideas without losing the connection between abstract notions and real-world issues that can be solved (Dimitra et al, 2020; Sadovets et al, 2022). As mentioned earlier, the approach of learning and training known as "game-based learning" makes use of games to attain new abilities and creative thinking as well as to offer a specified outcome (Alam, 2022). The application of game elements, such as point scoring, competition with others, and game rules, on the other hand, is known as gamification. It is used to solve problems and as an online marketing strategy to promote engagement with a product or service (Sadovets et al, 2022). The combination of game dynamics with instructional content is their primary distinction.

Previous studies have mentioned that, GBL have various benefits in accommodating children's learning, as well as in their overall growth. Children can also benefit from their assistance in creating goals, ensuring objective practise, contributing ideas, strengthening, and maintaining records of social change (Kristiani et al, 2022). Additionally, they are useful since they are simple to understand and can be used to measure performance on a variety of projects (Krouska et al, 2022). Besides that, these games can assess a few cognitive or affective aspects of learning, such as self-efficacy, self-concept, individual differences, etc. They are entertaining and make a big impression on people (Dimitra et al, 2020). Moreover, they can improve IT skills and enable participants to experience novelty, curiosity, and challenge (Sadovets et al, 2022). Despite everything said above, some parents and teachers have already noted some good results.

Many specialists, like William Massy, offer helpful instructions and develop educational games in order to make games that convey their knowledge and experience (Forbes, 2019). Apart from that, increase in children's attention span in the class is noticed when using GBL learning approach, since young children are attracted to the animation, visuals, and sounds (Aslan et al., 2022). Not only that, children get to increase their language skills as they watch over the words in more attractive ways. Other than that, GBL also improves the collaboration among the peers, as some activities being held in groups. Through this approach, collaboration, taking turns and social skills can be achieved (Liu et al., 2020).

Despite several research studies, only a few studies have brought attention to the potential negative impacts and restrictions that GBL in digital context may have on learning outcomes. For instance, since they doubt that the children are gaining from this form of learning rather than being distracted from their academics, parents, instructors, and other educators question its impacts (Riska et al, 2021). The extract is meant to illustrate a student's learning-related attitude, mental state, or performance element that is badly impacted (Lamrani et al, 2020). This is mainly concerned by the parents and some educators where they think games could be more distracting than usual learning activities. This statement was supported by the researcher Sadovets et al, 2022, due to the colour variety, animation, music, and other elements, it could be distracting to some children, which causes their attention to wander from the learning situations. This problem is also related to young children's short attention spans (Nurmash, 2022), which cause them to lose interest in a topic as soon as they become accustomed to or bored with it. Young children would choose hands-on activities that allow them to engage in experiential learning so they may understand the world at their own pace. According to Makhovych (2023), due to the usage of screens, playing too many video games can lead to addiction. They may become less motivated to engage in study and physical activity as a result of

this. The development of social skills in early children is crucial because it enables them to learn how to communicate, feel for others, and comprehend other people's situations (Nguyen, 2020). To add on, loneliness and sadness can stem from lacking in social skills when the children are involved in games as they be only facing the gadgets (Dimitra et al, 2020). There is a good chance that the children hinder their language development in this circumstance (Krath et al, 2021). It is mentioned that children acquire new words from screens as they expand their linguistic skills. However, since they play against the technology alone, it is ineffective (Makhovych, 2023).

2.9 Theoretical Framework

Figure 2.9.1

Theoretical Framework of the Study
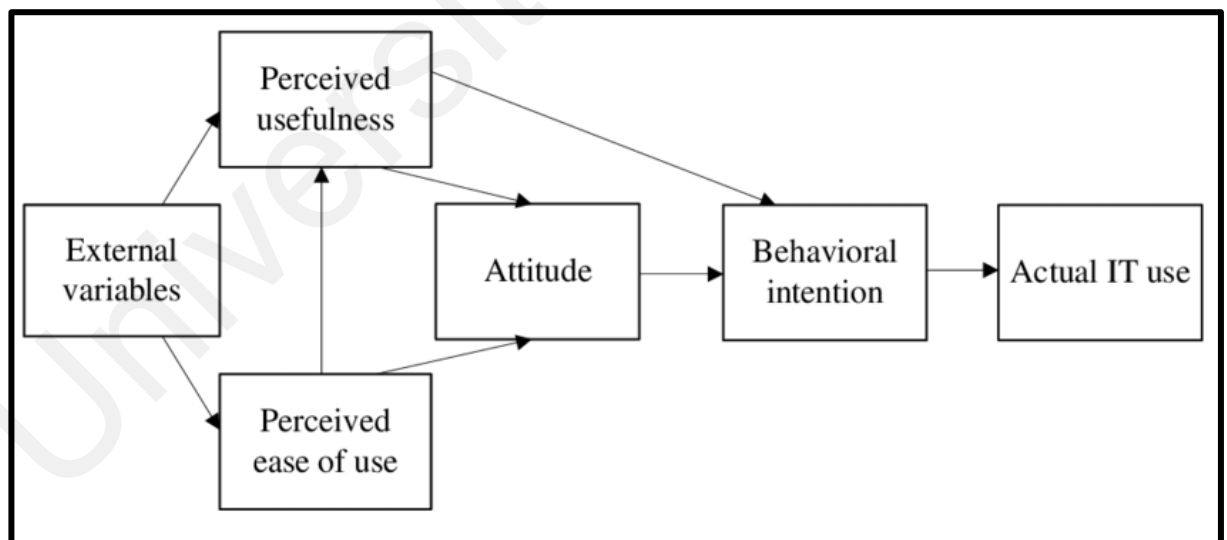
Note. TAM Model adapted from Davis, 1989.

This research is adapted to Technology Acceptance Model (TAM) which was proposed by Davis, 1989. This model was developed based on the influence of Theory of Reasoned Action by the theorists Ajzen and Fishbein. TAM describes how people accept information systems. According to TAM, a user's behavioural intention, which is in turn

influenced by how beneficial they believe a piece of technology to be in carrying out a task and how simple they believe it to be to use, will determine whether or not a technology will be accepted (Marikyan et al, 2023). Furthermore, TAM comprises of four core constructs such as perceived usefulness (PU), perceived ease of use (PEU), attitude towards usage (AU) and behaviour intention to use (BIU). PU and PEU are two of these variables that are regarded as crucial factors that either directly or indirectly explain the results (Kemp et al, 2019; Walker et al, 2020). These elements are frequently supplemented by outside factors that account for variations in perceived utility and usability: Subjective norms (SN), self-efficacy (CSE), and enabling conditions (FC) were among the additional factors that substantially correlated with the TAM core variables, but to varying degrees (Scherer et al 2019). Overall, the two most significant TAM components—perceived ease of use (PEU) and perceived usefulness (PU)—describe how much a person thinks using technology would be effortless and how much they think it would improve their performance on a task or job, respectively.

As Davis (1989) outlined in his landmark study, the phrase "free from effort" in this context refers to being "free from difficulty or great effort." As a result, (PEU), which is directly associated to competency views (Scherer, et al, 2019). These two views, PEU and PU, have a direct connection to attitudes towards usage (AU), another TAM-core characteristic. The TAM often includes at least one outcome variable, such as technology use (USE) or behavioural intention (BI). The former, which is based on the Theory of Reasoned Action, relates to desired behaviour, and the later, which is the actual application of technology, refers to observed behaviour (Granić et al, 2019). Thus, the purpose of this study to use TAM model is to investigate the acceptance of preschool teachers' on Game-Based Learning approach for interactive teaching and learning.

2.10 Summary

This chapter covered the evolution of the term "play" to "GBL," children's plays, and how games have been successful in the modern period owing to digital technology. In addition, this chapter has covered the platforms, existing practices among preschool teachers, and benefits and drawbacks of GBL using digital technology. Proceeding, the researcher will go into detail about the instrument, procedure, design of the study, and analysis to increase the study's relevance in the upcoming chapter on methodology.

CHAPTER 3

METHODOLOGY

3.1 Introduction

The aim of this study is to understand the preschool teachers' acceptance on the Game-Based Learning approach, as well as the strategies used to implement effective and interactive GBL approach in children's learning. This specific section outlines strategy of research, method of research, research approach, data collection method, sample selection, research process and the type of data analysis. Apart from that, ethical consideration also discussed in this chapter. Research methodology is an important aspect in any research as it promotes the researchers to rely on the collected data, as well as it provides solid evidences and supports for the aim of the study.

3.2 Research Design

To further this study, the approach used in this study is a case study as it promotes an in-depth understanding of the study. Case study often provides reliability and credibility, as well as develops the skills of critical evaluation, judgment, decision-making, and action (Peterson, 2019). In order to generate the theory used in this research, a qualitative research method was used to conduct the study to attain better understanding of the acceptance of preschool teachers, as well as the strategies used to implement interactive GBL approach into children's learning.

  According to the definition of qualitative research, it is "the study of the nature of phenomena," which includes "their quality, different manifestations, the context in which they appear, or the perspectives from which they can be perceived," but excludes

"their range, frequency, and place in an objectively determined chain of cause and effect" (Busetto et al, 2020). Focus groups, participant observation, structured and unstructured interviews, and other techniques are used in qualitative research to develop hypotheses that can be more thoroughly tested with quantitative research as well as to help researchers dig deeper into the quantitative research data, comprehend what it means, and comprehend the implications (Ariffin, 2018).   Researchers can better grasp what is happening via qualitative research, especially when things are difficult to categories (Peterson, 2019). Turale (2020) mentioned that, qualitative design is most suitable when the study is based on straight forward questions which compromises detailed description of the facts of the phenomena such as professional's understanding of an event or experience. Likewise, in this study the main goal is to outline the preschool teacher' acceptance on the specific spproach. Besides that, qualitative design is flexible and promotes rich information from the selected participants despite the time consuming factor (Tomaszewski, 2020).

As for this qualitative study, the researcher will conduct semi-structured interview protocol as for the data collection procedure, to understand the preschool teachers' acceptance and the way they incorporate the specific learning approach into their lesson. Furthermore, through the interviews, the researcher should be able to collect data for variables such as their acceptance, perception, understanding, views, attitudes, skills, as well as the techniques and tools used by the preschool teachers. Moreover, an interview with the population selected would be helpful for the evaluation of data later on in this study. Therefore, this data collection method has been chosen by the researcher, as it promotes views and sources from different angle to strengthen the study.

3.3 Development of Research Instrument

The research instrument adapted by the researcher to conduct this study is an individual semi-structured interview protocol. Semi-structured interview protocol frequently encourage enough flexibility to handle various respondents in variety of ways while addressing the same areas of data gathering (Arifin, 2018). The semi-structured interview protocol is more effective for qualitative research than other forms of interviews because it enables researchers to get in-depth data and evidence from respondents while taking the study's objective into account (Tomaszewski, 2020). Second, it gives researchers the flexibility and adaptability to stay on course as opposed to an unstructured interview, where the direction is not fully taken into consideration (Ruslin et al, 2022). Participants will be expected to answer a set of open-ended interview questions which are related to the topic of interest which is the acceptance of preschool teachers' and the strategies used to implement effective teaching and learning through Game-Based Learning approach. The participants will be given the informed consent information prior to the interview. Series of questions were derived based on RQ1: What is preschool teacher's acceptance on the implementation of GBL approach? RQ2: What are the strategies used to implementing interactive teaching and learning using GBL? and RQ3: What are the strategies used to implementing interactive teaching and learning using GBL?.

The instrument consist of 6 sections:

Section 1 is the demographic part which consist of participants' background information such as age, marital status, place of birth, educational background, work place, years of working experience, and degree of knowledge on GBL approach in non-digital game environment.

Section 2 is related to exposure and understanding of the preschool teachers on GBL approach.

Section 3 is based on the advantages and disadvantages of implementing GBL approach into children's learning.

Section 4 talks about the strategies of implementation of GBL and the tools or platform that can be used in promoting interactive teaching and learning.

Section 5 is based on the perception of preschool teachers in terms of experience in implementing GBL into their teaching practices.

Section 6 is more about the effects, improvisation, and recommendation of the GBL approach.

3.4 Validity and Reliability of Instrument

In qualitative research, validity and reliability are employed to assess the research's quality. Coleman (2022) states that "both validity and reliability are broadly concerned with the issue of trustworthiness; reliability refers to the application and appropriateness of the methods undertaken and the integrity of the conclusions, and validity refers to the correctness or credibility of a description, conclusion, explanation, interpretation, or other sort of account." To avoid research bias, which could have an impact on the study later on, it is crucial to take validity and reliability into account while developing research designs, organising methodologies, and summarising findings.

Besides that, to measure the variables such as the acceptance of preschool teachers, game-based learning approach, techniques and skills, the researcher came up with series of interview questions after several research which was verified by the experts in the field of instructional technology, game-based learning and digital education. The interview questions were sent to two experts for face and content validity. As indicated by Armstrong et al. (2005), a minimum of two and a maximum of twenty experts can be

recruited for a qualitative study, the researcher selected two experts for face and content validity in this study. The benefits of face and content validity is to get the experts' view regarding the instrument (Ruslin et al, 2022). This helps in strengthening the findings of study of the interest. Not only that, it also benefits the researcher to get the interview process run smoothly, as well as achieve the goal by end of the research. The instrument was developed by the researcher to fit the parameters of the study. Besides that, in this study the interview questions were reviewed and validated by the experts, followed by altered and modified the questions based on their views and comments. According to Grant and Daivs, the appropriate degree of competence and the panel's representation of a spectrum of knowledge should be taken into consideration when determining the ultimate number of experts required for content validity (Almanasreh et al, 2019). Experts were chosen based on certain criteria, such as academic credentials, professional experience, and industry expertise (Gani et al, 2020). The table 3.4.1 below shows a brief summary of the experts in short.

Table 3.4.1

Summary of Experts

Number of Experts	Position	Area of expertise	Institution	Country	Years of experience
Instructional technologist	Senior lecturer	Educational Technology and Media, Empowering Digital Citizenship and Digital Literacy	Local university	Malaysia	Less than 5 years
Instructional technologist	Senior lecturer	Curriculum Development and Web Technology	Local university	Malaysia	More than 5 years

3.5 Research Population

Population refers to the total number of individuals, occasions, or objects that exhibit the behaviours and/or have the traits that the researcher is interested in (Hennink et al, 2022). Furthermore, the targeted population to conduct this study was educators, precisely early childhood educators as this research relies on game-based learning approach among young children.

3.6 Location

To conduct this study, the location of population was measured based on Petaling Jaya district located at Selangor and this district consists about 30 pre-schools including international and local pre-schools. The population size for the specific district is about 240 early childhood educators.

3.7 Sampling

Sampling is essential because it is used to generalise theories that already exist or draw conclusions about a population (Turale, 2020).The study's sample consisted of 6 teachers from pre-school setting within Petaling Jaya only who have practised and/or have knowledge on game-based learning approach in non-digital game environment. As this is a qualitative study, a small number of samples will be able to provide enough sources and validation through the semi-structured interview protocols to make the study successful as the participants given the opportunity to share their experience and knowledge without any hesitation. This statement was supported in one of the research papers by Peterson (2019), he mentioned that in qualitative research, concentrating on a small number of well chosen, information-rich instances is typical in order to increase opportunities to produce

data pertinent to the study's purpose. Compared to the quantitative approach, the sample size is smaller because the qualitative approach yields detailed information sufficient for the investigation. The participants were chosen under specific criteria, which are currently working with young children at the pre-school, working experience must be at least 2 years and above, should have basic knowledge about game-based learning approach and should have incorporated game-based learning approach in non-digital gaming environment.

The researcher chose the study's participants by using purposeful sampling. According to Shaheen et al, "Purposeful sampling resides on the proposition that information-rich samples are to be selected to have an in-depth view of the phenomena," (2019, p. 28). Gill (2020) agreed that since purposeful samples are typically small, their utility and legitimacy are called into doubt based on their logic and goal. In qualitative research, the sampling strategy is fluid and develops during the analysis. Peer review, validation, and assessment of the sample size's suitability are required (Hennink et al, 2019). Selecting examples with lots of information for in-depth analysis is essential to the logic and effectiveness of purposeful sampling. Cases with a lot of information often have difficulties that are crucial to the research, therefore purposeful sampling is necessary to accommodate this study. This is to ensure the researcher receive the desired feedback from the participants, randomly chosen participants would not be able to provide the sufficient data. The table 3.7.1 shows a brief summary of the selected participants in short.

Table 3.7.1

Participants' Details

Participant	Level of education	Working experience
1	Master degree	11 years
2	Master degree	8 years
3	Degree	5 years
4	Degree	10 years
5	Degree	8 years
6	Degree	25 Years

3.8 Research Procedure

The research procedure will be conducted in the following ways:-

Pre-interview

Firstly, once the six participants are chosen, the researcher will contact them personally through Whatsapp or face-to-face to ask for approval if they are interested to participate in the research study. Once they agree, researcher explains to them about the study including the area of research and why they need them as participants to carry out the study. Then, researcher will inform the participants that a face to face interview will be carried out as data collection procedure, as well as they will be given informed consent that it is a closed interview and any kind of details provided will not be revealed in the study. This is to ensure, during the session the participants will be comfortable enough to be themselves and give their opinions without feeling pressured. The interview duration will be 25-40 minutes per person. The whole interview session will be recorded for study purpose, so that the researcher will not miss out any details given by the participants, as each information given are crucial and important for the data evaluation later on.

Before starting the procedure, the participants will be given a heads up on the type of questions that will be asked during the interview session, and the series of questions will be e-mailed to them so that they can be prepared before the interview session. Researcher will then schedule a private meeting one-to-one, either face-to-face or online meeting through zoom or video call depending on the participants' time of availability and the venue based on their preference, to make sure they are comfortable to conduct the interview.

During interview

Researcher head to the fixed location, then start the interview session by asking demographic questions, followed by the questions that were derived from the research questions related to the study. Researcher includes questions like how, why, where, what, who and when whenever it is necessary to get clear and valid answers for better result of the study. While the questions are asked and the participants begin answering, the researcher will note down all the points on a piece of paper or a book, at the same time record the interview session using as mentioned earlier. The recording will be stopped once the interview session is over.

Post interview

The researcher will transcribe the manuscript and then start to create themes, followed by coding. The transcribed manuscript will be attached in the Appendix. As a final step of this process, the researcher will then begin with the analysis of data.

Figure 3.8.1

Summary of the Research Procedure Process

Pre- interview	During interview	Post interview
• Contact 6 participants • Provide details and procedures of interview session • E-mail interview questions • Determination if venue and time • Determination of mode of interview (face-to-face or video call)	• Begining of interview with demographic questions to research questions. • Writing down the points and recording the audio of participants	• Transcribtion of manuscript • Begin with analysis of data

3.9 Data Collection Procedure

The researcher identified the participants in this study as preschool teachers because it is dependent on their comments. Specifically from Petaling Jaya, in the Klang valley, six participants were chosen for this study using purposeful sampling. The criteria established by the researcher to collect the data required for this investigation were used to choose the participants. A semi-structured interview approach was employed in this study to gather data from each of the six participants, in addition to other methods, in order to steer the research towards success. The entire set of questions might be answered in 25–30 minutes for each interview. The interviews were carried out in two different ways, such as face-to-face interview and online interview using 'Whatsapp' video call and the app Zoom, depending on the participant's preference. The participants were given enough time before the interview to understand the study purpose, as well as to prepare for the

interview. Pre-interview, during the interview, and post-interview are the three phases that make up the semi-structured interview procedure according to the researcher. The researcher will schedule the time and location for the pre-interview and provide the participants with information about the study. The researcher will then go over the significance and methodology of this study during the interview. After that, the interview will begin, and the responses will be recorded for data analysis purposes. In conclusion, the researcher will commence the post-interview phase by transcribing the gathered data and subsequently identify themes and code them for data analysis.

3.10 Data Analysis

In qualitative research, the data analysis method aims to synthesise all of the data gathered and uncover consistent themes or patterns that address the subject of inquiry (Busetto et al, 2020). In this research, the researcher adapted to thematic analysis to analyse the data collected. A simple, adaptable, and widely used technique for analysing qualitative data is content analysis (Scharp et al, 2019). It gives the qualitative researcher a basis in the fundamental abilities required to interact with various techniques to qualitative data processing. Finding themes from transcribed interviews can be done using thematic analysis. The researcher must make sure that all information given during the data analysis process is accurate, even if it contradicts the researcher's viewpoints or preferences. In order for the findings to authentically reflect the experiences of individuals who used game-based learning approach in non-digital environment, the researcher equally analysed all of the data. The procedure involved transcription of the interviews, coding the interview data, categorization of the data, and the discovery of recurring themes and patterns. The researcher found that it was more convenient and easier to analyse the research theme manually, so in this study, the data collected from the

participants was transcribed by hand rather than using the software Atlas.ti, which makes it easier to identify research gaps, themes, coding, and other processes. Thematic analysis in a qualitative study consist of five phase of process (Braun et al, 2021), such as:-

Figure 3.10.1

Brief process of Thematic Analysis
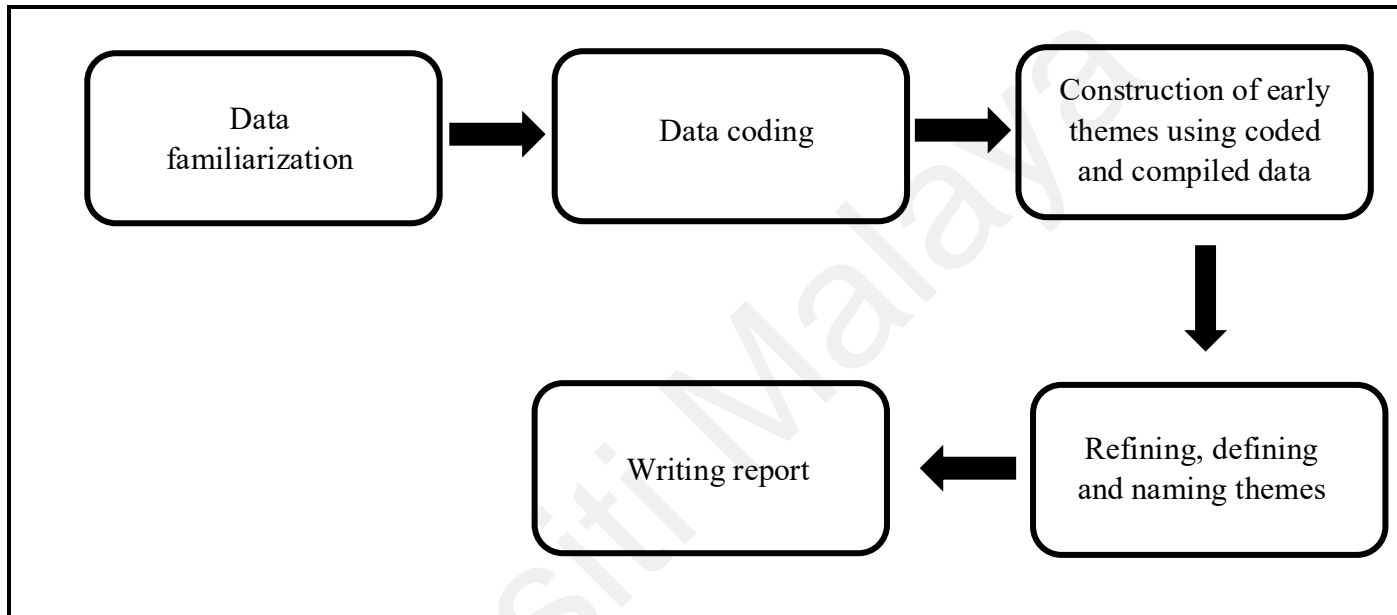
Step 1: Data familiarization

This is known as the first step in thematic analysis where the researcher go through the collected data by re-reading, re-listening, understanding and transcribe the audio into written form. This is also where the researcher will look for the broader theme to do the coding later on. This is to ensure that researcher will be able to get familiarize with the information provided by the participants to move forward to the next step.

Step 2: Data coding

A word or a brief phrase that encapsulates the meaning of a particular remark is known as a code. What the data are saying as well as the goal of the research will determine what codes to employ by the researcher (Braun et al, 2021). Additionally, it depends on if the

researcher conducting an inductive (exploratory) analysis where the themes are dependent on the data. Or researcher could use a deductive analysis to look for particular themes. The researcher will start reading over the data and apply the same code to the text passages that convey the same meaning in order to identify codes.

Step 3: Constructing early themes using coded and compiled data

In this step, the researcher will construct main theme and sub-themes using the codes generated in the initial phase. This will allow the analysis to be in systematic order, it allows the researcher to grasp information immediately and avoid leaving out important points.

Step 4: Refining, defining and naming themes

In this phase, the researcher will review, define and name the themes to make sure there are distinguishable distinctions between them by reading through the collected data snippets again. Themes should tell a story and be distinct and obvious. By going through the review process, the researcher find any new themes that might have overlooked and ensure that the themes are accurate and relevant summaries of the data. Make sure that each of themes has enough evidence to support it and to reveal trends across the entire data collection.

Step 5: Writing the report

In this stage, the researcher will be done labelling the themes and then followed by provide enough sources to make connection to the findings. Researcher will include questions like 'how', 'why', 'what', where' and 'when' to analyse the data to provide strong deduction from the data. The researcher must make sure link the findings and evidences to the research questions and relevant to the subject and questions so that the readers will not be confused.

3.11 Ethical Consideration

Ethical conduct of behavior by researchers are vital in any researches, as it gives the participants assurance that their identity and other information are secured to prevent from consequences later on. Not only that, due to the ethical consideration researchers are able to obtain necessary details from their participants which are reliable and valid that answers their research questions or promotes solution/ supporting evidence for their study which might not need a further research on the same study. It is applicable for this study too, as the researcher follow the guideline of ethical consideration. First and foremost, building a mutual relationship with the participants is highly recommended for the researcher to gain the respondent's trust, so that honest responses can be obtained, as well as rich findings. Secondly, a full consent from the participants should be attained prior to the study. "Ethical guideline of informed consent entails that the researcher warrant or ensure research participants join the study willingly or voluntarily with complete information on what it entails to be part of the research", (Kang, 2021, p. 8). The least condition of the concern is the respondents are to be aware of what the study entails. The informed consent should be presented by the researcher in written form or verbally.

Moving along, upholding confidentiality and privacy of the data collected from the respondents must be preserved. In the study, the participants' identity and other details will be labelled as codes that only the researcher knows and all information will be kept safely to avoid negative consequences in the future. Lastly, upholding honesty and integrity is vital for the researchers in order to attain research findings may help indicate whether further research on the same subject is required or possible solutions that may solve the existing challenge. When respondents realise the researcher has ulterior objectives, they are more likely to provide incorrect information. Thus, it is better to keep up with honest and integrity.

3.12 Research Matrix

Table 3.12.1

Research Matrix

Research objective	Research question	Data collection technique	Data analysis	Instrument	Participants
To examine preschool teacher's acceptance towards GBL teaching approach.	What is preschool teacher's acceptance on the implementation of GBL approach?	Qualitative	Thematic analysis	Interview	Six preschool teachers
To identify the strategies used to promote interactive teaching and learning using GBL	What are the strategies used to implementing interactive teaching and learning using GBL?	Qualitative	Thematic analysis	Interview	Six preschool teachers
To investigate preschool teacher's perception in terms of knowledge, awareness, training and facilities on the implementation of GBL into their teaching practices.	What are the preschool teacher's perception in terms of knowledge, awareness, training and facilities in the implementation of GBL into their teaching practices?	Qualitative	Thematic analysis	Interview	Six preschool teachers

3.13 Summary

This chapter encompasses of details such as research design, data collection, sampling, procedures and many other sections that will help the researcher to conduct the study appropriately. This chapter will also provide readers with adequate information regarding the research in overall. The next chapter will be a detailed discussion of collected data which relates to the literature review. The researcher will discuss more on the findings related to the topic and research questions.

CHAPTER 4

FINDINGS

4.1 Introduction

This chapter presents the results of the semi-structured interviews with the six study participants. It then elaborates on specifics that were discovered through thematic analysis. The purpose of this section is to understand the acceptance of GBL approach among preschool teachers from the data collected. The data collection yielded themes, and these will be thoroughly explained in the findings' write-up that follows.

4.2 Participants (Background Information)

Participants involved were six preschool teachers from Petaling Jaya area who have been teaching in preschool settings for more than two years. Preschool teachers that took part in study were between the age of 26 and 38 years old and all of them were females. They also have bachelor to master's degree education (Master degree: Two; Bachelor degree: Four). The GBL strategy is known to the participants, who have integrated it into their early childhood lessons, but in non-digital context. It should be noted that while small number of participants have honed their skills in the fundamentals of digital technology, others have not. The adoption of the GBL approach by preschool teachers could be investigated using criteria of this kind.

Table 4.2.1

Participants and Time of Interview Conducted

Participants	Date of Interview
1	26/4/2023
2	28/4/2023
3	29/4/2023
4	30/4/2023
5	25/6/2023
6	2/7/2023

4.3 Reporting of Findings

RQ1: What is the preschool teacher's acceptance on the implementation of GBL approach?

4.3.1 GBL in Digital Context

The GBL approach is the collaboration of actual games or serious games in the learning environment for the children with the incorporation of available sources using the digital technology tools, such as Smartboard, iPad, laptop and computers. Based on the findings, all the 6 participants understood the definition of GBL in digital environment, where they notably noted that the inclusion of games for the children using gadgets such as iPad, computer, laptop and smart board for interactive teaching and learning. Two of the participants provided significant responses toward the definition of GBL in digital context where, participant 1 mentioned,

> "...*My explanation to this is to be able to use gadgets such as ipad, laptop, smartboard which are incorporated to the children's everyday learnings which is playing video games designed in learning environment. GBL is more to educational, where have learnt something that games related to what they have learnt*" (L3-6, interviewed on 26/4/2023)

and participant 2 mentioned,

> *"…Game-based learning is like play with a learning purpose by designing some interactive games but that games, it has purpose and message to send to the children which is more like online learning and apps to help teachers to convert their teaching into small games like quizzes using electronic gadgets"* (L12-15, interviewed on 28/4/2023).

GBL is often used in the learning of young children to attain skills that cannot be attained using traditional learning method. GBL in digital environment promotes active participation due to its visuals, motivation and engagement as mentioned by participant 6,

> *"…This approach, use the principle of game designs to enhance motivation, participation, and learning outcomes"* (P6; L10-11, interviewed on 2/7/2023).

Not only will that, at the end of this approach, there will always be a reward system for the children upon completing the designed task and achieving learning objectives, as mentioned by participant 3,

> *"…helps the children learn the concepts through play which is actually the result of the game like environment which has like reward system, if you achieve this many goals you get certain numbers of points"* (L15-16, interviewed on 29/4/2023).

4.3.2 Acceptance

In this study, acceptance is known as the degree of accepting level of GBL approach and it can be also not accepting of the learning approach, as it varies according to the participants. Given that different teachers have varying pedagogical approaches and ways of imparting knowledge to their children, the participants' answers about their acceptance of the GBL approach varied. Different reactions were found by the researcher, including both good and negative feedback. According to the findings, several reasons were identified why and why not the preschool teachers are accepting this learning approach for young children, such as:-

4.3.2.1 Digital Literacy

The development of digital technology and education are vital to the world. Since the present generation, referred to as "digital natives," has grown up with technology from an early age, it is imperative that preschool teachers improve their children's digital literacy in order to prepare them for 21st century learning, such as problem-solving, creativity, communication and many others. This statement was supported by participant 1, whereby she mentioned,

> "…21st century learning is about children's life skills like critical thinking, creativity, collaboration and communication. So, incorporating all these games are really important, as digital literacy is an important aspect" (L26-30, interviewed on 26/4/2023).

Aside from that, the features of digital literacy make learning more engaging and enjoyable than using traditional methods. This is because, children usually tend to be more activated and excited when we use digital technology in the classroom, because it is fun, as well as engage them into the learning. As mentioned by two of the participants,

> "…learning using digital technology is more fun and give them enjoyment" (P6; L36-37, interviewed on 2/7/2023)

> "...this method can make learning more fun and engaging for students compared to the traditional method of just using books" (P5; L22-23, interviewed on 25/6/2023).

4.3.2.2 Increase Motivation and Engagement

The nature of GBL approach in digital context is to enhance children's motivation to learn and keep them engaged throughout the learning process. Learning using digital technology is like a reward and eye-catching for them, because the moment they see gadgets, they will be attracted to it, and lessons conducted will be easily adapted by the children. The children will be looking forward to the lessons, at the same time it boost their motivation and engagement, as well as their attention span, just like mentioned by participant 6,

> *"...incorporating GBL using digital technology is highly effective for children's' learning. It is because firstly, the engagement as young children are naturally drawn to digital technology so, when the lesson is created using technology which provides interest to learn, and improves their attention span compared to normal classroom learning"* (L32-36, interviewed on 2/7/2023).

4.3.2.3 Reduce Screen Time

It's no secret that children these days are always surrounded by digital devices, no matter where they go or what they do. Younger generations are particularly susceptible to this, and it could have long-term negative effects on both their health and education. An excessive amount of device use can also make children less interested in learning. Reducing the amount of time that children spend on screens is one way to address this issue, which is why some educators still favour traditional methods over digital learning. As mentioned by one of the participants,

> *"…I would still be sticking around the traditional method because it is more effective to the children's learning and exploration"* because

> *"…Children nowadays are more exposed to technology and when you don't teach anything using technology also they will know how to use it as all of them got access to it at home. So when it comes to school, I would suggest to go for traditional learning and reduce the screen time"* (P4; L55-60, interviewed on 30/4/2023).

4.3.3 Advantages of GBL

As discussed in the literature review, the incorporation of GBL approach using digital technology has many pros despite the cons for the learning development of the children. Learning with GBL approach serves multiple benefits for the children, such as motivation, active participation also known as engagement, communication, intellectual skill, teamwork, and many others. According to the findings, participants were able to address the advantages in detail. The most common answers from all the 6 participants for advantages were such as, motivation, teamwork, problem-solving skill and attention span.

4.3.3.1 Encourage Collaborative Learning

Through GBL approach, a good teamwork can be attained during the lessons, as some of the activities would require the children to work in pairs or a small group. This will ensure the children to improve on their social interactions with other children, such as cooperation, taking turns, helping out each other to complete certain tasks, healthy competition as well as their communication skills. As participant 6 mentioned,

> *"...social interaction where games would require the children to work in two or in group, by playing with peers they will improve their communication skill and collaboration"* (L82-84, interviewed on 2/7/2023).

Literacy skill can be also improved not only by communicating among group members, but also by participating in the activities. As some theorist say, young minds absorb and grasp things from their environment fast. When the children encounter a new word on the screen on repetition, they will grasp it and use it as well.

> *"... I also see improvement in their literacy skill when they often see new words, they easily grasp it* (P4; L113-114, interviewed on 30/4/2023).

According to the results, participant 6 also said that youngsters gain confidence and don't feel like they failed when they learn something or finish a task in a small group or with their peers. The children will consequently start doing better in every situation.

> *"…. Then, reduction in fear of failure, as when it comes to games children are often less afraid of making mistakes or failing, fostering a growth mind set and willingness to take risks. (L84-86,* interviewed on 2/7/2023*).*

4.3.3.2 Promotes Active Learning

The GBL approach encourages children to learn actively by letting them utilise their imagination, critical thinking, discussion, and evaluation skills to complete

lessons, games, and tasks that are assigned to them. Children will be able to think creatively and critically as a result of this, developing their critical thinking abilities. This is due to different activities comes with different challenges that they need to accomplish to reach the goal that have been set. Preschool teachers serve as facilitators, as is well known, but the children must figure out the answers to the activities on their own rather than having their teachers spoon-feed them. This type of education is essential because it helps children become more motivated and develops their critical thinking and decision-making abilities. Some of the participants have shared similar thoughts on this, as below:

> *"...critical thinking because if you look at all these games, they are just not meant to do one thing. There are different challenges in all this games. When we need to achieve different steps in the game, they have to think out of the box, and use creative methods of thinking"* (P3; L100-103, interviewed on 29/4/2023).

> *"...allows active learning for the children where it provides hands-on learning, elevate critical thinking skill and problem solving skill, decision-making and exploration which helps them understand and retain information better"* (P6; L78-80, interviewed on 2/7/2023).

> "… *It also expands children's creativity, problem-solving skills and decision making skills"* (P4; L111-113, interviewed on 30/4/2023).

The preschool teachers in charge can also promote active learning by giving the children instant feedback. Giving children feedback is essential as it can boost their learning process and provide them with encouragement on an occasional basis. It is helpful for teachers and children alike because it offers immediate feedback. As an example, teachers can determine the children's areas of strength and weakness and then adapt their lessons accordingly, taking into account the evaluation results. Moreover, it facilitates their ability to monitor the advancements of the children. When children get criticism, it helps them sort of encourage themselves to accomplish their goals. In order to accomplish their

objectives, they would even consider how to master the particular work. One of the participants mentioned,

> "…it can give them the motivation to learn, encourage scaffold learning and practitioners can also get immediate feedback of a child's progress by assessing the child's strength and weaknesses in the subject" (P5; L61-63, interviewed on 25/6/2023).

4.3.3.3 Enhance Memory Capacity

The GBL approach improves the children's memory ability, according to the data. Children are drawn to everything visually appealing and vibrant, as is common knowledge. For example, even in traditional learning, if the materials are colourful and exploratory, they will begin to show more interest. In a similar vein, children benefit from using digital technology in GBL since the games they play typically have vibrant images and imagery that draw them in and spark their interest in learning. When children are enthusiastic about learning and eager to learn, they will pick up the information quickly, which will eventually help them remember things better. They will demonstrate strong learning progress as a result. Regarding this, participant 4 mentioned,

> "… It improves children's memory because of the attractive visuals and sound. It has the tendency for them to remember the lesson better. It also expands children's creativity, problem-solving skills and decision making skills" (L110-112, interviewed on 30/4/2023).

4.3.4 Disadvantages of GBL

GBL approach has its disadvantages as well for the children. However, compared to the advantages, the disadvantages are little. The most common disadvantages traced were attention span, health issue due to the screen time and social interaction.

4.3.4.1 Attention Span

The category of both benefits and drawbacks includes attention span. Children

today are surrounded by electronics everywhere they look, as was previously said.

Children are fascinated to digital technology, thus parents who use these devices

to reward or discipline their misbehaving children can eventually convince them

to remain quiet. For example, these gadgets have been used to control children's

misbehaviour. Their interest in other activities that do not involve electronics may

also be affected by excessive exposure. Likewise, in the classroom, the children's

attention span reduce when it comes to do anything without the digital technology

because they find the other activities and learnings are already boring for them.

This were mentioned by few of the participants as below:

> *"... lack of attention when it comes to other activity which doesn't involve gadgets"* (P4; L141-142, interviewed on 30/4/2023),
>
> *"...children losing interest and not wanting to learn through books after being exposed to this learning method"* (P5; L115-116, interviewed on 25/6/2023),
>
> *"... reduce in their attention span because they so engross to the screen when you shift them away from the screen anything that as not as interesting as what they see on the screen, it reduces their attention span"* (P3; L134-136, interviewed on 29/4/2023),
>
> *"...anything I show them on the screen they are just sitting there for good 20-30 minutes. But I were to move them away from it, the slightest 5 or 10 minutes they will be like 'Teacher, I'm bored of it'. Sometimes, their thinking out of the box is not so much there"* (P3; L136-140, interviewed on 29/4/2023).

4.3.4.2 Health Issue

Health issue in GBL approach is caused by the screen time. As teachers, they are

concerned about children's exposure on the screen because it will mainly affect

their eye-sight in long term. This because, children are always exposed to the

gadgets at home for long hours, and this might worsen their eye-sight. So, it will

be good for short exposure with adults' supervision as mentioned by participant

1,

"... children's health in terms of their eyes in long term due to the screen. To me, I support these methods including digital technology as I don't see much disadvantages except the effects on eye even so it is not the biggest part coz it is also depends on adults' supervision (L118-121, interviewed on 26/4/2023).

Regarding the eye-sight issue, participant 6 also mentioned,

"…excessive use of screen time causes health issues among children like eye strain, sedentary behaviour, and disrupted sleep patterns. Next would be addiction and overuse where the children will get addicted and neglect other important activities" (L122-125, interviewed on 2/7/2023).

4.3.4.3 Social Interaction

As previously said, social contact can be improved with the GBL approach, but it can also have an impact on the children. This is due to certain assignments or activities that call for children to play individually rather than in groups. Playing alone too much might prevent children from interacting with their friends and can also make them worse off when they compete against each other. Children may be required to play alone at home as part of their homework, for example, and this can get problematic if they play for too long. Participant 6 had similar thought on this where she mentioned,

"...isolation also can be considered as disadvantage as some games requires to play alone and playing alone for extended period causes them to be alone since there won't be interaction with others. Lack of real world experiences, over reliance on digital games can limit a child's exposure to real world experiences" (L125-129, interviewed on 2/7/2023).

It will inhibit their communication and taking turn skill as well. As a result, children find comfort in playing alone and cause serious social isolation. This will lead into other factors, such as stress, feeling of failure, frustration and many others.

However, based on the findings only one participants said that there is no any disadvantages using GBL approach using digital technology, whereby she mentioned,

"*…I don't see any disadvantages because all the while I'm using this, I can see that even though the children couldn't pick up mandarin, but you can see that they interest in learning. It's not we want to make them smart, but we just want them to be interested and explore new things*" (P2; L130-133, interviewed on 28/4/2023).

RQ 2: What are the strategies used to implementing interactive teaching and learning using GBL approach?

4.3.5 Implementation of GBL

The participants were asked if they were to implement GBL approach in digital context, how they would implement to promote interactive teaching and learning for the children. Implementation is considered vital for the children's progress, as well as it allows children to progress better in their development of learning. Not only that, there are certain guidelines to follow in order to implement a lesson using GBL approach, as mentioned by one of the participants where implementation consists of few steps, and it also varies according to the preschool teachers. According to participant 6 of this study, mentioned in L155-165 (interviewed on 2/7/2023),

Step 1:

"*…Firstly, I would define the learning objectives by identifying specific educational goal and learning outcomes that wants to be achieved by using these methods, then, followed by selecting or creating age appropriate games for the children*",

Step 2:

"*…Before I begin the lesson, I would provide clear instruction to the children on how to play the games or will show them so that they understand how to carry out the activity*",

Step 3:

"*… I will make sure that I integrate the games according the curriculum where I will find at which part of the lesson these activities will suit the best to ensure the children enjoy and grasp the content of the lesson*",

Step 4:

"...Then, when the children started to perform, I would make sure encourage collaboration with their peers, at the same time I will provide the children with instant feedback of their achievement".

Step 5:

"... Last but not least, I will incorporate rewards and challenges to motivate the children and to keep them performing".

Another participant as well briefly elaborated on how she would implement, and Participant 4 (L:179-189, interviewed on 30/4/20203) mentioned,

Step 1:

"... I would implement by first analysing the topic, find out the children's strengths and weaknesses",

Step 2:

"...Then, create a game that starts from easy to difficult because in this way the children will be able to develop their problem solving skills and creative thinking skills".

Step 3:

"... Then, I'll introduce the topic of the children and show them how to play the game".

Step 4:

"...After that, I will let the children play in groups or pairs and observe the children. Also assist them whenever my help is needed, as well as feedback because this will motivate and engage them into the activity".

After every implementation of lesson, it is crucial for the preschool teachers to give their feedbacks of every progress of the children to enable them to do better. Not only that, providing feedbacks plays a huge role and it is an important element in the learning process. By doing so, it would be easier for the preschool teachers to identify the children's strengths and weaknesses as mentioned by few of the participants, as well as keep track of the progresses that had been made.

In order to make the implementation work, preschool teachers need to accommodate the learning more interesting and exciting for the children, so that the children get attracted and show enthusiasm in learning. According to the participants' responses, two different type of responses found were found. Most of the participants were able to list and elaborate on how and what can be done to improve and make it exciting using GBL approach. For instance, participant 6 mentioned,

> *"... By choosing engaging games, where I would select games with visually appealing, fun, interactive and colourful designs. Games with characters, animation, music that excites the children. I also would use the rewards and reinforcement methods so that it creates sense of achievement and keep them motivated to play" (L193-142, interviewed on 2/7/2023),*

She also added,

> *"...I will also set achievable goals by breaking down the objectives into small, achievable goals within the games. Children find it interesting when they can see their progress and accomplishments in games"* (L193-196, interviewed on 2/7/2023).

Similarly, participant 3 and participant 5 added by saying,

> *"… if you have children who love certain type of games, for example, some children like 'Minecraft', 'Frozen' characters and so on, so you take out these elements like the characters from 'Minecraft and put it into concept for them to learn"* (P3; L204-207, interviewed on 29/4/2023).

> *"... Other than games that involves clicking yes/no, multiple choice questions, incorporate mystery, problem-solving and games that includes actions or sometimes just fun games that attracts children like games that have more visuals and sounds"* (P5; L186-188, interviewed on 25/6/2023).

It is true that, games that involves different designs and patterns are one way to attract the children and make the learning exciting for them. However, participant 1 and 4 thinks that, there is no necessity to make the lessons exciting using digital technology, because they believe that incorporating technology into the lessons are already exciting for the children.

> *"... Incorporating digital technology is already exciting for the children because children loves screen time"* (P4; L208-209, interviewed on 30/4/2023);

> *"... I don't see how we need to make it interesting for the children because by using gadgets itself already exciting for the children. The moment they know you*

are using it, they are already excited. As for the rewards, it is don't need because using games with gadgets is already like a reward for their brain" (P1; L189-192, interviewed on 26/4/2023).

4.3.6 Teaching Strategies Using GBL

To deliver lessons using GBL approach needs a lot of planning, in sense of how and what to incorporate, what are the platforms can be used, as well as the strategies. A good strategy of GBL approach involves skills and techniques. Based on the findings, few strategies were identified from the participants.

4.3.6.1 Observation and Communication Skills

Effective observation and communication abilities are essential for preschool teachers. Preschool teachers that possess strong observational skills are able to both better themselves and their students. This is because the preschool teacher needs to possess this ability in order to identify each child's strengths and shortcomings and to monitor their development. This therefore gives them the opportunity to develop lessons that are tailored to the needs of the children. Good communication is essential to bolster the observant capability. The preschool teacher's communication style is crucial to the children's understanding of what the teacher is attempting to teach them. Any lesson should be delivered in simple language, as well as accommodated by proper body language that the children can understand and obey. The children will benefit from simple instructions in terms of finishing tasks that are assigned and also in terms of improving their language abilities. As for young children, they tend to get attracted to the preschool teachers' tone of voice and body languages. Not only that, clear communication using simple language make is a difference in children learning process. Participant 6 and 4 has shared their thoughts on this matter by saying,

> *"...I believe in clear communication where the teacher use simple language that young children can understand, as effective as the communication, children will understand better. Then, while teaching the teacher must show enthusiasm, as teachers' attitude while teaching the young ones is important, the intonation, body language and positivity"* (P6; L252-255, interviewed on 2/7/2023),

> *"...Then, also use proper body language, the tone of voice, as well as proper instruction that leads the children to participate"* (P4; L275-276, interviewed on 30/4/2023).

4.3.6.2 Online Games/ Resources

Given that the study focuses on digital context, integrating online games into children's academic curriculum was another tactic that was inferred from the results. As previously said, GBL is a method of employing games, and in a digital environment, it refers to using games that have been built in conjunction with technology such interactive Smartboards, laptops, and computers. Since children are digital natives, using technology in lessons with limited time each day is undoubtedly beneficial for developing 21st century learning abilities. Furthermore, many online materials can be adapted and scheduled into a child's daily lesson plan. Preschool teachers can always use the digital technology available to research, select, and customise which apps they wish to work with per their courses. Related to this matter, participant 3 mentioned,

> *"...I would try to incorporate technology everyday where most teachers don't agree. Because there's way more resources online that can use compared to traditional method but I do understand that screen time needs to be controlled and sometimes you need them to do more hands-on. So, if you were to ask me I definitely plan at least one small portion of my lesson with something to do with technology"* (P3; L266-270, interviewed on 29/4/2023).

Besides that, there are many platforms and tools that could be used as strategies while incorporating GBL approach in digital context. Many reliable apps are found in the online platform which contribute to different development of the children. Platforms that are available on the internet is planned and designed by professionals who have experiences in the curriculum. Based on the findings,

participants mentioned that they would use certain apps/platform as part of their strategies of their lesson. For example:

> "*... The strategies I would use would be interactive learning apps like Kahoot!, Biteable, Class dojo, Khan academy kids, Smartboards to practice children's writing, Youtube for educational videos*" (P5; L247-249, interviewed on 25/6/2023),

> "*... apps such as sesame street, turtle diary which has games and resources for teacher, then, PBSkids*" (P3; L271-272, interviewed on 29/4/2023).

4.3.6.3 Rewards

Preschool teachers employ rewards as a tactic to encourage children to engage in the learning process. Even though the GBL approach uses digital technology, a small percentage of children will never be interested in participating for a variety of reasons, including excessive device use, failing to finish tasks that are set and other issues. Introducing the reward system can assist in luring children into the activities since it keeps them thrilled, even though it could otherwise discourage them from participating. Every child will be able to participate and excel in their education, in a sense. Based on the findings, two of the participant mentioned rewards as their strategies, as below:

> "*…reward system. When the children hear of rewards they are very much interested and participate better in the activities*" (P4; L274-275, interviewed on 30/4/2023),

> "*... Based on my experience, seldom got kids not interested in the games, always like not listening, I would just give them, instruction like later we have games to play and will let them know those who perform will get a reward at the end of the lesson*" (P2; L260-263, interviewed on 28/4/2023).

4.3.6.4 Non-digital approach

Despite the research study in digital context, participants have responded for GBL approach in non-digital context. This is due to certain factors, such as lack of knowledge on GBL approach in digital context due to their age. It is noticed that,

some older preschool teachers are reluctant of incorporating this approach due to their lack of skills in ICT, and instead they prefer the traditional learning method. Based on the findings, one of the participant mentioned,

> *"... utilizing creative visual aids such as colourful charts, props and pictures enhance comprehension and engagement"* (P6; L256-257, interviewed on 2/7/2023),

RQ3: What are the preschool teacher's perception on the implementation of GBL into their teaching practices?

4.3.7 Preschool Teacher's Perception on GBL

Perception of preschool teachers are crucial to proceed with the GBL approach, because only then one would be able to find out if the teachers are accepting or not of the specific approach. In order to find that out, the researcher questioned the participants on children's attention span, engagement and motivation factors, as well as if there are any other factors can be achieved by incorporating this approach. All the participants responded positively saying that, there are many elements can be achieved, as well as the factors mentioned were achievable through GBL.

4.3.7.1 Motivation, Engagement, Attention Span and Others

As a result of the rapid advancement of technology, the GBL technique is mostly utilised in digital contexts to boost children's motivation, engagement, and attention span. In contrast, older methods tend to bore children and result in a reduction in children involvement. Children today are captivated by digital technology because, as was previously noted, they grew up surrounded by it. Therefore, to meet their needs in the present, preschool teachers must include digital technology into their lessons, which will increase the children's interest in

education. To support these factors, participant 6, participant 3 and participant 4 mentioned,

> *"…Yes, it does increase the children's motivation, engagement, attention span and others. Engagement can be enhanced by allowing children to play the games in group. Instant feedbacks and rewards can be booster for the children to keep them motivated and improve their attention span"* (P6; L337-340, interviewed on 2/7/2023),

> *"...Not only that, by allowing the children to play games, it promotes healthy competition where the competitive elements can stimulate motivation, especially in group setting. Competition encourage children to strive for improvement and perform to the best of their abilities"* (P6; L340-344, interviewed on 2/7/2023),

> *"... Attention span is increased when use technology, yes. But when you move back them to traditional it is a challenge. But I am still working on it, finding different ways of getting them to stay longer when you do something on off screen. When it comes to motivation and engagement, definitely they are way more motivated, I won't say engaged but they are more into it since its fun and more attractive. These things slightly improve their literacy and creativity* (P3; L348-353, interviewed on 29/4/2023),

> *"… Other factors like teamwork, healthy competition, and taking turns also can be observed using these methods. For example, when we put the children in a group, they are able to take turns and compete healthily with their peers to achieve the rankings. Team work could be enhanced through this"* (P4; L355-358, interviewed on 30/4/2023).

4.3.7.2 Teacher-Children Interaction

Conversely, this study aimed to investigate the effects of the GBL approach on the interaction between teachers and students. Since the teacher acts as a facilitator and is constantly available to children for advice, there may undoubtedly be beneficial interactions between the teacher and children. To encourage children and help them work more effectively, the teacher can also provide them with immediate feedback on their progress while they are working on a task. As a result, two parties interact more frequently. All the participants agreed that preschool teachers' plays vital role as a facilitator and definitely there is a positive effect in the relationship between the teacher and children. For instance,

> *"... It actually increase the engagement when it comes to learning because game-based learning help children become more engaged during the*

learning process, develops positive attitude towards learning also towards their teacher. In terms of collaboration, the children are required to work together, builds positive relationship with their friends and teachers. It also boost self-confidence" (P1; L362-367, interviewed on 26/4/2023),

"...I find there's more bonding and there's more rapport between both of them and what I mean is that the teacher also need to invest the time to work with children with things like this. Only then they know the children's strength and weaknesses, development and personality, so it definitely a way to bond with the child" (P3; L380-384, interviewed on 29/4/2023).

Overall, all the participants believes, GBL has a positive impact in the relationship between teacher and children, as well as the children get to learn from their teacher and be motivated. So, definitely the bond between them gets stronger.

4.3.8 Improvisation

The participants were questioned about ways to make the GBL method in early childhood settings better. The results show that training and creativity are the two primary things that the participants focused on. In order to promote dependable teachings for the children utilising the appropriate skills and procedures, training is essential for the GBL approach in a digital setting. The teachers' inventiveness then follows from this. For preschool teachers to increase their children's progress, they must be creative in order to design more interesting lessons. To innovate the GBL approach in a digital setting, then, these two elements need to be addressed.

4.3.8.1 Training

As discussed earlier, training is vital for every preschool teachers to handle GBL approach with ease. It has been observed that many preschool teachers are reluctant to use digital technology to implement the GBL approach because they lack the necessary technological skills. Furthermore, they believe there are drawbacks to exposing children to technology. It would be advantageous for teachers to receive training within the school to help them comprehend the

benefits and competencies that are required to support the children's learning. The results showed that three of the participants had discussed training. They think that in order for preschool instructors to comprehend and learn how to incorporate the GBL approach using digital technology, they should all receive appropriate training, which should be given by the school or organisation. It has been observed that some educators are reluctant to adopt the new approach and prefer to employ the traditional method. In order for them to learn the new method, teachers definitely must receive proper training. To support this, participant 1, participant 4 and participant 6 elaborated,

> "… Teachers would require training in specific areas for them to incorporate these methods in correct ways to teach children" (P1; L403-404, interviewed on 26/4/2023),

> "... This method can be improvised by giving proper training and guidance for teachers who are not familiar and always on traditional method. Older generation teacher can have some ideas from the younger generation of teacher because I personally witnessed that teachers above 35 years old are not so familiar with this. So, school should provide training session or normal brainstorm session among the teachers" (P4; 424-430; interviewed on 30/4/2023),

> "... It should start with the teachers where they receive adequate training and professional development which enables the teachers to integrate their knowledge into GBL in order to fulfil the 21st century skills to the children" (P6; L405-409, interviewed on 2/7/2023).

4.3.8.2 Creativity

Being creative is essential for preschool teachers to design more interesting lessons that will accelerate the learning of the students. A creative teacher would come up with numerous fun and exciting ways to impart the lesson to the children in a way that they could understand. However, some teachers are not creative enough to promote learning to the children. This can be improved by the abundance of internet resources and tutorials that the present and future generations can access to makes being creatively inclined effortless. It is worth noting that the next generation of educators possesses 21st century skills and are

digital natives. Hence, they would definitely able to create lessons creative which will be useful for the children. Being creative is also known as, to be able to carry out lesson based on the 21st century learning skills. Some participants shared their thoughts on creativity and they mentioned,

> "… *teachers nowadays are less creative so in order to create 21st century learners, the teacher themselves should be 21st century learners in order to promote to the children. As for my understanding, not many teachers are familiar of the term game-based learning*" (P1; L400-403, interviewed on 26/4/2023),

> "*... Before anything, the teacher should be able to understand this approach so that they can carry out the lesson accordingly to the 21st century learning. Also, always take time to plan the lesson and collaborate the games that are suitable to make sure all children are in the same phase of learning*" (P2; L412-416, interviewed on 28/4/2023),

> "… *incorporate AR and VR and allow the children to explore, as these technologies can provide immersive and interactive experiences, making lessons more engaging and memorable* (P6; L405-409, interviewed on 2/7/2023).

4.3.8.3 Facilities

Facilities are the resources that pre-schools have available, like computers, laptops, smartboards, and many more. In addition to the preschool teachers' awareness, creativity, and training in the interactive teaching and learning strategy, the preschools should give their teachers access to resources and supply the schools with technological equipment. This is due to the fact that creating and implementing the courses would require having the necessary facilities to easily teach the lessons to the children. Additionally, it gives the children a chance to discover technology first-hand and helps them understand how to interpret their interactive lessons in a digital circumstance. Based on the findings, two of the participants shared their thoughts on facilities by saying,

> "… *Then, schools need to have unlimited resources as in the digital gadgets. Because many schools don't have limited resources that the teachers and children could use. So, equipping the schools with digital*

technologies would be one way to improvise the GBL approach" (P5; L391-394, interviewed on 25/6/2023),

"...there should be good facilities provided by the schools, such as enough numbers of laptops or other technological devices to carry out the lessons. As I see, not many preschools are equipped with this kind of facilities. However, some schools do have but with a limited number which is not so effective for learning" (P6; L412-416, interviewed on 2/7/2023).

Apart from that, participant 3 shared her thoughts by saying,

"... My personal opinion, in our current setting, there is an ICT lesson which is only for the 6 years old. But if you were to ask me it can be applied from 3 years old. It doesn't have to as advanced as 6 years old. It can be just introducing them the technology. So when they are more familiar using this technology tools. So, I think this is the first step of improvising these methods." (L417-423, interviewed on 29/4/2023).

Some other suggestion were found saying that,

"... To improvise this learning method, digital companies can come out with a self-monitoring system in their apps, to save every child's scoring data and areas they need to improve in. This can help children do some activities independently while teachers are there to scaffold if needed. Then teachers can check back on the overall progress of the child" (P5; L388-391, interviewed on 25/6/2023).

4.3.9 Recommendation of GBL approach to future preschool teachers

Participants were asked if they would recommend GBL approach using digital technology to the upcoming preschool teachers and why. All the participants provided positive feedback on recommending this approach, as they believe technology is everywhere and it is much easier to get resources from online which would be the benefit for the preschool teachers, as mentioned by participant 2,

"… it makes the learning fun and creative. Plus nowadays teachers are surrounded by many resources, so they are creative enough to make gamified learning for the children especially in early years setting" (L455-457, interviewed on 28/4/2023).

In addition, educators nowadays, particularly those in the younger generation, are accustomed to using technology and are referred to as "digital natives" since they have received training in and acquired all of the 21st century learning abilities. Given that

teachers have grown up with technology, they ought to know more about digital learning. In addition, since there are resources and tutorials available on using digital technology for learning, teachers of the present generation can always search for information on supporting learning. As mentioned by participant 3,

> "… *Upcoming teachers would also be the younger generation teachers who also comes with digital technology experiences, probably they are way better in tech advance like if you were to see so many teachers on TikTok already sharing their experiences on what are the different type of platform to use to teach in the classroom. They share links of websites, different apps that they use to teach a certain learning concept to the children"* (L458-463, interviewed on 29/4/2023).

Not only that, participants also mentioned that despite the disadvantages that this approach holds, it is still a good approach to be used in the early years education, as said by participant 5,

> *"... it's important that children are exposed to these learning method, also by weighing the pros and cons there are definitely more pros to help children in many ways"* (L439-440, interviewed on 25/6/2023).

4.4 Summary

This chapter discussed on the findings collected from the participants of the study. Next, in Chapter 5 other elements will be discussed such as discussion, conclusion, implication and recommendation to the future teachers and researchers.

CHAPTER 5

DISCUSSION AND CONCLUSION

5.1 Introduction

This chapter comprises of five sub-topics which are the summary of research findings which summarizes the findings from the three research questions of this study, then the discussion, implication, recommendation and conclusion.

5.2 Summary of Research Finding

The primary objective of this study was to find out the acceptance of preschool teachers on Game-Based Learning approach in digital context. Six participants were chosen for this study to find out the preschool teachers acceptance on GBL approach, using semi-structured interview protocol. The interview was conducted one by one for each of the participants to collect their views all about this approach. Furthermore, the interview questions were synthesized based on the three research questions which was derived from the variables of this study. Based on the findings and the participants' feedbacks, out of six participants, five of them positively accepted the GBL approach to be incorporated in their teaching and learning activities, whereby one of the participant still not accepting despite the benefits because, this specific participant believes that learning without digital technology, in other words, traditional methods would be better due to over exposure of digital technology on everyday basis in children's life.

5.2.1 Acceptance of GBL Approach

The results showed that, notwithstanding their GBL practices in non-digital circumstance, every participant was aware of this technique in a digital context. Almost all of the participants agreed that the GBL approach is a kind of play that uses digital technology, such as computers, laptops, iPads, and many more, to support learning for young children. The learning objectives are meant to be accomplished by the end of the lesson. Regarding their acceptance of this approach in the current learning trend, the researcher found that most participants believe it to be interactive and effective, and that it should be incorporated into children's daily learning because it is more enjoyable than the traditional learning method and has advantages that will help children advance academically. Furthermore, it equips the children with the 21st century learning skills, a prerequisite for becoming digital natives. Children need to learn and acquire knowledge appropriate to their situation because, in the modern world, technology is the center of everything. Nonetheless, it was also noted that a tiny percentage of participants believed that traditional teaching methods were still preferable for children because of the children's regular exposure to digital devices at home. They therefore favour learning in a classroom setting that is not digital-based.

Moving forward, GBL has advantages and disadvantages for children's learning, much like any other learning strategy. The results showed that the participants focused mostly on improving children's attention span, motivation, engagement, and ability to solve problems, as well as provides active learning. They also highlighted improving their communication and social skills. In addition, it appeared that employing a digitally based GBL approach to teaching enhanced children's memory, which helps them assimilate information more effectively because of the way the GBL is integrated with digital technology. Regarding the drawbacks, though, the health of the children, more especially, their eyesight because of the excessive screen time seems to be the most worry. Aside

from that, children appear to become disinterested in other educational pursuits as using technology to learn is the only thing that interests them. As was already noted, nothing interests children more than devices, so they tend to hesitate about other forms of learning. This is another drawback of having short attention spans. Additionally, research revealed that utilising digital technology for education prevents children from engaging in experiential learning firsthand. Besides that, lack of social interaction is also a drawback of GBL approach in digital context, as sometimes children play alone for instance, at home as homework, and the children get too addicted to it and prevent themselves from interacting with others around their circumstance.

5.2.2 Implementation and Strategies of GBL

The results demonstrated that various preschool teachers apply GBL approach-based lessons in different ways. When creating lessons using the GBL approach, there are standard procedures to follow. These include establishing learning objectives and goals that must be met by the end of the lesson, choosing age-appropriate games to facilitate interactive teaching and learning, incorporating curriculum requirements, giving clear instructions, encouraging peer collaboration, and providing feedback and reward at the end. In this approach, the aim of GBL will be effortlessly met in the process of teaching and learning for both teachers and children. In addition, young children's learning can be made engaging and enjoyable by utilising the GBL technique. Some claim that including devices keeps children interested and engaged already. Even so, you can still add appeal to the approach by selecting games with vibrant graphics, catchy soundtracks, relatable characters, captivating and involved gameplay, and other features like goal-setting that leads to rewards, among many other things. The children will be extremely engaged and eager for the teachings as a result of this.

Strategies can be ingrained to improve the efficacy of any approach and learning, including GBL. Numerous tactics can be employed in conjunction with the GBL approach, it has been discovered. It includes techniques like the use of technology, reward systems, straightforward and easy communication between teachers and students, defining learning objectives and goal-setting prior to the class, and imaginative and vibrant visual aids. The strategy refers to the online platforms that would be employed. A number of these platforms, including PBSKids, Kahoot!, Smartboard, Khan Academy, and many more, were identified based on the findings of the GBL method. Preschool teachers can include these online tools into their classes to enhance the learning experience and make it more interactive. Going forward, it is discovered that the GBL approach has a positive impact on the teacher-student relationship because the teacher, acting as a facilitator, continuously provides feedback on the children's progress and inspires them to learn by developing innovative and engaging teaching techniques. When teachers and children work together to learn, it improves the children's learning and strengthens the relationship between them.

5.2.3 Preschool Teacher's Perception on the Implementation of GBL

Participants think that pre-school teachers should be properly trained on both the theory and application of this GBL technique in order to be able to improvise when implementing it. It has been observed that some of them dislike applying this strategy in a digital setting for various reasons. But one of the causes is a lack of training. Besides that, creativity among preschool teachers need to be boosted as well, because creativity of a preschool teacher will allow to promote lessons more creative which would attract the children and make them feel motivated to learn. In the findings, it showed that teachers nowadays are lack of creativity. Besides that, another factor that was addressed in the findings is that facilities. Pre-schools should promote facilities and resources for the preschool teachers to carry out GBL approach using digital technology. Lack of facilities

prohibits the interactive teaching and learning for both preschool teachers and children. Finally, the research indicates that current preschool teachers would unquestionably suggest this approach to aspiring educators given its many advantages. Younger teachers, on the other hand, grew up in a digital age and will be far more resourceful and aware of the online platform's resources. Therefore, it is still essential that aspiring preschool teachers have the requisite training in this area in order for them to be able to use this strategy to teach lessons in a digital environment.

5.3 Discussion

5.3.1 GBL in digital context

The first part of the discussion is based on the research question one, the acceptance of preschool teachers on the implementation of the GBL approach. Based on the findings, insightful thoughts have been shared by all the six participants which benefits the researcher to carry forward with the study, acceptance of preschool teachers on GBL approach in digital context. It is stated that, all the six participants have an excellent understanding of the GBL approach in digital context, whereby they shared a clear definition of the term. To summarize, participants mentioned that, GBL approach is the use of games and related elements to facilitate learning by the preschool teachers using the digital technology, such as computer, laptop and other available gadgets. This findings of the GBL term was consistent with the previous studies conducted by Coleman (2020), digital game-based learning uses a very high-quality game elements into children's lessons to accommodate appropriate learning based on the 21st century learning skills, using technology gadgets such as iPad, computer and laptop (Acquah et al, 2020). It is also stated by two out of six participants, GBL approach is used to increase children's learning in term of increasing motivation, engagement, creativity and many others.

Similarly, few studies have discovered that GBL is used to instil all these factors to create interactive teaching and learning environment for the children. For instance, according to Behnamnia et al, "Digital games is the focus on learning, gaining knowledge, behaviour, and new skills. As mentioned, games in digital context potentially increase children's motivation and participation" (2023, p. 22). Pulungan & Hariati (2022), mentioned in their research that, implementing GBL in children education allows the children to attain the 21st century skills, as well as it promotes holistic development in overall. Not only that, GBL in young children's learning keep them motivated and excited throughout the learning process (Schabas, 2023).

5.3.2 Acceptance

Moving along, since the main objective of this study is to investigate the acceptance of preschool teachers adapting to GBL approach in digital context, the researcher wanted to find out the participants' thought on this approach. Out of six participants, five participants showed positive behaviour of accepting this learning approach as an interactive teaching and learning method, however one of the participants did not accept. Based on the study conducted by May (2021), majority of the participants positively accepted GBL approach to be incorporated into children's learning and minority did not due to several reasons. Preschool teachers in this study open towards this learning approach due to several factors such as digital literacy and increased in motivation and engagement. Digital literacy is crucial in this era, because everything around the children have something to do with technology. Hence, it is necessary for the preschool teachers to keep the children's needs and requirement for learning is achieved, as well as equip them with the 21st century skills. Children between the ages of two and six have a lot of imagination, so when they are exposed to digital literacy which is one of the 21st century skills, it tends to make them more enthusiastic and creative (Maureen et al, 2020). Furthermore, children who acquire 21st-century abilities are better able to solve

problems, collaborate with others, and exercise critical thinking (Behnamnia et al, 2020). On the other hand, screen time appears to be the cause of this learning approach's rejection in the current study. As per the participants' perspective, children these days are always surrounded by screens; for example, they even spend time on them after they return home. As a result, when they return to school and are exposed to screens once more, it affects their vision and makes them disinterested in other activities. This factor has been discussed in research conducted by Pandya et al. (2021), Overusing screens while learning has a negative impact on children's emotional development and can lead to mental health problems like stress and headaches as well as health problems like vision impairments.

5.3.3 Advantages and disadvantages of GBL

Regarding the benefits of the GBL technique, each of the six participants was able to enumerate nearly identical components in the results. First, of the six participants, four stated that using the GBL approach in the classroom improves the collaborative learning skills of the children. Through working in pairs or small groups with their classmates, the students are able to strengthen their social skills. The activities frequently ask for children to work in groups or couples, which encourages healthy competitiveness in addition to other virtues like sharing, teamwork, and taking turns. When children collaborate on a task assigned by the teacher, they often achieve great academic success because, when placed in pairs or small groups, the children can discuss, share ideas, and ask questions of each other to complete the task at hand which, as a result helps the children develop good social skills (İlhan, 2021). In addition, Behnamnia et al. (2020) noted that the ability to work together will eventually motivate the children to improve their academic performance. Next, few of the participants shared that active learning can be achieved through GBL approach as well. As young children are full of imagination and creativity (Larenjeiro, 2021), it develops their thinking even better in this setting by allowing them

to attain problem-solving skill, creativity, decision-making skill and many others. According to Lambrani et al. (2020), who provided support for this claim, GBL encourages pre-schoolers to learn actively by teaching them 21st century skills like problem-solving and decision-making via a range of carefully crafted activities available on the internet platform. Proceeding, it is discovered in this study that GBL improves children's memory. Given that children are inherently drawn to digital technology (Janssen et al., 2020), any lessons or activities that involve the devices pique their interest and boost their desire to study. Additionally, games inherently include colourful graphics, appealing animation, music, and a host of other characteristics that draw in children to play. Children learn more effectively and assimilate information more readily as a result. "The learning process based on digital educational games has the ability to stimulate children's curiosity to find new ways to solve problems by creating attractiveness in the visual space, which, in turn, increases children's satisfaction" (Hooshyar et al., 2020; Lin et al., 2020). Consequently, creating games that emphasise these kinds of aspects tends to help players' memory since, once they see it and understand it, the information they have learned will remain in their long-term memory (Behnamnia et al., 2023).

Besides that, in the current study, five participants mentioned there are some disadvantages using GBL approach in digital context such as attention span, health issue and social interaction. According to a study by Hartt et al. (2020), children's attention spans might have both beneficial and harmful effects. Children who spend a lot of time in front of screens become disinterested in alternative teaching methods and lose motivation. As a result, children will only desire to learn when there are electronics around. Children who are constantly surrounded by electronics at home, school, and other locations may also be less interested in using those devices to learn through games because they know that they will always have access to those devices when they get home, so they don't really need to participate in class (Makhovych, 2023). This is another factor

contributing to short attention spans. Furthermore, the most common disadvantage that was addressed in the current study is concern on the children's health. First, there is the impact that prolonged screen usage has on eyesight. Their vision will eventually deteriorate to the point where they must wear glasses for the rest of their lives. Next is their mental health. Sometimes children experience stress and are unable to finish a task, or they view the task as a competition and put too much effort into it. Comparably, a prior study by Idris et al. (2020) shows that some children take their games extremely seriously and that their constant pursuit of victory causes them to strain their eyes and become more stressed out mentally to keep up with their classmates. The last issue is the decline in social engagement. It is a well-known fact that children who have access to digital technology are less likely to be interested in engaging in face-to-face learning or socialising with their classmates (Taub et al., 2020). This will eventually prevent children from having genuine relationships with their friends, as well as reduce the communication.

5.3.4 Implementation of GBL

Moving along, the second part of this discussion is based on the research question two which is more on the strategies to implement interactive teaching and learning using GBL approach. Based on the study's findings, it appears that participants' comprehension of the GBL approach is average since only two out of the six participants were able to provide appropriate guidelines for using the technique correctly. The initial stage of implementation, based on the children's strengths and weaknesses, appears to be setting goals and learning objectives. This is because the preschool teacher will be able to organise the lesson to meet the needs of the children, and being a good observer will help the teachers organise the lesson and comprehend the children (Kaimara et al., 2021). The next stage will be to provide the children with plain, understandable instructions in simple language for scheduled lessons. Lambrani et al. (2020) corroborated this claim, and they

went on to say that preschool teachers' tones are advantageous when providing clear instructions because children prefer different voice tones for different contexts, which draws them in and encourages participation as well as the completion of the task at hand. Moving forward, the study's findings indicate that fostering collaboration is a component of implementation. Preschool teachers reported that working with children in pairs or small groups enables them to collaborate, take turns, develop teamwork, and foster healthy competition in the classroom. This was also supported by the researcher Widayati et al. (2023), saying that implementation of GBL strengthens the collaboration among children while participating in certain activities, and it further benefits the children adapt to a friendly environment where they will be able to help one another or teach one another. In this case, better learning process will be able to take place among the children in the classroom setting. In addition to offering healthy competition, it also enables them to exchange knowledge and support one another during the learning process, allowing them to learn from one another (Raptopoulou, 2020). Participants noted that constant feedback is essential for children in order to improve their learning and help the implementation succeed. Children benefit greatly from feedback because it gives them confidence in their ability to learn and enhances their performance in the classroom (Kaimara et al, 2021). Finally, using rewards to motivate goal achievement. According to this study, all of the preschool teachers discussed prizes, saying that they help to motivate children to participate and develop an interest in particular learning activities so they can finish the assignment. According to a study by Hepach et al. (2023), rewards have an innate ability to draw in young children and encourage them to engage in necessary tasks. They are also frequently employed as a motivating strategy when teaching lessons to encourage participation from children. Zolkipli et al. (2023), agreed to the statement mentioned by Hepach et al. (2023), as he mentioned in his study that he has witnessed children getting motivated and performing better in any given tasks when rewards are mentioned to the

children. Thus, rewards are one of the reinforcement method that can be used as a strategy while implementing GBL lessons with children.

Using the GBL strategy involves making the lessons engaging for children, and four of the study participants said that creating games that are visually appealing by incorporating eye-catching colours, images, graphics, and other components would be helpful. According to earlier research, it's critical to create courses that incorporate more engaging sights, sounds, graphics, and other aspects since they encourage children to explore more and, in a sense, boost their creativity (Kaenah et al, 2023). When suitable game components are included, children will actively participate, take in the information, and eventually accomplish the objectives. On the contrary, two of the participants think that there is no need of making the implementation of GBL approach exciting, because using digital technology is already exciting for the children. Similarly, the study conducted by Chang et al. (2023), recorded that some of the participants believes that incorporating digital technology itself interesting and exciting for the children, and playing games using the gadgets alone comes with all the elements.

5.3.5 Teaching Strategies Using GBL

According to the findings, all participants of this study have good understanding of the teaching strategies that can be used to accommodate learning using GBL approach in the classroom. Firstly, two of the participants suggested observation and communication skill as one of the teaching strategies. Some researchers believe that these two skills are essential for preschool teachers to attain in order to identify each child's strengths and shortcomings and to monitor their development (Hartt et al., 2020; Taub et al., 2020). This therefore gives them the opportunity to develop lessons that are tailored to the needs of the children. Good communication is essential to bolster the observant capability. The preschool teacher's communication style is crucial to the children's understanding of what

the teacher is attempting to teach them (May, 2021). Any lesson should be delivered in simple language, as well as accommodated by proper body language that the children can understand and obey. Next, online games/resources are identified as teaching strategy in this study. Since the current generation known as digital natives, and implementing GBL approach in digital context requires online games and resources to accommodate the children's learning. Some participants of this study would incorporate lessons using digital technology in their everyday lesson with limited period of time. A study conducted by Behnamnia et al. (2023), clarified the benefits of implementing lessons using digital technology for young children as it improves the children's ICT knowledge in young age, boost their problem-solving skill, creativity and decision-making skill, which are vital components of 21st century learning abilities. Furthermore, preschool teachers can use a variety of online gaming applications created by curriculum designers and specialists in early childhood education into their lessons and requirements. Participants of this study have a good awareness of the online apps that could be used in their classrooms to romote interactive teaching and learning, such as 'Kahoot!', 'Wordwall', 'PBSKids', 'Khan academy', Smartboard and few others. There are some researches have been done on these tools, especially on Kahoot!. Kahoot! Is one of the common tools that has been used widely in every stage of education including in preschool education. According to Makhdum et al. (2023), this tool fosters social connection and healthy competitiveness among children by encouraging collaboration and engagement. Children can share knowledge with one another and collaborate to complete the assignment, which enables them to accomplish the goals as a team. Furthermore, Kahoot! helps children develop their language vocabulary. Children are drawn to and are able to comprehend focused phrases and sentences that are repeated and have vivid colours and sounds (Maulana et al., 2023). As a result, individuals will unintentionally utilise those terms in their statements and conversations when they talk. 'Wordwall' shares a similar feature with

Kahoot!, which is to enhance children's reading skills through quizzes (Swari, 2023). It also offers advantages in other areas, like science and mathematics. "Smartboards" are frequently used in interactive teaching and learning to support early literacy skills like writing and reading (Anero, 2023) because they give children the opportunity to practise writing digitally using a pen and lines. Children can practise their early writing with pens in the same way as they do by hand in notebooks, but with a "Smartboard," it's digital (van Dijken, 2023). Furthermore, "PBSKids" is a programme that is utilised in preschool classrooms to support early literacy abilities in arithmetic, language, social studies, science, and other subjects for children ages two to six. (Asmawati, 2023). Due to the fact that "PBSKids" was created by specialists in the early years sector and that all of the activities are tailored to meet curriculum requirements, preschool teachers are comfortable and enjoy implementing it (Petty, 2023, p. 13).

Additionally, the implementation of a reward system is another tactic that preschool teachers frequently employ to support learning. According to half of the survey participants, including rewards encourages and motivates children to participate. They contend that it is essential to provide incentives in interactive teaching and learning. According to a study by Mallawaarachchi et al. (2023), nearly all of the study's participants stated that rewards are crucial in early childhood digital apps because they improve children' cognitive behaviours, which raise their sense of motivation. Finally, because they lacked experience with digital technology, two study participants expressed their opinions about the GBL approach in non-digital contexts when it came to adopting interactive teaching and learning. Therefore, to improve understanding and engagement in non-digital GBL, innovative visual aids like colourful charts, props, and photographs can be used effectively. In a similar vein, May's (2021) study revealed that the use of colourful charts, props, and other educational tools has been beneficial for children's

learning because children are drawn to brightly coloured props and are naturally stimulated by larger images, which makes them interested in what they are learning.

5.3.6 Preschool Teacher's Perception on GBL

The next section of this study discuss the research question three of this study which is the perception of preschool teachers on the implementation of GBL approach into their teaching practices. Based on this study's finding, all six participants have given their positive feedbacks regarding incorporating GBL approach in children's daily learning just like the other previous researches that have been done in this area. Firstly, three out of six participants emphasized on increase in children's motivation, engagement and attention span. GBL approach has the natural tendency to improve all these three factors mentioned due to GBL's elements in digital context. Some studies findings were almost similar with the current study's findings whereby GBL approach is effective among young children in increasing their attention span due to its characteristics such as games which comes with rewards, sounds and attractive images (Contreras Lance, 2023); and as for the motivation and engagement, the designs of lessons planned by the preschool teachers motivate the young children during the learning process by using digital technology, guidance and feedbacks which immediately activate the children's engagement during the process (Ratnasari et al., 2023; Behnamnia et al., 2023; Ongoro et al., 2023), as well as enables teamwork, healthy competition and taking turns. Secondly, all the six participants' understanding of this GBL approach in teacher-children interaction is good based on the study conducted, because all the participants mentioned this approach have a positively increased the teacher-children interaction during the learning process. Preschool teacher's role as a facilitator has a good impact in learning and the relationship between them due to the guidance and constant feedback in assisting learning. Moreover, receiving guidance in handling the tasks and constant feedback of the teachers have taken the relationship to the next step, as well as a result, children also

get motivated in learning and perform better in the given tasks to achieve the learning objectives which was stated in the study conducted by Hayati et al, (2023).

5.3.7 Improvisation

In addition, the researcher learns from the study participants' comprehension of the improvisation technique how to make the GBL approach effective for interactive teaching and learning in preschool settings. The study participants also provided information about training, creativity, and advancement of facilities. In terms of training, the participants stressed that preschool teachers should have the proper training to apply the GBL approach in a digital setting, in order to understand both its foundational principles and its advantages. As this study has already indicated, some preschool teachers are hesitant to use this strategy in a digital setting because they lack technological proficiency and are worried about the negative effects on children. Similarly, a Schabas (2023) study underlined that for preschool teachers to be able to comprehend and apply GBL in a digital setting, they must have professional training in this area. Professional training will also be able to encourage and instil confidence in teachers who are deviating from this approach. Next, creativity is crucial for every preschool teachers to instil in themselves to designing lessons in terms of delivering and conducting. Based on the findings of this study, it is noticed that teachers nowadays are less creative which results in children to lose interest in learning. Being creative using GBL approach in digital context means understanding the 21st century skills and deliver the lesson accordingly to the children and in order to do so, preschool teachers must understand GBL approach first. Understanding this approach will be beneficial for the teachers to design creative lessons for the children. This statement was supported by Dahalan et al. (2023), whereby in their research participants thinks that teachers need to upgrade themselves to be creative to plan proper lessons which will attract the children's urges to learn. A study also highlighted that lack of creativity of the teacher causes boredom and make the children

lose interest, which results in lack of motivation and engagement (Kaldarova et al., 2023). There are many online resources available that teachers could learn and use them to make their lessons as creative as possible. Moreover, the study participants highlighted the absence of school-provided facilities as the final element influencing improvisation. Preschool classrooms should have access to limitless digital equipment so that teachers can implement the GBL approach in a digital setting while also allowing children to play with and learn from technology. Participants stated that interactive teaching and learning between teachers and students is hampered by a lack of facilities in schools. Participants in Schabas's study from 2023 expressed similar views, stating that one of the reasons preschool teachers are unable to adapt their teachings to the needs of their children —a process known as the adaptation of 21st century skills—is a lack of equipment. In order to give the children the education they need in this century and to prepare them for their future ambitions, it is crucial that the person in charge, the management, or higher authority address this scenario.

5.3.8 Recommendation of GBL approach to future preschool teachers

The final section of the discussion recommends the GBL technique in a digital context for aspiring preschool teachers. All study participants enthusiastically stated that they would recommend this strategy because of its many advantages for young children. Furthermore, despite these minor drawbacks, it can still be managed under the supervision of adults, and both teachers and students can benefit from this technique by encouraging interactive teaching and learning that will help them acquire the skills necessary for the twenty-first century. In addition, participants in the earlier study demonstrated a favourable attitude towards this digital context approach, citing its acceptance as the new standard for education in the modern era and its great support for digital learning in other educational stages as justification for its application in preschool education (Kaldarova et al., (2023); Schabas (2023); Swari (2023). It is usually preferable

to begin when children are still young, giving them time to adjust to the new standard of education.

Finally, as this study is tailored to the TAM, preschool teachers must embrace the GBL approach in a digital setting to support interactive teaching and learning for children. Furthermore, the adoption of the GBL approach starts with preschool teachers, who must adapt their instruction to the needs of the children in their care. Despite their expertise, awareness, creativity, training, and the resources available to them, preschool instructors must now adjust to the new norm of education in light of the growing role that technology plays in the educational system. In addition, the study participants have stated that these aspects help to improve the learning environment for children. Preschool teachers, who serve as both a role model and a facilitator for the children, should therefore acquire the necessary knowledge, be properly trained, and have unrestricted access to technology before they can embrace this approach and give children better opportunities.

5.4 Implication of Research Study

This study focuses on the acceptance of the GBL approach by preschool teachers in order to support interactive teaching and learning. As demonstrated by the theoretical framework of the Technology Acceptance Model (TAM), the study's findings indicated that steps should be taken, particularly in understanding the GBL approach in a digital context, raising awareness, encouraging appropriate training for preschool teachers, and accommodating school settings with proper facilities to enhance both teaching and learning.

5.4.1 Implication to preschool teachers

The implication of this study can be beneficial for the upcoming preschool teachers in giving good input to implement lessons according to the standards established for the children. The most effective strategies emerge from preschool teachers utilizing GBL when they genuinely embrace the approach and other elements like facilities, training, and awareness. This is because preschool teachers will feel appropriately inspired and guided to encourage interactive teaching and learning for young children.

5.4.2 Implication to policy maker

Preschool policy makers can utilise the study's findings to track the challenges faced by preschool teachers in implementing the GBL strategy in a digital context. Recognising the shortcomings eventually improves the preschool education system, which benefits young children by providing them with a high-quality education. To help preschool instructors adjust and gain the confidence to provide such lessons for children, those in authority might begin by providing them with the right guidance.

5.4.3 Implication to school management

School administrators should work with teachers to determine their needs, develop their creative skills, and make sure they are aware of the resources available on the internet by offering them endless opportunities to excel in the classroom. Finally, children will benefit from this study since it will introduce them to new learning opportunities in the classroom, where they can work with their peers to collaborate on projects using technology that enhances and diversifies their education.

5.5 Recommendation for Future Research

Addressing this recommendation, given that the present study centers on preschool teachers' acceptance of the GBL approach in a digital setting, future researchers should build on this work by investigating how preschool teachers can enhance their abilities by adjusting to the GBL approach despite their advanced age. According to this study, a few preschool teachers are hesitant to use digital technology in the GBL approach because of their age, inexperience, and lack of knowledge about the tactics. Thus, it would be wise to direct future research in this direction in order to raise preschool teachers' awareness of the methodology. In addition, this study could be expanded to distinguish between GBL in a traditional setting and GBL in a digital context in order to learn more and acquire abilities and knowledge that would help preschool teachers, who are less conscious of the need to support interactive teaching and learning, in their work. Furthermore, this study can be examined at the elementary and secondary education levels in order to understand implementation tactics and encourage interactive learning. To provide future educators with more knowledge to include into their everyday teaching practices, researchers can delve deeper into the platforms that are currently available for usage in the GBL approach in a digital setting.

Proceeding, although this study was based on a qualitative interview protocol, comparable research can be carried out employing quantitative surveys and participant observation to collect data, which also allows the researcher to collect more data during short period of time. Not only that, more participants can be drawn for a quantitative study which provides more sources compared to qualitative. Better results from the research can be shown in this area, strengthening the field of study and enabling higher authorities to examine areas that need improvement for the preschool educational system of the future. It will also assist future preschool teachers in enhancing their performance in this area. Finally, this study used the Technology Acceptance Model (TAM) to determine

preschool teachers' acceptance of the GBL approach. Future researchers can examine the ADDIE framework model for educator training and performance assessment, as well as Gagne's nine-event instructional model, which accommodates step-by-step learning so that children meet the goal by the end of the lesson.

5.6 Conclusion

The education system in Malaysia has been significantly impacted by the emergence of Industrial Revolution 4.0 (IR 4.0). The Blueprint states that this is because IR 4.0 has improved education by bringing technology into this field as well (Idris et al., 2023). Given that technology is advancing at an exponential rate and that the present generation is referred to as "digital natives," it is imperative that technology integration be included into the educational system in order to equip students with 21st century abilities. Incorporating GBL approach in digital context in preschool setting is one way of enhancing education better for the children due to the advantages that can be attained by the children such as ICT skills and 21st century learning skills which are known as problem-solving, decision-making, creativity and many others (Lamrani et al., 2020). As discussed, GBL approach boost children's engagement, participation and motivation which makes their learning process more interactive. Preschool teachers are responsible to create such an opportunities to the children to make the learning better.

Apart from that, acceptance of the preschool teachers of GBL approach in digital context is crucial for them to be able to design and deliver the lessons accordingly to the children's needs. As GBL approach in digital context involves technology, teachers should be ready to accept the teaching methodology by gaining insights, awareness, proper training, and creativity, and of course access to the digital technology. In this study, it is notably noticed that most of the participants are aware of the teaching

methodology, however, they suggested that proper training and facilities is a must to create a better learning experiences for the children. Some preschool teachers are of lack of ICT skills and creativity, which inhibits them from exploring GBL in digital context. Hence, proper training and awareness needs to be crated for those preschool teachers to promote interactive teaching and learning by implementing GBL approach, comes together with advancement of technology in the school.

As time went on, the game-based learning (GBL) approach in early childhood education changed from the concept of play to what is known as game-based learning in traditional terms and subsequently in digital contexts. In encouraging children to learn interactively throughout time, the components of the approaches remain the same, for some reason. As in a digital setting, preschool teachers may now find a wealth of online tools to help them create educational and game-based activities. Examples of these resources include 'Wordwall', 'PBSKids', 'Kahoot!', and many more that are created in accordance with the learning curriculum. Thus, preschool instructors can rely on these platforms because they are trustworthy. Because of the abundance of tools and rapid advancements in technology, preschool teachers nowadays must exercise extra creativity. Previous GBL research has demonstrated the numerous advantages of this strategy and these platforms for children in terms of fostering social interaction, fostering creativity, motivation, and active participation. These benefits were also identified by the study's participants through the use of interview protocols for data collection. Last but not least, the study's findings indicated that, as a result of their awareness and comprehension, the majority of participants demonstrated a positive attitude and acceptance of the GBL approach in digital context and openness towards being creative in promoting interactive teaching and learning for the current generation of the children by receiving proper guidance and resources from the management.

REFERENCES

Acquah, E. O., & Katz, H. T. (2020). Digital game-based L2 learning outcomes for primary through high-school students: A systematic literature review. *Computers & Education*, *143*, of artificial intelligence and machine learning. In *2022 International Conference on Sustainable Computing and Data Communication Systems (ICSCDS)*, 69-103667.

Alabbasi, D. (2018). Exploring Teachers' Perception towards Using Gamification Techniques in Online Learning. *Turkish Online Journal of Education Technology-TOJET, 17(2),* 34-45. https://eric.ed.gov/?id=EJ1176165

Alam, A. (2022, April). A digital game based learning approach for effective curriculum transaction for teaching-learning of artificial intelligence and machine learning . In *2022 International Conference on Sustainable Computing and Data Communication Systems (ICSCDS)* (pp. 69-74). IEEE.

Alharbi, M. O., & Alzahrani, M. M (2020). The importance of learning through play in early childhood education: Reflection on the Bold Beginnings Report. *International Journal of the Whole Child, 5(2),* 9-17.

Almanasreh, E., Moles, R., & Chen, T. F. (2019). Evaluation of methods used for estimating content validity. *Research in social and administrative pharmacy*, *15*(2), 214-221. https://doi.org/10.1016/j.sapharm.2018.03.066

Alshammari, S. H., & Rosli, M. S. (2020). A review of technology acceptance models and theories. *Innovative Teaching and Learning Journal (ITLJ)*, *4*(2), 12-22. http://161.139.21.34/itlj/index.php/itlj/article/view/56

Andersen, M. M., Kiverstein, J., Miller, M., & Roepstorff, A. (2023). Play in predictive minds: A cognitive theory of play. *Psychological Review*, *130*(2), 462. https://doi.org/10.1037/rev0000369

Anero, N. (2023). The use of emerging digital technologies for effective early childhood education in dynamic society.

Anvarovna, S. N. (2022). Some Aspects of the Maria Montessori Method in the Education of Preschool Children. *International Journal of Inclusive And Sustainable Education*, *1*(6), 169-173.

Arifin, S. R. M. (2018). Ethical considerations in qualitative study. *International journal of care scholars*, *1*(2), 30-33. https://doi.org/10.31436/ijcs.v1i2.82

Aslan, S., Agrawal, A., Alyuz, N., Chierichetti, R., Durham, L. M., Manuvinakurike, R., Okur, E., Sahay, S., Sharma, S., Sherry, J., Raffa, G., & Nachman, L. (2022). Exploring Kid Space in the wild: A preliminary study of multimodal and immersive collaborative play-based learning experiences. Educational Technology Research and Development, 70(1), 205–230. https://doi.org/10.1007/s11423-021-10072-x

Asmawati, L. (2023). Parenting Digital Media Promotes Digital Literacy Culture Early Childhood Aged 4-5. In *6th International Conference on Learning Innovation and Quality Education (ICLIQE 2022)* (pp. 56-67). https://doi.org/10.2991/978-2-38476-114-2_6

Bali, M. M. E. I., Fathony, A., Maghfirah, E., & Farida, L. A. (2021). Utilization of Zoom Cloud in M3D (Maze 3D) Game-Based Learning to Develop Early Childhood Social-Emotional Skills. In *IOP Conference Series: Materials Science and Engineering* (Vol.1125, No. 1, p. 012061). IOP Publishing.

Behnamnia, N., Kamsin, A., Ismail, M. A. B., & Hayati, A. (2020). The effective components of creativity in digital game-based learning among young children: A case study. *Children and Youth Services Review*, *116*, 105227. https://doi.org/10.1016/j.childyouth.2020.105227

Behnamnia, N., Kamsin, A., Ismail, M. A. B., & Hayati, S. A. (2022). A review of using digital game-based learning for preschoolers. *Journal of Computers in Education*, 1-34.

Behnamnia, N., Kamsin, A., Ismail, M. A. B., & Hayati, S. A. (2023). A review of usingdigital game-based learning for preschoolers. *Journal of Computers in Education*, *10*(4), 603-636. https://doi.org/10.1007/s40692-022-00240-0

Berson, I. R., Luo, W., & Yang, W. (2022). Narrowing the digital divide in early childhood: Technological advances and curriculum reforms. *Early Education and Development*, *33*(1), 183-185. https://doi.org/10.1080/10409289.2022.1989740

Braun, V., & Clarke, V. (2021). One size fits all? What counts as quality practice in (reflexive) thematic analysis?. *Qualitative research in psychology*, *18*(3), 328-352. https://doi.org/10.1080/14780887.2020.1769238

Busetto, L., Wick, W., & Gumbinger, C. (2020). How to use and assess qualitative research methods. *Neurological Research and practice*, *2*, 1-10. https://doi.org/10.1186/s42466-020-00059-z

Cai, Z., Mao, P., Wang, D., He, J., Chen, X., & Fan, X. (2022). Effects of scaffolding in digital game-based learning on student's achievement: A three-level meta-analysis. *Educational Psychology Review*, *34*(2), 537-574. https://doi.org/10.1007/s10648-021-09655-0

Ceker, E., & Ozdaml, F. (2017). What "Gamification" Is and What It's Not. *European Journal of Contemporary Education, 6(2),* 221-228. https://doi.org/10.13187/ejced.2017.2.221

Chang, C. C., & Yang, S. T. (2023). Interactive effects of scaffolding digital game-based learning and cognitive style on adult learners' emotion, cognitive load and learning performance. *International Journal of Educational Technology in Higher Education*, *20*(1), 16. https://doi.org/10.1186/s41239-023-00385-7

Coleman, T. E., & Money, A. G. (2020). Student-centred digital game–based learning: a conceptual framework and survey of the state of the art. *Higher Education*, *79*, 415-457. https://doi.org/10.1007/s10734-019-00417-0

Coleman, P. (2022). Validity and reliability within qualitative research for the caring sciences. *International Journal of Caring Sciences*, *14*(3), 2041-2045. https://oro.open.ac.uk/81588/1/Coleman%20Validity%20and%20Reliability.pdf

Contreras Lance, M. J. (2023). English language learning through a game-based approach to increase preschoolers´ attention span.

Dahalan, F., Alias, N., & Shaharom, M. S. N. (2023). Gamification and game based learning for vocational education and training: A systematic literature review. *Education and Information Technologies*, 1-39. https://doi.org/10.1007/s10639-022-11548-w

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly, 13(3), 319–340. https://doi.org/10.2307/249008

Dimitra, K., Konstantinos, K., Christina, Z., & Katerina, T. (2020). Types of Game-Based Learning in Education: A Brief State of the Art and the Implementation in Greece. *European Educational Researcher*, *3*(2), 87-100. https://doi.org/10.31757/euer.324

Dwi Safitri, N., Hasanah, U., Masruroh, F., & Dodd, J. (2022). The Development of Thematic Board Educational Game Tools to Train The Literacy Skills of Children 5-6 Years Old. Print) Indonesian Journal of Early Childhood Educational Research, 1(2), 75. https://doi.org/10.31958/ijecer.v1i2.8156

Fang, M., Tapalova, O., Zhiyenbayeva, N., & Kozlovskaya, S. (2022). Impact of digital game- based learning on the social competence and behaviour of pre-schoolers. *Education and Information Technologies,* 1-14. https://doi.org/10.1007/s10639-021-10737-3

Fearnley, M. R., & Amora, J. T. (2020). Learning Management System Adoption in Higher Education Using the Extended Technology Acceptance Model. *IAFOR Journal of Education*, *8*(2), 89-106.

Forbes. (2019). Research Report Shows How Much Time We Spend Gaming. https://www.forbes.com/sites/kevinanderton/2019/03/21/research- report-shows-how-much-time-we-spendgaming-infographic/#1a9602d13e07

Gani, A., Imtiaz, N., Rathakrishnan, M., & Krishnasamy, H. N. (2020). A pilot test for establishing validity and reliability of qualitative interview in the blended learning English proficiency course. *Journal of critical reviews*, *7*(05), 140-143. http://dx.doi.org/10.31838/jcr.07.05.23

Giarcia, S. G., Nicolas, A, H., Cano, M. G., & Alonso, J. M. R. (2021). Gamification in the childhood education classroom. *South Florida Journal of Development, 2(1),* 623-632. https://doi.org/10.46932/sfjdv2n1-045

Gill, S. L. (2020). Qualitative sampling methods. *Journal of Human Lactation*, *36*(4), 579-581. https://doi.org/10.1177/0890334420949218

Giorgdze, M., & Dgebuadze, M. (2017). Interactive teaching methods: challenges and perspectives. *International E-Journal of Advances in Education*, *3*(9), 544-548. http://ijaedu.ocerintjournals.org

Göçen, A., Eral, S. H., & Bücük, M. H. (2020). Teacher perceptions of a 21st century classroom. *International Journal of Contemporary Educational Research*, *7*(1), 85-98. https://doi.org/10.33200/ijcer.638110

Graber, K. M., Byrne, E. M., Goodacre, E. J., Kirby, N., Kulkarni, K., O'Farrelly, C., & Ramchandani, P. G. (2021). A rapid review of the impact of quarantine and restricted environments on children's play and the role of play in children's health. *Child: Care, health and development*, *47*(2), 143-153. https://doi.org/ 10.1111/cch.12832

Granić, A., & Marangunić, N. (2019). Technology acceptance model in educational context: A systematic literature review. *British Journal of Educational Technology*, *50*(5), 2572-2593. https://doi.org/10.1111/bjet.12864

Halili, S. H. (2019). Technological advancements in education 4.0. *The Online Journal of Distance Education and e-Learning*, *7*(1), 63-69. https://www.tojsat.net/journals/tojdel/articles/v07i01/v07i01-08.pdf

Hartt, M., Hosseini, H., & Mostafapour, M. (2020). Game on: Exploring the effectiveness of game-based learning. *Planning Practice & Research*, *35*(5), 589-604. https://doi.org/10.1080/02697459.2020.1778859

Hayati, S., & Behnamnia, N. (2023). Exploring Game Behavior, Scaffolding, and Learning Mathematics in Digital Game-based Learning Apps on Children. https://doi.org/ 10.53964/jmer.2023005

Hennink, M., & Kaiser, B. N. (2022). Sample sizes for saturation in qualitative research: A systematic review of empirical tests. *Social Science & Medicine, 292,* 114523. https://doi.org/10.1016/j.socscimed.2021.114523

Hepach, R., Engelmann, J. M., Herrmann, E., Gerdemann, S. C., & Tomasello, M. (2023). Evidence for a developmental shift in the motivation underlying helping in early childhood. *Developmental Science*, *26*(1), e13253. *Educ Res*, *2*(5). https://doi.org/10.1111/desc.13253

Herout, L. (2016). Application of gamification and game-based learning in education. In EDULEARN2016: *8th International Conference on Education and New Learning Technologies*, 978-984. https://doi.org/10.21125/edulearn.2016.1212

Hidayat, Y., Nurhayati, I., Salamah, S., Rosmiati, M., Fatimah, A. S., & Lestari, L. (2023). The Effect of the Educational Game Tools on Early Childhoods in the Kindergarten. *Journal Corner of Education, Linguistics, and Literature*, *3*(2), 100-107. https://doi.org/10.54012/jcell.v3i2.200 100

Hidayat, Y., Hidayat, T., Mariawati, A., Rosmiati, R., & Haq, V. N. (2022). WhatsApp Group: Online Media for Early Childhood Learning during the Covid19 Pandemic. Journal Corner of Education, Linguistics, and Literature, 2(2), 140–148. https://doi.org/10.54012/jcell.v2i2.76

Hoe, T. W. Nurturing Teachers with Tomorrow's Standards Today: Bring Games into and Building Games through Classroom Activities. In *THE 6th INTERNATIONAL CONFERENCE ON TEACHER EDUCATION* (p. 1570).

Hooshyar, D., Pedaste, M., Saks, K., Leijen, Ä., Bardone, E., & Wang, M. (2020). Open learner models in supporting self-regulated learning in higher education: A systematic literature review. Computers & Education, 103878. https://doi.org/10.1016/j.compedu.2020.103878

Hopkins, E. J., & Lillard, A. S. (2021). The Magic School Bus dilemma: How fantasy affects children's learning from stories. Journal of Experimental Child Psychology, 210, Article 105212. https://doi.org/10.1016/j .jecp.2021.105212

Huang, Y. C. (2021). Comparison and contrast of Piaget and Vygotsky's Theories. In *7th International Conference on Humanities and Social Science Research (ICHSSR)*, 28-32. https://doi.org/10.2991/assehr.k.210519.007

Hussin, A. A. (2018). Education 4.0 made simple: Ideas for teaching. *International Journal of Education and Literacy Studies*, *6*(3), 92-98. https://doi.org/10.7575/aiac.ijels.v.6n.3p.92

Idris, M. I., Said, N. E. M., & Tan, K. H. (2020). Game-based learning platform and its effects on present tense mastery: Evidence from an ESL classroom. *International Journal of Learning, Teaching and Educational Research*, *19*(5), 13-26. https://doi.org/10.26803/ijlter.19.5.2

Idris, R., Govindasamy, P., & Nachiappan, S. (2023). Challenge and Obstacles of STEM Education in Malaysia. *International Journal of Academic Research in Business and Social Sciences*, *13*(4), 820-828. https://doi.org/10.6007/IJARBSS/v13-i4/16676

İlhan, A. (2021). The impact of game-based, modeling, and collaborative learning methods on the achievements, motivations, and visual mathematical literacy perceptions. *SAGE Open*, *11*(1), 21582440211003567. https://doi.org/10.1177/21582440211003567

Ismail, M. E., Sa'Adan, N., Samsudin, M. A., Hamzah, N., Razali, N., & Mahazir, I. I. (2018). Implementation of the gamification concept using KAHOOT! Among

TVET students: An observation. In *Journal of Physics: Conference Series*, 1140(2), p. 012013. https://doi.org/ 10.1088/1742-6596/1140/1/012013

Janssen, X., Martin, A., Hughes, A. R., Hill, C. M., Kotronoulas, G., & Hesketh, K. R. (2020). Associations of screen time, sedentary time and physical activity with sleep in under 5s: A systematic review and meta-analysis. *Sleep medicine reviews*, *49*,101226. https://doi.org/10.1016/j.smrv.2019.101226

Kaenah, K., Utami, S. Y., Muawwanah, U., & Moha, L. (2023). Implementation of Loose Part Media to Increase Creativity in Early Childhood. *Indonesian Journal of Early Childhood Educational Research (IJECER)*, *1*(2), 87-96. http://dx.doi.org/10.31958/ijecer.v1i2.8157

Kaimara, P., Fokides, E., Oikonomou, A., & Deliyannis, I. (2021). Potential barriers to the implementation of digital game-based learning in the classroom: Pre-service teachers' views. *Technology, Knowledge and Learning*, *26*(4), 825-844. https://doi.org/10.1007/s10758-021-09512-7

Kemp, A., Palmer, E., & Strelan, P. (2019). A taxonomy of factors affecting attitudes towards educational technologies for use with technology acceptance models. *British Journal of Educational Technology*, *50*(5), 2394-2413. https://doi.org/10.1111/bjet.12833

Kjørholt, A. T. (2019). Early childhood and children's rights: A critical perspective. *Early Childhood and Development Work: Theories, Policies, and Practices*, 17-37. https://doi.org/10.1007/978-3-319-91319-3_2

Krath, J., Schürmann, L., & Von Korflesch, H. F. (2021). Revealing the theoretical basis of gamification: A systematic review and analysis of theory in research on gamification, serious games and game-based learning. *Computers in Human Behavior*, *125*, 106963. https://doi.org/10.1016/j.chb.2021.106963

Kristiani, T., & Usodo, B. (2022). Exploration of the use of Quizizz gamification application: teacher perspective. *International Journal of Elementary Education*, *6*(2), 205-212. https://doi.org/10.23887/ijee.v6i2.43481

Krouska, A., Troussas, C., & Sgouropoulou, C. (2022). Mobile game-based learning as a solution in COVID-19 era: Modeling the pedagogical affordance and student interactions. *Education and information technologies*, 1-13. https://doi.org/10.1007/s10639-021-10672-3

Kurmanbayev, B., & Anarbayev, A. (2023). Applying game-based learning to a primary school class in computer science terminology learning. In *Frontiers in Education* (Vol. 8, p. 1100275). https://doi.org/10.3389/feduc.2023.1100275

Lamrani, R & Abdelwahed, E. H. (2020). Game-based learning and gamification to improve skills in early years education. *Computer Science and Information System, 17(1),* 339-356. https://doi.org/10.2298/CSIS190511043L

Laranjeiro, D. (2021). Development of game-based learning apps for preshoolers. *Education Sciences*, *11*(5), 229. https://doi.org/10.3390/educsci11050229

Lin, S.-Y., Chien, S.-Y., Hsiao, C.-L., Hsia, C.-H., & Chao, K.-M. (2020). Enhancing Computational Thinking Capability of Preschool Children by Game-based Smart Toys. Electronic Commerce Research and Applications, 44, 101011. https://doi.org/10.1016/j.elerap.2020.101011

Lindeman, S., Svensson, M., & Enochsson, A. B. (2021). Digitalisation in early childhood education: a domestication theoretical perspective on teachers' experiences. *Education and Information Technologies*, *26*(4), 4879-4903. https://doi.org/10.1007/s10639-021-10501-7

Liu, Z. Y., Shaikh, Z., & Gazizova, F. (2020). Using the concept of game-based learning in education. *International Journal of Emerging Technologies in Learning (iJET), 15(14),* 53-64. https://doi.org/10.3991/ijet.v15i14.14675

Manesis, D. (2020). Barriers to the use of Games-Based Learning in pre-school settings. *International Journal of Game-Based Learning (IJGBL)*, *10*(3), 47-61.

McLelland, J. (2024). Connecting Piaget's cognitive development theory to technology in the early years. *He Kupu*, *8*(1).

Makhdum, F. N., Khanam, A., Faisal, A., & Sandhu, H. R. (2023). Impact Of Kahoot! On Students' Engagement And Learning Outcome At The Elementary Level In Pakistan: Their Perception Towards Kahoot! Assessment. *Journal of Positive School Psychology*, 64-78.

Makhovych, I. (2023). Advantages and disadvantages of digital and face-to-face gamification   in regards to retaining engagement and enhancing learning. In *Інноваційні тенденції підготовки фахівців в умовах полікультурного та мультилінгвального глобалізованого світу*. Київський національний

університет технологій тадизайну.
https://er.knutd.edu.ua/bitstream/123456789/23389/1/ITPF_2023_P040-043.pdf

Mallawaarachchi, S. R., Tieppo, A., Hooley, M., & Horwood, S. (2023). Persuasive design-related motivators, ability factors and prompts in early childhood apps: A content analysis. *Computers in Human Behavior*, *139*, 107492. https://doi.org/10.1016/j.chb.2022.107492

Marikyan, D. & Papagiannidis, S. (2023) *Technology Acceptance Model: A review*. In S. Papagiannidis (Ed), TheoryHub Book.

http://open.ncl.ac.uk/ISBN: 9781739604400.

Maulana, H., Puspaningrum, E. Y., Via, Y. V., & Kartika, D. S. Y. (2023). KAHOOT! Platform Training as an Interactive and Collaborative Learning Media at Al-Islah Surabaya Kindergarten. *PROISRM*, *8*(1), 36-36.

Maureen, I. Y., van der Meij, H., & de Jong, T. (2020). Enhancing storytelling activities to support early (digital) literacy development in early childhood education. *International Journal of Early Childhood*, *52*, 55-76. https://doi.org/10.1007/s13158-020-00263-7

May, A (2021). Gamification, Game-Based Learning and Student Engagement in Education. https://openriver.winona.edu/leadershipeducationcapstones/55

Meier, C., Saorín, J., Bonnet de León, A., & Guerrero Cobos, A. (2020). Using the Roblox Video Game Engine for Creating Virtual tours and Learning about the Sculptural Heritage. International Journal of Emerging Technologies in Learning (iJET), 15(20), 268-280. http://doi:10.3991/ijet.v15i20.16535

Mikrouli, P., Tzafilkou, K., & Protogeros, N. (2024). Applications and Learning Outcomes of Game Based Learning in Education. *International Educational Review*, *2*(1), 25-54. https://doi.org/10.58693/ier.212

Ministry of Education Malaysia (2013). Malaysia Education Blueprint 2013-2025 (Preschool to Post-Secondary Education). Malaysia.

Newton, N., Record, A. E., & Mello, A. J. (2019). Fluency doesn't just happen with addition and subtraction: Strategies and models for teaching the basic facts (1st ed.). Routledge. https://doi.org/10.4324/9780429055553

Nguyen, T. (2020). Gamification and Formal Practice: A Pilot Study on Gamification's Contributions to Early Childhood Student Teachers' Musical Practice. *Music Technology in Education*, 103.

Nicolaidou, I., Tozzi, F., & Antoniades, A. (2022). A gamified app on emotion recognition and anger management for pre-school children. *International Journal of Child-Computer Interaction*, *31*, 100449. https://doi.org/10.1016/j.ijcci.2021.100449

Ninaus, M., Moeller, K., McMullen, J., & Kiili, K. (2017). Acceptance of game-based learning and intrinsic motivation as predictors for learning success and flow experience. *International Journal of Serious Games*, *4*. http://dx.doi.org/10.17083/ijsg.v4i3.176

Nurmash, R. (2022). Advantages and Disadvantages of Implementing Gamification In Learning English Language. *Вестник науки и образования*, (2-1 (122)), 73-74. https://cyberleninka.ru/article/n/advantages- and-disadvantages-of-implementing-gamification-in-learning-english-language

Ongoro, C. A., & Fangjiang, Y. Y. (2023). Digital Game-Based Technology for English Language Learning in Preschools and Primary Schools: A Systematic Analysis. *IEEE Transactions on Learning Technologies*. https://doi.org/ 10.1109/TLT.2023.3268282

Pandya, A., & Lodha, P. (2021). Social connectedness, excessive screen time during COVID-19 and mental health: a review of current evidence. *Frontiers in Human Dynamics*, *3*, 45. https://doi.org/10.3389/fhu,d.2021.684237

Peterson, J. S. (2019). Presenting a qualitative study: A reviewer's perspective. *Gifted Child Quarterly, 63(3),* 147-158. https://doi.org/10.1177/0016986219844789

Petty, J. (2023). Implementing a Multi-Tiered System of Support for Mathematics Instruction in Preschool Classrooms (Master Theses & Capstones Projects, Northwestern College, Iowa)

Piaget, J. (1962). Play, imitation and dreams in childhood.

Pratiwi, R. D., Andriati, R., & Indah, F. P. S. (2020). The Positive Effect of Educative Game Tools (Puzzle) on Cognitive Levels of Pre-School Children (4-5

Years). *The Malaysian Journal of Nursing (MJN)*, *11*(3), 35-41. https://doi.org/10.31674/mjn.2020.v11i03.006

Pulungan, E. N., & Hariati, R. (2022). Developing the Educational Game Tool to Improve Reading Ability of Early Childhood. *International Journal of Language Education*, *6*(1), 25-35. https://doi.org/10.26858/ijole.v6i1.20145

Raptopoulou, A. (2020). Preschool teachers' perspectives and use of digital game-based learning. *Vasileios Symeonidis, Ulf Fredriksson & Petros Gougoulakis*, 69. https://cier.edu.gr/wp-content/uploads/t-25.pdf

Rashid, N. A. M., & Noor, N. M. (2023, September). Enhancing Pre-Schoolers' Learning Motivation in Jawi Subject Through Game-Based Learning Application. In *European Conference on Games Based Learning* (Vol. 17, No. 1, pp. 426-434).

Ratnasari, W., Chou, T. C., & Huang, C. H. (2023). Exploring the Research Trajectory of Digital Game-based Learning. *Educational Technology & Society*, *26*(1), 45-61. https://doi.org/10.30191/ETS.202301_26(1).0004

Ribeiro, M. D., Cantalice, M. B., de Moura Lima, A., de Souza Neta, M. B., da Silva Neto, J. A., & de Sena, M. M. (2021). Gamification and early childhood education in thecontext of the pandemic Gamificação e educação infantil no contexto da pandemia. *Brazilian Journal of Development*, *7*(12), 114124-114139.

Riska, N., Handini, M. C., & Asmawi, M. (2021). Instructional-based Gamification in Improving Knowledge in Early Childhood. *International Journal of Early Childhood Special Education*, *13*(2).

Risman, K., Saleh, R., & Selvi, S. (2022). Educational Game Tool Flash Card Hijaiyyah Letter as A Medium of Stimulation of The Development of Moral and Religious Values of Children In TK Al Gazali Desa Metere Lakudo Subdistrict. Room of Civil Society Development, 1(1), 24–33. https://doi.org/10.59110/rcsd.v1i1.5

Ruslin, R., Mashuri, S., Rasak, M. S. A., Alhabsyi, F., & Syam, H. (2022). Semi-structured Interview: A methodological reflection on the development of a qualitative research instrument in educational studies. *IOSR Journal of Research & Method in Education (IOSR-JRME), 12(1),* 22-29. https://doi.org/10.9790/7388-1201052229

Sadovets, O., Martynyuk, O., Orlovska, O., Lysak, H., Korol, S., & Zembytska, M. (2022). Gamification in the informal learning space of higher education (in the context of the digital transformation of education). https://doi.org/10.18662/po/13.1/399

Safitri, E., Kustiawan, U., & Suryadi. (2020). Development of Busy Bag Educational Game Tools for Fine Motor Skills for Children Aged 3-4 Years. Proceedings of the 2nd Early Childhood and Primary Childhood Education (ECPE 2020), 487(2), 104–108. https://doi.org/10.2991/assehr.k.201112.020

Sailer, M., Murböck, J., & Fischer, F. (2021). Digital learning in schools: What does it take beyond digital technology?. *Teaching and Teacher Education*, *103*, 103346. https://doi.org/10.1016/j.tate.2021.103346

Samson, S., Sharon Samson., Dr. SV Karthiga, (2020). Gamification as a Tool in English Language Teaching. International Journal of Early Childhood Special Education (INT-JECSE), 12 (2): 99-102. *International Journal of Early Childhood*, *12*(2), 99-102.

Schabas, A. (2023). Game-Based Science Learning: What are the Problems with Teachers Practicing It in Class?. *Assyfa Learning Journal*, *1*(2), 89-103. https://doi.org/10.61650/alj.v1i2.128

Scharp, K. M., & Sanders, M. L. (2019). What is a theme? Teaching thematic analysis in qualitative communication research methods. *Communication Teacher*, *33*(2), 117-121.

Scherer, R., Siddiq, F., & Tondeur, J. (2019). The technology acceptance model (TAM): A meta-analytic structural equation modeling approach to explaining teachers' adoption of digital technology in education. *Computers & Education*, *128*, 13-35. https://doi.org/10.1016/j.compedu.2019.103656

Shaheen, M., & Pradhan, S. (2019). Sampling in qualitative research. In *Qualitative techniques for workplace data analysis* (pp. 25-51).

Swari, N. K. T. A. (2023). Wordwall as a Learning Media to Increase Student's Reading Interest. *Jurnal Pendidikan Bahasa Inggris, Indonesia*, *11*(1), 21-29.

Taub, M., Sawyer, R., Smith, A., Rowe, J., Azevedo, R., & Lester, J. (2020). The agency effect: The impact of student agency on learning, emotions, and problem-solving

behaviors in a game-based learning environment. *Computers & Education*, *147*, 103781. https://doi.org/10.1016/j.compedu.2019.103781

Tomaszewski, L. E., Zarestky, J., & Gonzalez, E. (2020). Planning qualitative research: Design and decision making for new researchers. *International Journal of Qualitative Methods*, *19*. https://doi.org/10.1177/1609406920967174

Turale, S. (2020). A brief introduction to qualitative description: A research design worth using. *Pacific Rim International Journal of Nursing Research*, *24*(3), 289-291.

Van Dijken, M. J. (2022). Print referencing during e-storybook reading on a SMART board for kindergartners to promote early literacy skills. *Reading and Writing*, 1-21. https://doi.org/10.1007/s11145-022-10304-3

Van Dijken, M. J. (2023). Print referencing during e-storybook reading on a SMART board for kindergartners to promote early literacy skills. *Reading and Writing*, *36*(1), 97-117. https://doi.org/10.1007/s11145-022-10304-3

Venukapalli, S. (2023). Does Jean Piaget Have a Theory about Dreams and Symbolic Representation?. *Canadian Journal of Educational and Social Studies*, *3*(6), 43-51. http://doi.ord/10.53103/cjess.v3i6.190

Vidal-Hall, C., Flewitt, R., & Wyse, D. (2020). Early childhood practitioner beliefs about digital media: integrating technology into a child-centred classroom environment. *European Early Childhood Education Research Journal*, *28*(2), 167-181. https://doi.org/10.1080/1350293X.2020.1735727

Walker, Z., Kho, H. H., Tan, D., & Lim, N. (2020). Practicum teachers' use of mobile technology as measured by the technology acceptance model. *Asia Pacific Journal of Education*, *40*(2), 230-246. https://doi.org/10.1080/02188791.2019.1671808

Wang, Y., Bian, Y., Song, Y., Huang, R., Gai, W., Liu, J., Yang, C., & Meng, X. (2020). Exer-learning: A new genre combines learning, exercise and fun for children. Procedia Computer Science, 174, 735–745. https://doi.org/10.1016/j.procs.2020.06.150

Whitton, N. (2012). Game-based learning. In: Seel N.M. (eds) Encyclopedia of the sciences of learning. https://doi.org/10.1007/978-1-4419

Widayati, S., Widayanti, M. D., & Aulia, A. W. (2023). Exploring the efficacy of game-based learning models in enhancing children's gross motor skills. *Atfaluna: Journal of Islamic Early Childhood Education*, *6*(2), 68-80. http://dx.doi.org/10.32505/atfaluna.v6i2.6420

Xezonaki, A. (2023). The use of Kahoot in preschool mathematics education. *Advances in Mobile Learning Educational Research*, *3*(1), 648-657. https://doi.org/10.25082/AMLER.2023.01.014

Ying, T. S. (2021). *The Impact of Adding Online Gamification in Teaching English Words Recognition among Pre-schoolers* (Doctoral dissertation, Universiti Teknologi Malaysia).

Zolkipli, N. Z., Rahmatullah, B., Mohamad Samuri, S., Árva, V., & Sugiyo Pranoto, Y. K. (2023). 'Leave No One Behind': A Systematic Literature Review on Game-Based Learning Courseware for Preschool Children with Learning Disabilities. *Southeast Asia Early Childhood*, *12*(1), 79-97. https://doi.org/10.37134/saecj.vol12.1.7.2023