

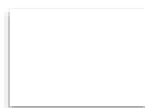
**TEACHERS PERCEPTION AND UTILIZATION TOWARDS DIGITAL
GAME BASED TEACHING IN SOME SECONDARY SCHOOLS IN
MINNA METROPOLIS**

BY

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2015/1/58792BT**

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SCHOOL OF SCIENCE AND TECHNOLOGY EDUCATION
FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA
NIGER STATE.**

APRIL,2023



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**A RESEARCH WORK SUBMITTED IN PARTIAL FULFILLMENT OF
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ABSTRACT

This study examines the perception and utilization towards the utilization of digital game-based teaching in some selected secondary schools within Minna Metropolis. Four research questions were raised and answered and two research hypotheses were formulated and tested. This study adopts the descriptive survey research design. The target population for the study consisted of all the senior secondary school teachers in Minna Metropolis, Niger State. The sample size for the study is fifty (50) teachers which consisted of thirty-two (32) male teachers and eighteen (18) female lecturers. The sample size was ascertained using the purposive sampling technique. The instrument for data collection titled “Teacher’s Perception and Utilization towards Digital Game based Learning” (TPUDGBL). The instruments were validated by educational technology experts and a reliability test was carried out using the Pearson’s Product Moment Correlation Coefficient (PPMC) which gave a reliability index score of $r=0.87$. The data was analyzed using the mean, standard deviation and t-test statistics. The findings revealed that Teachers held negative perception towards the utilization of digital game-based teaching. Teachers had low level of utilization of digital game-based teaching at the, there was no significant difference between the male and female teachers on the perception of game-based teaching. There was no significant difference between the male and female teachers on the utilization of game-based teaching. The study made recommendations amongst others, which included that the government and relevant stakeholders in education should make funds available for the purchase of needed digital game-based teaching for teaching and learning.

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CHAPTER ONE

1.0

INTRODUCTION

1.1 Background to the Study

Science encompasses the systematic study of the structure and behaviour of the physical and natural world through observation and experiment, and technology is the application of scientific knowledge for practical purposes (Rumjaun & Narod, 2020). Raja and Nagasubramani (2018) observed that the era of the 21st century is often regarded as an era of technology. Technology, today, plays a very important role in our life. It is seen as a basis of growth of an economy. An economy which is poor in technology can never grow in today's scenario. This is because technology makes our work much easier and less time consuming. The impact of technology can be felt in every possible field; one such field is Education.

According to the latest insights as to how exactly modern students of today prefer to use technology and how does their learning get an impact if they use technology, it was revealed that with the use of modern equipment technology and tools, the learning and interactivity of students increases (Mareco, 2017). They also find it much more interactive, as well as full of interesting areas, when aided by technology. The transfer of knowledge becomes very easy and convenient, as well as effective. What this means is that our minds now tend to work faster when assisted with the use of modern technology, be it any part of life, here we talk about education. The reliance and dependence of such an innovation, that simply makes life an easy, smooth journey is completely unavoidable these days even in schools, universities and colleges. Students today can make use of technology in the following ways: Internet connection and round the clock connectivity (E-study, 2021).

The internet has grown in importance by many folds, over the process of decades. Its importance in the education world can now never be undermined. Despite the chances of fraud and drawbacks, the use of the internet is like a blessing for students. Today, the internet is

something that is present in almost everything we use (Dentzel, 2021). From television to gaming consoles, and our phones, the internet is literally everywhere. The use of the internet allows students to find amazing convenience, they can find various kinds of help, tutorials and other kinds of assisting material which could be used to academically improve and enhance their learning. Using projectors and visuals Visual images always have a strong appeal compared to words. Using projectors and visuals to aid in learning is another form of great technological use. Top institutions around the world now rely on the use of amazing PowerPoint presentations and projections in order to keep the learning interactive and interesting (WorldBank, 2010). Technological use such as projectors within the schools and colleges can take the interaction and interest levels right up and also improve motivation. Students like to see appealing visuals and something that entices them to think rather than just reading words. The learning part also becomes pretty efficient when it comes to technology. Digital footprint in the education sector If we talk about digital and education, then the penetration of digital media within the education sector has now grown. This penetration has resulted in round the clock connectivity with students and different forums that are available for different kinds of assignments or help. As the power of digital increases, there are and there will be more applications that will assist students in development and learning.

Educational technology covers two aspects in teaching learning process i.e., technology as a thing and technology as a social process (Wikieducator, 2016). Educational technology is the embodiment of the practical information, which is the outcome of the application, science of teaching and learning to observe it practically in the classroom together with the aids and teaching strategies developed to give feedback in its application (UKEssays, 2018). In the field of education there are a number of products joint instructional procedures with instructional tools. Learning theories play a pivotal role in the teaching learning process, which help teachers, and to integrate them into teaching. Each theory of learning has its own procedures

for instruction in general and for the use of education technology in particular. Evidently, educational technology began to offer its services as early as the teaching started. In 1959 the term education technology was yet to be introduced, however, to pay share of educational television and instructional technology had already been commenced. In 1967 the word educational technology was recognized with the establishment of a national council for educational technology in the United Kingdom (UKEssays, 2018). The use of technology in education has witnessed many series of changes from nearly a way of instructing to development of educational technology as a system. “One of the important components of education is teaching. Therefore, teaching technology is a special branch of education technology. Education technology involves teaching, learning technology and systems approach, etc (Kumar, 2018). Teaching technology is related to systematization of the teaching process and in order to make the process of teaching effective and inspirational, it provides necessary theory and practice for the teachers. Education is not restricted to just a teaching process, and it is much more than this. Similarly, educational technology is much more than teaching technology.”

Educational technology is correlated with the application of audio-visual aids. A trained instructor uses these audio-visual aids to make his instruction effective. Electronic revolution is engulfed in educational technology, which has led to a stage of remarkable software and hardware. The audio-visual aids such as projector, tape record, radio and television has completely changed the background of education that is why educational technology was given importance in the teaching learning process. Technology describes a process that is something that the people do to solve problems or to achieve objectives and products such as instruments and tools, something that can be touched and exists and can be utilized to satisfy the community needs. The idea of systematic technology for education and training is not a new one. But in the last two decades it has gotten much attention. Research has been carried out in developing

scientific instruments for improving the educational and training programme. It should also be kept in mind that educational technology is not only a mechanical process but it is a social activity as well including human resources, ideas, methods, instruments and communications systems. Mahmood (2021) “The teacher must play a fundamental role for the success of Educational Technology. The teaching aids either new or old just supplement the attempts of the teacher to improve the learning process. ET cannot be a substitute for the instructor. The technologies help him to perform his duty in an efficient way to achieve the educational goals.” The areas regarding the application of educational technology are concerned with mass media i.e., radio, tape record, TV and computer etc, and system approach which means the designing, carrying out and evaluation of teaching learning process based on research.

Educational technology is concerned with learner behaviour and behaviour cannot only be resolved by biological technology. So, in this regard physical sciences should also be given importance. In short, the main focus of educational technology is to enhance the teaching learning process. Akhtar and Munshi, (2010) stated that: “The traditional teachers depended too much on verbal exposition. The pupil hears and forgets, but how it is possible to see and do everything in the classroom. Although it is very difficult, yet educational technology makes it possible. With the help of electronics, teaching and learning can be enriched, and a number of scenes may be shown in the classroom in a short time which is impossible to see in actual position for everyone.” The usual explanation for ET is that it will take the place of a teacher and the result will be unemployment. No technology can give new things because output is dependent upon the nature of input. The input side is more necessary, and it is dependent on the educator. The instructional material cannot be made by ET therefore, ET will not replace the human teacher but will assist him in improving teaching learning processes.

Avidov-Ungar and Eshet-Alkaai, (2011) observed that: “The teacher has to play a fundamental role for the success of Educational Technology. The teaching aids either new or old just supplement the attempts of the teacher to improve the learning process. ET cannot be a substitute for the instructor. The technologies help him to perform his duty in an efficient way to achieve the educational goals.” Educational technology has the ability to improve the teaching learning process. Educational technology in use of self-instructional programmes known as individualized instruction, to improve the quality of teaching learning process and helps us in using more varied, rich and motivating programmes through different media. It also helps in solving the problems of mass education. Education technology helps in using audio-visual aids for teaching the learning process. These aids include TV, computer etc. it also helps in bringing equality in education regarding the economic, social and geographical status of the students. It also helps in the continuous flow of education through different materials.

Digital game-based learning (DGBL) brings gaming concepts to the classroom, digital based learning offers a delicate balance between in-class lessons and educational gameplay (Prodigy, 2019). Teachers introduce students to new concepts and show them how they work. Then students practise these concepts through digital games. Refers to any form of use or integration of game into a learning environment in which the game plays a central role and is itself a digital (computer or console) game. May refer to serious games, curriculum in which the students learn through games (Van-Eck, 2009). Digital Game-Based Learning - “Instructional method that incorporates educational content or learning principles into computer or video games with the goal of engaging learners” (Coffey, 2017)

Huang (2013) noted that DGBL started out as an instructional strategy that can be embodied through computer-based applications. Through the advancement of learning technologies over the years, DGBL now can be considered a stand-alone learning environment that can address

various levels of learning needs. This strategy takes things many children enjoy doing outside of the classroom and adds them to their education. This helps students pay attention in class and improves their overall understanding of fundamental concepts.

“While actively involved in a game, our brains experience the joy of struggling with, and coming to understand, new systems, concepts, and perspectives. The same principles apply to digital games” (Jukes, 2017). Game-based learning is not a new concept in education, however, it has gained more popularity in recent years, particularly in classrooms where educators are looking to create an engaging learning environment. Digital game-based learning has actually been around for over three decades with advances in information technology and the Internet leading to an increase in use and popularity (Brom, Sisler, & Slavik, 2010). Digital game-based learning can take learning to the next level and support educators in creating a 21st century classroom. Digital game-based learning involves using computer and video games as tools to address learning goals. Digital game-based learning can also be defined as an “Instructional method that incorporates educational content or learning principles into computer or video games with the goal of engaging learners” (Coffey, 2017). In Prensky’s (2001) book, titled *Digital Game-Based Learning*, he wrote a chapter about the “Games Generations” learners. According to Prensky (2001), “Computer and video games provide one of the few structures we currently have that is capable of meeting many of the Games Generation’s changing learning needs and requirements”. Studies carried out by Erhel and Jamet (2013) revealed that game environments can promote learning and motivation, providing it includes features that prompt learners to actively process the educational content.

Research suggests that digital games have potential as learning tools (Wideman *et al.*, 2007). Recent reviews seem to confirm this potential of digital games to support students' learning and their motivation to learn (Wouters *et al.*, 2013; Clark *et al.*, 2015; Jabbar & Felicia, 2015).

Despite the many studies of the learning and motivational effects of digital games, teaching with digital games is not yet widespread in secondary education (Bourgonjon *et al.*, 2013; Proctor & Marks, 2013). Proctor and Marks (2013) reported that only 25.2% of teachers in secondary education use games in the classroom, whereas 60.6% of teachers in primary education use games. Negative teacher perceptions can be an important barrier to technology integration in general and to using digital games for learning, in particular (De Grove *et al.*, 2012). Teacher perceptions are important because teachers play a crucial role in selecting, implementing and evaluating educational games for their students (Hanghøj *et al.*, 2011). Insights into teachers' perceptions of the benefits of digital games for student learning, based on actual experience, may therefore provide us with a better understanding of teachers' decisions to use digital games in their practice. However, insight into how teachers evaluate the usage of digital games as part of their usual teaching practices is currently lacking. Therefore, this study focuses on how secondary education teachers, who are actually using digital games in their classrooms, evaluate the value of digital games for learning.

Whether the use of games actually leads to positive learning and motivational outcomes might be highly dependent on teachers' perceptions of and experience of teaching with games. Several studies examined teachers' views on digital games (Allsop *et al.*, 2013; Bourgonjon *et al.*, 2013; Dickey, 2015; Egenfeldt-Nielsen; 2011; Proctor & Marks, 2013). In these studies, three aspects are frequently mentioned: 1) teachers' perceptions of the value of teaching with games; 2) their ideas about barriers to using games in school; and 3) their acceptance of games as part of their educational practice. In the current study, we will focus on the first aspect, as this might be conditional for the other two. Many studies that examined why teachers value teaching with games show that the main reason teachers report for using digital games in their class is to enhance student motivation (Allsop *et al.*, 2013; Ince & Demirbilek, 2013; Li, 2013; Pastore & Falvo, 2010; Ruggiero, 2013; Wastiau, Kearney, & Van den Berghe, 2009). In addition,

teachers also mention students' acquisition of knowledge and cognitive skills as a reason for using (or wanting to use) games in their lessons (Allsop *et al.*, 2013; Ince & Demirbilek, 2013). These beliefs regarding learning opportunities have the strongest direct effect on teachers' intentions to use games (De Grove *et al.*, 2012). However, participants in these studies were mostly teachers who do not teach with games yet or teachers who use games in the context of a particular research project. This study takes a different approach. We deliberately selected teachers that used digital games in their classroom teaching on a regular basis, because these teachers' perceptions of the use of digital games in their teaching practice is based on their direct experience.

One study that did address this topic was Baek's (2018) exploration of Korean teachers' perceptions of roadblocks to using computer and video games in the classroom. From this quantitative study, Baek discovered six factors that inhibit teachers from using DGBL in the classroom. They are (a) inflexibility of the curriculum, (b) negative effects of gaming, (c) students lack readiness, (d) lack of support materials, (e) fixed class schedules, and (f) limited budgets. Although these factors hold true for Korean teachers, it has yet to be determined whether the same or similar results will be found with U.S. teachers. Furthermore, a more current study would be useful to determine whether modern updates to technology have influenced teacher decisions to use digital game-based learning.

1.2 Statement of the Research Problem

According to a survey conducted in 2015, 92% of teens reported going online daily (Armitage, 2015). Another study reported that "72% of all teens play video games on a computer, game console or portable device like a cellphone" (Lenhart *et al.*, 2015). Another study mentioned that teens spend an average of 9 hours a day on entertainment media, and this does not include time spent at school or on homework (Rideout, 2015). With this kind of competition for

students' attention during adolescence, it is becoming increasingly important to engage secondary school students in the field of education. DGBL has been shown to be a highly effective resource in the classroom, if the digital game is used effectively (Gelles, 2012; Hsiao, Chang, Lin, Chang, & Chen, 2014; Ray, Faure, & Kelle, 2013). The problem is that little evidence exists to help teachers, administrators, and professional development leaders in secondary school understand why teachers adopt or reject DGBL into their classrooms. By understanding the adopters and rejecters of DGBL in the classroom teachers, administrators, and professional development leaders can better formulate ways in which educators can effectively bring DGBL into the classroom setting. Discovering these reasons could also encourage positive social change by helping add another tool for secondary school teachers' use in the classroom to heighten student engagement and motivation. Hence, this study was designed to determine the perception and utilization towards the utilization of digital game-based teaching in some selected secondary schools within Minna Metropolis.

1.3 Aim and Objectives of the Study

The aim of this study is to investigate the perception and utilization towards the utilization of digital game-based teaching in some selected secondary schools within Minna Metropolis. Specifically, the study will achieve the following objectives: To;

- i. Investigate the perception of teachers on the use of digital game based teaching
- ii. Determine the level of utilization of game-based teaching by teachers
- iii. Investigate the gender difference in the perception of game-based teaching by teachers.
- iv. Investigate the gender difference in the utilization of game-based teaching by teachers.

1.4 Research Questions

The following research questions were raised to guide this study:

1. What is the perception of teachers on the utilization of game-based teaching and learning?
2. What is the level of utilization of game based teaching by teachers?
3. What is the gender difference in the perception of game-based teaching by teachers?
4. What is the gender difference in the utilization of game-based teaching by teachers?

1.5 Research Hypotheses

The following null hypotheses were formulated and tested at 0.05 level of significance.

HO₁: There is no significant difference between the male and female teachers' responses on the perception of game-based learning

HO₂: There is no significant difference between the male and female teachers' responses on the utilization of game-based learning.

1.6 Significance of the Study

The result of this research will be of immense importance or benefit to teachers, students, parents, government, and the society at large in the following ways:

The result of this research work will help improve teachers' perception and utilization of game based learning and how they are to be used during teaching and learning so as to better understand the impact of game based learning on students' academic performance. Teachers will consult this study to gain valuable knowledge and information regarding the influence of game-based learning usage on the perception and utilization of game-based teaching.

The findings of this study will help enhance the learning of students by stimulating and motivating them through the use of computer games. It will help them to overcome the challenges or difficulties they are facing during teaching and learning as games can enhance academic achievement.

The result of this research will be of immense benefit to parents and the society at large since parents will realize the importance of games in teaching and learning and develop the needed interest to support the utilization of digital game-based learning. Parents will also realize the importance of game-based teaching and how it directly stimulates their wards and provide efficiency during learning and also to the society since it will improve literacy level and build adequate comprehension and understanding skills.

Furthermore, this research work will serve as a reference source to the government when formulating and implementing policies that will improve teacher's competency with a view of making learning easier and enhancing national growth.

1.7 Scope of the Study

This study will focus on teacher's perception and utilization towards digital game-based teaching in some secondary schools within Minna Metropolis. It involves gathering reliable data from teachers from secondary schools in Minna Metropolis, Niger State. This study will cover all the secondary schools in Minna Metropolis, Niger State and will last for a period of four (4) weeks.

1.8 Operational Definition of Terms

Digital Game-Based Learning - "Instructional method that incorporates educational content or learning principles into computer or video games with the goal of engaging learners."

Educational technology is the embodiment of the practical information, which is the outcome of the application, science of teaching and learning to observe it practically in the classroom together with the aids and teaching strategies developed to give feedback in its application

Science encompasses the systematic study of the structure and behaviour of the physical and natural world through observation and experiment, and

Technology is the application of scientific knowledge for practical purposes.

CHAPTER TWO

2.0

LITERATURE REVIEW

2.1 Conceptual Framework

2.1.1 Concept of ICT

ICT stands for “Information and communication technology”. It refers to technologies that provide access to information through telecommunication (Borges & Laranjeira, 2013). It is similar to Information Technology (IT) but focuses primarily on communication technologies. This includes the internet, wireless networks, cell phones and other communication mediums (TechTerms, 2010). It means we have more opportunities to use ICT in teacher training programmes nowadays and improve the quality of teachers to teach effectively. According to UNESCO as cited by Khanday (2019) “ICT is a scientific, technological and engineering discipline and management technique used in handling information, its application and association with social, economic and cultural matters”. ICT has been a part of our lives for the last few decades affecting our society as well as individual life. ICT which is now broadly used in the educational world.

ICT includes the computer hardware, software, application of telecommunication technologies, projection devices, Local Area Network (LAN), Wide Area Network (WAN), digital cameras, Compact Disks (CDs), Digital Video Disks (DVDs), cell phones, satellites, and fiber optics. Digital Technologies is not a single technology. It is a combination of two or more technologies in that system (LISBDNETWORK, 2014). The emergence of ICT is one of the wonderful gifts of modern science and technology which has brought tremendous changes in library and information science (LISBDNETWORK, 2014). Application of information and communication technology (ICT) to library and information work has revolutionized the

traditional concept of libraries from a “Storehouse of books to an intellectual information center” connoting the concept of an electronic library. It has opened up a new chapter in library communication and facilitated global access to information crossing the geographical limitations (LISBDNETWORK, 2014). ICT is being increasingly used in library and information services for acquisition, processing, and dissemination of information.

The impact of ICT is enormous and global in its magnitude, pervasiveness and usefulness because of its most distinguishing features of a dramatic decrease in cost, size and tremendous increase in processing speed, storage and communication capabilities (LISBDNETWORK, 2014). ICT has a profound effect on the progress and development of human civilization (UN, 2013). The tools used in ICT include computer programs, databases, communication networks, analysis and design methods, programming languages, artificial intelligence, knowledge bases, etc. ICT has long-standing influence in almost all areas of human activity.

ICTs are making dynamic changes in society. They are influencing all aspects of life. The influences are felt more and more at schools. Because ICTs provide both students and teachers with more opportunities in adapting learning and teaching to individual needs, society is forcing schools to respond to this technical innovation (Mikre, 2011).

2.1.2 ICT in Education

Teachers, students, administrators and everyone related to education are popularly used to ICT, teachers use ICT for making teaching learning process easy and interesting (Bhattacharjee & Deb, 2016). A competent teacher has several skills and techniques for providing successful teaching. So development and increase of skills and competencies of teachers required knowledge of ICT and Science & Technology. In modern science and technological societies education demands more knowledge of teachers regarding ICT and skills to use ICT in teaching–learning process (Bhattacharjee & Deb, 2016).

Teacher is the main part of the educational field in our society, he works for the improvement level of our society in every field (Merrimack, 2020). Skilled teachers can make creative students in the form of the good social worker, politician, poet, philosopher etc. for the society. Teachers can play a friendly role with the learner. The rapid development in technology has made creatively changes in the way we live, as well as the demands of society. Recognizing the impact of new technologies on the workplace and everyday life, today's teacher education institutions try to restructure their education programs and classroom facilities, in order to minimize the teaching and learning technology gap between today and the future (Buabeng-Andoh, 2012).

Thakur (2012) noted that to effectively harness the power of the new information and communication technologies (ICTs) to improve learning, the following essential conditions must be met:

- Students and teachers must have sufficient access to digital technologies and the Internet in their classrooms, schools, and teacher education institutions. High quality, meaningful, and culturally responsive digital content must be available for teachers and learners.
- Teachers must have the knowledge and skills to use the new digital tools and resources to help all students achieve high academic standards. Generation of teachers to effectively use the new learning tools in their teaching practices. For many teacher education programmes, this daunting task requires the acquisition of new resources, expertise and careful planning. In approaching this task, it is helpful to understand the impact of technology on global society and the implications for education. The extensive knowledge that has been generated about how people learn and what this

means for creating more effective and engaging student-centered learning environments.

The knowledge of ICT is also required for pre-service teachers during their training programme, because this integrated technological knowledge helps a prospective teacher to know the world of technology in a better way by which it can be applied in future for the betterment of the students (Zyad, 2016). Nowadays ICT's are transforming schools and classrooms a new look by bringing in new curriculum based on real world problems, projects, providing tools for enhancing learning, providing teachers and students more facilities and opportunities for feedback. ICT also helps teachers, students and parents to come together. Continuous and Comprehensive Evaluation (CCE) helps students as well as teachers to use more technology for making teaching learning more attractive for the betterment of our future generation. Teachers must know the use of ICT in their subject areas to help the learners to learn more effectively (Ghavifekr, 2015). So, the knowledge of ICT is very much essential for both prospective teachers as well as in-service teachers also. This will help teachers to know integrated technology with classroom teaching.

2.1.3 Digital Educational Games

Digital educational games are software applications which combine both the characteristics of video games and those of computer-based games. They aim to design enticing learning experiences that successfully correspond to specific learning aims and results (Manesis, 2020). Digital educational games also take into account the desire and enthusiasm of students toward playing, while encouraging the development of logical thinking and the acquisition of knowledge, abilities, and skills. They can potentially stimulate the interest of the most demanding of students by assimilating them into the learning process through activities away from the traditional didactic methods adopted by most schools (Zirawaga, 2017). In order to

achieve this, digital educational games make use of multimedia and Internet technologies. At this point, the student has the ability to comprehend the demanding terms of a learning subject in his own learning pace through interactive and engaging applications and activities. Additionally, the possibility for socialization, cooperation, and creative expression is offered to learners of all grades through their interaction with digital environments and virtual worlds (Gregory *et al.*, 2016).

Rani *et al.*, (2015) opined that digital educational games are considered to be attractive because of their entertaining features in combination with their pleasant environment, their esthetic quality (graphics, effects, music), the existence of a structured framework, their learning goals (also presented as problems demanding solution), and the existence of the gaming dimension (causing also the strong participation of the learner). As a learning approach, digital educational games are considered to be contemporary learning tools and modern mediums of learning by bringing education to a new dimension. When used appropriately in an organized learning framework (with specific learning objectives, appropriate developmental design, and evaluation), digital educational games can be classified as active learning environments (Jantakun, 2021).

According to their educational use, digital educational games can be classified into three major categories: educational games, leisure games, and educational leisure games (Ulicksak & Williamson, 2010). The main definition of educational games refers to games designed with specific educational aims in order to support the teaching and learning processes. This definition includes games belonging to the “serious games” category, to “edutainment,” “game-based simulations,” and “epistemic games.” Leisure games are defined as games which do not promote learning as a clear and exclusive aim, although they also do not exclude their potential use when enforcing learning. This category consists of commercial games, also known as

commercial off-the-shelf games (COTS games). Educational leisure games are those used in class or in laboratory to support and enforce teaching and learning despite the fact these are designed for commercial purposes (e.g., The Sims, RollerCoaster Tycoon series, Civilization, and Age of Empires). This category is also continuously being expanded since digital gaming market companies are aware of the possible future inclusion of digital games in education, in universities, and even in military training.

Digital educational games do not set enjoyment and fun as their primary objective, but their environment includes educational content in a challenging and enjoyable way which promotes active learning (Abdellatif *et al.*, 2018). From a bird's-eye view, digital educational games must harmonize engagement, challenge, entertainment, and learning (Kaimara & Deliyannis, 2019). Digital educational games are based on four main elements which are engagement, autonomy, mastery, and progression. Engagement is connecting the player with the educational content of the game. Digital educational games allow players to be more autonomous as far as the ability to make decisions and take appropriate action is concerned. Mastery is the degree of repeatability of players' specific actions in order to gain full control of the game. Progression refers to the reward to players for their success. In fact, progression is the main motivation for players to accomplish the game's goals while learning at the same time (Pitarch, 2018). The evaluation of digital educational games can be conducted through several quality characteristics: game design, user interface, engagement, enjoyment, usability, playability, usefulness, cognitive behavior, pedagogical aspects, and learning outcomes (Abdellatif, 2018).

2.1.4 Digital Game Based Teaching

The didactic model of traditional teaching can be deemed as a noneffective method, which cannot also ensure great learning outcomes (at least as demanded by contemporary society). The current generation of students seems to lack motivation and satisfactory learning results as

encountered in the existing traditional educational system (Mupa, 2015). Bodies from all educational levels need to redesign their schedules as well as their policies on the use and incorporation of DGBL corresponding thus to the current digital literacy level of learners. In addition, digital educational games are suitable for digital natives (Ince, 2017). Indeed, this is one of the main reasons behind the increased levels of use of digital educational games in secondary schools.

Educational games offer a new perspective toward the culture of learning, which conforms to the habits and interests of learners. According to a relevant report by the Federation of American Scientists, the integration and use of digital educational games in the school environment could effectively contribute to the reformation of the educational system (Kebritchia *et al.*, 2010). When adding the element of entertainment in the learning process, education becomes not only more interesting and pleasant but also more effective (Zorica, 2014). As a result, digital educational games can successfully promote pupil participation, cooperation, and the development of problem-solving strategies (Manesis, 2020). Digital educational games can also place the learner-player into a situation described best by the term “flow” which is characterized by an increased attention span where all demanding tasks seem to be simple and fun. Learners are encouraged to learn by playing digital educational games, since such games offer an alternative learning environment which is both fun and effective.

All appropriate digital educational games can be very useful and effective educational tools, providing an alternative way of presenting educational content (Protopsaltis *et al.*, 2011). The educational organization known as Common Sense Media supports the belief that appropriately designed educational games do not distract students. On the contrary, they can be used as support channels for all practices and types of learning and teaching. Additionally, digital educational games can motivate students independent of gender, age, or level of education,

while offering an appropriate environment to different learning groups, for achieving common learning goals through cooperation. Educational games may also support teachers in their attempt to teach different types of students (Allen *et al.*, 2013; Pappdakis *et al.*, 2018)

As Klopfer *et al.*, described in (Klopfer *et al.*, 2009), digital educational games are usually defined as rich and exciting learning environments because they allow players to access environments otherwise impossible (e.g., players can go back to the story, manage entire civilizations, or handle the intricate operation of a big city). Digital educational games that include virtual worlds and simulations can also be transformed into necessary educational tools, mainly due to promoting and upgrading participatory interactive and entertaining activities (Thomas *et al.*, 2009). All appropriately designed games are able to support learners in developing such abilities and skills that will be proven valuable to the real world and which cannot be effectively taught through traditional teaching (Manesis, 2020). This fact could be applied to secondary school students. Such an example could be “The Sims” game addressing students of all ages, while assisting in the simulation of social situations through a variety of unpredictable situations (e.g., the role of economic goods and the relations between family members). Another example could be the game titled “Minecraft” whose sales exceed those of 20 million copies.

The combination of digital educational games with the curriculum in an easy and immediate manner. The prospects for the evolution of digital educational games are based on the relatively positive views of the majority of secondary school teachers (especially of the young ones).

The students' psychological and emotional development through the use of digital educational games. Furthermore, DGBL can enhance the study program of secondary education as far as ways of promoting learning are concerned. The educational system can make use of the energy and passion displayed by students on digital educational games in order to use these for

improving its learning processes, based on the acquisition of meaningful abilities and skills. The incorporation of new technologies in the game is indeed essential to the learning process in all stages of development.

Manesis (2020) argued that, there are certain principles which explain the way of learning through the use of digital educational games:

All previously acquired knowledge by the learner is in position to both assist and hinder learning. Undoubtedly, all pre-existing knowledge upon a subject is favorable. If someone's knowledge is flawed, this will become obvious only through a test when sticking to the traditional learning method. In the case of learning through digital educational games, the same person will be able to trace his problematic point easily and fast, since one wrong move leads to consequences. By doing this, the user will be able to correct himself and move forward (Manesis, 2020).

The learners' motives direct, define, and support their steps toward learning. Learners are usually motivated by scores and the progress of games. For example, they play persistently until they reach a safe score in the game. Through this process, they learn how to act in the environment of the game, how to experiment, and how to think and learn about the completion of a task. In this way, they develop a productive and consistent way of thinking.

Learners need to acquire abilities and skills for perfecting and applying all knowledge acquired. Usually, the design of a game is focused on rules and learning parameters without dwelling on their possible application. In contrast, all well-designed games are adjusted to each player and his learning pace. The learner keeps his basic knowledge as a starting point, but he cannot move forward without completing all levels. So, the game represents a realistic, interactive, and active learning environment that is focused on thinking, learning, and applying the appropriate knowledge at the appropriate time (Manesis, 2020).

Target-based practice is connected to feedback and to the enhancement of quality learning. Traditional learning does not provide any success-motivated feedback and does not offer students the possibility of constantly placing their thoughts and abilities in a realistic environment. In digital educational games, players are motivated by the aims of the game, while learning through errors and their consequences. Indeed, feedback motivates players to keep trying until they reach the goals of the game, providing them also with all necessary information to succeed.

Users consider games a relaxing and natural activity which leads them to also view computers as gaming tools. At the same time, users expect recognition of their efforts by the game either through feedback or by being encouraged to proceed to more difficult procedures (Shi et al., 2019). Through this process, the “I act to learn” model is being developed as opposed to the “I learn before I act” one. Learners also develop their fantasy through the environment of the game, while creating all appropriate conditions to approach new technologies in a friendly way.

When considering the use of digital educational games as pedagogical tools, teachers can play an important role by ensuring that their students re-evaluate all problems appropriately during the learning activity of the game. Digital educational games can also provide the learner with satisfactory interaction and can offer multiple chances for learning by doing.

Teachers today have to ensure that learners have the appropriate reflexes to gaining knowledge through playing digital educational games. DGBL is considered to be the fundamental component of teaching, although they do not have to play a central role to be deemed as necessary to learners. For example, (Ince, 2017) students may be taught a foreign language by the traditional teaching method while in class and practice the language at home using the equivalent digital game. Digital educational games may also have additional value as

supplementary teaching/learning material and as source teaching/learning material at the same time.

As new multipurpose mediums that activate students' interest and learning, digital educational games offer new perspectives that need to be treated maturely by teachers interested in renewing their means of teaching. But it is impossible for digital educational games to be treated as educational materials without fulfilling specific requirements to support in-class learning. Those requirements are a combination of the digital educational games' content and the basic principles of class management, which are fundamental for the development of digital educational games.

Most researches based on the use of DGBL in secondary education focus on the investigation of how digital educational games and gamification (the strategic use of games' elements to reach a goal) can be used to motivate students, to improve their skills, and to maximize their knowledge in different disciplines (Jones *et al.*, 2014; Kickmeier *et al.*, 2014; Gooch *et al.*, 2016)

2.1.5 Teacher's Perception towards Digital Game based Teaching

Whether the use of games actually leads to positive learning and motivational outcomes might be highly dependent on teachers' perceptions of and experience of teaching with games. Several studies examined teachers' views on digital games (Allsop *et al.*, 2013; Bourgonjon *et al.*, 2013; Dickey, 2015; Egenfeldt-Nielsen; 2011; Proctor & Marks, 2013). In these studies, three aspects are frequently mentioned: 1) teachers' perceptions of the value of teaching with games; 2) their ideas about barriers to using games in school; and 3) their acceptance of games as part of their educational practice. In the current study, we will focus on the first aspect, as this might be conditional for the other two. Many studies that examined why teachers value teaching with games show that the main reason teachers report for using digital games in their class is to

enhance student motivation (Allsop *et al.*, 2013; Can & Cagiltay, 2006; Ince & Demirbilek, 2013; Li, 2013; Pastore & Falvo, 2010; Ruggiero, 2013; Sandford *et al.*, 2006; Schrader, Zheng, & Young, 2006; Wastiau, Kearney, & Van den Berghe, 2009). In addition, teachers also mention students' acquisition of knowledge and cognitive skills as a reason for using (or wanting to use) games in their lessons (Allsop *et al.*, 2013; Can & Cagiltay, 2006; Ince & Demirbilek, 2013; Schrader *et al.*, 2006). These beliefs regarding learning opportunities have the strongest direct effect on teachers' intentions to use games (De Grove *et al.*, 2012). However, participants in these studies were mostly teachers who do not teach with games yet or teachers who use games in the context of a particular research project. This study takes a different approach. We deliberately selected teachers that used digital games in their classroom teaching on a regular basis, because these teachers' perceptions of the use of digital games in their teaching practice is based on their direct experience.

Alhebshi and Halabi (2020) opined that Digital game-based learning can be beneficial for teachers to plan their lessons effectively and assess students in terms of their learning progress. Wang and Lieberoth (2016) reported that DGBL is helpful for teachers because it motivates students to participate in class activities and improves their learning performance. So, teachers can use digital games as a reflective tool to check students' learning and enhance their learning achievement. It was also stated that Digital games help students stay active and energetic in class while attending lectures (Licorish *et al.*, 2018), thus leading to the creation of a successful learning environment. One famous digital game being used in the educational context is Kahoot which serves as an aid in language learning and teaching. Plump and LaRosa (2017) said that "Kahoot " is a digital game, which assists teachers and students. This is used for students to know their comprehension level of language learning concepts. Besides, it found that Kahoot is also considered as an important assessment tool among EFL university students. It could be

used in key English language skills such as vocabulary, to support long-term memory (Boulaïd & Moubtassime, 2019).

2.1.5.1 Factors that influence Teacher's Perception towards the use of Digital Game based Learning

Different factors influence the teacher's perception of virtual learning. Kaimara *et al.*, (2021) argued that traditional approaches to the educational process adopted by the teachers, according to the logistic regression model, two of the IVs affected this DV. Research has shown that one of the major obstacles that hinder the diffusion of educational games into schools is teachers' prejudices and negative perceptions about game-based learning (Ketamo *et al.*, 2013). Indeed, the debate between those academics, pre-service and in-service teachers who support the pedagogical benefits of digital games in the classroom and those who are more skeptical holds well since the late 80's, when computers were just starting to be seen as instructional technology for formal education with the latter to still consider the games do not have much to offer besides the traditional methods (Becker, 2010; Clark *et al.*, 2010; Ruggiero, 2013; Watson *et al.*, 2013). In the current research, the pre-service teachers with technological background were 3.92 times more likely to refer to the existence of traditional approaches to the educational process and the stereotypical perceptions of games as barriers to DGBL implementation than students with theoretical background ($p = 0.048$). Also, students between 24–30 years old were 4.56 times more likely to consider the existence of traditional approaches to the educational process and the stereotypical perceptions of games as barriers than students between 18–23 years old ($p = 0.033$). One could interpret this finding based on the fact that pre-service teachers who are slightly older than their 18–23 years old peers and have high technological knowledge, already have teaching experience through classroom practice and encountered the real situation in schools.

Other factors may include the following;

B. Ease of Use

Kale (2015) defines ease of use as “the degree to which a person believes using a particular system would be free of effort”. Many studies report that users often rush in choosing and using technologies, and their attitudes in using the technology are affected by the norms, and culture (Pineda, 2014). Alomary and Woolard (2015) report that users more often accept technological applications if their perceptions about them are easier to use than other technologies. Johnson (2016) reports that in the digital environment, both teachers and students must be familiar with the software tools, the easier they are the more satisfaction will be gained.

C. Influence of Policy Environment

In a study directly related to FL instruction, Aydin (2012) investigated teachers’ perceptions of using computers in EFL classes in Turkish primary and secondary schools. The researcher surveyed 157 instructors, roughly half of whom had attended training in computer integration, with a questionnaire designed to solicit information on computer skills, extent of classroom use, attitudes toward computers, self efficacy with regard to computer skills, and institutional support. The results showed that teachers had a high self-efficacy with regard to general and common uses of computers such as word processing, but a low level of confidence with applications that require more specialized skills such as using simulations. These confidence levels were reflected significantly in the actual use of computers in courses. At the same time, the teachers had a generally positive view of computer application in instruction, and felt that technology improves student motivation, understanding, and ultimately educational outcomes. With regard to the school contexts, teachers felt that technology-supported teaching tools were fairly common and accepted, that there was a fair amount of knowledge sharing between teachers with regard to these materials, and that there was sufficient institutional support and

encouragement for their use. Aydin recognized the effectiveness of administrative policy on 35 fostering technology integration and recommended ongoing faculty development programs to further increase teachers' computer skills.

2.1.6 Teacher's Utilization towards Digital Game based Learning

In the modernised era with the high growth of technology, the utilisation of Technology in the classroom becomes one of the most popular issues that is still commonly studied and discussed. The high development of technology has significantly changed people's perspective and has become an option for education fields, e-learning, and strategy to develop a better education. As Chen (2016) states that a strategy of learning, applying network delivery and extracting learning information could break through the efficient learning of knowledge and skills. One of the utilization of technology in the teaching and learning process is DGBL. Digital Game-based learning (DGBL) as it has come to be known, started out as an instructional strategy that can be embodied through both computer and mobile-based applications. (Jin, Tu, Kim, Heffron, & White, 2018) indicated that what is called game based learning is the learning process that involves game application in the real classroom. Teachers across the globe have considered Digital game-based learning as one of strategies to engage and motivate students and present learning experiences while helping long term memory and providing practical experience. Another benefit is when it's compared to traditional teaching strategies, DGBL can also offer learners an interactive learning experience and bolster independent learning (Lin & Lan, 2015; Yukselturk, 2018). Moreover, Cam & Tran (2017) also stated that DGBL enables students to connect learning content to their everyday life. Furthermore, a numerous study has specified the use of nontraditional interventions, such as games, simulations, multimedia instruction and interactive activities are valuable teaching methods. According to Feng's (2009) study, when used appropriately and frequently, computer or mobile games may be a good self-study tool.

On the other hand, Mohammad, Fayyumi, & AlShathry (2014) stated that there are some debatable issues among teachers concerning the use of mobile or computer technologies in the classroom. They don't agree with the use of smartphones in the classroom because of some reasons while the other looked at the potential advantages of it. Some teachers also don't want to use digital games in the classroom for several reasons such as there are some schools in the developing country such as Indonesia which still don't have good internet connection and no good technology provided, another reason is teachers do not master technological skill so they just feel lazy to use it. Nowadays, there are many digital games available, free and easy to use. Another matter is, if the digital games cannot be easily utilized in the classroom which does not provide a quite good technology. Knowing many benefits and drawbacks, this present study reveals Indonesian teachers' experience in implementing DGBL to boost the teaching process. The second tries to seek what will the teachers do in deciding the effective games in teaching and learning process and what challenge they face. Also, this study will try to reflect the solutions of the problems during the application of the games in the middle of the learning's activity by the teachers and how the teacher copes with it. The experiences of the teachers in using games in the teaching and learning process will give us what separated in between the results in implemented the games in teaching and learning or without the implementation of it or the lecturing using traditional methods that require the teacher keep in interact to the students without any kinds of special activities in the same terms of classes which consist of the students in the same level, which are the beginner learners.

2.1.7 Barriers in the use of Digital Game based Learning

Despite all possible gains deriving from digital educational games, there are many barriers to their inclusion in secondary education. Some teachers believe that new technologies are not capable of guaranteeing effective learning on their own, while there is still a need for adequate

educational design based on the fundamental principles of learning. As a consequence, there is a percentage of teachers remaining skeptical on the use of digital educational games as teaching and learning tools. When introducing a game in class without having a specific educational framework beforehand, it may lead to negative results rather than positive ones, since not all games are appropriate or designed for all types of learners (Ince, 2017). Because of this, the attention of learners might be diverted from the class, resulting in the failure of the desired learning goals. Then, learners might be unable to get knowledge out of the game, especially when the game is based on a wrongly designed environment of content or when it is structured on elusive learning goals. Other researchers participating in the creation and designing of games are worried that games based on facilitating learning might result in losing their appeal to learners (Papadakis, 2018).

The simple use of DGBL in education seems to be insufficient as there is much more need for their correct use, combined with effective systems of learning. For example, games are not deemed as appropriate in education on the basis of their 3D graphics but on their application inside and outside of the secondary education classroom. The main goal of a typical DGBL activity is to result in a combination of knowledge and entertainment. This is not always feasible, though, as there are certain elements reproduced in successful games whose incorporation does not necessarily guarantee a great educational outcome [Manassis, 2014].

Literature refers to two types of barriers encountered by teachers that might place limitations to the successful application of digital educational games in teaching. Firstly, there are external barriers like the lack of time, lack of education, limited funding, and limited access. It is rather difficult for teachers to incorporate digital educational games during a single teaching hour, especially when there is lack of time, support, and access to media. Teachers also lack further training on how to use digital educational games effectively in class. For that matter, the lack

of time, lack of motives, and lack of support discourage teachers from becoming involved with DGBL (Manesis, 2018).

Secondly, there are internal barriers for the exclusion of computer games from the classroom, such as teacher's personal beliefs (e.g., his negative attitudes toward digital educational games), his lack of interest, and his lack of confidence in using digital educational games as didactic tools (Manesis, 2018). This hesitation based on the appropriateness of digital educational games according to age and content might be subdued by the possibility of selecting age-appropriate computer games from the age rating system of Pan European Game Information (PEGI). The PEGI system takes into consideration the appropriateness of a game according to age—not according to level of difficulty or the user's abilities. This system includes age rating labels and other types of labels based on content, which can ultimately guide parents and teachers when choosing the age-appropriate digital game (Felicia, 2009).

2.2 Theoretical Framework

2.2.1 Unified Theory of Acceptance and Use of Technology (UTAUT)

Unified Theory of Acceptance and Use of Technology (UTAUT) is built on eight prominent user acceptance models having their roots in information systems, psychology and sociology, Venkatesh *et al.*, (2003) as cited by Keller (2007) developed an extended technology acceptance model: Unified Theory of Acceptance and Use of Technology (UTAUT). The eight models used in the development process were: Theory of Reasoned Action (TRA), Technology Acceptance Model (TAM), Motivational Model (MM), Theory of Planned Behavior (TPB), Combined TAM and TPB, Model of PC-Utilization (MPCU), Innovation Diffusion Theory (IDT) and Social Cognitive Theory (SCT).

When tested empirically by Venkatesh *et al.*, (2003) in two different organizations, UTAUT was found to explain 70% of the variance of intentions to use and actual usage of information systems. This is an improvement, compared to the explanation of variance accomplished by the original user acceptance models, of between 17 and 53%. The four core constructs of UTAUT are Performance Expectancy, Effort Expectancy, Social Influence and Facilitating Conditions. The core constructs are further defined in table 5. The table also summarizes what constructs from the original user acceptance models that make up the constructs of UTAUT.

Performance expectancy, effort expectancy, social influence and facilitating conditions are independent variables influencing the dependent variables of behavioural intention and usage. Gender, age, experience and voluntariness of system use have an indirect influence on the dependent variables via the four core constructs. Performance expectancy is, based on empirical studies, the strongest determinant in both voluntary and mandatory settings. It is dependent on gender and age in the sense that it is a stronger determinant for men and particularly younger men. Effort expectancy influences the behavioural intention to use information systems. The influence of the variable is dependent on gender, age and experience of computer usage. The influence of the variable is stronger for women, particularly younger women in early stages of experience. Social influence is only a significant determinant of usage behaviour if usage is mandatory. It also appears to lose its importance as a determining factor over time, as the information system becomes incorporated in the organization. The influence of the variable will be moderated by gender, age, voluntariness and experience. The effect of the variable is stronger for women, particularly older women 40 in mandatory settings and in early stages of experience. Facilitating conditions were only found to exert influence on usage, not on intention. The influence was moderated by age and experience in the sense that it was stronger for older workers with less experience of computer usage (Venkatesh *et al.*, 2003).

2.2.2 Technology Acceptance Model (TAM)

There are various theories of technology acceptance used to appreciate the perceptions of students. One of such models is the technology acceptance model (TAM) developed by Davis (1989 cited in Saade, Nebbe and Tan, 2007; McFarland, 2001 and Pituch and Lee, 2006). According to Pituch and Lee (2006) and Hayashi, Chen, Ryan and Wu (2008), TAM was built upon Fishbein and Ajzen's (1975) theory of reasoned action (TRA) which posits that beliefs could influence attitudes, which lead to intention, to use and finally actual usage behavior. TAM as proposed by Davis describes that a person's behavioural intention to use e-learning is determined by perceived usefulness and perceived ease of use (Mahdizadeh, Biemans and Mulder (2008). Although TAM's ultimate goal is actual usage, it could also be used to explain why individuals may accept or not accept a particular technology such as e-learning (Jung *et al.*, 2008). In this paper, one selects predictive variables such as access to computers, computer skills of students before entering university, gender and confidence or computer self-efficacy to use e-learning if it should be incorporated in teaching and learning to determine perceived usefulness and perceived ease of use of e-learning at the University. These variables have been described by most writers on TAM as external variables. One set of external variables is access to infrastructure such as computers and improved bandwidth has been found to be an important predictive variable in the use of e-learning. Another external variable crucial to this study is prior computer experiences. Prior technical skills or computer experiences may be influenced by age and gender and may influence intent to use a variety of technology applications (Pituch and Lee, 2006). Saade, Nebebe and Tan (2007) have noted that individuals will use technology when they perceive that the technology will enhance their performance.

2.3 Empirical Studies

Huizenga *et al.*, (2017) examined the practice-based perceptions of teachers who do teach with digital games - either playing or creating games - in their classroom. Semi-structured interviews were conducted with 43 secondary education teachers. Our findings showed that most teachers who actually use games in class perceived student engagement with a game and cognitive learning outcomes as effects of the use of games in formal teaching settings.

Taufik *et al.*, (2019) carried out a qualitative research that sheds light on the teachers' discernment and preconceptions toward the use of digital games, strategy to implement it, and the challenges in the class. Structured, face-to-face interview sessions among high school teachers' and university lecturers suggest that the use of digital game-based learning in EFL classrooms is quite common, but the limited facilities become the biggest challenge for this thing. The engagement with educational digital games is bringing a new atmosphere, and improving students' critical thinking as it helps them make evaluative decisions to solve problems. At the same time, the results reveal that most of the students in the class can develop their interpersonal skills as they collaborate in teams and work in tandem with their peers, during their formative activities.

Alhebshi *et al.*, (2020) explores the perceptions of teachers and students about digital game-based learning in ESL classrooms. The researcher draws on the relevant literature to demonstrate and support the study's findings. The research is investigated quantitatively by administering a questionnaire to measure the perspectives of ESL teachers and the foundation-year students at King Abdulaziz University, Kingdom of Saudi Arabia. The quantitative data gathered from students and teachers were analyzed through SPSS software. The findings indicate that a significant number of respondents prefer using technological devices for better outcomes in the teaching and learning process. It also shows that using digital games had a

positive impact in relation to three main variables; engagement with learning and teaching, acceptance of DGBL and the effects of DGBL to learn the English language.

Vogt (2011) carried out a qualitative study to understand how middle school teachers use DGBL in the classroom and the factors that positively and negatively influenced their choices to use DGBL. Rogers's diffusion of innovations theory framed the study. Research questions examined how middle school teachers use DGBL in the classroom, what they view as positively and negatively influencing decisions to integrate DGBL, and differences based upon the point in their teaching career when they began using DGBL. Eight purposively selected middle school teachers who have integrated DGBL were interviewed. In vivo and pattern coding were used in analysis. Findings indicated that teachers use DGBL to engage students in content, support skill building, promote teamwork, individualize learning, and for feedback and classroom management.

Erline (2019) explored the relationship among gender, age and prior digital game-based learning (DGBL) experience amongst high school teachers in determining the suggested content and interest of DGBL professional development. The ultimate goal of this study was to find ways to increase the preparedness of teachers to effectively implement DGBL in the classroom. This study and instrument survey questions were developed based on two theoretical frameworks. The first was the Technological Pedagogical Content Knowledge (TPACK) framework, which states that the complexity of technology integration requires an understanding of the deep connections of the three primary components (Koehler & Mishra, 2009). The second was Desimone's framework, which evaluates the effects of professional development. Desimone argues that researchers should use the common conceptual framework which includes the main features of effective professional development for studying professional development (Desimone, 2009). Fifty-seven teachers completed the 23-question

online survey, which contained multiple choice, open-response and Likert-type scale questions. Teachers were asked to answer questions regarding their prior DGBL experience, suggested content and interests of DGBL professional development. A three-way ANOVA test was used to indicate if there was a relationship among gender, age and prior DGBL professional development experience. The results indicated there was no significant statistical difference among teacher's gender, age and prior DGBL experience when determining the suggested content and interest regarding DBGL professional development.

2.4 Summary of Literature Reviewed

The study reviewed several literature under three major subheadings; the conceptual framework reviewed the following concepts; information and communication technology (ICT), information and communication technology in education, digital games, digital game based teaching, teacher's perception towards digital game based teaching, factors that influence teacher's perception towards the use of digital game based learning, teacher's utilization towards digital game based learning, barriers in the use of Digital game based learning. The next subheading was the theoretical framework, two theories were identified to be relevant to the study, these were the Unified Theory of Acceptance and Use of Technology (UTAUT) and the technology acceptance model. The last subheading; empirical studies reviewed the findings of related literature, these findings revealed that some digital games can make students in the class develop their interpersonal skills as they collaborate in teams and work in tandem with their peers, during their formative activities.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Research Design

Research design according to Wilson (2013) entails considering the type of evidence required and how it is to be collected and interpreted. The descriptive survey research design was used for the study. Survey according to Nwodu (2006) is a research method which focuses on a representative sample derived from the entire population of study. This design was appropriate for this study because the study elicited as well as analyzed information from secondary school teachers with regards to their perception, utilization and gender in digital game based teaching.

3.2 Population of the Study

Ogbeide (2011) defined population to refer to an entire group of persons, objects or events about which information is sought. The entire teachers from secondary schools in Minna Metropolis constituted the population to be studied. Senior secondary school teachers were chosen because they had gained relevant training and experience in the teaching profession.

3.3 Sample and Sampling Technique

Sample is a subset of the population selected in place of studying the entire population (Agbonifoh & Yomere, 1999). Sampling is the practical way of studying people and their activities, thoughts, attitudes, abilities, relationships etc. in relation to our interest (Greener, 2008). The sample for this study consisted of fifty (50) teachers randomly sampled from five (5) purposively selected schools in Minna Metropolis. The study employs the simple random sampling techniques to select the five (5) schools from the target population, the random

sampling was further employed to sample a total of fifty teachers from the already selected schools

S/N	Name of School	Population	Male	Female	Total
1	Ahamadu Bahago secondary school, Minna	12	7	5	12
2	FUT Model secondary school, Bosso	8	5	3	8
3	Bosso secondary school, Minna	9	6	3	9
4	St. Clement secondary school, Minna	11	8	3	11
5	Brighter schools, Minna	10	6	4	10
Total		50	32	18	50

The table above depicts the population of the respondents for the study, a total of fifty (50) teachers were sampled from the five (5) selected secondary schools in Minna Metropolis.

3.4 Research Instrument

In carrying out this research, a well-constructed and self-developed questionnaire was used to get the desired information from the students. Questionnaire according to Aborisade (1997) is a research instrument constructed such that respondents answer questions about their opinion, attitudes, preferences, activities in a written form and is usually structured based on scale adequate enough to obtain quantitative analysis. The instrument used in this study was a researcher developed questionnaire titled – “Teacher’s Perception and Utilization towards Digital Game based Learning” (TPUDGBL). The construction of the questionnaire was based on information gathered from the literature review. The questionnaire was divided into three parts which consisted of twenty (20) items. Part ‘A’ comprised an open-ended question that elicited background information on the respondents’ gender (male and female). Part B consisted of 10 items that had questions on perceived ease of use (five items), perceived usefulness (five items) and Part C consisted of ten (10) items that had questions on usage of

digital game based learning (ten items). Teachers were asked to indicate their agreement or disagreement with several statements using a 4-point Likert-type scale ranging from strongly agree to strongly disagree.

3.5 Validity of the Instrument

The face and content validity of the questionnaire was validated by experts in the field of education.. The instrument was validated by two experts under the Department of Educational Technology, School of Science and Technology Education, Federal University of Technology Minna. These experts made some recommendations for adjustments, before final drafts were made. The decision by the researcher to employ the services of experts was based on the remark of Rikichi (2011) who stated that validation by specialists is an effective method of content validation of a research instrument. After thorough evaluation, it was suggested that the instruments were appropriate, and relevant to the study.

3.6 Reliability of the Instrument

In this study, the test-retest reliability co-efficient was adopted, based on Pearson Product Moment Coefficient (PPMC). Analysis of the scores obtained from the pilot testing of the research instrument (questionnaire), established the reliability coefficient for the test instrument at 0.87. The result showed a high degree of relationship between the two test results (Bello & Ajayi, 2010). Therefore, the test instrument for the study was adjudged reliable.

3.7 Method of Data Collection

The researcher collected data using the self-designed questionnaire, permission was taken from the various headmasters/headmistresses of secondary schools before the admission of the questionnaires. Before the administration, the researcher explained and emphasized on the importance of the study to be carried out. Copies of the questionnaire were administered by the

researcher to the respondents. All the respondents were expected to give maximum co-operation, as the information on the questionnaire are all on the things that revolve around their study. Hence, enough time was taken to explain how to tick or indicate opinion on the items stated on the research questionnaire.

3.8 Method of Data Analysis

Responses from the questionnaire were analyzed using the Statistical Packages for Social Science (SPSS). Descriptive statistics of frequency counts and percentages were used in analyzing demographic variables and research questions while the T-test was used to test the stated hypotheses at a 0.05 level of significance.

CHAPTER FOUR

4.0

RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents the analysis and results obtained from the data based on research questions and research hypotheses stated in chapter one. The results are preceded by the demographic information of the respondents.

4.2 Demographic Data

Table 4.1 Gender Distribution of the Respondents

Gender	Frequency	Percent
Male	32	64.0
Female	18	36.0
Total	50	100.0

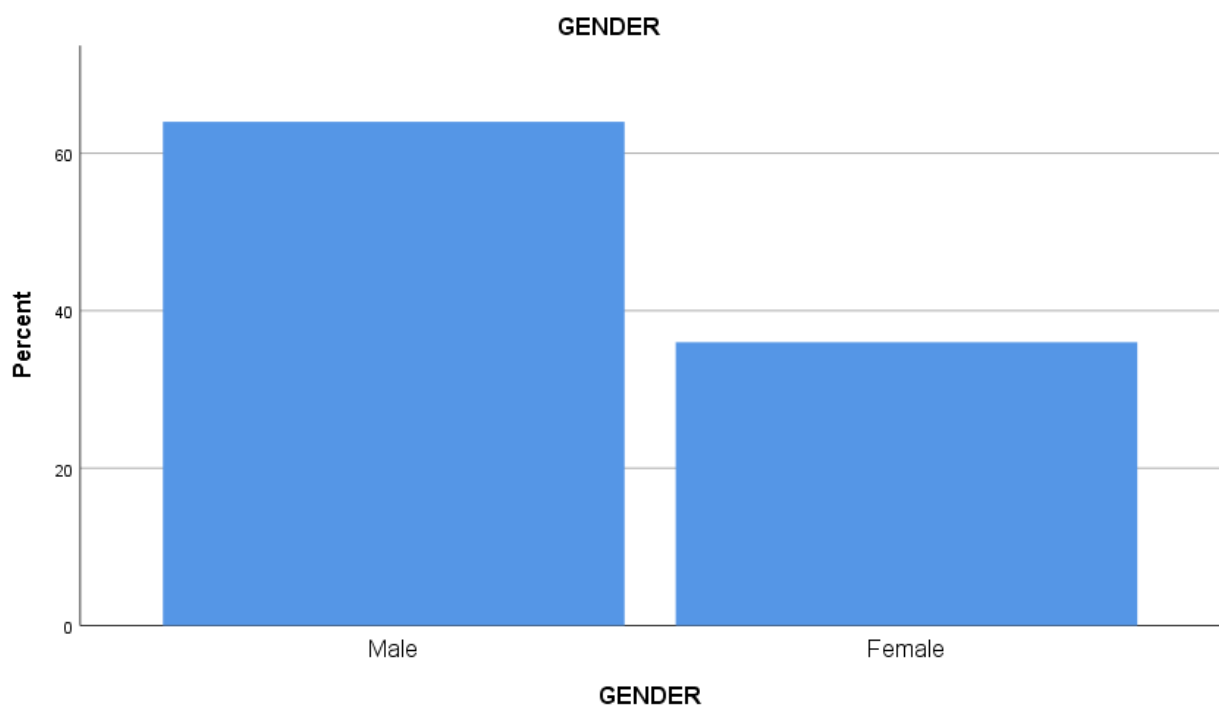


Figure 4.1 Gender Distribution of the Respondents

Table 4.1 reveals the gender distribution of the respondents, which shows that males with 64% surpassed the females (36%). Figure 4.1 also highlights on the number of male and female respondents for the study. Hence, males were more than the female teachers that were sampled for the study.

4.3 Result

This part presents the result of the analyses on teachers' perception, and utilization of digital game-based teaching.

Research Question 1: What is the perception of teachers on the utilization of game-based teaching and learning?

Table 4.2: Perception of teachers on the utilization of digital game-based teaching

S/N	Items	N	Mean	Std	Remark
1	It is easy to navigate and use the digital game-based teaching	50	2.00	0.83	Disagree
2	I require minimal training to be able to comfortably use the digital game-based teaching?	50	2.06	0.86	Disagree
3	I can easily integrate the digital game-based teaching into your lesson plans and classroom instruction	50	2.06	0.79	Disagree
4	I am comfortable adapting the digital game-based teaching to meet the needs of your students and curriculum	50	2.00	0.85	Disagree
5	I am satisfied with the level of support provided by the digital game-based teaching	50	2.20	0.88	Disagree
6	I perceive digital game-based teaching to be helpful for students to learn and retain new information	50	2.34	1.02	Disagree
7	Digital game-based teaching increases productivity	50	2.38	1.02	Disagree
8	The use of digital game-based teaching encourage collaboration	50	2.20	0.92	Disagree
9	Digital game-based teaching can enhance academic performance of students	50	2.26	1.06	Disagree

10	Digital game-based learning can be used as a tool to boost students' motivation and interest	50	2.20	0.80	Disagree
Grand mean			2.17		

The study evaluated the perception of teachers towards digital game-based teaching by analysing their responses to a set of questions, as presented in Table 4.2. The table displays the mean and standard deviation of the responses provided by the participants, reflecting their perceptions of digital game-based teaching. The findings suggest that the teachers have disagreed on each of the items as regards the perceived ease of use (item 1-5) and perceived usefulness (6-10) of digital game based teaching. Each of the ten items in Table 4.2 received a mean score below the agreed criterion mean of 2.50, indicating a negative perception towards digital game-based teaching. Furthermore, the overall mean score of 2.17 (which is less than 2.50) reinforces the notion that the teachers have a unfavourable perception towards digital game based teaching.

Research Question 2: What is the level of utilization of game-based teaching by teachers?

Table 4.3: Level of utilization of teachers on the utilization of digital game-based teaching

S/N	Items	N	Mean	Std	Remark
1	I frequently make use of digital game-based teaching in the classroom	50	2.22	0.88	Disagree
2	I can make use of digital game-based teaching technology while teaching	50	2.18	0.82	Disagree
3	I am confident in incorporating digital game based teaching in my teaching strategies	50	2.14	0.72	Disagree
4	I tailor digital games to suit the concept to be taught in class	50	2.22	0.84	Disagree
5	I receive regular training on the use of digital game base teaching approach	50	2.04	0.75	Disagree
6	I have observed improvement in students' engagement and motivation as a result of using digital game-based teaching	50	2.14	0.98	Disagree

7	I comfortably make use of digital game-based teaching in the classroom	50	2.08	0.89	Disagree
8	I adequately prepare for the use of digital game-based teaching	50	2.06	0.81	Disagree
9	Adequate time is allocated for the use of digital game-based teaching	50	2.06	0.73	Disagree
10	I face minimal challenges when using digital game-based teaching	50	2.20	1.03	Disagree
Grand mean			2.13		

In order to determine the self-efficacy of teachers on the utilization of digital game-based teaching technology, the researchers conducted an assessment based on specific items listed in Table 4.3. The table provides the mean and standard deviation for each item, which allowed the researchers to analyse the teachers' level of utilization of digital game-based teaching. Upon analyzing the data, it was found that the teachers showed a low level of utilization of digital game-based teaching, with each item scoring below the minimum criterion mean of 2.50. This means that the teachers were unable to use digital game-based teaching effectively. Moreover, the grand mean of 2.13 (which is below the criterion mean) indicates that the teachers have a were unable to adequately utilize digital game-based teaching in the classroom.

Research Question 3: What is the gender difference in the perception of game-based teaching by teachers?

Table 4.4: Gender difference in the perception of game-based teaching by teachers

Gender	N	\bar{x}	SD
Male	32	22.03	7.36
Female	18	21.11	5.15

Table 4.4 shows the mean and standard deviation of the respondent's perception towards game-based teaching based on their gender. The table reveals that the male teachers had a mean score

of 22.03 with a standard deviation of 7.36 while the female teachers had a mean score of 21.11 and a standard deviation of 5.15. Based on the mean of both genders, it is evident that there is difference between the perception of male ($x=22.03$) and that of female ($x=21.11$) teachers. Table 4.6 reveals the significant difference between both genders on the perception of game-based teaching by teachers.

Research Question 4: What is the gender difference in the utilization of game-based teaching by teachers?

Table 4.5: gender difference in the utilization of game-based teaching by teachers

Gender	N	\bar{x}	SD
Male	32	21.53	7.04
Female	18	21.00	5.04

Table 4.5 shows the mean and standard deviation of the respondent's level of utilization towards game-based teaching based on their gender. The table reveals that the male teachers had a mean score of 21.53 with a standard deviation of 7.04 while the female teachers had a mean score of 21.00 and a standard deviation of 5.04. Based on the mean of both genders, it is evident that there is difference between the perception of male ($x=21.53$) and that of female ($x=21.00$) teachers. Table 4.6 reveals the significant difference between both genders on the utilization of game-based teaching by teachers.

4.4 Hypothesis Testing:

HO₁: There is no significant difference between the male and female teachers' responses on the perception of game-based learning.

Table 4.6 T-test for the difference between the male and female teachers' responses on the perception of game-based learning

Gender	N	df	\bar{x}	SD	t-value	p-value
Male	32		22.03	2.36		
		48			0.46	0.64
Female	18		21.11	5.15		

Significant at $p > 0.05$

The t-test for table 4.6 shows the difference between the male and female teachers' responses on the perception of game-based learning. There was no significant difference between the male and female teachers' responses on the perception of game-based learning as determined by the t-test analysis with a t-value at 0.46 and a p-value of $0.64 > 0.05$. Male students ($\bar{x}=22.08$, S.D=2.36) while the female students ($\bar{x}=21.11$, SD=5.15). Therefore, the null hypothesis was not rejected, this revealed that there is no significant difference between the male and female teachers' responses on the perception of game-based learning.

HO₂: There is no significant difference between the male and female teachers' responses on the utilization of game-based teaching.

Table 4.7 T-test for the difference between the male and female teachers' responses on the utilization of game-based learning

Group	N	df	\bar{x}	SD	t-value	p-value
Experimental group	32		21.53	7.04		

		48		0.28	0.78
Control group	18	21.00	5.04		

Significant at $p > 0.05$

The t-test for table 4.7 shows the difference between the male and female teachers' responses on the utilization of game-based learning. There was no significant difference between the male and female teachers' responses on the utilization of game-based teaching as determined by the t-test analysis with a t-value at 0.28 and a p-value of $0.78 > 0.05$. Male students ($\bar{x}=21.53$, $S.D=7.04$) while the female students ($\bar{x}=21.00$, $SD=5.04$). Therefore, the null hypothesis was not rejected, this revealed that there is no significant difference between the male and female teachers' responses on the utilization of game-based teaching.

4.5 Major Findings of the Study

The following findings have been made from the research work.

1. Teachers held negative perception towards the utilization of digital game-based teaching.
2. Teachers had low level of utilization of digital game-based teaching at the
3. There was no significant difference between the male and female teachers' on the perception of game-based teaching.
4. There was no significant difference between the male and female teachers on the utilization of game-based teaching.

4.6 Discussion of Findings

The study investigated perception and utilization towards the utilization of digital game-based teaching in some selected secondary schools within Minna Metropolis. The analysis of the data revealed the following key findings.

Firstly, the analysis found that teachers held a negative perception towards digital game-based teaching. This means that teachers viewed digital game-based teaching as not been easy to use based on their perceived ease of use in teaching and learning and were likely not to incorporate it into their teaching practices, it also revealed that they found it not to be useful based on their perceived usefulness of digital game-based teaching. The grand mean score of 2.17, which was below the established decision mean of 2.50, indicates a low level of agreement among the teachers on the usefulness of digital game-based teaching. This finding is contrary to the findings of Huizenga *et al.*, (2017); Alhebshi *et al.*, (2020); Taufik *et al.*, (2019) who revealed that teachers held favourable perception towards digital game-based teaching. This finding might be due to the fact that these studies were carried out in first world countries with better predisposition towards technological usage for teaching and learning.

The analysis revealed that teachers did not make adequate use of digital game-based teaching. This means that teachers were unable to use digital game-based teaching in their teaching. The grand mean score of 2.13, which was also below the decision mean of 2.50, suggests that the teachers were unable to use digital game-based teaching. This contrary to the findings of Alhebshi *et al.*, (2020); Taufik *et al.*, (2019) who revealed that teachers made adequate use of digital game-based teaching in the classroom.

The hypotheses testing further revealed that there was no significant difference between the male and female teachers' responses on the perception of game-based learning as determined by the t-test analysis with a t-value at 0.46 and a p-value of $0.64 > 0.05$. The second hypothesis testing revealed that there was no significant difference between the male and female teachers' responses on the utilization of game-based teaching as determined by the t-test analysis with a t-value at 0.28 and a p-value of $0.78 > 0.05$.

CHAPTER FIVE

5.0 CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

Based on the findings of this study, it was concluded that:

Teachers showed unfavourable perception towards the use of digital game-based teaching, their perception towards digital game-based teaching. The level of utilization of digital game-based teaching showed by teachers was poor, this translated to little to no usage of digital game-based approach for teaching and learning in secondary schools in Minna Metropolis.

5.2 Recommendations

Based on the findings in this study, it was recommended that:

1. The Federal ministry of education should provide digital game-based teaching technologies in all the secondary schools in Nigeria.
2. The already existing infrastructure should be maintained and properly stored after usage to safeguard and prevent them from damaging.
3. Inspectors and supervisors should ensure regular supervision to enhance the effective use of digital game-based teaching and resources in the teaching and learning.
4. The government and relevant stakeholders in education should make funds available for buying needed digital game-based teaching for teaching and learning.

5.3 Contributions to Knowledge

Based on the findings of the study, the following are the contribution to knowledge:

1. The perception of teachers towards digital game-based teaching should lead to the transformation of the implementation of digital game-based teaching in secondary schools in Nigeria. This study will contribute to the body of existing literature on the perception of teachers towards digital game-based teaching.
2. The poor utilization of digital game-based teaching will spur the need for the adequate implementation and usage of digital game based teaching in secondary schools in Nigeria.

5.4 Implications of the Findings

The study revealed that teachers have a negative perception towards digital game-based teaching and are not utilizing it in the teaching and learning process. These findings have revealed there is an urgent need to change the perception of teachers towards digital game based teaching, the findings also exposes the need for the adequate utilization of digital game based teaching so as to enhance the teaching and learning process, engage, motivate and enhance the academic achievement and retention of learners. Hence, the findings of this study reveals the need to promote a positive perception of teachers towards digital game based teaching.

5.5 Recommendations for Further Research

1. Further research should be carried out to examine the availability and utilization of digital game-based teaching technologies in secondary schools in North Central Nigeria.

2. Studies should be carried out on effect of digital game-based teaching on the academic achievement, retention, and interest of students in senior secondary schools.
3. A similar research study could be carried out in South-western universities.
4. A study on the effect Bring Your Own Device (BYOD) policy to promote digital game based teaching in Nigeria.

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**TEACHER’S PERCEPTION AND UTILIZATION TOWARDS DIGITAL GAME
BASED LEARNING” (TPUDGBL)**

Dear respondents, this questionnaire is designed to collect data on **teacher’s** perception and level of utilization of digital game based learning, your responses are confidential and your identity remains anonymous.

Instructions: Tick the sections appropriately

SECTION A: BIO-DATA

Gender: M (), F ()

Key: SA (Strongly Agree), A (Agree), D (Disagree), SD (Strongly Disagree)

SECTION B: Perception of teachers on the utilization of game based teaching and learning

S/N	ITEMS	SA	A	D	SD
1	Game based learning can enhance teaching and learning				
2	Game based learning cannot be used for classroom teaching as it leads to distraction				
3	Game based learning is expensive and cannot be utilized in the classroom				
4	Students can be motivated to learn using game based learning				
5	Students may retain concepts taught in the classroom using game based learning				
6	Teachers may be unable to utilize game based learning				
7	Electricity supply may affect the use of game based learning				
8	Teachers may not be willing to try out new technologies				
9	Students may become addicted to game based learning				
10	Implementation of game based learning maybe tiresome and time consuming				

SECTION C: Level of utilization of game based teaching by teachers

Key: FU (Fully Utilized), U (Utilized), PU (Partially Utilized), NU (Not Utilized)

S/N	ITEMS	FU	U	PU	NU
1	I use games during teaching and learning in the classroom				
2	I engage students in educational games during classroom teaching and learning				
3	I can make use of game based softwares				
4	I design my lesson plan to suit the educational games I use in the classroom				
5	I encourage the use of smartphones and personal computer to play educational games				
6	I am proficient in the use of educational games to teach				
7	I can design simple educational games to teach the students				
8	I can make use of desktop applications				
9	I can download games from the Play/app store				
10	I can project games by the means of a projector for group engagement				