

An Examination of the Factors Involving Students' Acceptance of Online Educational Games

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ABSTRACT

Educators all over the world are scrambling to develop new and more advanced methods of teaching through the use of technology, with the common goal of engaging students in classrooms. Furthermore, the new generation, which grew up with the internet, video games, and online gaming, prefers a technology-infused approach to teaching and learning. They are no longer interested in the traditional method of classroom lectures. Educational games (EG) have also become a hot topic in the academic community. The goal of this paper is to look into the factors that influence students' acceptance of online education. Based on the literature review's discussions and arguments, it is possible to conclude that all factors influence students' acceptance of online EG.

Keywords: *Attitude, Educational Games, Learning Opportunities, Usefulness, User Acceptance*

INTRODUCTION

Our daily lives have been drastically altered as a result of advancements in technology. The invention of electronic household products, computers, mobile entertainment gadgets, smartphones, and the internet has not only made life easier and more efficient, but it has also changed the way we work, play, and learn.

Almost every industry, including education, has been impacted by technological advancement. Educators all over the world are scrambling to develop new and more advanced methods of teaching using technology, with the common goal of engaging students in classrooms. Aside from that, the new generation, which grew up with the internet, video and online games, prefers a technology-infused approach to teaching and learning. The traditional method of classroom lectures is no longer appealing to them (Juan et al., 2017). Furthermore, due to the Covid-19 situation, the traditional face-to-face method of learning is no longer feasible and must be replaced with online distance learning (ODL) for all schools and higher learning institutions (Liguori & Winkler, 2020). As a result, educators at all levels – kindergarten, primary, secondary, and tertiary – are attempting to find and implement new approaches to teaching and learning methods to make ODL interactive, fun, and engaging for all.

Educational games (EG) have become the most contentious topic in the academic community (Chen, Zou, Cheng, & Xie, 2020). Educators are intrigued by this approach because it incorporates game elements into the learning environment to motivate, engage, and inspire students to learn (Taub et. al., 2020, Simkova, 2014). The concept of EG is now widely accepted around the world and comes in many forms such as board, card, and video games such as Monopoly, Scrabble, Chess, Uno, and many others. EG is no longer limited to physical board or card games as technology have advanced and the internet has been introduced. Many EG games have been adapted for online use. Online EG is also gaining popularity, particularly among the younger generation, because they are interactive, simple to use, and can be played on any device, including laptops, tablets, and smartphones. Many popular board games have jumped on board and made the transition to online platforms.

According to AMR (2012), instructional or educational games can motivate students to learn better if they have the right features such as challenge and fantasy. Younger generations are more interested in games that can stimulate their minds in ways that can take their fantasies to the next level. This is supported by Enfield (2012), who stated that because games can significantly engage players, games should be expanded into learning paradigms and EG should be developed. Thus, EG should be carefully designed so that it not only helps students learn but also attracts them to learn willingly in a fun and engaging manner.

The primary goal of this concept paper is to investigate the factors that influence online EG acceptance among university students. Acceptance factors include usefulness, ease of use, attitude, and learning opportunities. Students' acceptance of online EG would then pave the way for more traditional EG to be converted to online EG.

LITERATURE REVIEWS

Educational games (EG) come in a variety of shapes and sizes. As the name implies, EG was created to assist students in improving various skills such as mathematics, language skills, and even problem solving and communication skills, and are typically used as a supporting tool in teaching and learning. Thanks to the availability of EG online, learning can now take place at any time and from any location. Although there are numerous benefits to using online EG in education, students have not widely adopted it.

Students' Acceptance of Online EG

According to Ibrahim R et al. (2011), the purpose of asking user acceptance questions about why people accept systems is to improve design and development methods. This study aims to go beyond usability studies that focus on designing a user-friendly interface to a more in-depth understanding of other factors that influence user acceptance. Malaysian undergraduate students are enthusiastic about using games to learn. Their enthusiasm for using games is evident, even though some of them have never done so before. Their experience with the game may serve as a guide in using EG. Exploring the influential factors influencing users' educational technology choices has proven beneficial in providing them with more acceptable educational technology and is thus regarded as an important issue. This paper emphasizes that there were three (3) predictors that encouraged students to use EG, namely attitude, usefulness, and ease of use.

The study by Bourgonjon et al., (2010) provide empirical evidence that experience with (entertainment) games does influence the acceptance of games for learning and shows that focusing on students' confidence in the ease of use will assist in student acceptance. In the context of digital game-based learning, usefulness, ease of use and learning opportunities appear to be important predictors for students' preference to use video games in the classroom. Gender differences do not, however, influence students' preferences for video games, but experience has a direct impact on

students' preferences for video games, supporting the idea that students who are more engaged in video game technology prefer a diverse approach in learning techniques.

Vlachopoulos & Makri (2017) supported the literature by stating that games and simulations are a medium of education that creates a supportive environment in which students can gain knowledge in all subjects and fields. Students can gain a better understanding of abstract concepts if these games are used in conjunction with traditional lecture-based courses. They emphasised that there is a large body of literature that highlights the role of emotional development in improving learning outcomes. Specifically, there seems to be an increase in students' emotions, from negative feelings (uncertainty, anxiety, restlessness, and frustration during pre-intervention) to positive feelings (satisfaction, confidence, joy, excitement, effort, attraction, and enthusiasm during game and after the game).

Usefulness

According to the Technology Acceptance Model (TAM), usefulness refers to the degree to which a person believes that using a particular system would then improve his or her job performance (Davis, 1989). Despite this, users may be willing to learn a new application simply because of its functionality, even if it is difficult to learn. Users may be discouraged by the new application's complexity, but they are willing to compromise the difficulty to complete a task. As a result of this model, one major conclusion is that perceived usefulness has a strong correlation with user acceptance and has become a critical component for those attempting to design or implement successful systems.

According to Bourgonjon et al., (2010) the use of TAM in the context of digital game-based learning in the classroom, as both usefulness and ease of use appear to be important predictors of students' acceptance and the video games has become a part of teaching tools. Meanwhile, Ibrahim R and his colleague discovered that usefulness is one of the factors influencing undergraduates' acceptance of online EG, which means that students use EG if they find it beneficial to their learning. Usefulness was discovered to be more important than ease of use, indicating that students are using online EG if it improves their performance. This is an invaluable insight for EG designers to highlight the game's utility. Students generally agree that EG would then improve their learning by increasing their performance, productivity, and effectiveness. This is a promising finding because the younger generation has shown a preference for using computer technology, particularly games, to learn (Ibrahim R et al., 2011).

However, Huang (2019) discovered that subjects' perceived usefulness had no significant influence on their behavioral intention to use EG in a recent study. According to Huang, a lack of interest in learning could have contributed to their ignorance of the games' utility. As a result, in this study, perceived usefulness had no significant and positive influence on behavioral intention.

Ease of Use

Aside from usefulness, ease of use is a key component in TAM because it is one of the primary predictors of individuals' behavioral intention to use information systems. The term "perceived ease of use" refers to "the degree to which a person believes that using a specific system would be free of effort." This model extends the direct relationship between ease of use and usefulness; in other words, people regard technology as more useful when it is easily handled (Davis, 1989). This is the second factor that users consider when using a new application, whether it is simple or difficult to use for it to perform the function. He also emphasized that ease of use is people's subjective assessment of effort and does not always reflect objective reality.

Similar to perceived usefulness, Bourgonjon et al., (2010) study also indicated that students' preference for using video games in the classroom is affected directly by the students' perception of ease of use. He also adds that students' experience with video games has a direct impact and influence on student's opinion whether the game is easy to use or not. His study supports the claim that prior experience with (entertainment) games influences students' acceptance of games for learning and that addressing students' beliefs about the ease of use will improve students' acceptance.

Another study, conducted by Huang (2019), indicated the extensive use of TAM in examining students' acceptance of digital games and indicated a lack of scholarly attention to the crucial role of learning strategies behind students' intention to use educational computer games. TAM was combined with flow theory in this study to investigate the role of learning strategies in students' acceptance of educational computer games. The findings indicate that the subjects' perceived ease of use had a significant influence on their perceived enjoyment. Furthermore, students who find it easy to complete the games because they were given tips to advance to the next level are less likely to give up on the games easily. Instead, this encourages them to play and learn more.

Furthermore, Acevedo (2020) stated that, while learning and academic goals are important, the ease of use of EGs must also be considered. When students felt the EG was too difficult, time-consuming, or stressful, it hampered their learning process. We, as EG developers, do not want students to have excessive screen time or a lack of educator support throughout their educational journey. However, with the right ease of use for students, they will be engaged in the EG while learning. Educators can save time on teaching and learning preparations by streamlining content setup, classroom management, and student assessments.

Attitude

Gender differences in game attitudes exist. According to Hainey et al. (2013), men have more positive attitudes toward gaming than women. Games are exciting, enjoyable, interesting, and time consuming for men. Male and female students also have different game preferences. Male students, for example, prefer role-playing, strategy and action games, and sports-related games, whereas female students prefer puzzles or card games. Male students spend more time than female students playing online games. The majority of students believe that online games are beneficial in the learning environment of higher education because they promote cooperation and teamwork while also improving communication skills. Students who disagree that online games are useful believe that learning through games is only appropriate for young learners, such as kindergarten students, and is thus not a motivating factor for serious learning. They prefer traditional teaching methods and regard games as purely recreational.

Another survey conducted by Ab. Rahman et al. (2018) discovered that students have positive attitudes toward using gamification in the classroom. The survey concluded that students' willingness to use gamification in learning is determined not only by whether the platform is simple to use but also by whether the games are appealing enough to elicit active participation and engagement from students during class. As gamification platforms, the survey made use of Kahoot! and Quizziz. Students found the platforms to be simple, entertaining, and exciting. Similarly, educators consider both platforms to be simple to use for game development because they do not need to set up their platforms. All students in the survey agreed that using gamification technology is beneficial to their learning and simple to use, given that the majority of students use their smartphones for gaming. 96% of students felt that gamification helped them improve their notetaking skills during class, listening skills during lectures to answer quizzes via gamification later, and classroom interaction in the classroom because they were eager to ask questions during lessons.

According to Varannai et al. (2017), students have positive attitudes toward using gamification in education if the platform or game is simple to use. A comparison study was conducted

at two public universities with students from two different courses: IT and non-IT. This research focuses on Kahoot! as a gamification platform. The findings, however, revealed that IT and non-IT students have different perspectives on gamification in education. Because they are used to using games in their lectures and frequently use smartphones to play the games, the IT students did not find the gamification lectures particularly engaging. Gamification's application to non-IT students, on the other hand, was successful because it was a slightly different method of learning for them. Another factor that may influence students' attitudes toward online EG is timing. Educators must determine when it is appropriate to use gamification in learning. It may be more appropriate to use it at the end of the semester when students' motivation is low due to work overload or fatigue, rather than early in the semester when they are still fresh and excited to begin a new term.

According to Barr (2018), students can create shared and dynamic contexts through video games that they would not have in a traditional classroom. This is because when they learn through video games, they not only use spoken words but also communicate through gestures that only players in the same game would then understand, such as in the *Minecraft* game. Barr (2018) demonstrated this in an experiment in which students played *Lara Croft and the Guardian of Light*, a video game in which players must give their cooperation. This game teaches players resourcefulness by forcing them to seize opportunities and switch characters because other players are not always available.

An experiment conducted by Sabirli and Coklar (2020) on primary students' attitudes toward English courses reveals that attitudes did not differ between groups that used EG and groups that did not use EG. However, students who used EG outperformed students who did not use EG. This demonstrates that EG is more effective in terms of student success as well as student motivation. The outcome differs in the Mathematics course, where students who used EG as an instructional method demonstrated a positive attitude (Ihendinihu, 2020). When used in mathematics, EG can help students improve their skills, thinking abilities, and opportunities to learn from one another, as well as reduce their fear of failure or error. It is possible to conclude that different courses can have different effects on the attitudes of students.

Learning Opportunities

Contrary to popular belief, learning occurs through gamification in all subjects, even though there is no element of education in playing games. When the students play games, they are learning. For short-term learning, gamification is also used in certain courses in health profession education (Haoran et al. 2019) It can be used to teach medical students in all fields, including surgery, dentistry, and nursing. As a result, health education, despite its complexity, has successfully used gamification in their learning; thus, other fields such as business and management, which are more theoretical, are more than suitable to use games in learning. Students learn not only about the subject but also about other skills such as following rules and instructions, communication, problem-solving, and social studies when they play games. Games can be used in almost any subject, and they provide unexpected or stealth learning opportunities while accommodating a variety of student learning styles (Laura A., 2012). According to Iaremenko (2017), gamification provides benefits such as a more relaxed environment, increased focus on the educational material, and a novel experience for students. Even though gamification has a learning process, educators must keep it from becoming meaningless gamification. To be effective, educators must carefully plan how the game would be used. While gaming can help to avoid boredom and encourage active learning, it is not the only way to motivate students to learn.

Games can provide learning opportunities by exposing students to experimentation, knowledge transfer, critical thinking, and motivation (Voulgari & Lavidas, 2020). Students who prefer roleplaying and exploration games place a higher value on them because they see learning opportunities in them. World of Warcraft, Final Fantasy, and Lord of the Rings are examples of role-playing games. Students prefer role-playing games to other types of games in the classroom. Complex

games that require problem-solving abilities, critical thinking, decision-making, and resource management are also suitable as classroom tools because they make the learning process more engaging. These are the games that students believe provide visible learning opportunities. They can see which skills they need to improve to succeed by playing this game.

Games can also be used to teach ethics and moral values (Bagus et al., 2021). This demonstrates that students are learning while having fun playing the game. There are no restrictions to using the EG in learning. It is not restricted to any particular course, age, or educational level, but rather is determined by how the game is designed.

User Experience

According to Nagalingam and Ibrahim (2015), user experience is defined as an interaction between users and the products or systems with which they interact, and the interaction is dependent on the surrounding components. According to Bourgonjon et al. (2010), experience has a direct influence on students' preferences for video games, as well as ease of use, learning opportunities, and usefulness. This demonstrates that the more students are exposed to video game technology, the more different types of learning methods they prefer. This also implies that experienced users benefit more from video game use than their inexperienced peers.

According to a study conducted by Karimazondo et al., (2020), the level of experience of science teachers in Zimbabwe in using technology has a positive influence on self-efficacy and ease of use. Teachers who have had more exposure to various types of applications and are more familiar with ICT appear to benefit more from using the new digital videos in science education. However, it appears that using the new digital videos will be more difficult for teachers who have limited prior ICT experience and technological self-efficacy.

Ninaus et al. (2017) investigated how experience affects the perceived usefulness and ease of use of a game as a learning tool. The study was carried out on Finnish public primary school students using a math game called Semideus School. According to the findings, players' acceptance of the game was related to their perceived flow experience. This reflects that higher levels of acceptance of Semideus as a teaching application, perceived ease of use of the game, and math interest were accompanied by higher levels of flow experience within the game.

THEORETICAL FRAMEWORK

Based on the discussions on the factors that influence students' acceptance of online EG, the following framework can be established. The framework is derived and adapted from Ibrahim et al. (2011). The independent variables adapted from Ibrahim are usefulness, ease of use, attitude, and learning opportunity, with user experience serving as an additional variable we believe is relevant to the study. The dependent variable is student acceptance of educational games.

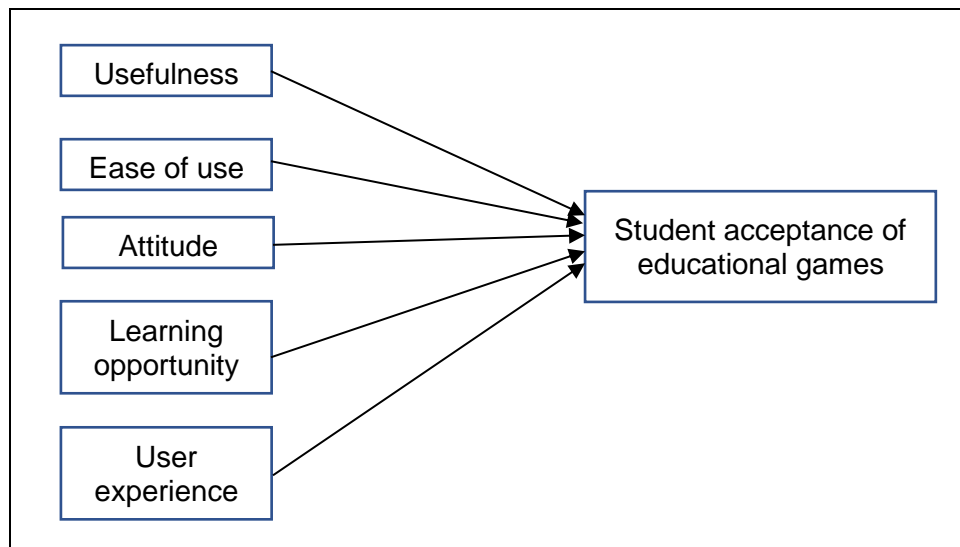


Figure 1: Theoretical Framework

DISCUSSION AND CONCLUSION

Today's students are deeply engrossed in their gadgets and digital devices. They also want new teaching and learning methods that will entice them to actively participate in learning, particularly in the classroom. In today's pandemic situation, where classes are entirely online, educators are encouraged to make classes interesting to pique students' interest and participation in class. Kahoot, Genially and Minecraft are among the tools available to educators for creating online educational games. An active teaching and learning approach necessitates direct student participation in learning activities (Hassan et. al., 2018). Furthermore, when the method is interesting and engaging to these young generations, learning transfer will be more effective (Covaci et. al., 2018). Online EG is an alternative method that educators can use in their teaching and learning processes. It can be used as the primary method of instruction or as a supplement to face-to-face classroom instruction or a blended learning approach. Earlier studies have shown online EG are user-friendly, fun, and simple to use, which may contribute to students easily accepting the approach as a substitute for traditional methods of learning (Hsu & Wang, 2018). The online EG should not be overly complicated to use, and it should also make learning more enjoyable for students. Based on the discussion of the literature review above, it can be concluded that the factors of ease of use, usefulness, attitude, and learning opportunities influence students' acceptance of online EG. The acceptance of online EG by students would pave the way for the transition of traditional EG to an online platform.

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