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Utilising Gamification in Improving Learning Motivation among Multimedia Education Undergraduates

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Abstract

Gamification is a teaching method that promotes element of game playing that can be implemented in educational environments to stimulate students interactively. Use of gamification in educational environments are aimed to attract students and encourage learning and problem-solving processes. This research paper presents an empirical study that investigated the use of gamification to improve learning motivation among Multimedia Education undergraduates at a public university in Malaysia. The data were analysed through descriptive statistics and correlation with a sample of 110 respondents. Technology acceptance model (TAM) was used to analyse students' perceptions using three variables: perceived ease of use (PEU), behavioural intention to use (BIU), and actual use (AU). Questionnaires were used as research instruments to collect relevant data through Google Forms. Findings show that gamification was considered by lecturers in the institution to have improved learning motivation among the respondents, with Kahoot as the most used gamification platform. Through the correlation analysis, the PEU variable had the highest R-value (0.80), indicating that students were attracted to gamification learning when it was perceived as easy to use. In general, this research presents an understanding of gamification to improve learning motivation from the perspectives of Multimedia undergraduates at the selected university.

Keywords: Gamification, Learning Motivation, Undergraduate, Public University

Introduction

Educational technology plays an important role in the growth of education. This has been proven through the diversified use of technology around the world. Although traditional techniques of teaching and learning (T&L) are significant and still have their effects on

students in general, the importance of technology in the field of education is indispensable due to its impact on students' learning and learning motivation. As highlighted by Florenthal (2018), the advantages of technology are proven in terms of its simplicity of use, increased motivation, increased involvement, and potential to change the organisation of learning.
Students are digital natives who are raised with digital technology. As outlined in the Malaysia Ministry of Education (MOE) plan (MOE, 2020), online learning, hybrid learning, and collaborative models are the country's education paradigms. These paradigms are in line with gamification in education. Gamification is a teaching method that promotes the element of game playing that can be implemented in educational environments to stimulate students interactively, thereby significantly improving curriculum, cognition, and social skills. Gamification in the field of education can be defined as process of adapting currently used learning activities and producing new content, such as games (Marisa, Akhriza, Maukar, Wardhani, Iriananda & Andarwati, 2020). It is a method of proposing game design-related dynamics into educational environments to stimulate and interact directly with students, thereby significantly improving curriculum, cognition, and social skills. Moreover, it is the use of technology to attract students, motivate their actions, and encourage learning and problem-solving (Simarmata, Djohar, Purba & Juanda, 2018). Also, the use of gamification in education is considered a new teaching era that can improve learning motivation among students.

Literature Review

The utilising gamification in education is gaining more popularity as it has beneficial effects on the educational field, where it is crucial to promote and maintain students' motivation and engagement. As motivation in learning is one of the things that need to be highlighted in learning efforts (Lin-Siegler, Dweck & Cohen, 2016), gamification can be considered as a creative technique to increase human involvement as the whole learning experience is made more entertaining and engaging through the incorporation of game mechanics and game design aspects into educational contexts (Bouchrika , Harrati, Wanick & Wills, 2019), which simultaneously enhances students' academic performance and their learning outcomes. This is because, with boosted learning motivation, students will learn harder by being more diligent and fully concentrated during the learning process. This statement complies with an opinion by Janni, Teoh and Low (2022) saying that students should put more responsibility for learning by showing full engagement and high motivation in online learning environment.
Gamification is designed to provide students with a challenge as they work to achieve their objectives and the game's goals, hence is a component of balance (Ike & Hoe, 2020). This creates a challenge as games must balance in terms of difficulty and advancement. The interaction between these two elements is what keeps students interested in the game. Hence, a component that comes together in producing an immersive and engaging experience attributable is well-balanced game mechanics. Gamification is often used in educational applications and processes to improve learning motivation (Mohamad, Sazali & Salleh, 2018). It is an approach that uses game-like elements or mechanics in non-gaming aspects. Several studies have revealed that gamification can improve user performance, productivity, and engagement. For example, Varannai, Sasvari, and Urbanovics (2017) discover that gamification, which includes a fun problem-solving activity of game stories with a play-minded approach, activates the voluntary participation of the students and encourages students to think more creatively and outside of the box. Also, Kayimbasioglu, Oktekin and Haci (2016) explain that game mechanics are frequently connected to learning encounters,

for instance, helping in the advancement of knowledge and learning collaborative abilities, such as problem-solving and teamwork.

It is undisputable to mention that various types of games have been used for educational purposes. In this article, two (2) common game variations are discussed: game-based learning (GBL) and gamification. GBL refers to the type of gaming played that will define the learning outcome. Gamification puts game mechanics into education, while GBL is a component of the learning process. The gamification mechanic of levelling up is represented by students' progress and levels because game components are represented by progress bars or module-end quizzes. According to Jayalath and Esichaikul (2020), the game dynamic of success opportunities is designated as a challenge, indicating that the desire to achieve a goal, as well as its inherent value and perceived difficulty, is controlled by regulations and limited resources. Achievement is defined as the successful development of cognitive and non-cognitive skills as judged by an assessment.

The existence of key elements, such as badges and leaderboards (P.B.L) in gamification, has long been in and out of students' life (Becker and Nicholson, 2016). While points are more attractive than grades, badges can induce students' motivation to execute their assignments in order to win the badges. The leaderboards, on the other hand, can incite competition among students in the class. Therefore, these key elements can encourage students to perform better, for instance, completing their assignments on time (Tan & Hew, 2016).

Gamification in Learning

Gamification in education is an interactive learning method that requires multiple interactions and involves elements that can be used to motivate students. It is growing in popularity in education as students find gamification in learning more engaging and appear to be less interested in traditional teaching methods. Game-based mechanics, aesthetics, and thinking promote learning and solve problems (Kahkpour & Colomo-Palacios, 2020), as well as motivating users to pursue their interests and gain points for completing tasks. Gamification also helps students improve their problem-solving and higher-order thinking skills. Thus, gamification in the context of learning is a design process of adding game elements in order to change existing learning processes. The relationship between gamification and learning is provided through frameworks, for example, the theory of gamified learning. The theory of gamified learning defines instructional content, behaviours and attitudes, game characteristics, and learning outcomes (Knutas, Van Roy, Hynninen, Granato, Kasurinen & Ikonen, 2018).

Gamification and Motivation

Determining gamification mechanics requires the identification of the system's intrinsic motivation factors. Intrinsic motivation is essential for the development of gamification because it encourages students to act voluntarily and for their personal benefit. Intrinsic motivation is linked to the concept of self-determination, which is frequently used to assess students' motivation to learn because students are engaged in activities that could provide them with satisfaction. Therefore, gamification can establish, guide, and maintain goal-oriented behaviours among students

In addition, the concept of expectancy is a gamification approach used to measure motivation in students that increases extrinsic motivation among students. Extrinsic motivation is defined as behaviour that is motivated by external rewards such as money, fame, grades, or praise. It refers to doing something as a result of something else, such as monetary incentives or social

pressure, such as when students are given rewards as a form of recognition for completing activities, thereby encouraging them to achieve their goals.

Despite the growing interest in gamification in academic circles, it is important to understand how students feel about the utilisation of gamification in their teaching and learning process. Through gamification, making it more academically acceptable and recognised for educating students by boosting user engagement brought on by game-like experiences. In the context of this paper, the term 'attitude of students towards gamification' refers to the personality or reaction that the users developed as a result of immersing themselves in the game (Ali, Endut & Embong, 2018). This causes positive changes in the students' perceptions and beliefs about gamification. It also shows acceptance of the use of gamification.

Gamification and Assessment

Assessment refers to the process of evaluating the efficacy of teaching and learning (Diaz-Ramarez, 2020). For example, assessment involves the use of empirical data on student learning to refine programmes to improve student learning. An assessment is usually conducted by a verified or experienced educator to gain some knowledge of the method used in their classrooms. Therefore, an assessment will maximise the learning capabilities of a student by enhancing the teaching delivery among educators.

Diaz-Ramirez (2020) believed that assessment is the process of collecting and analysing data from a variety of sources to gain a comprehensive understanding of what students know, perceive, and can do with their knowledge as a result of their educational experiences. When assessment data are used to promote subsequent learning, the process is complete. This process can be gamified to improve student involvement during their studies. With technology being the main role in education, the quality of education in the country will be improved.

When utilising gamification, assessment through multimedia-formatted learning activities can be conducted. As a result, students playing the games are unaware that they are being assessed (Putra, 2017). For example, Flash 8 not only allows basic animations, but combines text, graphics, interactive buttons, and animations to create entire web pages or sites. Despite the gamification elements, the game still represents a learning process.

Assessment is crucial in education since it determines the purpose of a course. In well-designed games, assessment is ongoing and determined by players. Also, player decisions have an influence on cause-and-effect variables (Jackson, 2016). Thus, when applied to real-world tasks such as learning performance variables, a far richer catalogue of abilities and opportunities for growth can be established.

Gamification and Game Elements

Game elements are components that enable gamification. Developing an education platform with embedded or inherent game elements first requires specifically defining what game elements are. Game elements can be effortless and laborious to be implemented (Puritat, 2019). It can be in the form of badges, points, and leaderboards, which are easy to implement. Then, more expertise is required if the game elements are applied, such as a story-based and technology-enabled game, as they allow for interactive feedback.

Nevertheless, the implementation of game elements is a crucial step in gamification in education as it increases student engagement and motivation, enhances learning performance and academic achievement, and provides instant feedback on students' progress and activity. Adaptation of badges, points and leaderboards in learning platforms

will increase the enjoyment of gaining knowledge. For example, according to Schell (2008) in Lu and Ho (2020), game elements such as mechanics, story, aesthetics, and technology in the teaching and learning process are crucial in determining the delivery to users. Schell has identified how key aspects of successful, recreational games could be applied to education and made attempts to categorise and separate elements that make up a successful game. The finding is prominent because the focus of gamification in education is to engage or motivate students through game elements that record player standing, achievements, and positive competitiveness within the education platform.

However, it is difficult to measure characters and personality traits. The Technology Acceptance Model (TAM) is an information systems theory that models how users come to accept and use technology. The TAM Model is frequently used to analyse student perceptions using three variables: perceived ease of use (PEU), behavioural intention to use (BIU), and actual use (AU). The model explains the impacts of gamification on students through statements in three sub-parts: PEU, BIU, and AU. Alfadda and Mahdi (2021) response to the difficulty of measuring character and personality traits by referring to Likert scale. The original Likert scale used a series of questions with five alternative responses: strongly disagree (1), disagree (2), neutral (3), agree (4), and strongly agree (5). Therefore, it is suitable to determine the student's perception using the Likert scale on the TAM model. This research also examined whether there is a relationship between the two independent variables (PEU and AU) and one mediating variable (BIU).

Research Objectives

The objectives of this research are as follows

1) To examine the impacts of gamification methods on the motivation of Multimedia Education undergraduates at a public university in Malaysia during the teaching and learning process.
2) To discover the methods utilised by Multimedia Education undergraduates at the selected public university in Malaysia in the teaching and learning process.
3) To investigate the perception of Multimedia Education undergraduates at the selected public university in Malaysia on the utilisation of gamification in the teaching and learning process.

Methods

This research adopted a quantitative approach and experimental method by employing positive statements to study the relationship between gamification and learning motivation. The data were analysed through descriptive statistics and correlation with a sample of 110 respondents. Questionnaire with 5 Likert scales were used to collect data. Specifically, questionnaire was practically used to gather information from a large audience in a short time, since this research had been conducted during pandemic time, whereas everyone was required to stay at their own place. Correlation analysis was utilised by the researchers to assess the link between two independent variables (PEU and BIU) and one mediating variable (AU). Using SPSS, the percentage, mean, frequency, standard deviation, and bivariate correlation between three variables of the obtained data were calculated.

Findings

Q1: The Impacts of Gamification Methods on the Teaching and Learning Process

Descriptive analysis was used to interpret the impact of gamification methods on the T&L process. The impact was measured by students' perception based on the perceived ease of use (PEU) variable. The following are the students' perceptions of PEU statements. For item Q1, 83 undergraduates (75.5 %) strongly agreed, 25 undergraduates (20 %) agreed, and 2 undergraduates (1.8 %) were neutral to the statement that gamification improved their learning performance. For item Q2, 76 undergraduates (69.1 %) strongly agreed, 32 (29.1 %) agreed, and 2 undergraduates (1.8 %) were neutral to the statement that they felt motivated to start the learning session.

For item Q3, 73 undergraduates (67.3 %) strongly agreed, 30 undergraduates (27.3 %) agreed, and 6 undergraduates (5.5 %) were neutral to the statement that they experienced improved motivation to produce desired results in learning. In addition, for item Q4, 77 undergraduates (70 %) strongly agreed, 29 undergraduates (26.4 %) agreed, and 4 undergraduates (3.6 %) were neutral to the statement that gamification was useful in learning. For item Q5, 81 undergraduates (73.6 %) strongly agreed, 28 undergraduates (25.5 %) agreed, and only 1 undergraduate (0.9 %) were neutral to the statement that gamification helped to improve concentration in learning. Table 1 shows the students' perceptions of PEU.

Table 1
Students' Perception of their Perceived Ease of Use (PEU)

Statement	**SD**	**D**	**N**	**A**	**SA**
Q1 - Using the gamification method improves learning performance.	-	-	2 (1.8 %)	%)	%)
Q2 - Using the gamification method motivates more to start learning sessions.	-	-	2 (1.8 %)	32 (29.1 %)	76 (69.1 %)
Q3 - Using the gamification method enhances the desire to produce the desired result in learning.	-	-	6 (5.5 %)	30 (27.3 %)	74 (67.3 %)
Q4 - Using the gamification method is useful in learning.	-	-	(3.6 %)	%)	)
Q5 - Using the gamification method helps to improve concentration in learning.	-	-	1 (0.9 %)	(25.5 %)	81 (73.6 %)

SD: Strongly Disagree, D: Disagree, N: Neutral, A: Agree, SA: Strongly Agree

Q2: Engagement in the Teaching and Learning Process

Meanwhile, to discover the methods utilised by the selected respondents in the T&L process, engagement in T&L process was measured. Students' perceptions based on the behavioural intention to use (BIU) variable was depicted in Table 2. For item Q6, 79 undergraduates (71.8 %) strongly agreed, 28 undergraduates (25.5 %) agreed, and 3 undergraduates (2.7 %) were neutral to the statement that they liked learning with gamification methods. For item Q7, 66 undergraduates (60 %) strongly agreed, 35 undergraduates (31.8 %) agreed, 8

undergraduates (7.3 %) were neutral, and 1 undergraduate (0.9 %) disagreed that the gamification functionality and interface were understandable. For item Q8, 70 undergraduates (63.6 %) strongly agreed, 38 undergraduates (34.5 %) agreed, and 2 undergraduates (1.8 %) were neutral on the statement that the gamification method ignited fun elements during learning.

For item Q9, 73 undergraduates (66.4 %) strongly agreed, 34 undergraduates (30.9 %) agreed, and 3 undergraduates (2.7 %) were neutral to the statement that gamification helped them participate actively during a learning process. For item Q10, on the statement of gamification helped them ask questions when they did not understand a lesson, 56 undergraduates (50.9 %) strongly agreed, 33 undergraduates (30 %) agreed, 19 undergraduates (17.3 %) were neutral, while 2 undergraduates (1.8 %) disagreed. Then, for item Q11, which is that the gamification method encouraged them to take good notes in the classroom, 36 undergraduates (32.7 %) strongly agreed, 37 undergraduates (33.6 %) agreed, 35 undergraduates (31.8 %) were neutral, 1 undergraduate (0.9 %) strongly disagreed, and 1 undergraduate (0.9 %) disagreed.

Table 2
Students' Perception of their Behavioural Intention to Use (BIU)

Statement	SD	D	N	A	SA
Q6 - I like learning with gamification methods.	-	-	3 (2.7 %)	28 (25.5 %)	79 (71.8 %)
Q7 - The gamification functionality and interface are understandable.	-	1 (0.9 %)	8 (7.3 %)	35 (31.8 %)	66 (60 %)
Q8 - The gamification method helps in having fun during the learning process.	-	-	2 (1.8 %)	38 (34.5 %)	70 (63.6 %)
Q9 - The gamification method helps in participating actively during the learning process.	-	-	3 (2.7 %)	34 (30.9 %)	73 (66.4 %)
Q10 - The gamification method helps in asking questions when I do not understand the lesson.	-	2 (1.8 %)	19 (17.3 %)	33 (30 %)	56 (50.9 %)
Q11 - The gamification method encourages to take good notes in the classroom.	1 (0.9 %)	1 (0.9 %)	35 (31.8)	37 (33.6)	36 (32.7)

SD: Strongly Disagree, D: Disagree, N: Neutral, A: Agree, SA: Strongly Agree

Q3: Level of Student's Perception of Using Gamification in the Teaching and Learning Process

Next, to investigate the perception of respondents on the utilisation of gamification in the teaching and learning process, students' perceptions was measured based on the actual use (AU) variable. For item Q12, 79 undergraduates (71.8 %) strongly agreed, 26 undergraduates

(23.6 %) agreed, and 5 undergraduates (4.5 %) were neutral to the statement that points awarded in learning were effective. For item Q13, 78 undergraduates (70.9 %) strongly agreed, 25 undergraduates (22.7 %) agreed, and 7 undergraduates (6.4 %) were neutral to the statement that gamification motivated them to win badges during learning. For item Q14, 76 undergraduates (69.1 %) strongly agreed, 27 undergraduates (24.5 %) agreed, and 7 undergraduates (6.4 %) were neutral to the statement that earning a medal improved their commitment to the course process. For item Q15, 81 undergraduates (73.6 %) strongly agreed, 23 undergraduates (20.9 %) agreed, and 6 undergraduates (5.5 %) were neutral to the statement that they were pleased to participate in lessons with gamification. For item Q16, 79 undergraduates (71.8 %) strongly agreed, 29 undergraduates (26.4 %) agreed, and 2 undergraduates (1.8 %) were neutral to the statement that gamification motivated them to make an effort to reach the highest level. For item Q17, 80 undergraduates (72.7 %) strongly agreed, 26 undergraduates (23.6 %) agreed, and 4 undergraduates (3.6 %) were neutral to the statement that being in competition kept the excitement alive. The summary was presented on Table 3.

Table 3
Students' Perception of their Actual Use (AU)

Statement				
Q12 - Points awarded for effective learning.	-	-	5 (4.5 %)	26 (23.6 %)	79 (71.8 %)
Q13 - It motivates me to win badges.	-	-	7 (6.4 %)	25 (22.7 %)	78 (70.9 %)
Q14 - Earnings medal improves commitment to the course process.	-	-	7 (6.4 %)	27 (24.5 %)	76 (69.1 %)
Q15 - I am pleased to participate in a lesson with gamification.	-	-	6 (5.5 %)	23 (20.9 %)	81 (73.6 %)
Q16 - I make an effort to reach the highest level.	-	-	2 (1.8 %)	29 (26.4 %)	79 (71.8 %)
Q17 - Being in competition keeps my excitement alive.	-	-	4 (3.6 %)	26 (23.6 %)	80 (72.7 %)

SD: Strongly Disagree, D: Disagree, N: Neutral, A: Agree, SA: Strongly Agree

Conclusion

In conclusion, this article highlighted the utilisation of gamification and it can be considered as the most effective teaching method for increasing learning motivation. This study analysed the utilisation of gamification to improve learning motivation and encourage student participation in the teaching and learning process. Gamification is considered as an effective teaching method of education because it instils in students a problem-solving mindset. In addition, gamification allows for student communication, which strengthens relationships between classmates. As mentioned by Ng and Mohamad (2014), the computer-based

redundancy learning mode that includes animation, audio narration, and on-screen text enhances student performance. For example, the on-screen text could reduce cognitive load and enhance learning performance by facilitating the retrieval of information from long-term memory. Therefore, the correlation demonstrated in this research concluded that students accepted gamification learning as they demonstrated positive impacts of the utilisation of gamification through their behavioural intention, perceived ease of use, and perceived usefulness.

Gamification methods have clearly given positive impact to learning session among students. Moreover, gamification enables struggling students, including those who are shy to speak up in class, to receive assistance from students who are better versed in the subject. The selected students which also will serve as preservice teachers are undeniable to demonstrate favorable reactions in terms of motivation and instructional efficacy, as proven in a study by Anuar, Teoh and Koo (2022). In addition, gamification makes teaching and learning simpler, more effective, and more attainable. As asserted by Chans and Castro (2021), a focused attention and empathy toward students' feeling are required to design a gamification approach that work properly. However, the approach may not suit all type of learning styles, but it should possibly enjoyable and educational.

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