

Students' Self-efficacy and Enjoyment in Gamification Influence Academic Engagement in Classroom A Study among Undergraduate Students

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Abstract

Gamification in education involves incorporating game features into the educational environment to encourage student engagement. Studies indicate that students in gamification courses tend to perform better because gamification helps them to focus in their studies. Self-efficacy, or a student's belief in their ability to succeed, is a key factor in enhancing engagement through gamification. Meanwhile, enjoyment significantly improves students' engagement by making learning activities more enjoyable and immersive. The problem with traditional learning is its limited ability to engage and motivate students, particularly in today's digital era where students are accustomed to interactive and multimedia rich contexts. Thus, this study aims to measure students' self-efficacy and enjoyment in gamification will contribute to academic engagement in the classroom. 165 respondents were selected among undergraduate students via online survey from seven classes using convenience sampling technique. The data was analysed through a multiple regression analysis. The result shows that students' self-efficacy ($\beta=.44$, $p<.001$) and enjoyment ($\beta=.35$, $p<.001$) in gamification significantly influence academic engagement in the classroom. The results also improved our knowledge and understanding of how gaming enhances student engagement. In addition, interactive platforms such as gamification can increase students' motivation, foster good critical thinking and problem-solving skills, boost self-efficacy, and reduce stress and anxiety.

Keywords: Gamification, Self-Efficacy, Enjoyment, Academic Engagement, Students

Introduction

Gamification in education involves integrating game elements into the educational environment to boost student engagement. "In today's world, where social media and digital technology mediate most of what we do, many firms shift that behavior by transforming routine tasks into rich, fun, gaming-like experiences" (Wang et al., 2021, p. 1). The purpose is to obtain levels of involvement equivalent to what people normally perceive in gaming (Fardo, 2014). Most researchers, educators, and industrial practitioners have demonstrated an alert attracts in gamification around several fields such as education, information studies, human-computer interaction, and public health (Seaborn and Fels, 2015). Moreover, Hamari and Koivisto (2015) emphasized that gamification delivers various benefits, including enjoyment, and social benefits through public and social engagement. They also define gamification that focuses on the term "playfulness". It's like a system that uses things in games to influence the audiences or students to be more engaging or enjoyable.

The influence of gamification in teaching and learning may diverge reliant on the audiences and the qualities of the content. The studies signify that students managed to achieve good results since gamification supports with the education. The study showed that college students in gamified cell biology program mastered in lecture-based counterpart by 40% (Kim et al., 2018). Thus, the results of the study explained that university students supported enjoyment and self-efficacy which later contribute to study engagement.

Meanwhile, self-efficacy, or a student's confidence to achieve, is a main feature or reason for implementing engagement over gamification. As we understood, gamification basic features such as points, badges, and leaderboards stipulate direct responses and concrete markers of the progress. This helps to increase the confidence level in students' abilities and therefore, increases students' self-efficacy toward better intrinsic incentives and engagement with education (Banfield & Wilkerson, 2014). Students who believe their achievements can meet the objectives are more prone to participate enthusiastically, stay with challenges, and devote their efforts to education responsibilities. Through aiming for possible objectives and getting optimistic strengthening over gamified schemes, self-efficacy among students is frequently reinforced, important to continuously engage with improvement learning outcomes (Deterding et al., 2011).

Enjoyment in gamification considerably increases learners' engagement by making educational programs more enjoyable. After the education program is gamified, it usually comprises elements of storytelling, contests, and prizes that contribute to a fun and attractive process. In addition, this enjoyment conducts greater motivation and optimistic behaviour toward education, which enhances students' inclination to take part and devote effort to students' responsibilities or tasks (Hamari, Koivisto, & Sarsa, 2014). Investigation on gamification among students has shown that once students enjoy educational activities, they are more likely to engage deeply, continue via challenges, and accomplish better education outcomes. The entertainment and collaboration of gaming generate an inspiring educational outcome, which benefits preserving students' awareness and attention over time (Domínguez et al., 2013).

The use of gamification ideologies influences the educators' objective to produce additional self-motivation and fascinating learning involvement that inspires learners to energetically take part, problem-solving, and fulfil their objectives. Integrating gamification elements in learning programs develops learners' engagement and enthusiasm. Students are prone to contribute to education, continue to finalize the tasks, and pursue supplementary trials after they are accessible in the gamification setup. Besides, gamification promotes a

sense of enjoyment and pleasure during learning which converts anything that may otherwise be reflected in boring or routine jobs into enjoyable knowledge. The improved engagement may lead to enhance retaining of knowledge and more thoughtful ideas.

Moreover, gamification nurtures cooperation and contest among students, promoting a perception of communal and solidarity in the education ecosystem. Initiating features in gamification such as “leaderboards and team challenges”, encourages social communication and cooperation, which preserves and boosts education goals. Gamification also offers instant responses to students, granting them to trace their score status, determine subjects or areas for progress, and lastly, commemorate their success. This response gap guide students to remain motivated and persistent on their main objectives, encouraging them to improve educational consequences over time. This claim permits various people to cooperate on issues by employing an interactional and engaging display (Zhao, 2019).

The students can use Quizizz on their smartphones, laptops, and tablets provided they have an Internet service. Quizizz approaches statistic data from quiz game findings and is greatly adjustable due to its customization period for quizzes (Yana et al., 2019). The medium also persuades competition between the students by exhibiting the current results on the scoreboard. This can encourage the student to learn more and continuously. In addition, educators or lecturers can examine the improvement and transfer or download the report after completion of quizzes to review students’ performance (Suharsono & Uluwiy, 2020).

In the meantime, the issue with conventional education is the limitation of the capability to stimulate students’ engagement, especially in today’s world where learners are normalized towards interactional and multimedia contexts (García-Martín & García-Sánchez, 2018). Traditional education frequently depends on a passive approach, which indicates to diminish or decline in motivation and education outcomes. Additionally, conventional learning preserve overlooks individual distinctions in learning methods and preferences, leading to fit in all styles of learning that will not efficiently meet the requirements of various learners (Mayer, 2014).

Therefore, the research aims to examine students’ self-efficacy and enjoyment of gamification that will influence academic engagement in the classroom.

Students’ self-efficacy in Gamification towards Academic Engagement

The influence of students' self-efficacy on academic engagement is significantly important. Self-efficacy implies to students' observations and beliefs concerning their capability to accomplish educational tasks. According to Bandura (1977), self-efficacy beliefs represent individuals' assessments of their capability to organize and execute actions required to achieve a particular performance outcome. Essentially, it reflects students' confidence in their capacity to complete learning tasks. Students gain confidence in their abilities and believe in their capacity to succeed; thus, self-efficacy increases. Gamification offers opportunities for students to experience a sense of achievement by overcoming challenges and advancing through levels, thereby reinforcing their belief in their own abilities (Meccawy et al., 2023).

Self-efficacy significantly influences students' engagement in the learning process. Once students believe in their ability to complete a task, they become motivated to actively participate in it. Those with higher levels of self-efficacy tend to exhibit increased behavioral, cognitive, and motivational involvement in the classroom, leading to elevated levels of learning engagement (Linnenbrink & Pintrich, 2003). Hence, it is essential for educators to prioritize the enhancement of students' self-efficacy during instructional sessions (Manasia,

2015). For instance, this can be achieved by providing positive feedback as students progress and offering encouragement when they encounter challenges in the learning process.

Students' enjoyment in gamification towards academic engagement

Many educators encounter challenges in the classroom due to students' lack of motivation and passive involvement in learning activities. Subsequently, the issues of education' aim and study engagement have gathered continuous attraction from educators and researchers. The lack of enjoyment in the classroom between students is frequently mentioned as a contributing factor to reduced study engagement (Lumby, 2011). Many researchers have determined gamification as a convincing method for initiating psychological and social transformation. Such as, according to Kim et al (2018), gamification has been identified to advance students' motivation and engagement in education. Students predictably accompanied their excitement with an education founded on their enjoyment of the progression (Lumby, 2011). Thus, it is evident that gamification holds promise for effective teaching by enhancing learner participation (Kim et al., 2018).

In addition, studies show that there is a relationship between age and the duration of service usage implying that younger users tend to experience a more pronounced novelty effect and sense of playfulness. While younger individuals are more receptive to enjoyable interactions, they may also grow bored more quickly compared to older users. This observation suggests that younger users might engage more actively in embracing and appreciating gamified education (Koivisto and Hamari, 2014). Positive emotions stemming from gamified education can enhance students' enjoyment of learning and consequently foster their study engagement. Thus, the researchers would like to investigate the relationship between self-efficacy and engagement such as below:

H₁: Students' self-efficacy in gamification significantly influences academic engagement.

H₂: Students' enjoyment of gamification significantly influences academic engagement.

Academic Engagement

Academic engagement encompasses the positive and rewarding aspects of learning, which entail energy, focus, and absorption in educational activities (Zhang et al., 2021). When students are engaged through gamification, they are more likely to be attentive, participate actively, and persist through challenges, leading to better academic performance and deeper learning (Dichev & Dicheva, 2017). Energy signifies a high level of mental strength during learning, whereas concentration indicates the ability to fully engage with and stay dedicated to learning materials. Absorption involves a deep understanding of the content, reflecting a student's immersion in the learning process and often resulting in unconscious learning (Siu et al., 2014).

As shown in figure 1, the dependent variable (academic engagement) is influenced by the independent variables which are presented by self-efficacy and enjoyment.

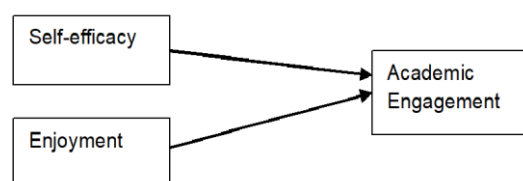


Figure 1: Research Framework

Methodology

Sample and Statistical Procedure

A cross-sectional, online survey was conducted among undergraduate students at faculty of Communication and Media Studies in Universiti Teknologi MARA, Rembau, Negeri Sembilan. The study was conducted in April 2024 using convenience sampling technique among Diploma students who implemented Quizizz assessments in class after completed the lecture. Seven classes have been identified for this study (four classes for year one and three classes for year two) and total population is 178. The data collection process took about a month and in total 165 online questionnaires were administrated via Google form. Five were removed due to invalid responses. Table 1 shows the demographic profile of undergraduate students' which majority of the respondents are female (76%), age is less than or equal to 19 showed the highest responses (55%) and year one students are among the biggest respondents (57%).

Table 1

Demographic profile (n=160)

Item	Item	Frequency (%)
Gender	Male	38 (24)
	Female	122 (76)
Age	≤19	88 (55)
	20-22	61 (38)
	≥ 23	11 (7)
Year	Year 1	91 (57)
	Year 2	69 (43)

Instruments and Reliability

The instruments used were adapted from past research studies on technologies adoption. A 14-item survey instrument was adopted and modified. The questions also included demography items. Respondents were asked about their experiences of using gamification in class such as Quizizz. Table 2 shows the allocation of instruments, items, reliability test, standardized item loadings, average variance extracted (AVE), composite reliability (CR), and Cronbach alpha (CA). The items used five Likert scales. The instruments were adapted from Speier and Frese (1997) for self-efficacy items such as *when I am confronted with a new task involving learning through gamification, I am confident in my ability to handle it.*, Botes et al (2021) for enjoyment items such as *I enjoy learning through gamification* and Schaufeli et al (2006) for engagement items such as *I was interested in this learning*. Before distributing the questionnaires to students, researchers consulted experts to ensure the items were suitable for the study's objectives. A pre-test was conducted with 30 Diploma students. The results of the reliability analysis, shown in Table 1, indicate that the reliability criteria were met after making some adjustments or rewording items to prevent misunderstandings. Each item's factor loading should be .6 or higher and positive. Conducting Average Variance Extracted (AVE) for each construct is crucial to measure validity. Most factor loadings were above .6, with AVEs for all constructs exceeding .5 and Composite Reliabilities (CRs) exceeding .6.

Meanwhile, the normality test using Skewness and Kurtosis have been tested. Referring to Nieslony et al (2021) stated that Skewness must fall between -3 and +3 and Kurtosis between -7 and +7. Every variable in the study shows values within the designated range as at below: Self-efficacy (-1.09, 2.36), enjoyment (-1.07, 2.80), and academic engagement (-1.27, 3.0). In order to examine the appropriateness of factor analysis, the Kaiser-Meyer-Olkin (KMO) has been conducted and shows (.92, $p < .01$) which suggest that values between .8 to 1 indicates the data for each variable is adequate.

Table 2

Instruments, standardized item loadings, CA values AVE, and CR

Factor	Instrument	Item	Item loadings ≥.60	CA ≥.70	CA ≥.70	AVE ≥.5	CR ≥.6
				Pilot Test	Field Test		
Self-efficacy	Speier and Frese (1997)	SE1	.71	.80	.82	.52	.82
		SE2	.72				
		SE3	.75				
		SE4	.71				
Enjoyment	Botes et al. (2021)	E1	.72	.83	.88	.61	.82
		E2	.85				
		E3	.76				
Academic engagement	Schaufeli et al. (2006)	AE1	.71	.91	.92	.60	.91
		AE2	.72				
		AE3	.80				
		AE4	.84				
		AE5	.83				
		AE6	.71				
		AE7	.75				

* Cronbach alpha (CA), average variance extracted (AVE) and composite reliability (CR)

Data Analysis

The data were entered and analyzed using SPSS version 24 and five were removed due to invalid responses. The researcher used multiple regression analysis to predict the relationship between students' self-efficacy and enjoyment in gamification and how these variables influence their academic engagement. To conduct the multiple regression analysis, preliminary tests were performed to ensure no violation of the assumptions of normality, linearity, multicollinearity, and homoscedasticity. As previously mentioned, the normality test using skewness and kurtosis indicated normal distribution. The linearity test showed that the relationship between the independent and dependent variables was represented by a straight line. The multicollinearity test, with a Variance Inflation Factor (VIF) below 10, indicated a moderate level of multicollinearity (correlations between variables must be below 10). Homoscedasticity was confirmed by a consistent and random scatter of residuals across all levels of the predicted values (independent variables). To check the model fit, the researcher analyzed the R-square (Table 3), F-ratio, and significance value (Table 4). These steps were taken before running the multiple regression analysis to test the hypotheses.

Table 3 shows the model summary of this study where R squared value is .50 which explains 50% of total variance of academic engagement (dependent variable). In general, the higher the R-squared, the better the model fits the data. However, according to (Ozil, 2022), acceptable values and minimum values of at least 0.10, R squared are acceptable in social science empirical modelling when some or most explanatory variables are statistically significant.

Table 3

Modal Summary for R-square value obtained.

Modal Summary				
Model	R	R square	Adjusted R square	Std. Error of the Estimate
1	.71 ^a	.50	.50	.62

a. Predictors: (Constant), Enjoyment, Self-efficacy

In addition, the researchers used the ANOVA test in Table 4 as an analysis of variance to find common means between different groups of variables. As can be seen from the table, the F-ratio value is 77.61, significant value ($p < 0.001$). It can be seen that this model is a significant model.

Table 4

Anova Table

Modal Summary						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	59.86	2	29.93	77.61	.000 ^b
	Residual	60.54	157	.39		
	Total	120.40	159			

a. Dependent Variable: engagement

b. Predictors: (Constant), Enjoyment, Self-efficacy

Results

A multiple regression analysis using the enter method was conducted to examine whether students' self-efficacy and enjoyment in gamification significantly influences academic engagement. Overall, the model was significant, $F(2,157) = 77.61$, $p < 0.001$, explaining 50% ($R^2 = .50$) of the variance in the outcome variable. Thus, table 5 shows students' self-efficacy in gamification ($\beta = .44$, $p < 0.001$) has positive and significant relationship towards academic engagement. Meanwhile, enjoyment in gamification ($\beta = .35$, $p < 0.001$) also shows positive and significant relationship. Self-efficacy contributed as a strong variable towards academic engagement as compared to enjoyment. Overall, H_1 and H_2 are supported and reject H_0 . This demonstrates that gamification in the classroom enhances academic engagement among students. The independent variables, such as self-efficacy and enjoyment, are proven to be important elements in using gamification in the classroom.

Table 5

Regression Analysis Results

Variables	Unstandardized		Standardized	t	Sig	R ²	F
	Coefficient	SE	Coefficient				
	<i>B</i>		Beta (β)				
Constant	.26	.24		1.08	.28	.50	77.62
Self- efficacy	.46	.07	.44	6.23	.00**		
Enjoyment	.37	.08	.35	4.96	.00**		

**p>0.001, SE= standard error

Discussion and Conclusion

The study measured the extent to which students' self-efficacy and enjoyment of gamification influenced academic engagement in the classroom. The study found that students' academic engagement is influenced by self-efficacy and enjoyment. This study is consistent with the previous research done by (Cheng and Liang, 2022). The benefits of digital gaming have encouraged its application beyond entertainment (Seaborn and Fels, 2015). Gamification in the classroom concerns incorporating game design features into informative learning activities to improve student engagement and education results.

The present findings have supported that gamification can improve students' engagement. Gamification offers learning opportunities to become more interactive and entertaining. This facilitates to portrayal of students' interests and keeps them engaged. Integrating gaming features such as points, badges and leaderboards, students are interested in taking part dynamically and with completed assignments. Therefore, it is used as an incentive to accomplish or recognize as a various platform of effort (Doney, 2019). In addition, gamification preserves to assist several educational methods and paces. By aiding students to improve at their own speed and indicate their practices of engagement with the substantial, gamification approaches a more individualized knowledge involvement.

Self-efficacy, or a student's confidence to achieve certain responsibilities, plays an important role in gamification, markedly in learning situations. Thus, it assists students in aiming their objectives and analyzing the improvement, which motivates stability and energy in their studies. Research has shown that gamification contributes to a beneficial preservation of knowledge and understanding of complicated ideas or beliefs. By aiming to study a game, students are more prone to recall important keywords or lessons that have been taught in the classroom and thus, employ them successfully. The findings also show that students with better self-efficacy are more likely to engage with gamification orders, believing that they can effectively accomplish the tasks. The students are prone to endure competitive tasks, as they certain in their capability to defeat obstacles. Students with high self-efficacy can decrease anxiety over studying tasks, making

Meanwhile, enjoyment in gamification also performs a critical factor in academic engagement. Enjoyment persuades students to take part more energetically in gamification tasks. Students are prone to concentrate and focus on tasks or assignments that enjoyable, indicating continued engagement. These practices preserve better memory retention, facilitating students to recall what they have studied. When students enjoy studying activities,

they are more likely to accomplish good academic outcomes. Likewise, enjoyment can enhance intrinsic motivation causing students more excited to study and can contribute to more positive thoughts toward studying (Manasia, 2015). Enjoyable tasks can stimulate creativity, as students are more willing to experiment and think outside the box. Students are more likely to engage in complex problem-solving when they enjoy the process, leading to better problem-solving skills

Overall, self-efficacy significantly enhances the effectiveness of gamification by fostering a positive and proactive approach to learning and task completion. Meanwhile, enjoyment significantly enhances the effectiveness of gamification by making learning more appealing and engaging, leading to better educational outcomes and a more positive learning experience. By harnessing these benefits, educators can cultivate a more dynamic and effective learning environment that enhances academic performance and nurtures a love for learning.

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