

## Students' Acceptance of Gamification in Education: The Moderating Effect of Gender in Malaysia

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### Abstract

Learning through gamification has been one of the most popular techniques and methods used by today's educators because it creates a fun environment of learning that may boost student performance in their studies. This study aims to investigate gamification acceptance among students in Malaysian higher education institutions, and the moderating effect of gender. The COVID-19 outbreak has made online learning essential in all educational sector in the world; hence, the motivation for this study. The study involved a representative sample of 406 survey responses from students currently enrolled in a diploma programme at Malaysian universities. The data were analysed with Structural Equation Modelling (SEM). According to the results, only one factor substantially influenced students' acceptance of gamification: performance expectancy. Gender had a moderating effect on performance expectancy regarding the acceptance of gamification. The findings may be a guideline for future studies in response to changes in the existing learning approach.

**Keywords:** Gamification, Students Acceptances, Unified Theory of Acceptance and use of Technology (UTAUT), Performance Expectancy, Social Influence, Gender.

**Introduction**

The globe is now affected by the coronavirus disease 2019 (COVID-19), a devastating viral disease caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) (Shah et al., 2020). All universities, schools, religious institutions, and non-essential sectors in Malaysia were closed during the Movement Control Order or known as MCO (Salim et al., 2020). Due to the closure of universities and schools, the implementation of online distance learning is required to ensure that the educational process is not interrupted during MCO.

In the study by Sundarasan et al (2020), students face stress and anxiety during the pandemic and lockdown period, and one of the methods to continue learning is through online distance education. Previous research has indicated that the incidence of illness epidemics has an effect on an individual's mental health and well-being (AlAteeq et al., 2020). Disruptions to face-to-face education and the shift to online distance education have also created several difficulties (Kamaludin et al., 2020). Therefore, gamification methods or online learning should be implemented and be adequately interesting to ensure the education process will continue smoothly during the pandemic. Teachers or lecturers can use different contents to be creative in the delivery of remote teaching. Gamification can make the class become fun and effective. Gamification is currently among the most popular technologies because it seeks to increase motivation in various activities by implementing the qualities embedded within games (Hamari et al., 2015). Gamification in education is becoming increasingly crucial as students lose interest in traditional learning activities. It applies game concepts, methods, and features in non-game contexts (Kiryakova et al., 2014). Gamification enables game design features to enhance the desirability of behaviour that can be learnt and adopted pleasantly and entertainingly (Tanouri et al., 2021). This method can also reduce students' stress and anxiety as they will enjoy going through their learning process through remote learning.

There are numerous gamification solutions available to educators for use in their classrooms. Nowadays, many educators use technology-enhanced learning sessions such as Kahoot, online and computer-generated quizzes, and others to ensure that their students become active, engaged, and receive immediate feedback on their understanding of the topics covered. Ab Rahman et al (2018) mentioned that since not all educators are creative enough to incorporate gamification into their lessons, online platforms such as Kahoot! Quizizz, Socrative, and Quiz Alize provide educators with a variety of lesson plans and activities that can captivate and inspire students' motivation and engagement during classroom lessons. Gamification has the potential to motivate students and increase students' attendance to online classes by making it more enjoyable for students to attend, which correlates with students' academic success. Teachers and lecturers should ensure they can create an interesting platform for students to learn. Nevertheless, there is a scarcity of studies on students' attitudes regarding gamification in an online learning environment and students' intention to integrate gamification into their study environment (Chung et al., 2019).

Therefore, this study aimed to establish the determinants of gamification acceptance and to understand the potential effects of gender for a better understanding and development gamification in Malaysia using the unified theory of acceptance and use of technology (UTAUT) as a basis of the study. The objectives of the study are as stated below:

- To investigate the factors of gamification acceptance among students in Malaysia.

- To examine the moderating effect of gender on the relationship of performance expectancy and social influence towards gamification acceptance.

## **Literature Review**

### *Gamification*

Gamification may be defined as “the application of game design features in non-gaming contexts” (Deterding et al., 2011; Schobel et al., 2020; Zimmerling et al., 2019) that could be applied in a variety of fields, including education and learning, health, and science (Ahn & Dabbish, 2004). According to Kapp (2012), gamification in education uses game-based techniques, visuals, and game judgment to involve people, inspire action, improve learning, and assist in overcoming any obstacles and problems. Gamification has become a popular technique for motivating people to enhance their performance in training or educational activities (Cheong et al., 2013; Landers, 2014). In addition, game components are stages, points, badges, boards, and avatars in different fields (Barata et al., 2017; Lister & College, 2016). Many more methods, such as fighting, content unlocking, giving, boss fighting, questing, social graphics, and certifications, are also accessible on gamified systems (Buckley & Doyle, 2017).

Gamification in learning is becoming increasingly crucial as students are becoming disinterested in traditional learning activities. A previous study discovered that students were not truly engaged in constructing knowledge since they were perceived as typical technology users (Tan & Hew, 2016). Some studies have indicated that game-based learning is attractive to students. Educators may utilize gamification applications such as Kahoot! and Quizizz in their learning settings. Furthermore, gamification not only includes playfulness elements, but it also assists students in becoming fully immersed in the learning experiences and increasing their enthusiasm (Codish & Ravid, 2014).

Nonetheless, students may disapprove of gamification techniques in learning for a variety of reasons, including: (1) unclear goals, or (2) unfamiliar games (Browne et al., 2014). Therefore, it is essential to identify what significant aspects influence users’ gamification adoption to increase the impact of gamification in education.

## **Underline Theory**

### *Unified Theory of Acceptance and Use of Technology Model (UTAUT)*

The unified theory of acceptance and use of technology model (UTAUT) was developed by Venkatesh et al (2003) by combining eight prior technology acceptance models. It has been utilized extensively in various research to analyses users’ technology acceptance behavior (Tagoe, 2012). The UTAUT theoretical model was used in this study with two key factors as independent variables: performance expectancy and social influence. Furthermore, gender was set as a moderator.

## **Variables of the Study**

### *Performance Expectancy*

Performance expectancy is an individual’s belief in the benefits and usefulness gained through the usage of technology and systems (Venkatesh et al., 2003). Within this research, performance expectancy is the scale to which students perceive that the use of gamification in their learning could help them improve their performance. Vleeshouwer (2015) reported

that performance expectancy significantly impacted students' acceptance of usage intention and showed the highest significance as compared to effort expectancy and social influence. Students who believe that using gamification could increase their study capabilities will like and use this method more frequently than students who disregard it. Another study reported that performance expectancy was an essential contributor to student acceptance of games to support teaching and learning (Alsaifi & Mendoza, 2020; Wan Ishak & Yamin, 2020).

In addition, based on the previous research by Chao (2019), performance expectancy had a solid and beneficial influence on university students' behavioral intention to accept mobile learning in their studies. Indeed, another studies also revealed that a significant relationship of performance expectancy toward e-learning and student self-efficacy (Latip et al., 2020). Indeed, recent article revealed that self-efficacy act as a moderator in the relationship between performance expectations and e learning acceptance. A high level of self-efficacy will increase the likelihood that students with performance expectation and social influence will adopt e-learning in their daily life (Latip et al., 2022).

Furthermore, Chung et al (2019) stated that performance expectancy had the most significant influence on students' favorable acceptance of gamification and was the most significant factor as compared to other variables. Therefore, students who think gamification can improve their study performance will likely use this method. The below hypothesis was formulated:

H1: Performance expectancy positively influences gamification acceptance among students.

### **Social Influence**

Social influence refers to the influence of other people that consciously and subconsciously affects an individual's beliefs and actions (Venkatesh et al., 2003). According to AlMarshedi et al (2017), the use of gamification is influenced by social rather than technological factors. Relatively, social behavior could affect a user's opinion, adoption, and performance, especially in a collectivist culture.

A previous study by Rui et al (2020) showed that social influence is an essential factor for accounting students' attitude to use game-based learning. Besides, social influence also influenced the intention to use gamification for training in higher education (Vanduhe, 2020). According to a study by Asiri (2019), social influence was essential for predicting a female teacher's behavioral intention to apply gamification in an English as a Foreign Language (EFL) classroom when the social influence of gamification increased. This demonstrated that social influence is one variable that impacts teachers' decision to use gamification in the classroom. When a teacher introduces gamification into a class, it indirectly influences students to learn better and use gamification in their studies. Therefore, the below hypothesis was developed:

H2: Social influence positively influences gamification acceptance among students.

### **Gender**

Continuous studies indicated gender variations in gaming motivations, game genre preferences, game styles, and feelings experienced during the game. It was found that female players are less likely to participate in competitive online games than male players (Hartmann & Klimmt, 2006). Many games are either online games or physical games and are designed

for a particular gender (Reijmersdal et al., 2013).

Wehrwein et al (2007) analyses and examined learning preferences among undergraduate students. The findings revealed that males put a strong emphasis on logic and rational assessment, whereas females emphasized elaborate processing and the search for personal significance in the material. In addition, Dabraj (2009) stated that female students in digital environments had a better perspective than male students.

Seaborn and Fels (2015) argued that women are more attracted by badges in gamification than men. In addition, females have a high positive perspective towards the digital environment in their study. However, this is in contrast with Eickhoff et al (2012); Pedro et al (2015), who stated that women are less motivated by the game environment .

Santana et al (2016) studied the performance of different genders involving female and male students from primary education institutions in Brazil. The authors used gamified technology to assess their performance in Math and Portuguese and found that males outperformed females in Math. However, no significant changes in student performance in Portuguese were found. There is notably a lack of studies to test gender as a mediator between performance expectancy and social influence towards gamification acceptance among students in higher education. Therefore, this study is crucial to investigate moderating gender with variables that affect the acceptance of gamification among students. This leads to the following hypotheses:

H3: Gender strengthens the relationship between performance expectancy and gamification acceptance among students.

H4: Gender strengthens the relationship between social influence and gamification acceptance among students.

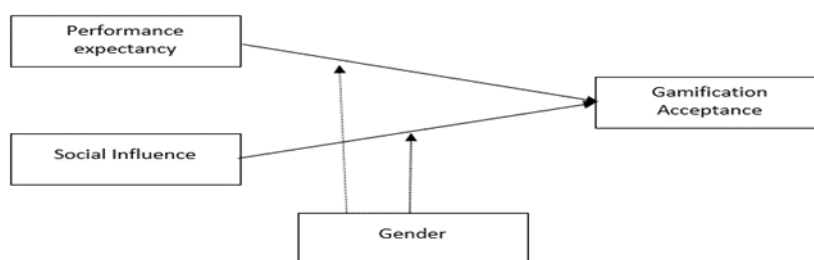


Figure 1: Framework

## Methodology

The study adopted a descriptive study through primary data. The data were collected using convenience sampling through an online survey. The population of the study was diploma students of Malaysian public higher education institutions. To ensure a generalised finding, the minimum sample size of the targeted population is critical. Therefore, the study's minimum of 160 sample sizes was required based on 16 items tested by the study. A previous study supported that in Structural Equation Modelling (SEM), 10 samples are required for each item tested (Hair et al., 2010). A total of 406 valid responses were obtained after data screening, and few outliers were removed.

### Respondents' Profile

Based on the descriptive analysis, most of the respondents were female (79.3%), while 20.7% of the respondents were male. Moreover, most of the respondents' age was between 18–21 years old (96.3%), while 3.7% of the respondents were between 22–25 years old.

### Data Analysis and Result

The Confirmatory Factor Analysis (CFA) was conducted with a score of model fitness, as presented in Figure 2. The CFA reported a good model fit with the minimum discrepancy divided by degree of freedom (CMIN/DF) = 3.302; Comparative Fit Index (CFI) = .929; Goodness of Fit (GFI) = .904; and Root Mean Square Error of Approximation (RMSEA) = .074 as supported by (Awang et al, 2018; Fornell & Larcker, 1981). Moreover, the Composite Reliability (CR) of all variables scored above .60. The CR for perceived enjoyment (PE) was .751, gamification acceptance (GA) was .898, and lastly, the CR of social influence (SI) was .850.

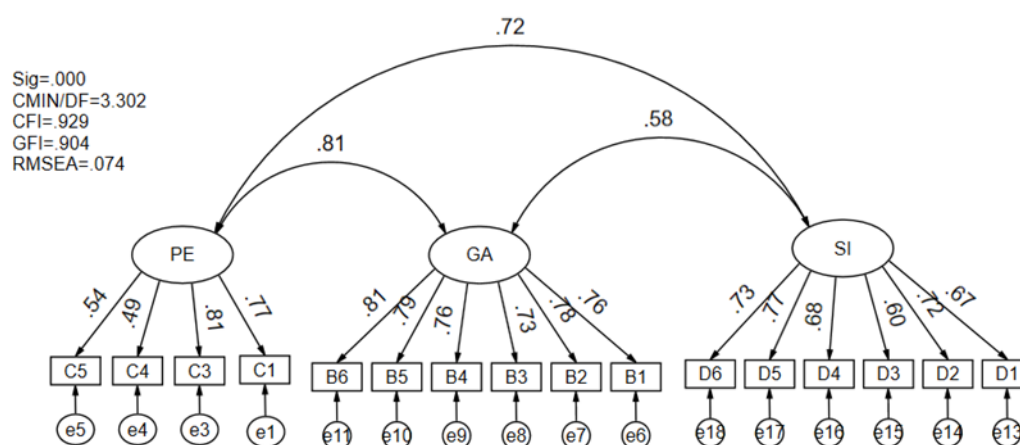


Figure 2. Model fitness

### The Direct Hypothesis Testing

The Structural Equation Modelling (SEM) was utilised in this study to test the direct and moderating effects of the constructs. The summary of the result can be accessed in table 1, and figure 3. The outcome revealed that performance expectancy significantly influenced gamification acceptance among students with a p-value less than .05 ( $\beta = .826$ ; CR = 9.118;  $p=.001$ ). When the performance expectancy of gamification learning increased by 1, the acceptance of student on gamification rose by .826. Therefore, Hypothesis 1 was supported. However, there was no significant relationship between social influence and gamification acceptance as the p-value score was more than 0.05 ( $\beta = -.016$ ; CR = -.217;  $p=.829$ ). Thus, Hypothesis 2 was not accepted.

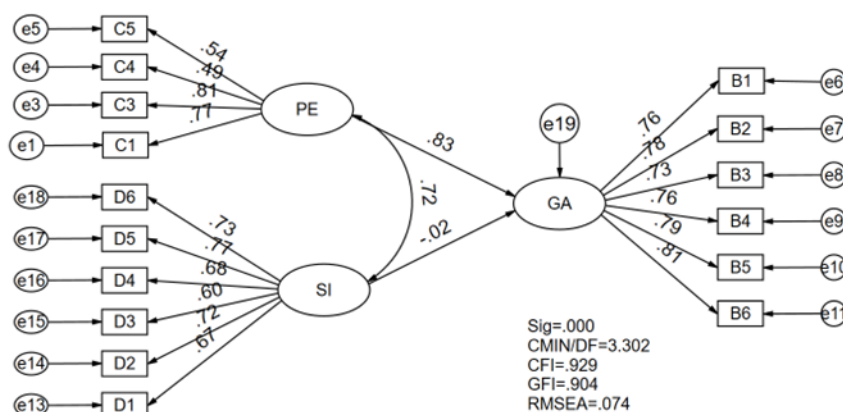


Figure 3. Direct hypothesis testing using SEM

Table 1  
Summary of direct hypothesis testing

Relationship tested		Std. estimate	S.E.	C.R.	P	
Performance expectancy	→	Gamification acceptance	0.826	0.078	9.118	***
Social influence	→	Gamification acceptance	-0.016	0.067	-0.217	0.829

**Moderating Analysis**

The moderating analysis of gender was conducted. Based on the direct relationship analysis (Table 1 and Figure 3), only Hypothesis 3 could be tested because there were significant relationships between performance expectancy and gamification acceptance. Meanwhile, Hypothesis 4 was not supported as Hypothesis 2 was not supported statistically. The moderating analysis of gender between performance expectancy and gamification acceptance found that gender significantly moderated the relationship on the constructs tested as the Chi-square differences of constrained and unconstrained models for male and female were more than 3.84 (Awang et al., 2018) (refer to Table 2).

Table 1  
Moderating Analysis

Gender	Analysis	Constrained model	Unconstrained model	Differences in Chi-square	Moderation effect
Male	Chi-square value	179.860	170.786	9.074	Yes (The difference in Chi-square is more than 3.84)
	DF	102	101		
Female	Chi-square value	343.568	337.552	6.016	Yes (The difference in Chi-square is more than 3.84)
	DF	102	101		

Moreover, it can be concluded that the partial moderation effect was recorded as the p-value of male and female on the standardised regression weight between performance expectancy and gamification acceptance was less than .05 (Refer table 3). Indeed, the performance expectancy of gamification acceptance was much stronger on female students than male students.

Table 2

*Regression weight of moderating analysis*

Regression weight of moderation analysis							
Gender	Relationship tested			Std. estimates	S.E.	C.R.	P
Male	Performance expectancy	→	Gamification acceptance	.752	.112	4.929	***
Female	Performance expectancy	→	Gamification acceptance	.805	.096	7.608	***

## Discussion

The study able to achieve the stipulated research objectives (1) which is to investigate the factors of gamification acceptance among students in Malaysia, and (2) to examine the moderating effect of gender on the relationship of performance expectancy and social influence towards gamification acceptance.

According to the study's findings, students' acceptance of gamification was statistically significant only to one of two independent variables, namely performance expectancy. Gender was a significant moderated of the relationship between performance expectancy and gamification acceptance in the moderating analysis.

In response to objective (1), which is to investigate the factors of gamification acceptance among students in Malaysia, the data demonstrated that performance expectancy significantly influenced students' acceptance of gamification in their learning. This finding is consistent with a recent study by Chung et al (2019), which discovered that performance expectancy was the most important component influencing students' acceptance of gamification as compared to other variables. When students feel that the gamification strategy may help them do better in class, they will frequently use it. Furthermore, the research by Chao (2019) found that performance expectancy had a favorable association with university students' desire to adopt mobile learning (one of the gamification methods) in their study. In addition Zawaideh (2017), also founded one of the main factor that influenced behavior intention of student to use e-learning is performance expectancy. Indeed, the recent article revealed that self-efficacy act as a moderator in the relationship between performance expectations and e-learning acceptance. A high level of self-efficacy will increase the likelihood that students with performance expectations and social influence will adopt e-learning in their daily life (Latip et al., 2020, 2022). Therefore, it is deemed beneficial when gamification matches students' perceived performance.

It was revealed that social influence did not significantly impact gamification acceptance in subsequent responding to objective (1). This finding is consistent with the research conducted



by Bharati and Srikanth (2018), which revealed that social influence did not positively impact students' behavioral intentions to use mobile applications in their studies. However, a study conducted by Chung et al (2019) found that social influence had a significant impact on students' acceptance when gamification was implemented. This result was insignificant, possibly because students are not influenced by others to use certain things, especially in terms of their studies. However, they will use certain techniques if they are confident that tool will improve their performance. Indeed, it is also supported by the recent study as the self-efficacy does have self-influence toward gamification acceptance. The strongest student perceived their self-ability to use e-learning, the higher their acceptance toward technology in education (Latip et al., 2022).

Finally, in answering objective (2), the results of the moderating analysis confirmed that gender had a significant impact on the link between performance expectancy and students' acceptance of gamification. Indeed, the results indicated that female students had a substantially higher performance expectancy of gamification acceptance than male students. This finding is consistent with prior research (Hamari et al., 2014; Seaborn & Fels, 2015) that found women to be more interested in gamification and more involved in digital environments than males. Furthermore, the research by Tsay et al. (2018) discovered that female students were more involved in gaming than male students. Therefore, the creator of a gamification application should supposedly design it to provide results that make both gender users view it as interesting and have the desire to use it frequently. Furthermore, the lecturer or institution must select a style of gamification that is beneficial and acceptable to both genders.

### **Conclusion**

The study examined students' acceptance of gamification in their learning. According to the findings, students' acceptance of gamification is based on performance expectancy rather than social influence. In the current challenging era caused by the COVID-19 pandemic, it is critical for lecturers and institutions to build an interactive and enjoyable method to ensure the learning session runs smoothly and students do not feel stressed, such as by using gamification approaches. During the COVID-19 pandemic, too much time spent on a computer has been identified as a major contributor to university students' poor mental health, anxiety, and stress (Al-Kumaim et al., 2021). In Malaysia and other developing countries, this gamification strategy is vital. In light of the COVID-19 pandemic, higher education institutions and students are left with little choice but to adapt to e-learning as the only alternative to institutions being forced to close due to the Movement Control Order and government rules.

Lecturers can always use gamification apps like Kahoot and Quizizz that have been proven to enhance student performance. In order to help students, learn more effectively, this platform also saves educators from designing their own gamification platform because not all educators are creative enough to do so. In addition, lecturers should consider the gender of their students while selecting their preferred activities in gamification applications. This is crucial because the study results also confirmed that gender plays a role in gamification acceptance. Females perceived greater social and hedonic benefits from gamification, while males might be more likely to participate in a gamified system because of its utility. Therefore, e educators must choose gamification activities that offer advantages valued by both male

and female students.

### Limitations and Future Studies

There are various limitations to the study that was conducted. The researcher using an online survey to obtain responses from respondents through the convenience sampling technique. This sampling strategy had a higher probability of being susceptible to selection bias. Therefore, it is recommended that future research use probability sampling to collect data to minimize excessive sample error and maximize the value of the study itself. In addition, future research should include an interview session with a possible respondent in order to conduct a more in-depth investigation.

Apart from that, only students with diplomas from Malaysian public higher education institutions were included in this study. As a result, the findings had a limited amount of generalizability. Future research is recommended to include students from other educational levels, such as bachelor's degree students, or observe higher learning education in other countries to obtain a more generalizable outcome. The final point to emphasize is that this study had only two independent variables: performance expectancy and social influence. Future studies can make use of additional variables that are included in UTAUT, such as effort expectancy, in their study.

### References

- Ab Rahman, R., Ahmad, S., & Hashim, U. R. (2018). The effectiveness of gamification technique for higher education students engagement in polytechnic Muadzam Shah Pahang, Malaysia. *International Journal of Educational*, 15(1), 1–16. <https://doi.org/10.1186/s41239-018-0123-0>
- Ahn, L., & Dabbish, L. (2004). Labeling images with a computer game. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 319–326. <https://doi.org/10.1145/985692.985733>
- Al-Kumaim, N., Alhazmi, A., Mohammed, F., Gazem, N., Shabbir, M., & Fazea, Y. (2021). Exploring the impact of the covid-19 pandemic on university students' learning life: An integrated conceptual motivational model for sustainable and healthy online learning. *Sustainability (Switzerland)*, 13(5), 1–21. <https://doi.org/10.3390/su13052546>
- AlAteeq, D. A., Aljhani, S., & AlEesa, D. (2020). Perceived stress among students in virtual classrooms during the COVID-19 outbreak in KSA. *Journal of Taibah University Medical Sciences*, 15(5), 398–403. <https://doi.org/10.1016/j.jtumed.2020.07.004>
- AlMarshedi, A., Wanick, V., Wills, G. B., & Ranchhod, A. (2017). *Gamification and Behaviour*. Springer, Cham. [https://doi.org/10.1007/978-3-319-45557-0\\_2](https://doi.org/10.1007/978-3-319-45557-0_2)
- Alshafi, R., & Mendoza, A. (2020). *Predicting students' intention to use gamified mobile learning in higher education*. The University of Melbourne.
- Asiri, M. J. (2019). Do teachers' attitudes, perception of usefulness, and perceived social influences predict their behavioral intentions to use gamification in EFL classrooms? Evidence from the middle east. *International Journal of Education and Practice*, 7(3), 112–122. <https://doi.org/10.18488/journal.61.2019.73.112.122>
- Awang, Z., Hui, L. S., & Zainudin, N. F. S. (2018). *Pendekatan mudah SEM - Structural equation modelling*. MPWS Rich Resources Sdn. Bhd.
- Barata, G., Gama, S., Jorge, J., & Goncalves, D. (2017). Studying student differentiation in gamified education: A long-term study. *Computers in Human Behavior*, 71, 550–585.

- <https://doi.org/10.1016/j.chb.2016.08.049>.
- Bharati, V. J., & Srikanth, R. (2018). Modified UTAUT2 model for m-learning among students in India. *International Journal of Learning and Change*, 10(1), 5–20.  
<https://doi.org/10.1504/IJLC.2018.089532>
- Browne, K., Anand, C., & Gosse, E. (2014). Gamification and serious game approaches for adult literacy tablet software. *Entertainment Computing*, 5(3), 135–146.  
<https://doi.org/10.1016/j.entcom.2014.04.003>
- Buckley, P., & Doyle, E. (2017). Individualising gamification: An investigation of the impact of learning styles and personality traits on the efficacy of gamification using a prediction market. *Computers & Education*, 106, 43–55.  
<https://doi.org/10.1016/j.compedu.2016.11.009>
- Chao, C.-M. (2019). Factors determining the behavioral intention to use mobile learning: An application and extension of the UTAUT Model. *Frontiers in Psychology*, 10.  
<https://doi.org/10.3389/fpsyg.2019.01652>
- Cheong, C., Cheong, F., & Filippou, J. (2013). Quick quiz: A gamified approach for enhancing learning. *Proceedings - Pacific Asia Conference on Information Systems, PACIS 2013*.
- Chung, C. H., Shen, C., & Qiu, Y. Z. (2019). Students' acceptance of gamification in higher education. *International Journal of Game-Based Learning*, 9(2), 1–19.  
<https://doi.org/10.4018/IJGBL.2019040101>
- Codish, D., & Ravid, G. (2014). Academic Course Gamification: The Art of Perceived Playfulness. *Interdisciplinary Journal of E-Skills and Lifelong Learning*, 10, 131–151.  
<https://doi.org/10.28945/2066>
- Dabraj, F. (2009). The role of gender and age on students perception towards online learning. Case study: Sakarya University, vocational high school. *The Turkish Online Journal of Education Technology*, 8.
- Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011). From Game Design Elements to Gamefulness: Defining "Gamification." *Proceedings of the 15th International Academic MindTrek Conference*, 9–15. <https://doi.org/10.1145/2181037.2181040>
- Eickhoff, C., Vries, A., Harris, C., & Srinivasan, P. (2012). Quality through flow and immersion: gamifying crowdsourced relevance assessments. *Proceedings of the 35th International ACM SIGIR Conference on Research and Development in Information Retrieval*, 871–880.
- Fornell, C., & Larcker, D. F. (1981). Evaluating Structural Equation Models with Unobservable Variables and Measurement Error. *Journal of Marketing Research*, 18(1), 39.  
<https://doi.org/10.2307/3151312>
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate data analysis: A global perspective* (Global Edi). Pearson Education.
- Hamari, J., Huotari, K., & Tovanen, J. (2015). Gamification and Economics. *The Gameful World: Approaches; Issues; Applications;*, 139, 15.  
<https://doi.org/10.7551/MITPRESS/9788.003.0009>
- Hamari, Juho, Koivisto, J., & Sarsa, H. (2014). Does gamification work? - A literature review of empirical studies on gamification. *Proceedings of the Annual Hawaii International Conference on System Sciences*, 3025–3034. <https://doi.org/10.1109/HICSS.2014.377>
- Hartmann, T., & Klimmt, C. (2006). Gender and computer games: exploring Females' Dislikes. *Journal of Computer-Mediated Communication*, 11(4), 910–931.
- Kamaludin, K., Chinna, K., Sundarasan, S., Khoshaim, H. B., Nurunnabi, M., Baloch, G. M., Sukayt, A., & Hossain, S. F. A. (2020). Coping with COVID-19 and movement control order (MCO): experiences of university students in Malaysia. *Heliyon*, 6(October), e05339.

- <https://doi.org/10.1016/j.heliyon.2020.e05339>
- Kapp, K. (2012). *The gamification of learning and instruction: Game-based methods and strategies for training and education*.
- Kiryakova, G., Angelova, N., & Yordanova, L. (2014). Gamification in education. *Proceedings of 9th International Balkan Education and Science Conference*.
- Landers, R. N. (2014). Developing a Theory of Gamified Learning: Linking Serious Games and Gamification of Learning. *Simulation and Gaming, 45*(6), 752–768.  
<https://doi.org/10.1177/1046878114563660>
- Latip, M. S. A., Noh, I., Tamrin, M., & Latip, S. N. N. A. (2020). Students' Acceptance for e-Learning and the Effects of Self-Efficacy in Malaysia. *International Journal of Academic Research in Business and Social Sciences, 10*(5). <https://doi.org/10.6007/ijarbss/v10-i5/7239>
- Latip, M. S. A., Tamrin, M., Noh, I., Rahim, F. A., & Latip, S. N. N. A. (2022). Factors affecting e-learning acceptance among students: The moderating effect of self-efficacy. *International Journal of Information and Education Technology, 12*(2).  
<https://doi.org/10.18178/ijiet.2022.12.2.1594>
- Lister, M. C., & College, H. (2016). Gamification: The effect on student motivation and performance at the post-secondary level. *Issues and Trends in Educational Technology, 3*(2), 1–22. [https://doi.org/10.2458/azu\\_itet\\_v3i2\\_lister](https://doi.org/10.2458/azu_itet_v3i2_lister)
- Shah, M. A. U., Safri, S. N. A., Thevadas, R., Noordin, N. K., Abd Rahman, A., Sekawi, Z., Ideris, A., & Sultan, M. T. H. (2020). COVID-19 outbreak in Malaysia: Actions taken by the Malaysian government. *International Journal of Infectious Diseases, 97*, 108–116.  
<https://doi.org/10.1016/j.ijid.2020.05.093>
- Pedro, L., Vassileva, J., Lopes, A., Praters, B., & Isotani, S. (2015). Does gamification work for boys and girls? An exploratory study with a virtual learning environment. *Proc. Proceedings of the 30th Annual ACM Symposium on Applied Computing*.
- Reijmersdal, E., Jansz, J., Petes, O., & Noort, G. (2013). Why girls go pink: Game character identification and game-players' motivations. *Computers in Human Behavior, 29*(6), 2640–2649.
- Rui, S., Ricardo, R., & Leal, C. (2020). *Social factors influence on accounting students attitude to use games based learning*. <https://doi.org/10.5772/intechopen.95430>
- Salim, N., Chan, W. H., Mansor, S., Bazin, N., Amaran, S., Mohd Faudzi, A. A., Zainal, A., Huspi, S. H., Hooi, E. K. J., & Shithil, S. M. (2020). COVID-19 epidemic in Malaysia: Impact of lockdown on infection dynamics. *MedRxiv*.  
<https://doi.org/10.1101/2020.04.08.20057463>
- Santana, S., Paiva, R., Bittencourt, I., Ospina, R., & Isotani, S. (2016). Evaluating the impacts mars and venue effect on the use an adaptive learning technology for Portuguese and Mathematics. *2016 IEEE 16th International Conference on Advanced Learning Technologies (ICALT), 31–35*. <https://doi.org/10.1109/ICALT.2016.58>.
- Schobel, S., Janson, A., Jahn, K., Kordyaka, B., Turetken, O., Djafarova, N., Saqr, M., Wu, D., Sollner, M., Adam, M., Gad, P., Wesseloh, H., & Leimeister, J. (2020). A research agenda for the Why, What, and How of Gamification Designs: Outcomes of an ECIS 2019 Panel. *Communications of the Association for Information Systems, 46*, 706–721.  
<https://doi.org/10.17705/1CAIS.04630>
- Seaborn, K., & Fels, D. (2015). Gamification in theory and action: A survey. *International Journal Human-Computer Studies, 74*, 14–31.
- Sundarasan, S., Chinna, K., Kamaludin, K., Nurunnabi, M., Baloch, G. M., Khoshaim, H. B.,

- Hossain, S. F. A., & Sukayt, A. (2020). Psychological impact of covid-19 and lockdown among university students in malaysia: Implications and policy recommendations. *International Journal of Environmental Research and Public Health*, 17(17), 1–13. <https://doi.org/10.3390/ijerph17176206>
- Tagoe, M. (2012). Students' perceptions on incorporating e-learning into teaching and learning at the University of Ghana. *International Journal of Education and Development Using Information and Communication Technology (IJEDICT)*, 8(1), 91–103.
- Tan, M., & Hew, K. F. (2016). Incorporating meaningful gamification in a blended learning research methods class: Examining student learning, engagement, and affective outcomes. *Australasian Journal of Educational Technology*, 32(5), 19–34. <https://doi.org/10.14742/ajet.2232>
- Tanouri, A., Kennedy, A.-M., & Veer, E. (2021). A conceptual framework for transformative gamification services. *Journal of Services Marketing*. <https://doi.org/10.1108/JSM-12-2020-0527>
- Tsay, C., Kofinas, A., & Luo, J. (2018). Enhancing student learning experience with technology-mediated gamification: An empirical study. *Computers and Education*. <https://doi.org/10.1016/j.compedu.2018.01.009>
- Vanduhe, V. Z. (2020). Similar With Moodle. *IEEE Access*, 8, 21473–21484.
- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User Acceptance of Information Technology: Toward a Unified View. *MIS Quarterly*, 27(3), 425–478. <https://doi.org/10.2307/30036540>
- Vleeshouwer, J. J. (2015). *Gamification in higher education : factors influencing the usage intensity of a gamified E-learning application*. November.
- Ishak, W. H., & Yamin, F. M. (2020). Student acceptance on game to support teaching and learning. *International Journal of Advanced Trends in Computer Science and Engineering*, 9(3), 2517–2521. <https://doi.org/10.30534/ijatcse/2020/05932020>
- Wehrwein, E., Lujan, H., & Dicarolo, S. (2007). Gender differences in learning style preferences among undergraduate physiology students. *Adv Physiol Educ*, 153–157.
- Zawaideh, F. H. (2017). Acceptance Model for e-Learning Services: A Case Study at Al-Madinah International University in Malaysia. *International Journal of Academic Research in Accounting, Finance and Management Sciences*, 7(2), 14–20. <https://doi.org/10.6007/ijarafms/v7-i2/2785>
- Zimmerling, E., Hollig, C., Sadner, P., & Welpel, I. (2019). Exploring the influence of common game elements on ideation output and motivation. *Journal of Business Research*, 94, 302–312.