Gamification in Online Learning: A Case Study among University Students in Malaysia

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Abstract: Online learning has become compulsory when the world was facing the Covid 19 outbreak. Accordingly, students' engagement and participation during online learning have been a major concern among teachers. By adapting the Technology Acceptance Model (TAM), the present study is carried out to examine influential factors towards the intention to use gamification during online classes. With the use of judgmental sampling, 283 usable responses have been gathered from undergraduate students in Malaysia. Results revealed that 'authentic' positively affects three mediating variables of perceived value (PEU), perceived usefulness (PU) and perceived enjoyment (PE). Additionally, PEU, PU and PE posit positive responses towards the intention to use gamification in online learning. Furthermore, all three mediators also present positive effects in the relationship between authentic and intention to use. Thus, this study affirms the usability of TAM in the online learning context with the extension of authenticity as the external factor and perceived enjoyment as the mediating factor. The results give implications for educators and higher learning institutions to modify their learning outcomes and course content to be more interesting with the usage of online gamification tools. Perhaps, this study gives further insight for future research to apply other external factors, such as knowledge and trust to enrich the study in gamification context.

Keywords: Aesthetic, Gamification, Perceived Enjoyment, Perceived Usefulness, Online Learning

1. Introduction

The world has witnessed huge transformation from traditional learning to online learning since 2020 due to the spread of the Corona Virus disease (Covid 19). The urge to convert the face-to-face teaching and learning process into virtual learning gives a new landscape in the learning process where all the education systems around the world were forced to conduct online learning immediately. As reported by the United Nations Educational and Scientific Council (UNESCO, 2020), around 57 percent which is equivalent to 990 million learners were affected with the closure of schools and institutions around the world. Consequently, almost all academic institutions from primary schools to higher

education institutions had to divert their teaching and learning process from face-to-face to online classes. Thus, at this point, most teachers and educators were forced to apply various online learning tools to ensure the process of teaching and learning would be conducted efficiently. Furthermore, to ensure the alignment between the learners and the objectives of the higher education institutions, the development of digital technologies must go in parallel with the knowledge of the teachers to practice the online educational tools (Galanti et al., 2020). Good services provided by higher education institutions are very crucial to maintain students' satisfaction and then lead to loyalty towards the institution (Mohammed, et al., 2023). Thus, this matter gives huge challenges to all academicians in higher education (Misman et al., 2021) and creates an urgent call to react to this sudden change.

Generally, online learning can be described as an education method conducted through an online medium with the support of the Internet (Bartley & Golek, 2004). The concept of online learning, e-learning and web-based education gives similar meaning where the process of teaching and learning can be conducted at different places using several platforms (Rodrigues et al., 2019). Additionally, online learning gives some flexibility and advantages as it can be conducted anywhere and anytime. It also involves the application of various learning tools that can encourage active participation from students. However, this method of learning also has several drawbacks. For example, activities in online learning can be dull when the students are not actively participating in the class (Nandi et al., 2009). Furthermore, online learning is not able to keep students motivated (Jones & Issroff, 2006) and to stay focused for a long time in large groups of online classes (Nasir et al., 2018). Group communication in the classroom is able to enhance students' performance in the learning process (Kurniawan, et al., 2023). Therefore, there is a need to highlight the online learning issue from a different perspective.

Past studies have found that online learning requires some innovations in preparing the learning materials such as learning media that are aligned with the learning outcomes and objectives of the respective courses (Syarifuddin, et al., 2023). Gamification in online learning is an application of game elements developed as solutions to students' involvement during the online classes (Lorenzo-Alvarez et al., 2019; Terras & Boyle, 2019). This method gives a new experience to students and improves their motivation and learning process (Alshammari, 2020). Past studies also indicate high motivation of learners when they participated in online class gamification with the influence of persuasion (Jayawardena, 2021). Two persuasion outcomes derived in the study that consist of a central route where an individual has a higher involvement in processing the message and peripheral route where an individual engages with superficial analysis due to low motivation, ability and opportunity to process the message (Cacioppo & Petty, 1986; Jayawardena, 2021). Thus, the credibility of gamification contents and the usage of technology are crucial to enhance the motivation of students participating in the online learning process. Furthermore, prior studies indicate the influence of perceived ease of use and perceived usefulness towards the intention to use e-learning (Kashive & Mohite, 2022). However, there is a dearth of research to understand this matter from the perspective of aesthetic and perceived enjoyment towards online learning gamification. Prior studies indicated that the gamification decision was influenced by other factors of perceived enjoyment (Khan, 2015) and aesthetic (Palmer, 2021). These two factors are considered important variables in gamification decision-making. Thus, the present study was conducted to measure the influence of aesthetic and perceived enjoyment by extending the Technology Acceptance Model towards the intention to use online learning among university students in Malaysia. The outcome of this study can enrich the existing literature to understand the gamification concept in online learning from different perspectives.

2. Literature Review

2.1 Technology Acceptance Model

Past literature predicted the intention in adopting a particular technology or assessing its usage derived from the Technology Acceptance Model (TAM) by Davis (1989). TAM was developed from the theory of Reasoned Action (TRA) that explained people's behaviors were influenced by their attitude and subjective norms that affect their intention (Ajzen & Fishbein, 1980). Based on this theory, people believed that their intention to behave was executed based on their willingness, which is called attitude or from others' thoughts that can formulate their behavior, a subjective norm. TAM was developed to discover the process of accepting the usage of technology by understanding the behavior of technology

users and providing theoretical explanations on the technology implementation. Thus, by extending the theory of Reasoned Action (TRA) from Ajzen and Fishbein (1980), this model expected the intention of people to use one technology based on two influential factors that consist of perceived ease of use and perceived usefulness. Perceived ease of use can be described as the "degree to which a person believes that using a particular system would be free from effort" meanwhile perceived usefulness is defined as the "degree to which a person believes that using a particular system would enhance their job performance" (Davis, 1989). The construction of these influential factors are affected by several external variables that were explored by Venkatesh and Davis (1996) that comprise subjective norms derived from beliefs on how important others want a person to behave and social norms, which are shared standards formed in a group's behavior. In the context of gamification in online learning, the present study attempts to examine the influence of external variables from the perspective of aesthetic towards these two variables; perceived ease of use and perceived usefulness. Furthermore, this study also incorporates perceived enjoyment in the existing relationship to examine whether it can affect the intention to use gamification in online learning.

2.2 Direct Relationships

Aesthetics consist of sensory elements and contemplative elements. The sensory elements can be categorized as graphics, sound, haptic, themes and motifs, meanwhile the contemplative elements consist of narrative, story arc and character development (Ferrara, 2013). Aesthetics are related to the individual's impression regarding visual appearance of an interface (Rosmansyah et al., 2020). The aesthetics interface design is able to create high implications on learners' motivation towards the usage of online instructional information systems (Farhan et al., 2019). Prior studies indicate that the online learning process received lack of engagement from the learners due to unattractive interface design (Korableva et al., 2019; Maloshonok & Terentev, 2016). Apparently, a creative aesthetic design can enhance the users' acceptance towards online courses (Farhan et al., 2019; Korableva et al., 2019). With regards to the context of gamification in online learning, aesthetic design can attract the students to actively participate in their online courses effectively. Thus, this factor contributes as the external factor in the TAM model. According to TAM, the mutual relationship between external variables and perceived ease of use and perceived usefulness can affect the behavior of people to accept those technologies (Hong & Yu, 2018). Thus, the present study attempts to extend the TAM construct by examining the influence of aesthetics towards three variables that consist of perceived ease of use, perceived usefulness, and perceived enjoyment. Therefore, the following hypotheses were constructed:
H1: Aesthetic positively affects perceived ease of use.
H2: Aesthetic positively affects perceived usefulness.
H3: Aesthetic positively affects perceived enjoyment.

TAM postulates positive influence of perceived ease of use (PEU) and perceived usefulness (PU) on attitude towards using a technology and later affects the intention to use that technology and its usage (Davis, 1989). With regards to the context of online learning, these two factors (PEU and PU) positively affect undergraduate students' attitude to accept online learning in Vietnam (Thi, et al. 2022). It was found that online learning creates positive values to students in terms of knowledge-derived and achieving the learning outcome of the courses. Similarly, these relationships also positively correlated among postgraduate students to accept the online education system in India where perceived usefulness was found as the stronger predictor as compared to perceived ease of use (Sinha and Bag, 2022).In addition, prior studies have examined direct influence of perceived ease of use and perceived usefulness towards intention to use gamification in online learning (Naeini & Balakrishnam, 2012). Thus, following justification of past studies, this study hypothesized:
H4: Perceived ease of use positively affects intention to use.
H5: Perceived usefulness positively affects intention to use.

Perceived enjoyment can be described as the degree of computer-usage activities that are seen as enjoyable, which is excluded from any predicted performance results (Park et al, 2012). This factor is a basis of intrinsic motivation that creates a feeling of fun while using information technology or systems. Based on TAM, perceived enjoyment was commonly used as the external variable that

significantly impacted perceived ease of use, perceived usefulness, and intention to use the information system (Chang et al, 2017). Whether perceived enjoyment positively affects the intention to use gamification in online learning is yet to be explored. Therefore, the following hypothesis was developed:
H6: Perceived enjoyment positively affects intention to use.

2.3 Mediating Relationships

According to Davis (1989), perceived ease of use and perceived usefulness directly influence the intention of people to use technology. Later, the formation of this model is being expanded to become TAM2 that incorporates various external factors on the existing relationship (Venkatesh & Davis, 1996). Thus, these external factors directly influence both perceived ease of use and perceived usefulness and later affect the attitude and intention of users to use a technology (Kashive & Mohite, 2022; Sinha & Bag, 2022; Venkatesh & Davis, 1996). The mediating factor of attitude in the relationship between explanatory variables (PEU and PU) and intention to use online education has been examined by part research (Sinha & Bag, 2022). The results of the study showed that attitude positively mediates those relationships. Furthermore, past studies also indicate a positive mediating factor of perceived usefulness in the relationship between enjoyment and satisfaction in the context of applying gamification in e-learning (Kashive and Mohite). Following past justifications, the present study attempts to examine the mediating factor of perceived ease of use, perceived usefulness, and perceived enjoyment in the relationship between aesthetic and intention to use gamification in online learning. Therefore, the following hypotheses were postulated:
H7: Perceived ease of use mediates the relationship between aesthetic and intention to use.
H8: Perceived usefulness mediates the relationship between aesthetic and intention to use.
H9: Perceived enjoyment mediates the relationship between aesthetic and intention to use.

2.4 Conceptual Framework

Figure 1 below presents the conceptual framework derived in this study. This framework examines three direct relationships between aesthetic (independent variable) and perceived ease of use (H1), perceived usefulness (H2) and perceived enjoyment (H3). Furthermore, it predicts another three direct relationships between perceived ease of use and intention to use (H4), perceived usefulness and intention to use (H5) and perceived enjoyment and intention to use (H6). Besides, this framework also examines the mediating role perceived ease of use between aesthetic and intention to use (H7), mediating role of perceived usefulness in the relationship between aesthetic and intention to use (H8) and the mediating role of perceived enjoyment between aesthetic and intention to use (H9).

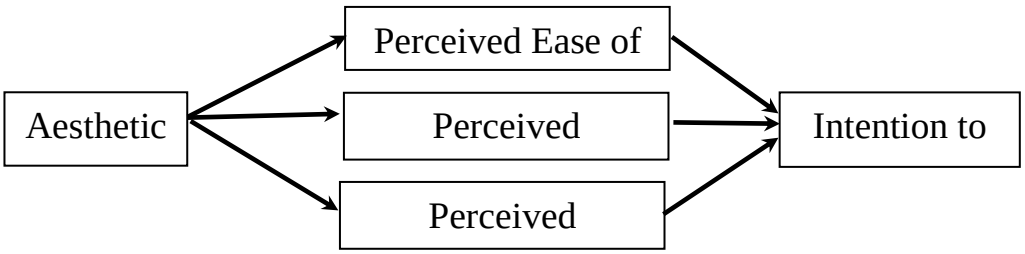

Fig. 1 Conceptual Framework

3. Methods

This study is conducted quantitatively where the instrument used was an online survey distributed to public university students in Malaysia. The judgmental sampling technique under non-

probability sampling was used to gather responses from university students. The question begins with a screening question to filter only students who experienced gamification in their online class. These students were selected to answer all questions in the survey. The choice of judgmental sampling is appropriate as this study only obtained information from specific responses (Cavana et al., 2001) that are best placed to proceed with the data collection procedure. The questionnaire consists of three main sections. The first section relates to screening questions i.e. "Have you ever experienced playing games during your online class?" and the second section relates to the demographic profile of the respondents. The third section was related to multiple-item scales regarding five constructs developed in this study. All items were adapted from past studies and measured using a five-point Likert scale that ranges from 1 (strongly disagree) to 5 (strongly agree). Next, pre-testing was conducted before the final data collection procedure to assess the reliability of the questionnaire. The results of the pre-test required further descriptions of several variables such as aesthetic, perceived ease of use and perceived enjoyment. Later, some descriptions are added and the same respondents are required to answer the revised questionnaire to confirm the reliability of the items constructed. Two expert panels from the field of research methodology and online learning were chosen to examine the items in the instrument to ensure the content validity of the items constructed. Some modifications were made based on the comments derived from both experts.

3.1 Sample Size

With regards to the sample size, this study follows Chin (1998) who used power analysis. G*Power software version 3.1 was used to determine the minimum sample size based on the statistical power analysis (Faul et al., 2007). G*Power analysis was selected as this study uses the Smart Partial Least Squares (Ringle et al., 2015) as a tool for data analysis. Based on three maximum indicators that point to one construct, it was suggested a minimum sample size of 77 was required to achieve power greater than 0.80. Therefore, this study collected 295 responses from public universities in Malaysia. However, only 283 usable responses were derived after the data cleaning processes such as removal of the outliers and straight-lining answers were done. Thus, 283 responses were appropriate for this study since it exceeded the minimum requirement of the G*Power's suggested sample size.

4. Findings and Analysis

The data analysis procedure begins with transferring all data into SPSS software version 22. The frequency of demographic profile was gathered to identify the cluster of the respondents. The data was saved as .csv format to transfer it into the SmartPLS software version 3.7. The structural equation modelling (SEM) approach was used with the SmartPLS software, as the technique of data analysis for this study was to predict the relationship between variables and testing the study hypotheses (Hair et al., 2019). Furthermore, Smart PLS also provides a comprehensive method for examining all relationships between constructs at the same time by using a measurement model and structural model (Henseler et al., 2009). Thus, the selection of this software seems reliable in this study.

4.1 Demographic Profile

Table 1 represents the respondents' demographic profile in terms of gender, age and the year they belong in their study. Overall, 73.1 per cent of the respondents are female, equivalent to 207 respondents. With regards to the age group, the majority of the respondents are between the age of 21 to 24 years old, which is 65 percent that represents 184 respondents. Meanwhile, in terms of the year in university, most of the respondents were from Year 1, which is 48 percent that equals to 136 respondents.

Table 1. Demographic Profile

Demographics	Respondents (n=283)	Percentage (%)
Gender		
Male	76	26.9
Female	207	73.1
Age		
20 years old and below	96	33.9
21-24 years old	184	65
25 years old and above	3	1.1
Year		
Year 1 (Part 1 and 2)	136	48
Year 2 (Part 3 and 4)	75	26.5
Year 3 (Part 5 and 6)	72	25.5

4.2 Common Method Variance

The analysis procedure proceeds with analyzing the common method variance issue as all data were collected from a single source (Mackenzie et al., 2011), which are the students. This study opts for both procedural and statistical remedies suggested by Podsakoff et al. (2003). For procedural remedy, the instrument contains the first page that is related to instruction to respondents and the purpose of this study was conducted with the assurance that all responses were kept confidential and anonymous.The pre-test procedure was done to validate all items to avoid vague and unclear questions (Podsakoff et al., 2003) before the actual questionnaire was distributed to the respondents. In terms of statistical remedy, this study applied the method of full collinearity suggested by Kock (2015). This method assesses the values of variance inflation factor (VIF) for all constructs in the structural model where the value of below 3.3 was viewed as no collinearity issue. Thus, all constructs show VIF values range from 1.00 to 2.845 indicating no collinearity issue in this study.

4.3 Measurement Model

The assessments of the measurement model is divided into internal consistency (reliability), convergent validity (loading ≥ 0.708 and average variance extracted ≥ 0.5), composite reliability (CR), which should be ≥ 0.7 and discriminant validity for the indicators (Hair et al., 2017). Subsequently, the structural model indicates the results of the research hypotheses. The results of the measurement model are presented in Table 2. In terms of cross loading, two items (AE6 and AE8) need to be deleted due to lower loading below 0.708. As for AVE and CR, all constructs recorded the value of higher than 0.5 for AVE and 0.7 for CR confirming the reliability of the measurement model at the item and construct levels.

Table 2. Measurement model

Construct	**Items**	**Loadings**	**CR (>0.7)**	**AVE (>0.5)**
Aesthetic	AE1	0.82	0.954	0.632
	AE2	0.744		
	AE3	0.746		
	AE4	0.744		
	AE5	0.82		
	AE7	0.746		
	AE9	0.852		
	AE10	0.751		
	AE11	0.803		
	AE12	0.847		
	AE13	0.799		
	AE14	0.851		
Perceived	PE1	0.921	0.938	0.834

Construct	Items	Loadings	CR (>0.7)	AVE (>0.5)
Enjoyment	PE2	0.922		
	PE3	0.896		
Perceived ease of use	PEU1	0.903	0.935	0.828
	PEU2	0.914		
	PEU3	0.913		
Perceived usefulness	PU1	0.901	0.943	0.805
	PU2	0.908		
	PU3	0.871		
	PU4	0.908		
Intention to use	UI1	0.933	0.933	0.875
	UI2	0.938		

Subsequently, discriminant validity was assessed based on the HTMT criterion suggested by Henseler et al. (2015) and Franke and Sarstedt (2019). A stricter criterion is denoted by an HTMT value of ≤ 0.85, whereas a lenient criterion is denoted by ≤ 0.90. Table 3 shows that all the HTMT values were lower than ≤ 0.85; hence, it can be deduced that the five constructs are easy to understand by the respondents and the measurement items for all constructs are valid and reliable.

Table 3. Discriminant Validity

	Aesthetic	Intention to use	Perceived ease of use	Perceived usefulness	Perceived enjoyment
Aesthetic					
Intention to use	0.695				
Perceived ease of use	0.768	0.71			
Perceived usefulness	0.78	0.712	0.846		
Perceived enjoyment	0.793	0.69	0.781	0.755	

4.4 Structural Model

Next, the structural model was assessed to determine the accuracy of the research model's estimations as well as the significance of the hypothesized variables' relationships. According to Hair et al.'s (2019) suggestion, the path coefficients, standard errors, t-values, and effect size (f^2) of the structural model were tested through a bootstrapping procedure of 5,000 samples. R^2 values of 0.26, 0.13 and 0.02 indicate substantial, moderate, and weak explanatory power of the model (Cohen, 1992). Thus, the results in Table 4 revealed R^2 value of 0.506, 0.529 and 0.542 representing 50.6 per cent of the variance in perceived ease of use (PEU), 52.9 percent of the variance in perceived usefulness (PU) and 54.2 percent of the variance in perceived enjoyment (PE) is explained by aesthetic (AE). With regards to intention to use (UI), the results of R^2 showed 46.8 percent of the variance is explained by all three mediators (PEU, PU and PE) and thus presented substantial explanatory power of the model for all constructs.

As for the effect size (f^2), the values of 0.02, 0.15 and 0.35 represent small, medium, and large (Cohen, 1992). Thus, the results showed that aesthetic exerts a large effect on all three variables of perceived ease of use (PEU) ($f^2 = 1.029$), perceived usefulness ($f^2 = 1.129$) and perceived enjoyment ($f^2 = 1.192$). In contrast, those three variables (PEU, PU and PE) exert a weak effect on intention to use with $f^2 = 0.034$, 0.057 and 0.054. For assessing the study hypotheses, the cut-off t-value of one-tailed test for 5% (a = 0.05) significant level is 1.645 (Ramayah et al., 2018). Table 4 showed a summary of the hypothesised relationships among the constructs. Aesthetic positively affects perceived ease of use

(β= 0. 712, t = 21.428, p < 0.01), perceived usefulness (β= 0. 728, t = 23.799, p < 0.01) and perceived enjoyment (β= 0.737, t = 21.747, p < 0.01). Thus, H1 H2 and H3 were supported. Additionally, perceived ease of use (β= 0.226, t = 2.896, p < 0.01), perceived usefulness (β= 0.286, t = 3.607, p < 0.01), and perceived enjoyment (β= 0.25, t = 3.364, p < 0.01), also significantly affect intention to use and thus H4, H5 and H5 were accepted.

Table 4. Direct Relationship

Hypothesis	Relationship	β	SE	*t*-value	LL	UP	f^2	Decision	R^2
H1	AE -> PEU	0.712	0.033	21.428	0.658	0.765	1.029	Supported	0.506
H2	AE -> PU	0.728	0.031	23.799	0.669	0.773	1.129	Supported	0.529
H3	AE -> PE	0.737	0.034	21.747	0.676	0.788	1.192	Supported	0.542
H4	PEU -> UI	0.226	0.078	2.896	0.094	0.352	0.034	Supported	0.468
H5	PU -> UI	0.286	0.079	3.607	0.162	0.422	0.057	Supported	
H6	PE -> UI	0.25	0.074	3.364	0.123	0.363	0.054	Supported	

Mediating hypotheses were examined by bootstrapping the indirect effect with 5000 resamples as suggested by Preacher and Hayes (2008). Table 5 presents a summary of all three mediating relationships. Overall, perceived ease of use (β= 0. 161, t = 2.865, p < 0.01), perceived usefulness (β= 0.208, t= 3.656, p < 0.01) and perceived enjoyment (β= 0. 185, t = 3.352, p < 0.01) mediate the relationship between aesthetic and intention to use. In addition, the 95% confidence intervals bias-corrected shows intervals extending over 0, which confirmed these results, and thus H7, H8 and H9 were supported.

Table 5. Mediating Relationship

Hypothesis	Relationship	β	SE	*t*-value	LL	UP	Decision
H7	AE->PEU->UI	0.161	0.056	2.865	0.059	0.281	Supported
H8	AE->PU->UI	0.208	0.057	3.656	0.121	0.357	Supported
H9	AE->PE->UI	0.185	0.055	3.352	0.068	0.288	Supported

5. Discussion and Conclusion

The objectives of the study are to examine the influence of aesthetic (AE) on three variables that consist of perceived ease of use (PEU), perceived usefulness (PU) and perceived enjoyment (PE). Then, these three factors (PEU, PU and PE) are measured towards the intention to use gamification in online learning. Additionally, three mediating factors (PEU, PU and PE) have been assessed between the relationship of aesthetic and intention to use. Therefore, the results revealed that all direct relationships (AE-PEU, AE-PU and AE-PE) were positively correlated and thus all three hypotheses (H1, H2 and H3) were accepted. The results of the study ascertain the validity of aesthetics as the external factors in TAM. Thus, the outcomes of this study provide valuable insight to the existing literature on the interface design gamification to attract users' engagement in online learning classes. This is aligned with past studies that indicate a good aesthetic design can enhance the users' acceptance towards online courses (Farhan et al., 2019; Korableva et al., 2019).

Additionally, this study also measured the direct relationship between perceived ease of use and intention to use gamification in online learning. As expected, this relationship is found positively correlated and supports the H4. The results are associated with past studies in the context of online learning (Naeini & Balakrishnam, 2012; Thi, et al. 2022). Hence, the application in gamification should contain elements of simplicity, flexibility, and ease to understand to encourage the learners'

participation in online class. Furthermore, this study also found a positive relationship between perceived usefulness and intention to use and thus H5 was supported. As suggested by Sinha and Bag (2022), perceived usefulness is the stronger predictor in applying online education system in India. Therefore, it is proved that online learning can be more effective when the teachers apply gamification in their courses. The students' engagement and participation increase dramatically when they learn through gamification (Thi, et al. 2022). Thus, it is suggested that teachers should improvise their learning contents that suit gamification criteria to ensure the course delivery can be more efficient and effective with the engagement of a participative group of students. Moreover, this study also measures a direct relationship between perceived enjoyment and intention to use gamification in online learning. The results revealed positive correlation in this relationship and thus supporting H6. This finding affirms the incorporation of perceived enjoyment in the TAM model in the context of using gamification in online learning. The basic intrinsic motivation, which is enjoyment while playing gamification in online learning certainly gives new experience to learners. The enjoyment creates a pleasure feeling when an individual completes a task using a technology and not affecting the performance results (David et al, 1992).

Furthermore, this study also found a positive relationship in three mediating factors (PEU, PU and PE) in the relationship between aesthetic and intention to use gamification in online learning. Therefore, H7, H8 and H9 were supported. The findings draw the attention of future literature to consider these variables as mediators besides attitude in using the technology.

Overall, the findings of the study affirm the utilization of TAM in measuring the intention of using gamification in online learning with additional new variables. Despite the existing variables of perceived ease of use and perceived usefulness, these findings demonstrate a crucial role of aesthetic and perceived enjoyment in applying gamification in online learning. Therefore, teachers should understand the gamification features and align their course content to ensure that the process of online teaching and learning can be conducted efficiently with full enjoyment. Therefore, active engagement from the students can increase their understanding of the course contents and performance in the class.

6. Limitations and Future Research Directions

This study was conducted by highlighting the aesthetic factor as an external factor that influences perceived ease of use and perceived usefulness in applying gamification in online learning. It is recommended that future studies can expand the external factors from the perspective of teachers in terms of their knowledge, trust and relevance using these online tools (gamification). Furthermore, the present study was conducted quantitatively where the respondents were university students. Thus, to get more insight for this research context, future studies can apply qualitative methods and focus groups to get reliable responses from the perspective of teachers. By conducting an interview and having a focus group, robust data can be collected and this will give more insight for future literature. Besides, the present study was conducted in public universities in Malaysia, thus it is suggested for future research to conduct a study on private universities to get more insight in this research context. Private institutions in Malaysia have different teaching and learning environments as compared to public universities , hence further research in this context may be needed

7. Co-Author Contribution

The authors have declared that there is no conflict of interest in this article. Author 1 and 2 have conducted analyses of the article, writing the analysis, discussion of the findings, conclusion, and recommendations sections. The other authors have carried out the data collection, formatting and were responsible for the critical revision of the write up for submission of the final manuscript.

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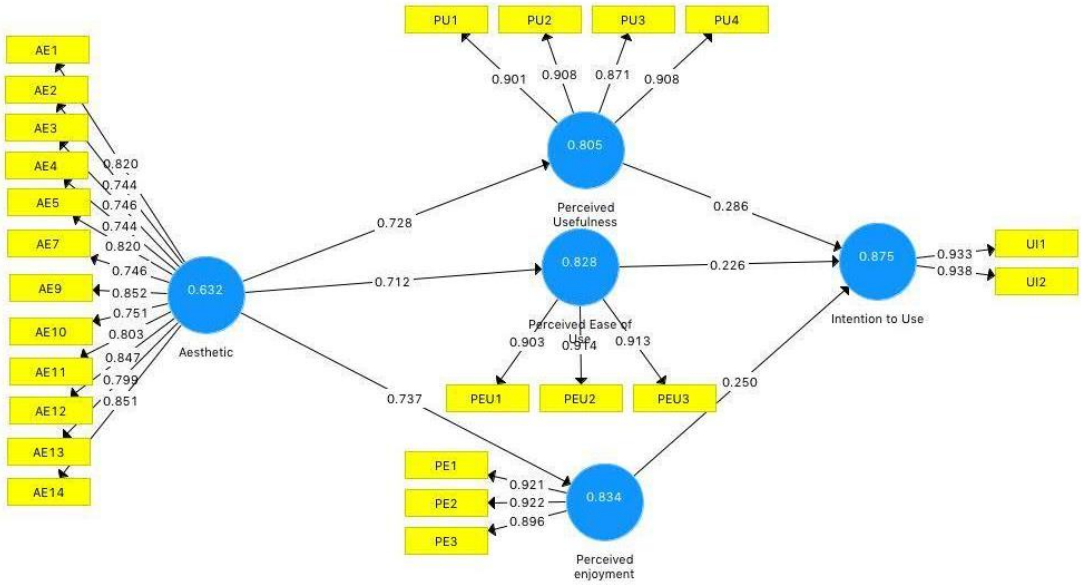
10. Appendix A



Appendix A Measurement Model