

GAMIFICATION AT UNIVERSITI MALAYSIA SABAH: A CASE STUDY OF ENHANCING ENGLISH AMONG UNDERGRADUATE STUDENTS

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ABSTRACT

In general, the term gamification is defined as the use of game facets in non-game contexts. This study aims at investigating undergraduate students' perception on gamification as an alternative platform to facilitate their language learning processes as well as their acceptance of gamification according to gender. The psychometric properties of a questionnaire on the acceptance of gamification (PLE) particularly in terms of its validity and reliability were also examined in this study. Confirmatory factor analysis (CFA) was performed to test the reliability and validity of the measurement model by looking at the results of composite reliability, average variance extracted, and standardized loadings of the construct measures. Goodness-of-fit indices of the measurement model were also examined. The results of the study have shown that users of PLE were positive towards its usefulness in assisting their language learning and enhancing their performance, and confident of its ease of use. In general, the users have positive attitudes towards using PLE in language learning and they showed positive intention in using gamification in their future language learning. It is believed that this study would not only provide a good understanding of the undergraduate students' acceptance of gamification in learning, but also shed light to the understanding of the future game use of these students. Therefore, it is recommended that gamification (PLE for instance) could be applied at the tertiary level in order to gamify educational contexts as one of the methods to make learning more interesting, motivational, and less conventional; and to promote autonomy and that learning does not remain within the boundaries of the classroom.

Keywords: Gamification, language learning, Structural Equation Modeling

INTRODUCTION

In this era of digital age, it is undeniable that technology has become an integral part of education. According to Prensky (2001), today's students (which he called as *Digital Natives* because they have spent their entire lives using and surrounded by computers, video games, cell phones and the Internet) learn in different ways as of their predecessors (who are the *Digital Immigrants* that were not born into the digital world but have engaged in the new technology at some later point of their lives) and that their thinking pattern has changed. Therefore, Prensky (2001) has stressed that the same methods which worked for the teachers when they were students will not work for their students now. Consequently, he urged that the only way for the Digital Immigrant teachers to reach their Digital Native students is to change their methodology in teaching and content by using their students to guide them (Prensky, 2001). According to Nomass (2013), the conventional teaching methods are teacher-centred, not exciting and motivating in general, and slower than the modern technical ways for learning language. In Nomass's (2013) case study, majority of the sample preferred the use of technology in language learning, in particular using the computer to improve their four language skills which are listening, speaking, reading, and writing. This further supports Prensky's (2001) claims and indicates that educators should embrace technology in education in order to create more meaningful learning experience for today's learners.

Although video games has become increasingly sought-after as a form of entertainment since the 1970s and 80s, education researchers have found some great potentials of video games for positive educational purposes (Domínguez, Saenz-de-Navarrete, de-Marcos, Fernández-Sanz, Pagés, & Martínez-Herráiz, 2013). The exploration has gone beyond using video games to educate because some emphasis has been put on the concept of applying positive aspects of video games to non-gaming contexts; and this concept is referred to as 'gamification' (Domínguez et al., 2013). Gamification is an idea that is applied in many fields and it is not exclusive of education solely. In general, the term gamification is defined as the use of game facets in non-game contexts (Domínguez et al., 2013; Deterding, Dixon, Khaled, & Nacke, 2011). Since the 1990s, the potential of computer games for teaching and learning has been increasingly recognized and researched (Steiner, Kickmeier-Rust, & Albert, 2009). According to Godwin-Jones (2014), there has been an increase in the interest in making learning as meaningful and authentic as to learners' real life, and also in informal learning. These have been reflected through the growing interest in

using digital games for language learning which coincides with the proliferation of multiplayer online gaming and also mobile games (Godwin-Jones, 2014).

The Role and Rationale of Gamification in Tertiary Education System

According to Huotari and Hamari (2012), Gamification refers to a learning design that provides a game-like experiences to users, usually with the expected-goal of reinforcing positive user behaviour. Briefly, gamification differs from other pedagogical approaches in the following strategies: (1) Gamification attempts to afford and create experiences reminiscent of games, involving a sense of flow, and feelings of mastery and autonomy (2) Attempts to increase motivation among learners (Oinas-Kukkonen & Harjumaa, 2009) (3) Gamification refers to adding ‘gamefulness’ to current existing systems rather than building an entirely new game as is done with ‘serious games’.

Incorporating appealing games for educational purposes can stimulate students’ motivation and thus activate their learning of topics which they may not have interest in formerly (Heeter & Winn, 2007). In a study conducted by Reinders and Wattana (2014) with a sample of 30 Thai learners of English as a foreign language at a university in Thailand, they examined the effects of participating in an online game on learners’ willingness to communicate in English. Their findings revealed that digital game environment made students to interact more willingly in English, less anxious, and felt better about their ability to use English than the classroom environment. These are some of the advantages that gamification could offer to education. Meanwhile, in a 12-month exploratory study on second language (L2) gaming with a sample of 153 Year 1 Chinese-speaking undergraduates in an English-medium Hong Kong university, Chik (2014) discovered that learner autonomy facilitates language learning through language gaming. She pointed out that L2 learning is not totally incidental in gaming environment because learners learned L2 through written and social interaction in the gaming community and they apply language learning strategies learned from class to their gaming environment, which indicates a development of autonomy.

This implies that gaming has the potential to construct L2 learning experience. As Godwin-Jones (2014) stated:

The fact that digital gaming plays a central role in the lives of a good many young people today provides a rich opportunity to connect with populations who may have limited interest in formal education. If language learning can be tied to popular forms of gaming in a way that does not inhibit its enjoyment, that's a winning situation both for students and educators. (p.9)

Heeter and Winn (2007) suggested four attributes that should be incorporated in games intended for learnings:

- i) Strongly engaging both females and males;
- ii) Accommodating diverse play style preferences;
- iii) Providing necessary support for users with limited gaming experience; and
- iv) Inculcating deep learning through play.

Having said that, the fundamental concern lies in the actions taken by students while playing games because these actions unfold the learning experience and players create their individual game experience by the actions they make (Heeter & Winn, 2007). On top of that, "players' freedom of action is also freedom of inaction" (Heeter & Winn, 2007, p. 167). Consequently, it is important for teachers to explain the learning goals and also to give clear instructions to students before playing the games so that students are aware of what is expected from them; because an unmotivated player will likely learn little or nothing if he/she just goes through the games without caring to figure out the goals and rules. Moreover, Chik (2014) stressed that educators should provide instructions and assistance for learners on how to use language games to learn autonomously as a way to promote awareness among learners in realizing their ability to turn their leisure gaming sessions into learning practices. Thus, it can be concluded that it is not merely shifting the burden from the subject teacher to the game designer for motivating players to become engaged with the game as pointed out by Heeter and Winn (2007).

Problem Statement

English language has been widely used as an international language by non-native speakers across the globe for many years and its importance is

generally acknowledged. In Malaysia, English has become a second language for many people after Malaysia achieved her independence (Jamaliah Mohd Ali, 2000). According to Darmi and Albion (2013), Malaysian learners have long exposure to learning English in both primary and secondary school levels and the Communicative Language Teaching (CLT) approach has been used in the English language curriculum since 1974 as an approach to engage learners in meaningful interaction. CLT is an approach that aims to prepare learners “to use the new language in speech and in writing for a variety of purposes and in a range of contexts” (Lewis, 2002, p. 40). The scenario has gone worse when undergraduates need to obtain a pass in English courses in local university in order to graduate. Despite the fact that English being made the compulsory subject schools and university, having poor command of the English language and lack of ability to communicate are still among the key factors why local graduates fail to secure jobs (Borneo Post Online, March 4, 2014). Darmi and Albion (2013) pointed out that there is a gap between school and university classrooms which has differentiated the language learning process, particularly to those of rural areas due to lack of exposure, seeing no purpose of communicating in English, etc. In pursuing their studies at the tertiary level, these students would feel nervous, uneasy, worry and lack of confidence for having difficulty to speak in English; and as a result, they tend to be passive in class as they are aware of their limited command of English as compared to their more proficient peers. Thus, the language anxiety experienced by students, less proficient students in particular, has stalled them from being active learners in tertiary classrooms as they constantly feel uneasy in learning and thinking in the English language (Darmi & Albion, 2013). This indicates that it is important for less proficient learners to overcome their anxiety and develop a positive attitude for meaningful language learning to occur at the tertiary level.

Apart from the CLT approach, various approaches and strategies have been applied and examined in enhancing English language learning, and that is inclusive of technology and gamification. As technology has been an integral part of everyday life, there is a need to utilise the gadgets and digital games that are close to the heart of the learners in language learning. Gamification studies have shown that motivation and interest can be increased and learning can be inculcated through play (Chik, 2014; Godwin-Jones, 2014; Heeter & Winn, 2007; Reinders & Wattana, 2014). While there has been extensive research on gamification, determinants of gamification usage and acceptance have not been abundant, especially within a tertiary education system in Malaysia. To address this concern, this study aims to

examine the acceptance of gamification and undergraduate students' perception on gamification as an alternative platform to facilitate their language learning.

Research Objectives

The psychometric properties of a questionnaire on the acceptance of gamification (PLE) particularly in terms of its validity and reliability will be gauged in this study. This study also aims at investigating undergraduate students' perception on gamification as an alternative platform to facilitate their language learning processes as well as their acceptance of gamification according to gender.

Research Questions

- i) What are the psychometric properties of a questionnaire on the acceptance of gamification (PLE) particularly in terms of its validity and reliability?
- ii) To what extent undergraduate students perceive gamification as an alternative platform to facilitate their language learning processes at the tertiary level?
- iii) Is there a significant difference in students' acceptance of gamification in facilitating their language learning processes at the tertiary level according to gender?

Definition of Terminologies

i. Gamification

Gamification is an idea that is applied in many fields and it is not exclusive of education solely. In general, the term gamification is defined as the use of game facets in non-game contexts (Domínguez, et al., 2013; Deterding, Dixon, Khaled, & Nacke, 2011). In the context of this study, gamification refers to a package called Play to Learn English (PLE) which consists of five games selected by the course instructor with the aim of helping the participants to practise and enhance their English language proficiency on top of other face-to-face or non-face-to-face language learning activities.

ii. Perceived Ease of Use

Perceived ease of use is the degree to which an individual believes that using a particular system would be free of physical and mental effort.

iii. Perceived Usefulness

Perceived usefulness is based on expectancy theory which is concerned with an individual's beliefs in the decision making process (Fishbein & Ajzen, 1975). Perceived usefulness is the degree to which an individual believes that using a particular system would enhance his or her performance.

iv. Attitude Toward Using

Attitude toward using is the user's evaluation of the desirability of his or her using the system (Mathieson, 1991). The attitude toward using is an individual's positive or negative feelings about performing the target behaviour (Davis et al., 1989).

v. Behavioural Intention to Use

Behavioural intention is a measure of the strength of one's intention to perform a specified behaviour.

vi. Perceived Usage

Igbaria et al. (1995) defined perceived usage as the amount of time interacting with a technology and the frequency of use. Actual usage, as originally conceptualized in the Davis et al. (1989) study, was measured by the frequency of use and the length of time of use.

LITERATURE REVIEW

Technology Assimilation

Assimilation is defined as the extent to which the use of a technology diffuses across organizational processes or society and becomes an integral part of the tasks associated with those processes (Cooper & Zmud, 1990; Fichman & Kemerer, 1999). Many researchers have focused on the importance of the causality between the organizational adoption of an information technology and its impacts on business performance (DeLone & McLean, 1992; Jarvenpaa & Ives, 1991; Sethi & King, 1994). There have been numerous studies in the past twenty years on the adoption and assimilation of information technologies. Fichman and Kemerer (1999) suggest that information technologies exhibit an assimilation gap, where their rates of organizational assimilation trail behind their rates of organizational adoption. Swanson (1994) purported a taxonomy of IS innovations where he suggests that information technologies follow three different pathways of organizational adoption: type 1 innovations (to

enhance the efficiency of the IS function), type 2 innovations (to enhance the efficiency of administrative functions in the organization), and type 3 innovations (to enhance the competitiveness of the organization).

Technology Acceptance Model

Significant progress has been made over the last decade in explaining and predicting user acceptance of information technologies. In particular, substantial theoretical and empirical support has accumulated for the Technology Acceptance Model (TAM) (Davis et al., 1989). Numerous studies have found that TAM is a model that consistently explains a substantial proportion of variance in usage intentions and behaviour among a variety of technologies. It is also found that TAM perform well against alternative models such as the Theory of Reasoned Action (TRA) and the Theory of Planned Behaviour (TPB) (Mathieson, 1991; Sun, 2003). TAM theorizes that an individual's behavioural intention to use a technology is determined by two beliefs: perceived usefulness and perceived ease of use. TAM has become a well-established and robust model for predicting user acceptance. TAM is one of the most influential research models in studies of determinants of information systems/information technology acceptance (Chau, 1996).

The Technology Acceptance Model (TAM) is an adaptation of TRA specifically tailored for modeling user acceptance of information systems (Davis et al., 1989). The model provides a basis for tracing the impact of external factors on internal beliefs, attitudes, and intentions (Davis et al., 1989). The two main constructs of TAM are perceived usefulness and perceived ease of use (Figure 1). Perceived usefulness is defined as the extent to which a person believes that using a technology will be free of effort. TAM posits that behavioural intention determines actual system use and behavioural intention is determined by both attitude and perceived usefulness. Perceived usefulness and perceived ease of use both have an effect on behavioural intention. Perceived ease of use also affects perceived usefulness. Behavioural intentions are influenced directly by external variables through perceived usefulness and perceived ease of use. The relative strength of the usefulness-usage relationship versus the ease of use-usage relationship was a significant finding and particularly important for designers. Users need to perceive the systems as being useful or they will not attempt to use it regardless of how easy or difficult it is to use. Ease of use is less important because difficulty in using a system can be overcome if the user thinks that the system will be useful to them.

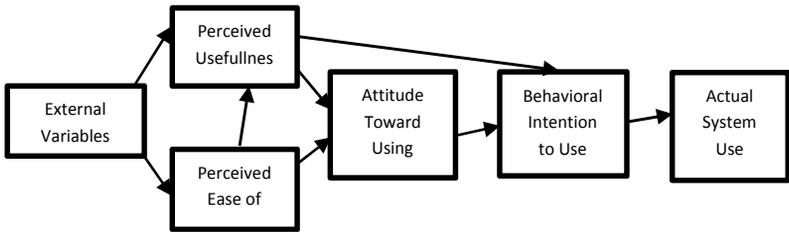


Figure 1: Technology Acceptance Model (TAM)

Previous Studies on Technology Acceptance

i. Perceived Ease of Use

Perceived ease of use has been found to influence usefulness, attitude, intention, and actual use (Chau, 1996). Davis et al. (1989) found that perceived ease of use directly and indirectly affects usage through its impact on perceived usefulness through the attitude toward using the internet. Chau's study revealed that perceived ease of use significantly affected near-term usefulness, but did not significantly affect intention to use. Venkatesh and Davis (2000) found that TAM2 retains perceived ease of use from TAM as a direct determinant of perceived usefulness.

ii. Perceived Usefulness

Davis (1989) found that the relationship between perceived usefulness and usage was stronger and more consistent than other variables reported in prior studies. Individuals evaluate the consequences of their behaviour in terms of perceived usefulness and base their choice of behaviour on the desirability of the usefulness (Chau, 1996). Usefulness has been confirmed to be the most important factor affecting user acceptance with few exceptions (Sun, 2003).

iii. Attitude Toward Using

Sun (2003) found that attitude is not a reliable predictor of behaviour to use or usage. Although many studies have focused on behaviour rather than attitude as an indicator of user acceptance, Mathieson found that attitude construct was statistically valid for explaining intention to use, comparing the Theory of Planned Behaviour with the TAM. Taylor and Todd (1995) found that attitude is not a significant determinant of behavioural intention although the relationship between attitude and behavioural intention is more significant for experienced users. Chau and Hu (2001) found perceived

usefulness to be a significant determinant of attitude as well as behavioural intention. These findings show that users are likely to have a positive attitude if they believe that usage of a technology will increase their performance and productivity.

iv. Behavioral Intention to Use

Sun reports that behavioural intention is a good predictor of actual usage of a technology which has received numerous empirical support from prior studies (Davis et al., 1989; Taylor & Todd, 1995; Venkatesh & Davis, 2000). One of the conclusions of the study by Davis et al. (1989) was that people's computer use can be predicted reasonably well from their intentions (1989). Therefore, any factors that influence behaviour are indirect influences through behavioural intention (Davis, 1989). The results of Taylor and Todd's study of inexperienced and experienced users confirmed that there is a stronger correlation between behavioural intention and behaviour (usage) for experienced users (1995).

v. Perceived Usage

Igbaria et al. (1995) found strong relationships with behavioural intent to use the technology. Igbaria et al. (1997) found that individuals are likely to use a system if they believe it is easy to use and will increase their performance productivity.

Previous Studies on the Differences in Technology Acceptance According to Gender

With regard to gender differences, it is important to understand this aspect in learners concerning their attitude and acceptance towards game-based learning because computer games are generally acknowledged to be dominated by males, and hence this brought up the question on whether implementing game-based learning would benefit the females (Steiner et al., 2009). As Steiner et al. (2009) pointed out, males and females differ in their general attitude and usage patterns (level of confidence and duration in handling computers), personality traits (such as the need for achievement, sensation seeking, and social interaction styles), types of game (due to differing preferences and interests), purposes of playing, skills to accomplish the game, and last but not least the game characters and avatar preferences. Due to the aforesaid gender differences, the researchers proposed the adaptation of computer games to gender-sensitive elements for educational purposes in order to enhance students' motivation and learning performances, as well as suggesting more effective game development

which could cater for both gender's needs (Steiner et al., 2009). With regards to the time spent in playing games, the gender gap intensifies with age (Heeter & Winn, 2007). "Boys play 2.8 times longer than girls in middle school, 4.4 times longer in high school and 5.1 times longer in college", and thus Heeter and Winn (2007) predicted that an average male graduate will spend even more time on game play as of his average female classmate by the time he graduates (p.165).

In spite of the aforementioned gender differences, a study involving 858 Flemish secondary school students conducted by Bourgonjon, Valcke, Soetaert, and Schellens (2010) found that the direct relationship between gender and preference for video games is very weak. This finding is opposed to the claims made by previous studies in which they have mentioned in their articles that "explanations for these gender differences are sought in the uses and gratifications theory, in biological determinants, in the violent content of games, in the representation of gender in games and in gender differences in ability" (Bourgonjon, et al., 2010, p. 1148). Nonetheless, the study revealed that the gender effects on the students' acceptance for using video games in the classroom were mediated by experience and ease of use (Bourgonjon, et al., 2010); in other words, the acceptance for using video games in the classroom is not essentially affected by gender directly.

In an online survey conducted among 339 pre-service teachers enrolled at a teaching training institute in a South-East Asian country on their acceptance of technology in their professional work under the TAM framework, its report showed no statistical difference on perceived usefulness, attitudes toward technology, and intention to use technology in education between the male and female students (Teo, Fan, & Du, 2015). With regard to the factor of perceived ease of use in TAM, the female group had statistically lower level responses than the male group, suggesting that the females expect the use of technology in education to be more challenging or more difficult than of the males (Teo et al., 2015). One possible justification that causes this difference may due to one's computer competency in handling computer applications in future education settings (Teo et al., 2015).

METHODOLOGY

Participants

The participants of this study involved 119 undergraduate students (43 males and 76 females) who were chosen via purposive sampling from a university in Sabah, Malaysia. Although the samples were purposively chosen, the samples were drawn from different faculties such as Faculty of Science and Natural Resources, Faculty of Engineering, Faculty of Computing and Informatics, as students registered themselves for an English proficiency course for a semester of their studies. Majority of the sample had low proficiency in English as majority of them obtained a Band 2 (90.76%) in their Malaysian University English Test (MUET), whereas 3.36% obtained a Band 1 and 5.88% with other English proficiency certifications. Therefore, the majority of the MUET Band 2 students were labelled as limited users of the English language because they are described as having “limited commence of language, lacks of fluency and appropriacy, inaccurate use of the language resulting in frequent breakdowns in communication, limited understanding of the language, and limited ability to function in the language” (Rethinasamy & Chuah, 2011, p.245).

Instrumentations

A survey instrument was developed using existing scales from prior Technology Acceptance Model (TAM) instruments and modified them where appropriate. The questionnaire consists of 39 items measuring five dimensions of acceptance of gamification (PLE), namely (1) Perceived Usefulness (PU), (2) Perceived Ease of Use (PE), (3) Attitude toward Using (AT), (4) Behavioural Intention to Use (BI), and (5) Perceived Complexity (PC), which were designed in a 5-point Likert scale with scores of “1” for “Strongly Disagree” and “5” for “Strongly Agree”. Based on the data gathered from the respondents, reliability of the measurement items are further checked via Cronbach’s alpha and the calculation of Composite Reliability (CR) values of each construct, while validity check is performed via calculation of Average Variance Extracted (AVE) of each factor, and standardized item loadings of each measurement items based on the confirmatory factor analysis. After reliability and validity are satisfactory, further analysis can be performed. The resultant instrument can be used in future research to test how undergraduate students adopt and accept gamification in their language learning process at the tertiary level.

Data Collection Procedures

In aligning with the English proficiency course that the participants were taking during the particular semester, a package called Play to Learn English (PLE) was introduced to the participants in class. The PLE is consisted of five games which were selected by the course instructor with the aim of helping the participants to practise and enhance their English language proficiency on top of other face-to-face or non-face-to-face language learning activities. The five games are listed as follows:

- i. English Grammar at <http://freerice.com/#/english-grammar/1936272>
- ii. English Vocabulary at <http://freerice.com/#/english-vocabulary/1540>
- iii. Falling Clouds at <https://www.gamestolearnenglish.com/falling-clouds/>
- iv. Alphabear at <https://play.google.com/store/apps/details?id=com.spryfox.alphabear>
- v. Word Search Puzzle at <https://play.google.com/store/apps/details?id=com.uysal.wordsearch>

In other words, the PLE functioned as follow-up activities for the participants' English language learning. Prior to requesting the participants to engage in the five games daily for at least 10 consecutive days, they were briefed on the PLE in class, and the written instructions were posted on the course's e-learning page for their reference at <https://www.thecn.com/4233143>. At the end of the semester, questionnaires were distributed to the participants for collecting their feedback on using the PLE in learning English.

Data Analysis Procedures

The Structural Equation Modeling (SEM) technique via the Analysis of Moment Structures (AMOS) software version 21 was performed for inspecting the consistency of the measurement instrument with the data through confirmatory factor analysis in terms of item loadings, composite reliability, and average variance extracted. Descriptive statistics (mean and standard deviation) were used to describe undergraduate students' acceptance of gamification (PLE) in facilitating their language learning

processes at the tertiary level. Inferential statistics (independent sample *t*-test) were used to examine if a significant difference exists in students' acceptance of gamification (PLE) in facilitating their language learning processes at the tertiary level according to gender.

RESULTS AND DISCUSSION

Validity and Reliability of the Measurement Model

Confirmatory factor analysis (CFA) was performed to test the reliability and validity of the measurement model by looking at the results of composite reliability, average variance extracted, and standardized loadings of the construct measures (see Table 1 and Figure 2).

Label	Items	Cronbach's Alpha	Standardised Loadings	Composite Reliability (CR)	Average Variance Extracted (AVE)
PU: Perceived Usefulness		.949		0.627	0.949
PU1	Using the PLE can enable me to accomplish tasks/assignments more quickly		.750		
PU2	Using PLE can improve my performance (e.g., grade) in related tasks/assignments		.796		
PU3	Using PLE can make it easier to do my tasks/assignments		.774		

PU4	Using PLE in my tasks/assignments can increase my productivity	.843		
PU5	Using PLE can enhance my effectiveness	.765		
PU6	I find PLE useful in my tasks/assignments	.835		
PU7	PLE helps me to understand a particular topic better and faster	.776		
PU8	PLE encourages me to actively discover new knowledge	.784		
PU9	PLE enables me to learn on my own	.798		
PU10	I am more aware about learning English through games	.727		
PU11	PLE is a useful platform in learning English	.850		
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PE: Perceived Ease of Use		.913	.641	.932
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PE1	Learning to use PLE is easy for me	.785		
PE2	I find it easy to get what I need from PLE	.842		

PE3	My interaction with PLE is clear and understandable	.853		
PE4	I find PLE to be flexible to interact with	.830		
PE5	It is easy for me to become skilful at using PLE	.763		
PE6	I find PLE easy to use	.721		
PE7	I can use PLE whenever I want to	.614		
AT: Attitude toward Using		.949	0.627	0.948
AT1	I have fun interacting with PLE	.762		
AT2	Using the PLE provides me with a lot of enjoyment	.789		
AT3	I enjoy using PLE	.789		
AT5	PLE stimulates my interest to learn	.764		
AT6	PLE increases my motivation to learn	.831		
AT7	PLE makes learning more fun	.886		
AT8	PLE increases my concentration	.799		
AT9	PLE can capture my attention longer	.778		

AT10	PLE makes learning more interesting	.902		
AT12	I enjoy sharing information relating to PLE with my friends	.623		
AT13	The feedback offered by PLE motivates me to continue to progress	.754		
BI: Behavioural Intention to Use		.892	0.694	0.898
BI2	I always try to use PLE in as many occasions as possible	.611		
BI3	I plan to use PLE in the future	.916		
BI4	I intend to continue to use PLE in the future	.954		
BI5	I expect my use of PLE to continue in the future	.808		
PC: Perceived Complexity		.889		
PC1*	Using PLE can take up too much of my time when performing many tasks/assignments	.858		

PC2*	When I use PLE, I find it difficult to integrate the results into my existing task/assignment	.933
PC3*	Using PLE exposes me to the vulnerability of computer breakdowns and loss of data	.769

Note: PU: Perceived Usefulness; PE: Perceived Ease of Use; AT: Attitude toward Using; BI: Behavioural Intention to Use; PC: Perceived Complexity; * negatively-worded items

Reliability tests were performed to check the internal consistency of the variable items to represent their respective constructs via the reading of Cronbach's alpha and composite reliability. Convergent validity of the measurement items was verified by checking the standardized loadings of each factor item, and the construct's average variance extracted. Table 2 and Figure 2 present the final measurement model after deletion of poor loading items by retaining standardized loadings that were satisfactory and statistically significant ($p < 0.001$). Figure 2 illustrates the results of the measurement model.

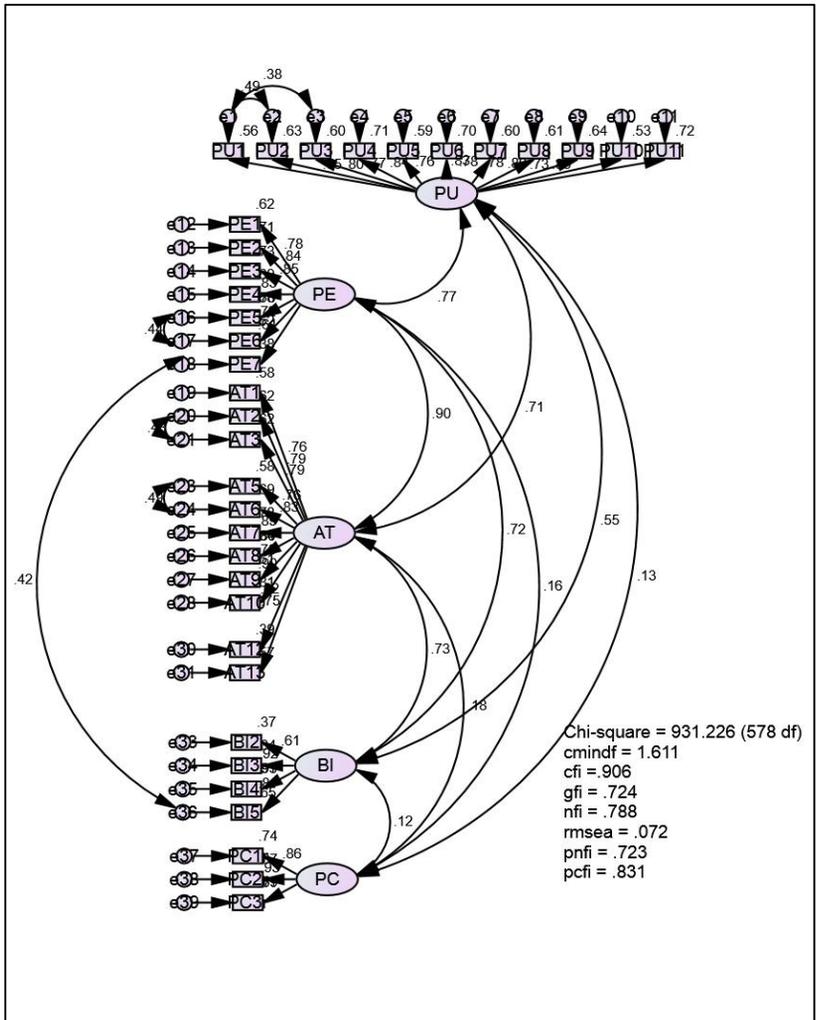


Figure 2. The Measurement Model

Table 2 displays the goodness-of-fit indices of the measurement model such as χ^2 , degrees of freedom, comparative fit index (CFI), goodness-of fit index (GFI), normed fit index (NFI), and root mean square error of approximation (RMSEA), parsimonious normed fit index (PNFI), and

Parsimonious comparative fit index (PCFI) following the recommendations of Bentler (1990), Byrne (2001), and Hair et al. (2010).

Table 2: Goodness-of-fit Indices for the Measurement Model

	χ^2	df	χ^2/df	CFI	GFI	NFI	RMSEA	PNFI	PCFI
Recommended values	N/A	N/A	< 3.0	> 0.9	> 0.9	> 0.9	< 0.08	> 0.5	> 0.5
Model values	931.226	578	1.611	.906	.724	.788	.072	.723	.831

Undergraduate Students' Acceptance of Gamification (PLE)

Table 3: Acceptance of Gamification (PLE)

Scales	N	Mean	SD
Perceived Usefulness	119	4.15	.658
Perceived Ease of Use	119	3.97	.693
Attitude toward Using	119	4.07	.592
Behavioural Intention to Use	119	3.81	.698
Perceived Complexity*	119	3.07	.979

1= Strongly Disagree; 2 = Disagree; 3 = Neither Disagree Nor Agree; 4 = Agree; 5= Strongly Agree; * measured with negatively-worded items

As shown in Table 3, undergraduate students perceived gamification (PLE in particular) as a useful platform to facilitate their language learning processes at the tertiary level ($M = 4.15$, $SD = .658$). They believed that using a particular system like gamification would enhance their performance in language learning. They expressed positive feelings about the use of PLE in their language learning processes ($M = 4.07$, $SD = .592$) and believed that using a particular system like gamification would be free of physical and mental effort ($M = 3.97$, $SD = .693$). Undergraduate students also expressed their behavioural intention to use gamification in their future language learning ($M = 3.81$, $SD = .698$).

Differences in Undergraduate Students' Acceptance of Gamification (PLE) According to Gender

Table 4: Differences in Acceptance of Gamification (PLE) According to Gender

Scales	Gender	N	Mean	SD	<i>t</i>	<i>p</i> -value
Perceived Usefulness	Male	43	4.15	.618	-.029	.977
	Female	76	4.15	.684		
Perceived Ease of Use	Male	43	3.94	.752	-.348	.728
	Female	76	3.98	.662		
Attitude toward Using	Male	43	3.94	.630	-	.077
	Female	76	4.14	.560		
Behavioural Intention to Use	Male	43	3.86	.672	.516	.607
	Female	76	3.79	.715		
Perceived Complexity	Male	43	2.85	.947	-	.059
	Female	76	3.20	.980		

In contrast with past studies that claimed gender affects students' acceptance for games in educational contexts, the results in Table 4 showed that there was no gender difference in students' acceptance of gamification (PLE) (in terms of perceived usefulness, perceived ease of use, attitude toward using, behavioural intention to use, and perceived complexity) in facilitating their language learning processes at the tertiary level at $p = 0.05$.

CONCLUSION AND IMPLICATIONS

In conclusion, the study adapted TAM over undergraduate students' use of PLE in language learning and also validated the instrument. The findings of this study are important to the teaching and learning methods of tertiary education (English language courses in particular) because it serves as a market survey for incorporating gamification in language learning at this level. Ma and Yuen (2006) pointed out that the implementation of a system is successful only if its users use the system effectively; and it is necessary to gain a better understanding of their beliefs toward the system in order to achieve effective management. The results of the study have shown that users of PLE were positive towards its usefulness in assisting their language learning and enhancing their performance, and confident of its ease of use. In general, the users have positive attitudes towards using PLE in language learning and they showed positive intention in using gamification in their future language learning. It is believed that this study would not only provide a good understanding of the undergraduate students' acceptance of

gamification in learning, but also shed light to the understanding of the future game use of these students. Therefore, it is recommended that gamification (PLE for instance) could be applied at the tertiary level in order to gamify educational contexts as one of the methods to make learning more interesting, motivational and less conventional; and to promote autonomy and that learning does not remain within the boundaries of the classroom. Similar to any research, this study has some limitations. In order to gain a better understanding about the users' acceptance behaviours on gamification, a longitudinal perspective, and a bigger sample and wider scope which include students of every faculty or stream of studies would be recommended.

RECOMMENDATIONS

Following the above-mentioned, the Gamification@USM Committee proposed that a project between Universiti Malaysia Sabah and the Ministry of Higher Education be established to carry out a nationwide survey and study on gamification in learning across different fields of study at the tertiary level. The potential of gamification in improving the learning experience of Malaysian university students should be exploited and treated strategically as gamification is the new catalyst for meaningful, life-long learning. The proposed nationwide study involving all the IPTA and IPTS is expected to establish a first of its kind standard - "Gamification Competency Standards for 21st Century Educators".

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