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Empirical study of digital games acceptance in Malaysia: an extended theory planned behavior

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ABSTRACT

In this study, we extend the theory planned behavior (TPB) by incorporating fun and examining its impact on the gamer' intention to continue playing digital games. A majority of the digital games adoption research has been completed in developed countries such as the South Korean. Overall, the results indicate that the proposed model provides a good understanding of factors that influence the intention to continue playing digital games. From a theoretical perspective, the findings help further our understanding of the constructs that impact digital games technology adoption in an under researched area: developing countries. It also confirms the construct of fun and its role in the adoption of digital games. From a practical perspective, the findings would contribute useful insights, knowledge and ideas to future theories, academic research and digital games industries production practice.

1. Introduction

Researchers such as Lee and Tsai (2010) and Venkatesh et al. (2003) had expressed the opinion that the issue regarding the effect of attitude, subjective norm, perceived behavior control and fun on behavioural intention to accept non-utilitarian ICT applications had not been addressed fully. Fromme and Unger (2012) who studied digital games and cultures agreed with this opinion and felt that the issue regarding the effect of attitude, subjective norm, perceived behavior control and fun on behavioural intention to accept digital games was also not fully understood. Fromme and Unger (2012) also suggested that the influence of gamer behavioral intention to continue playing digital games needed further investigation.

Bourgonjon et al. (2013) who incorporated perceived ease of use (complexity) and perceived usefulness (relative advantage) as attributes of attitude in their TAM model for educational digital games, discovered that perceived usefulness and perceived ease of use were significant when the digital games were used for education purposes. However, perceived usefulness and perceived ease of use were not significant when the digital games were used for entertainment purposes. Based on these arguments, other possible factors in attitude beliefs for behaviour intention to continue playing entertainment digital games need further consideration and investigation.

Meister et al. (2012) queried and questioned whether the rapid changes of digital entertainment technology and social networking would result in an increase in the influence of social community and simultaneously bring about a decrease in the influence of friend and family on the subjective norm. Hence, it will be necessary to investigate normative beliefs which influence behavior intention to continue playing digital games. When developing digital games business, it is important and crucial to be able to understand the concept of enjoyment or fun associated with digital games. It is therefore important in this study to understand the factors contributing towards fun. The research model used in the study is shown in Fig. 1. This research model is specifically aimed at investigating the acceptance of digital games in Malaysia. Perceived behavior control (PBC) reflects how the strength of an individual's attempt to perform a behavior of interest with the degree of his control to determine the likelihood of actual performance of behavior. The beliefs that reflect an individual's perceived control behavior related to his/her ability to perform the behavior of interest are termed control beliefs. These control beliefs are affected by perceived facilitation of external resource (e.g. money and time) and internal resource (e.g. self-efficacy and ability). Perceived facilitation indicates that the individual's assessment of the significance of each control belief or the extent of perceived behavior control together with the intention can be utilized to predict behavior. The present research extended the TPB further by including the fun construct in the model. Merikivi et al. (2013) and Chennamaneni et al. (2012)

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strongly believed that fun (perceived enjoyment) should be an important factor in influencing behavioural intention for technology acceptance (Hsu and Lu, 2004; Lee and Tsai, 2010). With this support, fun has been included as a construct together with the constructs of attitude, subjective norms and perceived behavioral control. Four hypotheses in this study are discussed in this study;

Hypotheses 1: Attitude about digital games positively affects the intention to continue playing them.

Hypothesis 2: Subjective norm positively affects the intention to continue playing digital games.

Hypothesis 3: Perceived behavioral control positively affects the intention to continue playing digital games.

Hypothesis 4: Fun positively affects the intention to continue playing digital games.

Hypothesis 5: A test to confirm whether fun has explained additional variance in the behavioral intention to continue playing digital games.

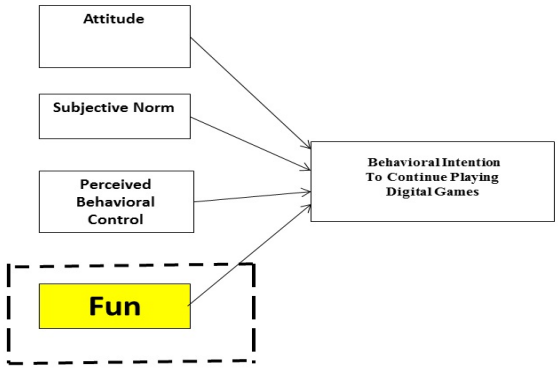

Fig. 1: Model research

2. Method of study

Research design incorporates methods and procedures, which became the main guide for this study from start to finish. The study consists of (a) literature review and the search for a valid digital games acceptance and engagement model, (b) development and validation of questionnaires which are the basis for the research instrument (c) multivariate constructs SEM data analysis procedures using SmartPLS and (d) finding, discussions and thesis writing.

Literature review was necessary to find research problems, identify research questions, and recognize research objectives in order to ascertain a valid digital games acceptance and engagement model and variables. The development and validation of the research instrument include the identification of target audience (research subjects sampling), design and writing up processes to come up with the questionnaires, and pilot survey.

Participation in the survey was voluntary. Subjects for this study were digital gamers in Malaysia, ages between 15 to 55 years old. This age group was chosen because ESA (2014) had confirmed that in 2014, over 90% of digital gamers worldwide were in the age group of 15 to 55 years old with an average age of 35. Digital gamers within this age group had the maturity to express their opinion and perception freely without due influence from parents or guardians.

Snowball sampling technique (Wright and Stein 2005) was used to recruit the respondents to provide responses to the questionnaires. This technique was necessary because digital gamers had a network of their own. Outwardly, it was difficult to distinguish a digital gamer from a non-digital gamer. Only a digital gamer could identify someone was of his/her kind. For this reason, snowball sampling technique facilitated better judgment as who could provide the best information to accomplish the objective of the study. Structural Equation Modeling (SEM) data analysis using SmartPLS computational tool was used to validate measurements and structural model used in this study. Detail description of the quantitative approach used for the study relating to frame sampling, survey administration, sample size, research instrument development and validation, procedures of data analysis and report writing are discussed in detail in the following sections. The research model used in the study is shown in Fig. 2.

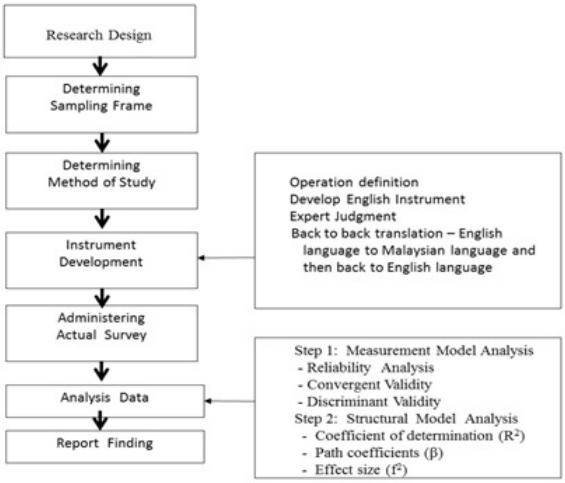

Fig. 2: Flow diagram

3. Results and discussion

Determination of size sample 422 respondents and the mode for data collection was carried out about 55 % of respondents were male and 44% were female. Approximately 28% were from the 15-19 years age group, 38% from the 20-24 years age group, 21% from the 25-29 years age group and 13% from the age group above 29 years but less than 55 years old. About 73% of the respondents were Malays while the remaining 27 % of the respondents were the other races.

An internal consistency reliability value of above 0.7 is regarded as satisfactory (Chin, 1998). In this study, the result of Cronbach's alpha coefficients for all constructs ranged from 0.858 to 0.942, well above

the acceptable value of 0.7 for confirmatory research.

All the measurement items with the same construct should have high loadings on their component (convergent validity) and low loadings on other factors (discriminant validity). This study showed results that the measures' validity as measurement items had highly correlated with their own scales than with other scales. The structural model was tested by estimating the paths between the constructs in the model to determine the significance as well as the predictive ability of the model. Assessing the structural model was performed by using the SmartPLS algorithm procedure and SmartPLS bootstrapping re-sampling technique. The essential criteria for the assessment of the structural model were (a) the coefficient of determination, R^2, (b) path coefficients and (c) effect size (Sekaran and Bougie, 2013; Henseler and Fassott 2010).

The coefficient of determination for dependent variable (R^2) is the first essential criterion. The R squared (R^2) measures the proportion of the variance of a dependent variable that is explained by independent variables (Henseler and Fassott, 2010). According to Chin (1998), the level of explanatory power (R^2) having values of approximately 0.670 is considered substantial; the level of explanatory power having values around 0.333 is considered average, and the level of explanatory power having values of 0.190 and lower is considered weak.

From Table 1, it is observed that all the R^2 values of the dependent variables in the research model are moderate except for subjective norm which the R^2 values are weak. According to Table 1, when R^2=0.502, the influence of the attributes and constructs on intention behavior to continue playing digital games is considered moderate. Therefore, model provides an adequate predictive power for the intention behavior to continue playing digital games by considering the independent variables including attitude, subjective norm, perceived behavioral control and fun.

Table 1: R-squared of dependent variables

Dependent Variables	R Square	Level of Explanatory Power
Attitude	0.340	Moderate
Subjective Norm	0.260	Weak
Perceived Behavioral Control	0.382	Moderate
Fun	0.376	Moderate
Intention To Continue	0.502	Moderate

The results of the study show that the intention behavior to continue has four antecedent factors (constructs) which are attitude, subjective norm, perceived behavioral control and fun. When analyzing the antecedent factors, the intention behavior to continue yielded R^2 of 50.2% and the four constructs were found to be significantly related with a significant value of less than 0.001.

Hypotheses 1 suggests that attitude about digital games positively affects the intention to continue playing them. Supporting the hypothesis, the research model demonstrated a positive and significant influence of attitude on intention behavior to continue playing digital games (β=0.184, T-value=3.431, $p<0.001$). The result shows that attitude is significantly related to the intention to continue playing digital games. Hence, the influence of attitude does matter.

In hypothesis 2, it was predicted that subjective norm positively affects the intention to continue playing digital games. Subjective norm has a positive influence on the intention to continue playing digital games was fully supported (β=0.133, T-value=3.120, $p<0.001$). This result also explains that the subjective norm is significantly related to the intention to continue playing digital games.

In hypothesis 3, it was predicted that perceived behavioral control positively affects the intention to continue playing digital games. The empirical evidence supports the research hypothesis 3, that perceived behavioral control has a positive influence on intention to continue playing digital games (β=0.289, T-value=5.442, $p<0.001$). The finding suggests that the perceived behavior control is significantly related to the intention to continue playing digital games.

In order to confirm hypothesis 5, it was necessary to investigate whether fun explains additional variance in the intention behavior to continue playing digital games. The independent variables were attitude, subjective norm, perceived behavioral control, and fun. The dependent variable was the behavioural intention to continue playing digital games. Results from SmartPLS analysis showed that attitude, perceived behavioral control, subjective norm and fun all significantly affect the behavioural intention to continue playing digital games. As is observed in Table 2, R^2 for the first model is 0.502 (the influence of independent variables attitude, subjective norm, perceived behavioural control and fun on behavioural intention). With the exclusion of the independent variable of fun (second model), R^2 is 0.455. It was found that fun contributed 4.7% in explaining the behavioural intention in the research model. Hypothesis 5 is supported.

Fun is indeed an essential determinant of gamer intention behavior to continue playing digital games. This confirmation is based on evidence obtained from the result of comparative statistical analysis using effect sizes (refer to Table 2) of the four constructs. From the comparative statistical analysis (refer to Fig. 3), fun contributed 38.3% while perceived behavior control contributed 34.2% towards the intention behavior to continue playing

digital games. The other two constructs, attitude contributed 16.2% and subjective norm contributed 11.3% towards the intention behavior to continue playing digital games. The fun construct was responsible for 4.7% additional variance in behavioral intention to continue playing digital games (Table 2).

Table 2: Fun explains additional variance

Independent Variables	Dependent Variable	Level of explanatory power (R^2)	Explains additional variance
Attitude	Behavioral intention	0.502	0.047
Subjective norm			
Perceived behavioural control			
Fun			
Attitude	Behavioral intention	0.455	
Subjective norm			
Perceived behavioural control			

As digital media entertainment application shares similar characteristics with digital games, the results also suggest the need to incorporate fun in models of digital media applications adoption.

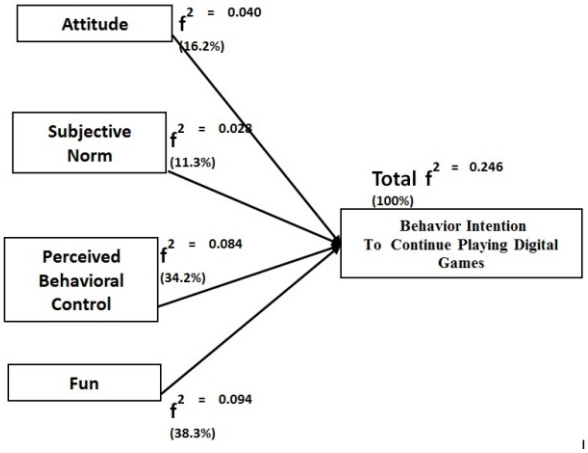

Fig. 3: Comparison of effect size (f^2)

From practical point a view, fun may be increased through appropriate strategies to be incorporated in digital games design such that gamers' flow experience towards continuing involving in gameplay can be prolonged. Digital game distributors need to increase the choice of gamers by making available a selection of digital games according to suitability and cross-platform playability for digital gamers to have fun anytime and anywhere.

4. Limitation of study

The scope of this study embraces in a specific manner, the interpretation and the identification of important elements concerning digital gamers' behavioral intention to continue playing which results in engagement in digital games. The interpretation and identification are based on the construct of attitude, subjective norms, perceived control behavior and fun. However, this study has the following limitations:

Firstly, this study lacks focus by using a wide range of ages (between 15 to 55 years old) of respondents as subjects (digital gamers in Malaysia). Malaysians in the age group 15 to 55 years old have different life principles and interests. In particular, those in the age group between 15 to 19 years old who are still in school and who live with their parents are open to the influence of their parents and members of their families. This is confirmed by ESA (2014) which stipulated that more than 85% of this age group is greatly influenced by their parents in choosing and purchasing the genre and platform types of the digital games. Those in the age group above 29 years old are normally married and have children of their own. People in these age groups are normally interested in playing digital games with their young children. Those in the age group between 20 to 24 years old are normally more matured, independent and not readily influenced by their parents. The majority of those in these age groups is either students in institutions of higher learning or is employed and lives on their own. Regardless, the research was carried out to help digital industry of Malaysia to understand a cross sectional evaluation of digital gamers (global view) to help the design and production of digital games. In any business, it is often necessary to look at niche areas. It is therefore important, when looking at the intention behaviors of digital gamers from different age groups, to be aware that these different age groups have different likings and characteristics. It may be useful to focus on a particular age group because digital games are normally targeted for a particular segment of consumers.

This study on digital games was conducted in Malaysia to look into intention behavior to continue playing digital games. This study is meant as a guide for digital games designers, developers and distributors so that they are aware of the type of gameplay and genre of digital games for Malaysian market. The result of this study may not be directly applicable for design, development and distribution processes of digital games meant for the market in countries other than Malaysia. Digital gamers in other countries might not share the same exposure, experience and level of entrainment technology infrastructure. Since they do not share the same issues faced by Malaysian digital gamers, it is possible that factors which are significant in this study might not be important to digital gamers from other countries.

For this study, analysis was carried out on the responses of digital gamers, irrespective of race or religion to obtain a cross sectional view. The majority of responses were obtained from cyber cafes in big cities, small towns and villages of each state of Malaysia. About 73 % of the respondents were Malays. This number is a reflection of 2012-2013 digital gamers' racial composition of users in cybercafés and at home. Since there are distinctly different characteristics of digital gamers for different races in Malaysia, it may be useful to look at influence of the intention behavior to continue playing digital games on engagement for digital gamers of different races. This would provide information to digital games designers and distributors the types of digital games which would be preferred by the different races in Malaysia.

5. Future research

The use of a wide range of ages (between 15 to 55 years old) of respondents as subjects (digital gamers in Malaysia) may produce analytical results which are generalized in nature. It may be useful to replicate the study using digital gamers within specified group age sampling frame. The new sampling frame may suggest additional underlying level affecting several factors which can influence intention behavior to continue playing digital games (such as family or observability).

Regarding the effect on the intention to continue and engage playing digital games, the factors which are considered important for Malaysia might not be as important in other countries. Cultural values, exposure to entertainment technology and level of entertainment technology infrastructure and other issues may influence digital gamers' perception and influence on the intention behavior to continue and engagement in digital games. Replicating the study in other countries may highlight for that particular country, additional underlying factors that affect behavioral intention to continue and engagement.

6. Conclusions

The empirical results indicate that all the main beliefs, including fun which is a new construct of antecedent variables; have significant effects on behavioral intention to continue playing digital games. The finding shows that the effects of antecedents on main beliefs are significant. The fun construct was found to explain 4.7% additional variance in behavioral intention to continue playing digital games. Approximately 50.2% of the total variance of intention to continue playing digital games is explained in this proposed model. In short, the results reveal that the model provides a better understanding of the factors that influence the intention to continue playing digital games in Malaysia.

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