Digital Gamers' Attitude towards Intention to Continue Playing Digital Games

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***Abstract*—User-centered design of digital games calls for a clear understanding of the mind and the thinking of digital gamers. This understanding is important because it allows digital games designers to create games with the right game dynamics to capture a specific market segment. In the past, digital games were produced without prior consideration of the human factors which were difficult to define and measure. Fang & Zhao (2010)paved the way towards the use of technology acceptance model to ascertain the degree of emotion flow which induces the desire to continue playing digital games. This paper used snow-ball sampling (Wright&Stein , 2005; Blernackl , 1981) to collect data which was used in the analysis to estimate how compatibility,trialability, observalability and attitude influenced the intention to continue playing digital games and how they affected actual behavior playing digital games. It was found that digital gamers' attitude towards intention to continue playing digital games wassignificantly influenced by attitude beliefs compatibility and trialability. Observalability of digital games by digital gamers significantly increased intention to continue playing digital games.**

Keywords- Digital games; Attitude; Intention; Actual behavior

I. INTRODUCTION

Digital games sector which is a constituent component of the creative industry is contributing significantly to the growth of today's world economies. This has been reported by IDATE**,** one of Europe's foremost market analysis and consulting firm. In its recent World Video Games market report, IDATE [1]stipulated that the digital games sector could be the panacea for economic recovery. The game sector is becoming a global phenomenon [2].According to PWC's Global Entertainment and Media Outlook 2011-2015, the video games market in Malaysia is poised to grow at a compound annual rate (CAGR) of 6.8 % between 2011 to 2015 [3]. However, in Malaysia, research in the area of digital games is still at its early stage. Nonetheless, literature collections have shown that this research field is expanding fast [4]. Younger generations are adapting rather quickly into games technology [4][5][6]. Most Malaysian teenagers are familiar with many genres of digital games, and they believe that games playing encourage social skills because digital games are cognitive in nature and promote group participation.

II. LITERATURE

A. *Digital Games*

Malaysian Government is interested in leveraging on digital games and creative industries to build its economy. Unlike conventional application of ICT, digital games provide a new dimension containing elements of interactivity and reciprocal communication in the virtual world [7]. They lay out a new challenge to conventional society's view of culture and technology. The developments of digital games follow Maslow's hierarchy of needs. Initially, a digital gamer plays a digital game either to pass the time or as a means of relaxation. That is to satisfy his/her basic need to relax and to entertain himself/herself. With time, the digital game becomes a challenge which he/she has to overcome for his/her emotional fulfillment. Hence, digital games nourish all the human impulses, in line with the way the natural human mind has been created, to get the task done [8].

B. *Attitude and Relevent Findings*

Attitude in this study is been defined asbelief that performing a behavior will lead to a particular outcome, weighted by an evaluation of the desirability of that outcome [9]. There is intention to perform a behavior when an individual possesses positive evaluation of performing that behavior. Hence, an individual's intention to adopt a behavior gets stronger if the attitude with respect to that behavior is favorable. Table 1 is summary of some previous studies related to attitude beliefs.

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Table 1: Previous studies related to attitude beliefs.

Source	Technology	Participant	Relevant Findings
(Md Nor and Pearson, 2008)	Internet banking	1164 respondents	trialability and compatibility significantly affect attitude.
(Chen, 2009)	e-Learning Courseware Certification program (eLCC).	67 managers in e-learning organizations	Attitudes (observalability, and compatibility) play an important role in making and sustaining adoption decision.
(Folorunso, Vincent, Adekoya, & Ogunde, 2009)	Social networking sites (SNS)	102 students in Nigeria	trialability and compatibility of SNS do positively influence the attitude towards using the innovation.
(Kebritchi, 2010)	Computer games for Education	Interview teachers 7 years of experience teaching mathematics	Compatibility & trialability, played significant roles in the game acceptance.
(Wang et al., 2011)	RFID adoption in logistics industry at Taiwan.	439 participated	compatibility, trialability and observalability of the RFID system revealed the importance of the attitude towards RFID usage intentions
(Ismail, 2012)	Apple iPhone	134 students in Malaysia.	trialability important attributes in acceptance intention

Intention to continue, in this study, isthe intention of digital gamers to continue playing their favorite digital games. Behavioral intention to continueis a measure of the strength of one's intention to perform a specified behavior continually. If digital gamers' behavioral intention to continue is strong, the time duration of engagement (actual behavior)in digital game play will be longer [10].Several researchers have suggested that compatibility, trialability and observalability are factors for attitude beliefs which influence intention behavior [12][14-19]. This paper describes tests carried out on the suggestion specific for Malaysian digital gamer environment.

III. Methodology

A. Sampling and Data Collection

This study used snow-ball samplingto collect data. 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 [2]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 [11].

Purposive sampling and snowball technique (Blernackl, 1981) (Wright & Stein, 2005)was used to recruit the respondents. 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. As this paper concerns cross-sectional view of digital gamers on attitude beliefs affecting intention behavior, the sampling does not take into account groups of specific types of digital gamers (beginner, casual and hardcore).

B. Questionnaire

The items in the questionnaires for research instrument development was based on the results of preliminary surveys and the results of previous investigative studies on technology acceptance [12][13]14][15][16][18][19][20][21] [2]23][24].

C. Analysis Procedure

Data analysis was carried out using the two-step SEM PLS path model assessment shown in Figure 1. The first step assessed the measurement model using PLS algorithm while the second step assessed the structural model using PLS Bootstrapping. Measurement model assessment used (a) Cronbach' alpha and composite reliability tests to check for reliability (b) Item factor loading, composite reliability and AVE tests to check for convergent validity and (c) Cross factor loading, square root of AVE and bivariate correlation tests to check for discriminant validity. While structural model assessment used (a) Coefficient of determinant R^2 test to indicate what proportion of the variance of dependent variable that can be explained by the independent variables, (b) Path coefficients β test to check the relationship strength between the latent variables of the research model and (c) The P-value is a numerical measure of the statistical significance of a hypothesis test.

IV. Result and Discussion

In the design process it is important to validate and measure the strength of one's intention to playing digital games. This research shows an approach whereby the strength of this intention is ascertained from a cross-section sampling frame. Prior knowledge of the strength of this intention facilitates optimum design.

In the research carried out, a total of 450 questionnaires were distributed in this study. Four hundred and thirty two (432) questionnaires were returned, indicating a 96 percent rate of return. All the respondents were current gamers of digital games. The reliability of the responses was checked for missing data and extreme response. Having removed 10 responses, the data from 422 respondents were used for further analysis.

A. Digital Games Usage

The samples from this study have shown that a strategy game is the most popular genre played by the respondents (32.5%). Most of the digital games played by the respondents operate on PC platform (53.6%). A significant number of the

respondents started playing digital games before the age of 15 (52.8%). About 56.2% of the respondents were introduced to digital games by their friends and a substantial number (20.4%) of the respondents had the support of their families with regards to the choice of digital games which they play. Approximately 14.4% of the respondents had admitted that they were early gamers, 58.3% of the respondents admitted that they were casual gamers and 27.3% admitted that they were hard-core gamers. This statistics is consistent with high levels of usage of casual games among the population of digital gamers [25].

B. Assessment of Measurement Model

Cronbach Alpha provides an estimate for the reliability based on the indicator ofintercorrelations for internal consistency. An internal consistency reliability value of above 0.7 is regarded as satisfactory [26]. In this study, the result of cronbachalpa coefficients for all constructs ranged from 0.858 to 0.942, well above the acceptable value of 0.7 for confirmatory research.

The composite reliability takes into account the fact that indicators have different loadings, and can be interpreted in the same way as Cronbach's Alpha. As Cronbach's alpha tends to provide severe underestimation of the internal consistency reliability of latent variables in PLS path models, it is more appropriate to apply the composite reliability [27]. According to Cohen [28], an internal consistency reliability value above 0.7 is regarded as satisfactory, in this study, all constructs exhibited the value of composite reliability, ranging from 0.904 to 0.946, all of which are greater than the acceptable level of 0.7.This indicates that the measurement errors have been relatively small [27][29].

The results of cross factor loadings depicted in this study reveal that each item of measurement has a low correlation with other latent variables (attributes or constructs) of the research model except for the related attributes or construct. Therefore, the items for each attributes or construct were loaded on a single factor without large cross loadings on additional factors [29][30].

C. Assessment of the Structural Models

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, β and (c) p-value, p***<0.001 and P**<0.01(Sekaran & Bougie, 2013; Henseler et al., 2009). Figure 1 displayed the result of structural model.

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 et al., 2009; Cohen, 1988). According to Chin [26], 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.Results R-squared of dependent variables shows in Table 2.

Table 2: R-Squared of Dependent Variables

Dependent Variables	**R Square**	**Level of Explanatory Power**
Attitude	0.329	Moderate
Intention To Continue	0.339	Moderate
Actual Behavior	0.076	Weak

At all times, a two-tailed P-value was used in this research. A two-tailed P-value of 0.01 would mean that there is a 0.01 (or 1% chance) that the two sets come from the same group. The research finding in this study demonstrated a positive and significant influence of attitude on the intention behavior to continue playing digital games (β=0.184, T-value=3.431, p<0.001).This result is consistent with past studies of[18][19] in IT and agrees with the study carried out by Lee [20],Kebritchi[15], Boyle et al.[32]in the field of digital games. The significant positive effects of attitude gamers' belief on the intention behavior to continue playing digital games in the present study may refer to gamers' belief that playing the digital games would bring the positive consequences. Without a doubt, when individuals judge digital games with positive attitudes, they will be more inclined to play digital games [20][33]. Hence, the influence of attitude does matter.

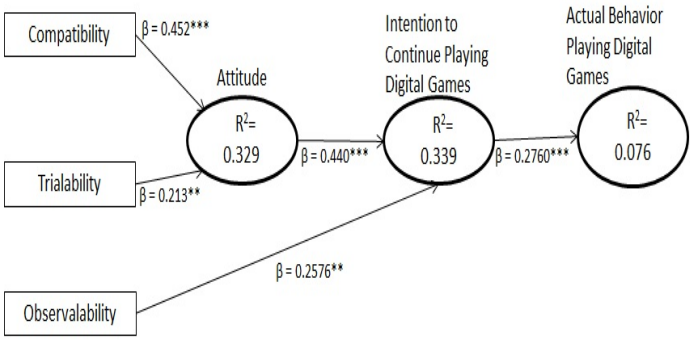

Figure 1 Result of structural model

Attitude yielded R^2 of 32.9% and the twoantecedentsattitude compatibility and trialability were found to be significantly related with a significant value of less than 0.01. Compatibility in this study is the degree to which the favorite digital games are perceived as being consistent with existing values, needs, and past experience of the gamer. This was in agreement with previous findings concerning compatibility effect of gamers on attitude towards playing digital games [21][31].

The trialability and attitude were significantly related. Similar findings were obtained by previous studies, including

a significant and positive relationship between trialability and individual's attitude with regard to digital games [13][16][21].This significant result implied that gamers who were given the opportunity to try new digital games or new version of digital game might acknowledge the fun and benefit of that digital game which lead to the creation of positive attitudes towards it.

Observalability of digital games by digital gamers significantly increase intention to continue playing digital games.Observalability stimulates gamer's discussion regarding new digital games through information which is innovation-evaluation in character.

The result shows that the intention to continue and actual behavior were related with a significant p-value. The findings suggest that intention to continue is significantly related to actual behavior, supporting the results obtained from other studies [34][35].According to Doan [35] less than 8% represent the percentage number of digital gamers who are associated with the intention behavior to continue playing digital games and who would continually and persistently be involved in playing digital games for some time in the future. The summary of results show in Table 3.

Table 3: Summary of the results.

Path (Indicator)	**Path Coefficient**	**t-Value**	**p-Value**
Intention to Continue Play Digital Games→Actual Behavior	0.267	3.099	0.001
Attitude → Intention to Continue Play Digital Games	0.440	4.157	0.001
Compatibility → Attitude	0.452	5.136	0.001
Trialability → Attitude	0.213	2.365	0.01
Observability → Intention	0.257	2.576	0.01

D. Future Research

The use ofa 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 different group of gamers; casual and hardcore gamers).

ACKNOWLEDGMENT

This research is supported and collaboration with Research Management Center (RMC), Universiti Teknologi Malaysia (UTM). This paper is financial supported by Ministry of Education (MOE) under Vot Q.J130000.2528.09H16. We would also like to express our sincere gratitude to UTM ViCubeLab research group who has been supportive throughout our research.

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