

Mobile Gaming Perceived Enjoyment and Ease of Play as Predictors of Student Attitude and Mobile Gaming Continuance Intention

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Abstract

With the rapid development in wireless networks and mobile communication devices nowadays, the current received wisdom is that online and offline mobile gaming are dominating the people's time - particularly the youth generation. As a result, the mobile gaming industry has been fast growing in South Africa. Nevertheless, scant attention is given to the empirical investigation of the influence of mobile gaming perceived enjoyment and mobile gaming perceived ease of play on attitude towards mobile gaming and continuance intention in South Africa. Therefore, the principal objective of this study is to fill this void by examining the influence of students' mobile gaming perceived enjoyment and perceived ease of play on mobile gaming continuance intention and the mediating role of student attitude towards mobile gaming intention in these relationships in South African universities. A sample data of 352 is collected for final data analysis. All the posited five hypotheses are supported. Managerial implications of the findings are discussed and limitations and future research directions are indicated.

Keywords: Mobile gaming, Perceived enjoyment, Perceived ease of play, Students attitude, Continuance intention.

1. Introduction

Nowadays, with the rapid development in wireless networks and mobile communication devices, mobile games are playing a more important role in our daily life and becoming one of the fastest growing segments of the game industry (Qingwei & Ting, 2011). Recent technological advances in mobile devices have produced powerful mobile phones and personal digital assistants that come with ever-greater computing power, storage capacity, and graphical and audio capabilities (Liu & Li, 2011). Mobile computing devices such as smartphones, e-readers and tablet computers are currently undergoing a phenomenal surge in market penetration (Browne & Anand, 2012). Interesting to note too, is the growing recognition that both mobile technologies and games technologies are increasingly fertile ground for the development of resources to support learning (Facer, Joiner, Stanton, Reid, Hull & Kirk, 2004). For instance, some educational theorists and researchers are beginning to identify these tools as potentially powerful resources in supporting the development of learning communities of offering experiential learning and in encouraging the development of meta-level thinking skills (see, for example, Roschelle & Pea 2002; Andrews et al. 2003; Gee 2003; Wegerif 2003; Facer et al. 2003; Holloway & Valentine 2003). It is only relatively recently that sustained educational research has been carried out in this area (Facer, Joiner, Stanton, Reid, Hull & Kirk, 2004). The received wisdom from these researches is that, computer games potentially offer children powerful opportunities not only to learn through experience, but to develop meta-level reflections on strategies for learning (for example, Gee 2003; Kirriemuir & McFarlane 2003; Squire 2003). To that extent, students might for instance, develop meta-level thinking skills or learn problem solving skills through computer gaming or mobile gaming (Roschelle & Pea 2002; Holloway & Valentine 200).

Of late, the field of mobile gaming has recently attracted some academic interest and research related to mobile gaming has been growing over the past decade (Bryce & Rutter, 2002; Feijoo, Gomez-Barroso, Aguado & Ramos, 2012). However, most of the available literature from some researchers in the field of sociology and social psychology are primarily focused on the possible dangers which mobile phone and internet use presents to young people, and ask what social, educational and psychological problems are caused by Internet and mobile phone use (Ling, 2004; Ling & Pedersen, 2005; Katz & Rice, 2002). In particular these researches, have mainly focused on the possible negative psychological consequences of computer gaming, and posit that they encourage violent and aggressive behaviour in real life (Bryce & Rutter, 2002; Bryce & Rutter, 2003). Notwithstanding the recent researches done focusing on the positive side of mobile gaming such as facilitation of mobile learning (Colley & Stead, 2003; Attewel & Savill-Smith, 2005; van der

Merwe & Brown, 2005; Norman & Pearce, 2007; Donner, Verclas & Toyoma, 2008) and the development of meta-level thinking skills (see, for example, Roschelle & Pea 2002; Andrews, Woodruff, MacKinnon & Yoon, 2003; Gee 2003; Wegerif 2003; Facer, Furlong, Furlong & Sutherland, 2003; Holloway & Valentine 2003), there still exist a dearth of studies that examine the extent to which perceived enjoyment of mobile gaming and attitude towards mobile gaming influence the mobile gaming continuance intention, particularly among the youth generation in Africa. Except a study by Hsiao and Chou, (2012) which investigated 'Massive Multiplayer Online Game (MMOG)' and had player network centrality and non-guild interaction as the predictors while continuation intention was the outcome variable, in the context of Taiwan, related researches on the same can hardly be found.

Against this backdrop, the purpose of the current study is two-fold. First, the current study seeks to investigate the direct influence of student perceived enjoyment of mobile gaming on their mobile gaming continuation intention in South Africa. Second, the study examines the mediating role of student attitudes towards mobile gaming on the perceived enjoyment – continuation intention relationship. Since the youth population is the target, the student community was deemed appropriate and chosen for this purpose. In particular, university students are the subjects of investigation. Furthermore, since too the current research is the first to investigate the aforementioned variables in Africa, it is anticipated that the research findings will contribute new knowledge on to the existing scant literature related to mobile gaming from an African student perspective. By and large, both academic and practical implications are expected to be drawn from this study.

The rest of the article is organized as follows. A review of the literature, conceptual framework and hypotheses are provided. These are followed by the discussion of methodology, the constructs and scales used, and the analysis and conclusion are outlined thereafter. Finally managerial implications, limitations and future research directions are given.

2. Mobile Gaming in South Africa

A cursory observation of the South African society show that access to traditional computers and the Internet remains limited to a small elite (Ndlovu, 2008; Bracey and Culver, 2005). However, the advent of wireless technology and its provision at mass scale, coupled with the availability of inexpensive mobile phone handsets has provided the Internet platform for mobile online media usage to many South Africans. While quantitative data on the actual mobile online usage is difficult to come by, evidence available so far, for instance, indicate that by 2006 the estimated number of mobile handsets in use in South Africa was about 18.7 million, of which 80% were active customers (Van Wyk & Van Belle, (2005). In addition to that, it was reported that, 72% of 15-24 year-olds had a mobile phone (Selanikio, 2008). Subsequent researches thereafter showed, for example, that 67% of South Africans 'own a cell phone' (AMPS, 2008) or that 62% 'own a mobile phone or an active SIM card' (Research ICT Africa, 2009).

By and large, the impression by deduction is that given the phenomenal adoption of mobile technology and the availability affordable wireless services at mass scale, mobile gaming (online and offline) could be on the increase in South Africa, especially among the youth population. As Selanikio (2008) rightly pointed out, research on mobile Internet access and usage has been largely neglected in Africa - more so, mobile gaming among the youth in South Africa. Given the benefits such as the development of meta-level thinking skills and experiential learning related to computer or mobile gaming (Jenkins, 2006; Buckingham, 2005; Ndlovu, 2008; Donner & Tellez, 2008), this observed phenomenon is disturbing and unfortunate. Therefore, in view of this void, researches such as the current one might be long overdue in South Africa.

3. Extending the Technological Acceptance Model to Mobile Gaming

This study particularly capitalizes on the Technological Acceptance Model (TAM) in order to provide a theoretical grounding for the conceptualised research model. TAM has been widely used to explain technology usage by many researchers because of its parsimony, capability and predictive power (Legris, Ingham & Collette, 2003). TAM was originally proposed by Davis, (1989) and was an adaptation of the theory of reasoned action (TRA) by Fishbein & Ajzen (1975) and was mainly designed for modelling user acceptance of information technology (Davis, 1989; Davis, Bagozzi & Warshaw, 1992). The original TAM had perceived usefulness and perceived ease of use, mediated by attitude towards use, as the primary drivers of technological acceptance (Su & Zhang, 2006). Davis, Bagozzi & Warshaw, (1992) and many other researchers such as Legris, Ingham & Collette, (2003) and Venkatesh, Speier & Morris, (2002) had variations of the original TAM applied in different contexts. The later versions had intrinsic and extrinsic motivators influencing attitude towards use and behavioural intentions – with some versions of TAM excluding attitude towards use

(Venkatesh, Speier & Morris, 2002; Venkatesh, Morris, Davis & Davis, 2003). In the current study, an attempt is made to adopt and apply TAM in mobile gaming. In particular, four variables are used in this conceptualised model – that is, the perceived mobile gaming enjoyment, perceived ease of play, attitude towards mobile gaming intention and mobile gaming continuance intention. It is submitted in this conceptualised research model that the student's perceived mobile gaming enjoyment and perceived ease of play will directly and indirectly influence mobile gaming continuance intention via student attitude towards mobile gaming intention. In a nutshell, the conceptualised model utilised two intrinsic motivators (perceived enjoyment and perceived ease of play) as the predictors, while attitude towards mobile gaming and continuance intention are treated as mediator and outcome variables respectively.

4. Mobile Gaming Perceived Enjoyment

Perceived enjoyment is one of the construct conceptualised to constitute the technological acceptance model (TAM) developed by Davis in 1989 (Su & Zhang, 2006). It is conceived as the extent to which the activity of using computers is perceived to be enjoyable in its own right, apart from any performance consequences that may be anticipated (Davis, Bagozzi & Warshaw, 1992; Bryce & Rutter, 2003). In this study student perceived enjoyment refers to the extent to which students expect to derive pleasure, fun and joy from playing mobile games. This implies that students may opt for mobile gaming simply because they expect to experience a feeling of joy, elation, fun and pleasure and gratification from mobile gaming, otherwise they may have no inclination or motivation to play. The extant literature indicates that perceived enjoyment is a key intrinsic motive for playing an online game (Holbrook et al. 1984, Deci & Ryan 1985; Teo, Lim & Lai, 1999; Teo & Pok, 2003; van der Heijden 2004; Sherlock 2007).

5. Mobile Game Perceived Ease of Play

In this study perceived easy of play refers to the student's assessment that his/her interaction with mobile games will be relatively free of cognitive burden (c.f. Saade & Bahli, 2005). In other words, it is the degree to which a student believes that mobile gaming would be free of effort (Davis, 1989). In this regard, perceived easy of play explains the student's perception of the amount of effort required to learn and understand mobile games (c.f. Davis, Bagozzi & Warshaw, 1992; Bryce & Rutter, 2003). Accordingly, perceived easy of play encompass easy of learning, easy of control, easy of understanding, clarity and flexibility. Thus, the student need not spend significant time and effort in order to understand and know how to play mobile games (Moon & Kim 2001; Saade & Bahli, 2005; Pavlou, 2003). Deducing from the extant literature, perceived ease of play should represent an intrinsically motivating component of the student-mobile game interaction.

6. Attitude towards Mobile Gaming

Mobile gaming requires various skills and resources (Klimmt & Hartmann 2006). The availability of resources and skills to play mobile games shape the player's attitude towards mobile gaming (Gist & Mitchell 1992; Kilduff & Krackhardt 1994; Sparrowe, Liden, Wayne & Kraimer, 2001). For instance, a student's ownership of a smart phone that has exciting games might influence his/her attitude towards mobile gaming. Equally the same, the student's previous skills or knowledge of some computer games can also influence his/her attitude towards mobile gaming. In the current study, student attitude towards mobile gaming refers to his/her confidence or assertiveness resulting from possession of resource (e.g. mobile phone) and requisite skills to play mobile games. Previous studies have indicated that availability of resources and skills influence a player's attitude towards computer games (e.g. Klimmt & Hartmann, 2006; Gist & Mitchell, 1992; Kilduff & Krackhardt 1994)

7. Mobile Gaming Continuance Intention

To understand a mobile game player's continuance intention, one has to take into account the antecedents and expected outcomes of mobile gaming. For instance, if the motivators are strong relative to the consequences, the player is likely to intend continuing with mobile gaming. More so, the inclination and intention to continue with mobile gaming can be expected to be much stronger when the player has various motivators and the mobile gaming outcome is a beneficial experience. For example, if a student is motivated by perceived enjoyment derived from mobile gaming and also in the process of playing the student ends up sharpening his/her meta-analysis skills, the intention of mobile gaming

continuance can be expected to be high. In the current study, mobile gaming continuance intention refers to the student's desire to continue playing mobile games given his/her motivations and expected benefits. Prior studies have found perceived enjoyment and attitude towards computer games as some of the motivators that influence players' intention to continue with mobile/computer gaming (Klimmt & Hartmann 2006, Gist & Mitchell 1992; Kilduff & Krackhardt 1994; van der Heijden 2004; Sherlock 2007).

8. Conceptual Model and Hypothesis Development

Premised on the literature on technology acceptance model (TAM) and related literature on perceived enjoyment, attitude toward gaming and continuance intention this study conceptualises a research model provided in Figure 1.

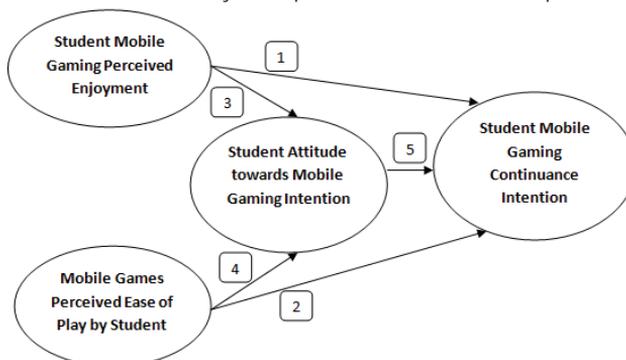


Figure 1: Research Model

9. Hypothesis Development

9.1 Perceived enjoyment, attitude towards mobile gaming and continuance intention

According to Davis (1989) Technological Acceptance Model (TAM) and the extended versions of the model, both intrinsic and extrinsic factors influence the attitude towards the use of technology and the subsequent behavioural intention (Legris et al., 2003; and Venkatesh et. al., 2002). This study chose to focus on intrinsic motivators, that is, perceived enjoyment and perceived easy of play as the predictors of attitude towards mobile gaming intention and continuance intention. It is submitted in the current study that when a student perceive enjoyment from mobile gaming, this triggers a positive desire in him/her that eventually lead to his/her positive attitude towards intention to play mobile games. In this case, perceived enjoyment serves as a type of hedonic value that affects a student's attitude and intention toward mobile gaming (c.f. Dabholkar & Bagozzi 2002, van der Heijden 2004). Concurrently, the perceived enjoyment can arouse a strong craving in the student that might necessitate future mobile gaming continuance intention. Prior empirical researches have also supported a positive linkage between perceived enjoyment and attitude towards use of technology (Wu & Liu 2007, Lee 2009) and as well continuance intention (Hsu & Lu 2004). Accordingly the same can be posited for student mobile gaming perceived enjoyment – attitude towards mobile gaming relationship and student mobile gaming perceived enjoyment – continuance intention relationship in the current study. Therefore, drawing from the TAM and empirical evidence, the following hypotheses can be postulated:

H1: Students' perceived mobile gaming enjoyment is positively related to their attitude towards mobile gaming intention in South Africa.

H2: Students' perceived mobile gaming enjoyment is positively related to their mobile gaming continuance intention in South Africa.

9.2 Perceived ease of play, attitude towards mobile gaming and continuance intention

In this study, student mobile games perceived ease of play is expected to directly influence student attitude towards intention to play mobile games. The main reason being the notion that lower cognitive burden frees up student's attentional resources, thereby allowing the student to focus on other learning matters (c.f. Saade & Bahli, (2005). The

fact that the student find it easy to learn mobile games, easy of control, and easy of understanding clearly without much effort and time, might also motivate the student's desire to continue playing mobile games (c.f. Moon & Kim 2001). Previous studies have also found a positive association between perceived ease of use and attitude towards use of technology (Saade & Bahli, 2005; Pavlou, 2003) and as well as continuance intention (Hsu & Lu 2004; Wu & Liu 2007). Similarly, the same can be hypothesized for student mobile gaming perceived ease of play – attitude towards mobile gaming relationship and student mobile gaming perceived ease of play – continuance intention relationship in the current study. Therefore, drawing from the TAM and empirical evidence, the following hypotheses can be proposed:

H3: Students' perceived mobile games ease of play is positively related to their attitude towards mobile gaming intention in South Africa.

H4: Students' perceived mobile games ease of play is positively related to their mobile gaming continuance intention in South Africa.

9.3 Attitude towards mobile gaming and continuance intention

A student's positive attitude towards mobile gaming can lead to the actual playing of mobile games (c.f. Mathieson, 1991; Hu, Clark & Ma, 2003). This is so, because people tend to perform behaviors that align with their attitudes (Fishbein & Ajzen 1975). However, if the favourable attitude towards intention to play mobile games persists as a result of perceived mobile gaming enjoyment and perceived ease of play, the student is likely to continue playing mobile games in the future. Prior studies have supported a positive relationship between attitude toward playing an online game and intention to continue playing (Hsu & Lu 2004; Wu & Liu 2007, Lee 2009). Therefore, based on the empirical evidence and foregoing discussion, it can be posited that:

H5: Students' attitude towards mobile gaming intention is positively related to their mobile gaming continuance intention in South Africa.

10. Research Methodology

10.1 Sample and Data Collection

Research data were collected from universities in Gauteng Province – in particular Vaal University of Technology and North West University (Vaal Triangle Campus) in South Africa. Some students from Vaal University of Technology, Logistics Department assisted with the distribution and collection of the questionnaires from the respondents. A total of 352 questionnaires were collected and used for the final data analysis.

10.2 Sample Description

Table 1 presents the profile of the participants. The profile indicates that more than sixty-one percent (61%) of the participating students are female, while the remainder is male. About fifty-eight percent (58%) of the participating students are undergraduates, while the remainder is postgraduate. About fifty percent (50%) of the participating students play mobile games one to five (1 – 5) times a day, while twenty-five percent never play at all and the remainder play more than six (6) times a day. The analysis also indicates that about ninety-one (91%) of the participating students are aged between thirteen to twenty-five (13–25) years while the remainder are above twenty-six (26) years old.

Table 1: Sample Demographic Characteristics

Daily Frequency of Play	Freq	%	Gender of Student	Freq	%
Never	63	25.0	Male	99	39.3
1-2	66	26.2	Female	153	60.7
3-5	61	24.2	Total	252	100
6-10	38	15.1			
11-20	12	4.8			
≤ 21	12	4.8			
Total	252	100			
Age Group	Freq	%	Level of Education	Freq	%

13-18 years	5	2.0	Undergraduate	145	57.5
19-25 years	223	88.5	Postgraduates	107	42.5
26-35 years	18	7.1	Total	252	100
36-45 years	5	2.0			
≤46 years	1	0.4			
Total	252	100			

10.3 Measurement Instrument

Research scales were operationalized mainly on the basis of previous work. Proper modifications were made in order to fit the current research context and purpose. Some four-item scales adapted from Teo (2001) previous works were used to measure "Mobile game perceived ease of play". "Mobile game perceived enjoyment" used a four-item scale measure while "Attitude towards mobile gaming intention" and "Mobile gaming Continuance intention" used a three-item scale each, all adopted from Hsiao & Chiou (2012) work. All the measurement items were measured on a 5-point Likert-type scales that was anchored by 1= *strongly disagree* to 5= *strongly agree* to express the degree of agreement. Individual scale items are listed in Appendix

10.4 Measure validation

In accordance with the two-step procedure suggested by Anderson & Gerbing (1988), prior to testing the hypotheses, confirmatory factor analysis (CFA) was performed to examine reliability, convergent and discriminant validity of the multi-item construct measures using AMOS 5. Overall acceptable model fit are indicated by Goodness-of-Fit Index (GFI) ≥ .80; Adjusted Goodness-of-Fit Index (AGFI) ≥ .80; Root Mean Square Error of Approximation (RMSEA) values ≤ .08; Incremental Index of Fit (IFI), Tucker-Lewis Index (TLI) and Comparative Fit Index (CFI) values ≥ .90; and Chi-square degrees of freedom ratio (CMIN/DF) value < 3. Recommended statistics for the final overall-model assessment show acceptable fit of the measurement model to the data: chi-square value over degrees (χ^2/df) = 2.950; GFI = 0.910; NFI = 0.91; RFI = 0.92; IFI = 0.91; TLI = 0.90; CFI = 0.91; RMSEA = 0.076. Loadings of individual items on their respective constructs are shown in Table 2, while the scale construct correlations are presented in Table 3.

Table 2; Accuracy Analysis Statistics

Research Construct		Mean Value*	Cronbach's Test		C.R. Value	AVE Value	Shared Variance	Factor Loading
			Item-total	α value				
MGPE	MGPE1	3.96	3.90	0.750	0.856	0.856	0.608	0.8500 ^c
	MGPE2		3.88	0.736				0.810 ^c
	MGPE3		4.00	0.670				0.842 ^c
	MGPE4		4.06	0.666				0.752 ^c
MGPEP	MGPEP1	3.72	3.94	0.633	0.872	0.871	0.622	0.817 ^c
	MGPEP2		3.72	0.760				0.852 ^c
	MGPEP3		3.55	0.770				0.841 ^c
	MGPEP4		3.66	0.784				0.762 ^c
ATMGI	ATMGI1	3.82	3.86	0.792	0.876	0.878	0.598	0.852 ^c
	ATMGI2		3.74	0.771				0.816 ^c
	ATMGI3		3.87	0.776				0.832 ^c
MGCI	MGCI1	4.71	4.72	0.745	0.883	0.883	0.618	0.804 ^c
	MGCI2		4.73	0.752				0.733 ^c
	MGCI3		4.70	0.748				0.755 ^c

Note: MGPE=Student Mobile Game Perceived Enjoyment; MGPEP=Student Mobile Game Perceived Ease of Play; ATMGI=Student Attitude towards Mobile Gaming Intention; MGCI=Student Mobile Gaming Continuance Intention. C.R.: Composite Reliability; AVE: Average Variance Reliability; S.V: Shared Variance. * Scores: 1 – Strongly Disagree; 3 – Neutral; 5 – Strongly Agree. ^asignificance level <0.05; ^b significance level <0.01; ^c significance level <0.001

Measurement CFA model fits: $\chi^2/(df) = 2.950$; GFI = 0.910; NFI= 0.91; RFI= 0.92; IFI = 0.91; TLI = 0.90; CFI = 0.91; RMSEA = 0.076.

Table 3: Descriptive Statistics and Correlations between Constructs

Research Constructs	MGPE	MGPEP	ATMGI	MGCI
Student MGPE	1.000			
Student MGPEP	0.756 ^c	1.000		
Student ATMGI	0.754 ^c	0.732 ^c	1.000	
Student MGCI	0.739 ^c	0.767 ^c	0.688 ^c	1.000

Note:MGPE=Student Mobile Game Perceived Enjoyment; MGPEP=Student Mobile Game Perceived Ease of Play; ATMGI=Student Attitude towards Mobile Gaming Intention; MGCI=Student Mobile Gaming Continuance Intention. * Scores: 1 – Strongly Disagree; 3 – Neutral; 5 – Strongly Agree. *significance level: ^a significance level <0.05; ^b significance level <0.01; ^c significance level <0.001

The individual item loadings are all above the recommended 0.5 (Anderson & Gerbing, 1988). In particular, the lowest item factor loading is 0.733. This indicates an impressive and acceptable individual item reliabilities as more than 70% of each item's variance is shared with its respective construct. Thus, all items converged well on their respective constructs. This study also computed the composite reliabilities (CR) and average variance extracted (AVE) for each construct using the formulas proposed by Fornell & Lacker (1981). The formulas are as follows:

$$CR\eta = (\sum\lambda_i)^2 / ((\sum\lambda_i)^2 + (\sum\epsilon_i))$$

Where CR η = Composite reliability, $(\sum\lambda_i)^2$ = Square of the summation of the factor loadings; $(\sum\epsilon_i)$ = Summation of error variances.

$$V\eta = \sum\lambda_i^2 / (\sum\lambda_i^2 + \sum\epsilon_i)$$

Where V η = Average Variance Extracted (AVE); $\sum\lambda_i^2$ = Summation of the squared of factor loadings; $\sum\epsilon_i$ = Summation of error variances.

The results of the CR and AVE computations are presented in Table 2. All the CR values are above 0.856, therefore surpassing the recommended threshold of value 0.7 suggested by Hulland (1999). This confirms the internal consistency and reliability of the respective measures used by this study. Furthermore, the AVE values are above the recommended threshold value of 0.5 (Fornell & Larcker, 1981; Gerbing and Anderson, 1988). The results presented in Table 2 indicate that the minimum AVE value is 0.598. This further confirms acceptable levels of research scale reliability. To assess discriminant validity two approaches were used. First, the study checked if the lowest AVE values for each multi-item construct were greater than the highest paired shared variance between constructs (Nunnally & Bernstein, 1994; Hu & Bentler 1995). The lowest AVE value of 0.598 is greater than the highest shared variance value between constructs of 0.54. As such, all pairs of constructs reveal an adequate level of discriminant validity (see Table 2). Second, the study checked if the correlations between research constructs were below a unit value (1.0). The maximum correlation value between constructs is 0.767, and therefore, is lower than the value of 0.8 that was recommended by Fraering & Minor, (2006), as evidence of discriminant validity. All in all, the study provides sufficient evidence that the measurement scales used are reliable and valid.

11. Structural Equation Modeling

In order to test the direct and indirect effects of student perceived mobile gaming enjoyment and student perceived mobile games ease of play on student mobile gaming continuance intention and student attitude towards mobile gaming intention respectively, this study performed a structural equation modeling (SEM) using AMOS version 7 statistical software program. Following a two-step model building approach recommended by Anderson & Gerbing, (1988), the measurement model was assessed prior to testing the structural model. The maximum likelihood estimation (MLE) method was used because it has desirable asymptotic properties (e.g., minimum variance and unbiasedness) and is scale-free. The results for the model fit are reported in Table 4. The model is acceptable in terms of overall goodness of fit. Acceptable model fit are indicated by CMIN/DF value <3; RMSEA values \leq .080; GFI, TLI and CFI values \geq .90. The study results indicate that, CMIN/DF (2.812); GFI (0.90); IFI (0.94), TLI (0.93), CFI (0.96), and RMSEA (0.070) and therefore, achieved the suggested thresholds (Benteler, 1990; Browne & Cudeck, 1993; Marsh, Balla & Hau, 1996). This suggests that the model converged well and could be a plausible representation of underlying empirical data structures collected in South Africa.

Table 4: Results of structural equation model analysis

Path Coefficients	Hypothesis	Factor Loading
Student MGPE → Student MGCI	H1	0.564 ^c
Student MGPE → Student ATMGI	H2	0.375 ^c
Student MGPEP → Student MGCI	H3	0.421 ^c
Student MGPEP → Student ATMGI	H4	0.252 ^c
Student ATMGI → Student MGCI	H5	0.348 ^c

Note: ^a significance level <0.05; ^b significance level <0.01; ^c significance level <0.001;

Research structural model fits: χ^2 (df): 2.812; GFI: 0.90; CFI: 0.96; TLI: 0.93; IFI = 0.94; RMSEA = 0.070.

Note: MGPE=Student Mobile Game Perceived Enjoyment; MGPEP=Student Mobile Game Perceived Ease of Play; ATMGI=Student Attitude towards Mobile Gaming Intention; MGCI=Student Mobile Gaming Continuance Intention

The parameter estimates of the structural model exhibited the direct effects of one construct on the other. A significant coefficient at a certain level of alpha thus reveals a significant relationship among latent constructs (see Table 4).

The results in Table 4 provided support for the entire proposed five research hypothesis. The path coefficients for H1, H2, H3, H4 and H5 are 0.564, 0.375, 0.421, 0.252 and 0.348 respectively. All hypothesis coefficients are significant at a confidence level (p value) of 0.001.

12. Discussion and Conclusions

The purpose of the current study was first and foremost, to explore the direct effects of students' mobile gaming perceived enjoyment and students' mobile gaming perceived ease of play on their mobile gaming continuance intention and the mediating role of their attitude towards mobile gaming intention in these posited relationships in South Africa. In order to empirically validate these relationships, a sample of 352 students from Vaal University of Technology and North West University in South Africa was used. All the proposed five hypotheses were empirically supported indicating that mobile gaming perceived enjoyment, mobile gaming perceived ease of play and attitude towards mobile gaming intention, all positively influence the students' mobile gaming continuance intention in a significant way in South Africa.

What is interesting to note from the current study findings is that the "mobile gaming perceived enjoyment" has a stronger direct effect on "mobile gaming continuance intention" than on "perceived mobile gaming ease of play" and "attitude towards mobile gaming intention". Perhaps this can be explained by the fact that students consider first and foremost, the enjoyment they expect to derive from mobile gaming more than how ease to play the mobile games might be. Therefore, the higher the expected enjoyments from mobile gaming, the more the students are expected to play mobile games irrespective of the ease of play or the lack of it. "Students' attitude towards mobile gaming intention" has the least effects on "mobile gaming continuance intention".

Another important observation from the current study findings is that both "student mobile gaming perceived enjoyment" and "student mobile gaming perceived ease of play" have stronger influence of "mobile gaming continuance intention" than they do on "attitude towards mobile gaming intention". Moreover, "students' mobile gaming perceived enjoyment" has stronger influence on "attitude towards mobile gaming intention" than what "perceived mobile gaming ease of play" does.

The current study is the first to investigate the direct and indirect effects of student mobile gaming perceived enjoyment and perceived ease of play on continuance intention and attitude towards gaming intention respectively in South Africa's institutions of higher learning – universities in particular. Because mobile gaming industry is rapidly growing in South Africa and that the youth constitute the majority of mobile gaming consumers, the findings of this study provide fruitful implications for both practitioners in the mobile gaming industry and academicians alike. On the academic front, this study makes a significant contribution to the mobile gaming literature in developing countries of Africa. The managerial implications of the study findings will be provided below.

13. Managerial Implications

The current study findings have implications for practitioners and entrepreneurs in the mobile gaming industry in South Africa. One of the practical implications of the research findings is that entrepreneurs who design mobile games in South Africa need to consider the possible enjoyment the students derive from the mobile games more than the ease of play of

designed mobile games. This is so, because mobile gaming perceived enjoyment triggers students' desire to continue play mobile games in the future more than does mobile games perceived ease of play.

Since "attitude towards mobile gaming intention" has the least effects on student mobile gaming continuance intention, in order to enhance mobile gaming continuance intention, marketers for mobile gaming should put more emphasis on the enjoyment experienced from mobile games or to some extent the "ease of play" in their advertisements rather than flooding adverts targeted at changing student's attitudes towards mobile gaming intention. The sole reason for such a recommendation is that, both "mobile gaming perceived enjoyment" and "perceived ease of play" have stronger effects on "students' mobile gaming continuance intention" than does "student attitude towards mobile gaming intention".

14. Limitations and Future Research

Although this study makes significant contributions to both academia and practice, there are some limitations which open up avenues for further research. First, the current study was limited to a sample of students at Vaal University of Technology and North West University in Vanderbijlpark. Subsequent research could replicate this study in broader sampling contexts that include more universities in South Africa or more institutions of higher learning such as colleges. Perhaps too considering extending this research to other African countries and testing the conceptualized model might be another necessary future research direction. Furthermore, future studies can also extend the proposed conceptual framework by studying the effects of a larger set of variables. For instance, the influence of the "usefulness of mobile gaming" or the application of whole "TAM" in the mobile gaming context might provide a possible future research avenue. Above and beyond, this will provide added insights and immensely contribute new knowledge to the existing body of mobile gaming literature in Southern Africa.

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