The study of mobile game loyalty: The need gratification and flow experience approach

BY

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An Honours Degree Project Submitted to the School of Business in Partial Fulfillment of the Graduation Requirement for the Degree of Bachelor of Business Administration (Honours)

Hong Kong Baptist University
Hong Kong

April 2013
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Abstract

Mobile game market has experienced astonishing growth. Players’ loyalty toward a mobile game could have profound impact on mobile game developers. In this study, factors were drawn from flow theory (control, focused immersion, curiosity and heightened enjoyment) and uses and gratifications approach (cool and new trend, escapism, companionship, habitual pass time and to meet new people) and their impact on mobile game loyalty was examined. An empirical study of mobile game players (n=149) found that flow significantly affect loyalty while only three factors, cool and new trend, escapism, and habitual pass time from uses and gratifications approach are relevant to mobile game loyalty. Implications for research and practice are discussed.
1. Introduction

The usage of smartphone is sky-rocketing and there is no sign of stoppage. Currently, the number of smartphones in use is around one billion and the number is expected to double to two billion within the next few years (Yahoo Finance, 2012). The size of the mobile game market also experience rapid expansion. In 2011, the total number of American mobile game players surpassed the 100 million mark; a year-on-year increase of 35% while Europe showed a growth of 15%, totaling 70 million gamers for seven key territories. Growth rate in terms of the time and money spent was significantly higher. Mobile gaming took 13% of all time spent on games worldwide, totaling more than 130 million hours a day, and 9% of total money spent on games, grossing $5.8bn. In addition to the growing installed base of smartphones and tablets, uptake of in-game purchases in free games and emerging separate markets created by tablets and smartphones also added momentum to the mobile game market (newzoo, 2012). The great potential of the mobile game market have attracted numerous mobile game developers to enter into the market using various business models, including game-fee, subscription, add-on content and virtual items.

In-app billing service has become a more popular form of subscription revenue for App-platform provides like Google to gain more market share and revenue (paidcontent.org,,2011). For application developers, in order to cope with this change and maximize the return on in-application purchases by customers, they need to encourage users to repeatedly use their application and to pay for more advanced features. For mobile game developers, in order to increase the duration of mobile game playing time by players and their desire to pay for higher leveled items in the games, the key is discouraging players from switching to new games, while cultivating mobile games loyalty held by them to the current games.

Compared with mobile game market’s accelerated development, research on mobile game loyalty is rare. Although considerable effort has been devoted to the study of m-commerce and other design aesthetics
in mobile context (Cyr, Head, & Ivanov, 2006) few researchers paid attention to the particular area of mobile game. Some researchers argue that the success of information technology relies more on individual’s continuance usage instead of the initial usage or adaptation of IT (Bhattacherjee, 2001). This would be particularly important for subscription-based or in-app purchases mobile game developers, since the continuance playing of these mobile games is closely related to the profits. In addition, advertisements in mobile games could be a significant source of income for mobile game developers (Seek omega, 2012).

The purpose of this paper was to develop and a test a model of a players’ mobile game loyalty, specifically focusing what factors constitute to loyalty towards a specific mobile game. From a theoretical perspective, there is a clear need to build a model that can help explain loyalty in the mobile game context. The model can serve as a starting point for understanding mobile game loyalty by incorporating flow theories and uses and gratifications approach.
2. Prior research

2.1 Loyalty

Loyalty is described as “a deeply held commitment to rebuy or re-patronize a preferred product/service consistently in the future, thereby causing repetitive same-brand or same brand-set purchasing, despite situational influences and marketing efforts having the potential to cause switching behavior” (Oliver, 1999). Consumers are theorized to become loyal following the cognition-affect-conation pattern and finally in a behavioral manner, which is described as “action inertia” or action loyalty. In the first loyalty phase, cognition can be based on prior knowledge or on recent experience-based information about the performance of the brand. Loyalty at the cognitive phase is focused on the brand attribute information available to the consumer. The second phase of loyalty development, affective loyalty, is directed toward the attractiveness of the brand, developed on the basis on previous satisfying usage occasions. The next phase of loyalty development, conative loyalty refers to a commitment to the intention to rebuy the brand. However, this desire may be only a “good intention”, anticipated but without any realized purchase. In the action loyalty phase, the repurchase intention in the former state is transformed into eagerness to act, accompanied by an additional will to overcome obstacles that might prevent the act. If the action is repeated, an action inertia grows, therefore facilitating repurchase (Oliver, 1999).

2.2 Customer loyalty

In the context of e-commerce, antecedents and consequences of customer loyalty have been investigated. According to Ribbink et al. (2004), trust in the electronic medium, known as “e-trust”, and e-satisfaction both directly affect e-loyalty. Dimensions of e-service quality, such as assurance, ease of use, e-scape, customization and responsiveness strongly affect satisfaction and indirectly influence e-loyalty. Srinivasan et al. (2002) concluded that seven factors, including customization, contact
interactivity, care, community, cultivation, choice, and character impact e-loyalty. Their study also reveals that e-loyalty has an impact on two customer-related issues: word-of-mouth promotion and willingness to pay more.

2.3 Loyalty in the mobile context

Lin and Wang (2005) examined the determinants of customer loyalty in mobile commerce context, and found that perceived value, habit, trust and customer satisfaction are factors exerting significant influence in this subject matter. Their analysis successfully applied the traditional concept of customer loyalty in the mobile commerce context. In mobile context, perceived enjoyment and perceived usefulness both play a significant role in influencing mobile loyalty. The impact of perceived enjoyment on loyalty may be more or less the same as that of perceived usefulness (Cyr, Head, & Ivanov, 2006). Results show that the incorporation of a hedonic component into the study of mobile loyalty is highly relevant and deserve researchers’ attention. Wakefield and Whitten (2006) stated that perceived entertainment “is an intrinsic belief that is likely to maximize use of the device for users that expect immersing and playful interactions with the device”. Properties or elements that raise cognitive absorption or playfulness will cause affirmative feelings that prompt usage behavior.

2.4 Uses and Gratifications theory

The origin of the uses and gratifications (U&G) approach can be traced back to the 1940s, when scholars in communication research field began to study why audiences engaged in different forms of media behavior (Ruggiero, 2000). The U&G approach reversed the conventional research agenda, changed the research question from “what do the media do to people?” to “what do people do with the media?”, as noted by Elihu Katz (1959). It is proposed that media users search for a specific form of mass communication, such as the newspaper and the radio, to gratify their needs. If those needs are satisfied, people will probably reiterate the experience. Recently, researchers apply the U&G approach
in the IS context to examine the audience experience associated with websites (Eighmey & McCord, 1998) and the motivations contributing to the use of social media (Raacke & Bonds-Raacke, 2008; Smock, Ellison, Lampe & Wohn, 2011).

2.5 Flow experience

The concept of flow was first introduced by Csikszentmihalyi (1975) in 1975. He specified it as “the holistic sensation that people feel when they act with total involvement”. Flow is regarded as a multi-dimensional construct with several distinct components – control, attention, curiosity and intrinsic – interest. When people are in a state of flow, they are totally immersed into the activity; their attentions are centered to the activity itself; they feel in control of the environment and there is an enhanced state of sensory and cognitive curiosity (Agarwal & Karahanna, 2000). The key element in flow is that the activity itself must be autotelic, which means “people do it because they love it”. There is no need for external reward because the activity itself is intrinsically interesting and motivating (Csikszentmihalyi, 1975). The theory of flow has been widely used in studying an extensive range of circumstances, including work, shopping, chess playing, rock climbing, dancing and others. In recent times, researchers also applied flow in studying player enjoyment in online games (Hsu & Lu, 2004; Sweetser & Wyeth, 2005).
3. Theory and hypotheses

Fig. 1 depicts the research model, showing the six hypotheses that were empirically tested. It asserted that mobile game loyalty was a function of: satisfaction, commitment and flow. Flow was hypothesized as being directly related to loyalty, whereas uses and gratifications indirectly influence loyalty through satisfaction and commitment. Satisfaction also posited a positive relationship with commitment. Four latent dimensions formatively make up the second-order construct of flow: control (3 items), focused immersion (5 items), curiosity (3 items) and heightened enjoyment (4 items), formatively make up the second-order construct of flow.

3.1 Relationship between satisfaction, commitment and loyalty

3.1.1 Loyalty

Customer loyalty in mobile context can be defined as the favorable attitude held by a customer towards a specific m-commerce website, resulting in reiterate purchasing behavior (Lin & Wang, 2005). In the setting of mobile game, loyalty can thus be regarded as the repetitive playing and word-of-mouth promotion of a mobile game by a player. The presence of other substitutes which could cause switching
behavior has no effect to the player’s repetitive playing of the mobile game.

3.1.2 Satisfaction

Satisfaction is an affective response of customers who find the long-term service interaction experiences rewarding and fulfilling (Crosby, Evans & Cowles, 1990). In this study, the concept of satisfaction is adopted to be a summary of affective interaction experience between a mobile game player and a mobile game in considering all aspects of the game playing experience. Satisfaction has been indicated as a strong indicator of re-purchase intention in previous research (Wang, T.I. Tang & J.T.E. Tang, 2001). Hence, satisfaction can be regarded as a reliable indicator of loyalty towards a mobile game. This expectation, shown in Fig.1, leads to the first hypothesis:

**H1**: Satisfaction is positively related to mobile game loyalty.

3.1.3 Commitment

Morgan and Hunt defined commitment as a belief of the committed party that the relationship is so crucial that it warrants maximum effort to ensure it lasts (Morgan & Hunt, 1994). There are two commitment traits: affective (based on loyalty and a sense of belonging) and calculated (based on rational assessment). Obviously, loyalty which stems from affective commitment will be greater than that from calculated commitment. An intention to maintain the relationship indicates a possibility that a subsequent behavior will take place. For example, gamers who are committed to their favorite games are likely to continue to play those games. Therefore, there should be a positive relationship between commitment and loyalty

**H2**: Commitment is positively related to mobile game loyalty.

As Tax et al. (1998) showed, satisfaction has a direct impact on commitment. In the context of this study,
mobile game satisfaction can strengthen player’s willingness to continue playing the selected mobile game. Thus:

**H3**: Mobile game satisfaction is positively related to the commitment to a mobile game

### 3.2 Uses and gratifications

The term gratification is used to describe the particular types or dimensions of satisfaction reported by individuals concerning their media use experiences (Eighmey & McCord, 1998). Papacharissi and Mendelson (2011) employed factor analysis to identify nine distinct scales of motives for using Facebook from the uses and gratifications perspective. To better suit the mobile game context, five out of the nine motives were chosen to be tested in the study, they are: (1) Cool and new trend, suggesting that individuals play mobile games because it is “the thing to do” and because “everyone else is doing it”. (2) Escapism, suggesting procrastinatory playing of mobile games, to avoid tasks or individuals. (3) Companionship, pointing to the ability of the mobile game to stimulate companionship without the presence of other channels. (4) Habitual pass time, referring the pass time playing of mobile games of a ritualistic nature, possibly pointing to the addictive nature of the genre. (5) To meet new people, a factor pointing to the importance of mobile games in making new connections.

Therefore, cool and new trend, escapism, companionship, habitual pass time and to meet new people are the components of gratifications in this study. In the context of mobile gaming, gratification refers to the extent that the motivations of the players (needs of the players) are satisfied. The U & G approach has been applied in previous research (Liang, Lai & Ku, 2006-7) and found to be associated with user satisfaction, so the following hypotheses are proposed:

**H4a**: Cool and new trend is positively related to the satisfaction of mobile game players to a mobile game
**H4b:** Escapism is positively related to the satisfaction of mobile game players to a mobile game

**H4c:** Companionship is positively related to the satisfaction of mobile game players to a mobile game

**H4d:** Habitual pass time is positively related to the satisfaction of mobile game players to a mobile game

**H4e:** To meet new people is positively related to the satisfaction of mobile game players to a mobile game

According to the U & G approach, people use media to gratify their needs and this will reinforce their repeat media use if their needs are satisfied. In light of this, players will return to the same mobile game if their needs are gratified through game playing. Consequently, the following hypotheses are put forward:

**H5a:** Cool and new trend is positively related to the commitment of mobile game players to a mobile game.

**H5b:** Escapism is positively related to their commitment to a mobile game.

**H5c:** Companionship is positively related to their commitment to a mobile game.

**H5d:** Habitual pass time is positively related to their commitment to a mobile game.

**H5e:** To meet new people is positively related to their commitment to a mobile game.

### 3.3 Flow experience

Csikszentmihalyi (1975) defined flow with several dimensions, including intense concentration, a sense of being in control, a loss of self-consciousness and curiosity. In this study, based on the work of Csikszentmihalyi (1975) and Agarwal and Karahanna (2000), flow can be measured from the following four dimensions:

1. Control, representing the mobile game player’s perception of being in control of the game;
(2) Focused immersion, or the total involvement where other distraction are, literally, ignored;

(3) Curiosity, suggesting that there is an enhanced wakefulness of sensory and cognitive curiosity;

(4) Heightened enjoyment, capturing the pleasurable interaction between the player and the mobile game.

According to Csikszentmihalyi (1975), one key characteristics of the flow experience is its autotelic nature. In other words, the activity itself is so enjoyable that there is no need for goals or external rewards for people to get involved in the activity. People are motivated to pursue these activities to derive satisfactions from them, resulting in repetitive behavior of the activities for maximum satisfaction. Consequently, the following hypothesis is proposed:

**H6:** Flow is positively related to mobile game loyalty
4. Research method

4.1 Data collection
Empirical data were collected by conducting an online research through the use of Qualtrics. A message was placed in social networking platforms such as Facebook to promote the study and the questionnaires were self-administered. The message stated the objective of the study, a hyperlink to the survey form and an incentive, an opportunity to participate in a lucky draw was offered to raise the willingness of potential respondents to participate in the study. At the end of the survey, 212 people completed the questionnaires. After examination, 63 responses were deleted for incompleteness and screening out at the initial stage. Therefore, a total of 149 usable data were collected.

4.2 Measurement
All responses were recorded on seven-point Likert scales anchored by 1 (strongly disagree) and 7 (strongly agree). The five constructs being studied in this study were loyalty, satisfaction, commitment, flow and gratifications. The study developed measures based on prior related studies. Specifically, the construct of uses and gratifications were drawn from the items developed by Smock et al. (2011) resulting in a total of 15 items. 15 items were generated to measure mobile game flow (Agarwal & Karahanna, 2000). Furthermore, the commitment measures were culled from Allen and Meyer (1990). Finally, the items measuring mobile game loyalty and satisfaction were chosen from Huang and Hsieh (2011) and Bhattacherjee (2001) respectively. All the items were initially prepared in English, they were translated into Chinese. Chinese and English versions of the questions were put side by side for easy reference by respondents. Item wordings were slightly modified to suit the study context of mobile game. The measurement items are listed in Appendix A.
4.3 Data analysis and results

Partial Least Squares (PLS) is used to analyze the research model. PLS is a frequently utilized technique in IS studies (Ahuja & Thatcher, 2005; Gefen & Straub, 1997; Venkatesh & Morris, 2000). PLS is a latent structural equation modeling approach, which has no restriction on normal distribution and can be applied to data with a relatively small sample size (Chin, Marcolin & Newsted, 2003). These cause PLS an ideal tool for the data analysis of the study. The measurement model was first assessed and the structural model was examined next.

4.4 Measurement model

Convergent validity Convergent validity refers to the degree to which the measures of a construct that should be theoretically related to each other are, in fact, related in reality. It was examined by using the composite reliability (CR) and the average variance extracted (AVE). The threshold values for CR and AVE are 0.70 and 0.50 respectively (Fornell & Larcker, 1981). As summarized in Table 1, nearly all CR and AVE values conform to the critical levels, with the CR ranging from 0.78 to 0.92 and the AVE ranging from 0.47 to 0.79. For the item loadings, most of them meet the recommended level and are higher than 0.7.

Discriminant validity Discriminant validity presents the degree to which the measurement can be empirically differentiated from other variables. It is shown by low correlations between the assessment of interest and the assessment of other variables (Fornell & Larcker, 1981). Discriminant validity can be evidently exhibited when the square root of the average variance extracted (AVE) for each variable is higher than that the correlations between it and other variables. As shown in Table 2, the square root of AVE for each variable is greater than the latent variable correlations between them and all other variables. The results indicate a sufficient discriminant validity of all measurements.
Table 1. Convergent validity of the measures

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<th>Construct</th>
<th>Item</th>
<th>Factor Loadings</th>
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<th>Mean</th>
<th>St.dev</th>
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<tr>
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<td>Satisfaction</td>
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Table 2. Correlations between components (diagonal elements of square root of the AVE)

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<th>COM</th>
<th>COMP</th>
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4.5 Structural model

Figure 2 presents the results of the study with the overall explanatory power, the estimated path coefficients (all significant paths are indicated with an asterisk, when *p < 0.05, or **p < 0.01, ***p < 0.001), and the associated t-values of the paths of the research model. By using the bootstrap re-sampling method, tests of significance for all paths were performed.
The results illustrate that the exogenous variables explain 47 percent of the variation in mobile game loyalty, 51 percent in commitment and 14 percent in satisfaction. Not all of the structural paths were found to be statistically significant in the research model. Satisfaction had significant effects on both commitment and mobile game loyalty ($\beta = 0.20$, $p<0.01$ and $\beta = 0.29$, $p<0.001$ respectively), supporting H1 and H3. Commitment ($\beta = 0.29$, $p<0.001$) had significant impact on mobile game loyalty, supporting H2. Flow ($\beta = 0.27$, $p<0.01$) had significant effects on mobile game loyalty, providing empirical support for H6. In Uses and Gratifications components, companionship and meeting new people were found to have no significant impact on both commitment and satisfaction. Cool and new trend and Escapism were indicated to be significant to commitment, with path coefficients at 0.25 and 0.25, but no significant effect to satisfaction. Habitual pass time had significant positive impact on both satisfaction and commitment ($\beta = 0.37$, $p<0.001$ and $\beta = 0.24$, $p<0.001$ respectively).
Figure 2. Structural model result

U & G Theory

- **Cool and new trend**
  - **Escapism**
    - **Companionship**
      - **Habitual pass time**
        - **To meet new people**

- **Satisfaction (R^2=0.14)**
  - 0.25*** (t=3.37)
  - -0.08 (t=0.66)

- **Commitment (R^2=0.51)**
  - 0.25*** (t=2.87)
  - 0.08 (t=0.65)
  - 0.05 (t=0.71)

- **Loyalty (R^2=0.47)**
  - 0.20** (t=3.01)
  - 0.29*** (t=3.50)

- **Flow**
  - **Control**
  - **Focused Immersion**
  - **Curiosity**
  - **Heightened Enjoyment**

**Coefficients and Significance Levels**

- 0.25*** (t=3.37)
- -0.08 (t=0.66)
- 0.24*** (t=3.61)
- 0.37*** (t=3.73)
- 0.20** (t=3.01)
- 0.29*** (t=3.50)
- 0.27** (t=2.68)
- 0.29*** (t=4.33)
- 0.07 (t=0.66)
- 0.08 (t=0.65)
- 0.05 (t=0.71)
- 0.25*** (t=2.87)
- -0.11 (t=1.12)
- 0.11 (t=1.46)
5. Discussion of Result

Flow experience is found to significantly influence consumers’ mobile game loyalty. These results are consistent with previous findings (Choi & Kim, 2004; Huang & Hsieh, 2011). This implies that control, focused immersion, curiosity and heightened enjoyment of mobile game players are important indicators of their loyalty towards a mobile game. Uses and gratifications approach is also adopted in this study. Surprisingly, only three out of the five U&G factors in the research model are relevant to satisfaction and commitment. Meeting new people and companionship are not significantly related to mobile game satisfaction and commitment.

A possible explanation is that, in light of the mobile game context, most mobile games are single player mobile games and there is less socializing function in mobile games compared to other platforms such as Facebook and multiplayer online games (MMO). Multiplayer functionality in mobile context is often achieved through WIFI, 3G, Bluetooth or Wireless LAN. However, given the lack of processing power of mobile devices and connectivity constraint (Stack Overflow, 2011), multiplayer gaming may not be readily applicable in mobile context compared to computers. On the other hand, cool and new trend and escapism only relate positively to commitment but not satisfaction. A probable explanation is that when mobile game players play a game because of trend, they are not looking for satisfaction but simply want to follow others and to be seen as keeping up with trends. For escapism, it is possible that mobile game players know playing games as a mean of mental diversion “is not so gratifying in itself” (Hirschman, 1983), but only takes them away from unpleasant aspects of life. Therefore, escapism fails to have a significant impact on satisfaction. These findings are believed to broaden our understandings of the constituents of mobile game loyalty, as well as enrich the research of satisfaction and commitment in the mobile context.
6. Conclusion and discussion

Motivated by the need to understand what factors constitute loyalty in the mobile game context from a non-technological perspective, this study attempts to develop and test a set of psychological factors that encourage the repeated playing behavior of a mobile game by players. The research model incorporates two theories, namely the uses and gratifications approach and flow experience adopted from the communication research and psychological literature. The study results indicate that flow is positively related to mobile game loyalty. Among the uses and gratifications components, only habitual pass time exerts a positive effect to both satisfaction and commitment. Escapism and Cool and new trend are only positively related to commitment but not satisfaction. Companionship and meeting new people have no significant effect to either satisfaction or commitment of playing mobile games.

6.1 Implications for theory and research

This study addresses two academic needs. Firstly, after going through many hedonic information systems studies in the IS literature, research on mobile game loyalty is not fully explored. Secondly, this study demonstrates the use of psychological theory (flow experience) and communication research theory (uses and gratifications approach) in the context of mobile game loyalty. Previously, these two theories have only been applied in the study of online game loyalty but not in mobile context. Bearing these thoughts in mind, it is believed that these theories should play a more significant role in studying mobile game loyalty. In this study, several factors were extracted from the theories and put to test. Results of the data analysis indicate that only some of the hypotheses are supported.

6.2 Implication for practice

The findings of this study may also inform practitioners, especially designers of mobile games. Because cool and new trend is positively related to commitment to mobile game, mobile game designers should
provide incentives for game players to share the game to their peers and thus creating a trend for others to follow. For escapism, people escape the unpleasant realities through seeking sensory arousal and imaginal capacity of life (Hirschman, 1983). Therefore, mobile game designers may provide sensory stimulation to players through features like graphics and sounds, while inducing players’ desire to construct imaginary sequences. Concerning the positive effect of habitual pass time to both satisfaction and commitment, mobile game designers can add achievement component (Yee, 2006) in the form of gaining power, progressing and accumulating in-game symbols of wealth or status to encourage the repetition of the playing behavior, which eventually facilitate habit formation (Lally, Van Jaarsveld, Potts & Wardle, 2010). Finally, mobile game designers can facilitate the achievement of flow experience by players through adding suitable components and providing the four dimensions of flow to players, which are control, focused immersion curiosity and heightened enjoyment.

6.3 Limitations and future research
The main limitation of this study is related the sample, which is conveniently collected in Hong Kong with 149 usable respondents. Both the sampling region and the sample size could affect the generalizability of this study. Another limitation is that some factors in the research model are not relevant to the study of satisfaction and commitment in the mobile game context. In sum, future research could be conducted by collecting results from a larger sample size and more geographically diverse regions, and also using other U&G factors that can be more applicable to the mobile game context. This can broaden our understandings of the applicability of flow theory and uses and gratifications approach in the study of mobile game.
References


Fornell, C., & Larcker, D.F. (1981) Structural equation models with unobservable variables and measurement errors. *Journal of Marketing Research*, 18(3), 382-388


Huang, L.Y. & Hsieh, Y.J. (2011) Predicting online game loyalty based on need gratification and experiential motives. *Internet Research*, 21(5), 581 – 598


**Appendix**

Scales and items

*Note:* All scales, except satisfaction, shared a common prompt: “Please indicate how well do you agree with the following statements” and were measured with a 7-point Likert-type scale ranging from “Strongly Disagree” to “Strongly Agree”.

**Mobile game loyalty**

[L1] I will recommend the mobile application game I played to others
[L2] I repeat playing the mobile application game
[L3] I frequently return to the mobile application game that I participated before.
[L4] I will say positive things about the mobile application game I played to others

**Commitment**

[COM1] I enjoy discussing the mobile application game with others
[COM2] I think that I could easily become as attached to another mobile application game as I am to the one
[COM3] I feel emotionally attached to the mobile application game
[COM4] The mobile application game has a great deal of personal meaning for me

**Satisfaction**

[ST1] Very dissatisfied…Very satisfied
[ST2] Very displeased…Very pleased
[ST3] Very frustrated…Very contented
[ST4] Absolutely terrible…Absolutely delighted

**Flow**

*Focused immersion*

[FI1] While playing the mobile application game, I am able to block out most other distractions.
[FI2] While playing the mobile application game, I am absorbed in what I am doing.
[FI3] While playing the mobile application game, I am immersed in the task I am performing.
[FI4] When playing the mobile application game, I get distracted by other attentions very easily.
While playing the mobile application game, my attention does not get diverted very easily

*Heightened Enjoyment*
- [HE1] I have fun interacting with the mobile application game.
- [HE2] Playing the mobile application game provides me with a lot of enjoyment.
- [HE3] I enjoy playing the mobile application game.
- [HE4] Playing the mobile application game bores me.

*Control*
- [CO1] When playing the mobile application game I feel in control.
- [CO2] I feel that I have no control over my interaction with the mobile application game.
- [CO3] The mobile application game allows me to control my mobile phone interaction.

*Curiosity*
- [CU1] Playing the mobile application game excites my curiosity.
- [CU2] Interacting with the mobile application game makes me curious.
- [CU3] Playing the mobile application game arouses my imagination.

*Uses and gratifications*

*Cool and new trend*
- [CNT1] Because everybody else is playing that mobile application game.
- [CNT2] Because playing that mobile application game is the thing to do.
- [CNT3] Because that mobile application game is cool.

*Escapism*
- [ES1] So I can forget about school, work, or other things.
- [ES2] So I can get away from the rest of my family or others.
- [ES3] So I can get away from what I’m doing.

*Companionship*
- [COM1] So I won’t have to be alone.
- [COM2] When there’s no one else to talk or be with.
- [COM3] Because it makes me feel less lonely.

*Habitual pass time*
- [HAB1] Because I just like to play around that mobile application game.
- [HAB2] Because it is a habit, just something I do.
[HAB3] When I have nothing better to do.
[HAB4] Because it passes the time away, particularly when I’m bored.
[HAB5] Because it gives me something to do to occupy my time.

[MEET1] To meet new people (single time)