

# Effect of game motivation on flow experience and companionship

## The online pet games as the example

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Motivation crucially influences the willingness to play online games. Game motivation can affect players' flow experience and player's companionship with their game roles or avatars. However, the relationship among game motivation, flow experience, and companionship is unclear; therefore, designing online games that improving the playing experience is difficult. This study chose online pet games as study samples, and this study used a game motivation scale, flow experience scale, and the Companionship Scale of Artificial Pets to identify the relationship among game motivation, flow experience, and companionship. According to 216 valid questionnaire responses, this study demonstrated that (a) game motivation for online pet game players was primarily immersion and achievement, (b) compared with achievement motivation, immersion motivation had a greater influence on flow experience and the development of player companionship with online pets, and (c) players with immersion and achievement motivation had a substantially enhanced flow experience and companionship with their online pets.

**Keywords:** flow, companionship, online pets

### 1. Introduction

Many online games were developed when the Internet became a part of user life. Some online games, such as Neopets and League of Legends, have game roles or avatars for players; players finish game tasks and interact with other players through their game roles and avatars. Game designers assume that players are willing to continue playing online games and purchase game merchandise. A crucial factor that affects people's decisions to play games is game motivation (Bartle, 1996; Dindar & Akbulut, 2015; Hussain, Williams, & Griffiths, 2015; Yee, 2006). Several

studies (Chang, 2013; Choi & Kim, 2004; Voiskounsky, Mitina, & Avetisova, 2004) have indicated that flow experience also crucially influences players' willingness to play games.

Game motivation partially determines the types of games people want to play. The flow experience that players derive from games can enhance their willingness to continue playing games. A deep relationship with their game roles or avatars can also encourage players to continue playing games. Many types of relationships can be developed between players and their game roles or avatars, such as familial, romantic, friendly, and competitive relationships; this study proposes that companionship is a relationship that players build with their online game roles or avatars. Compared with negative relationships that players may build with their game roles or avatars, such as addictive relationships, companionship is healthier and can provide a long-term positive relationship for players. For example, Bickmore, Caruso, Clough-Gorr, and Heeren (2005) indicated that the long-term interactive relationships that users build with their computational artefacts can improve their quality of life.

Game motivation, flow experience, and companionship can encourage players to continue playing games. When players are willing to play online games for an extended duration, game developers are encouraged to design similar online games, and game companies are prompted to develop game merchandise. When virtual game roles are converted to embodied products, players have the opportunity to purchase embodied companions. Many game roles for online games and comic books have embodied products and hold exhibitions, such as the Avengers and Gundam. These embodied products strengthen player loyalty and enhance the relationship between players and their game roles.

Therefore, if game companies were aware of how game motivation affects players' flow experience and companionship with their game roles, then they could strengthen the relationship between players and their game roles through game design. This would help game companies expand their game marketing and increase the selection of online games for players.

Some studies have shown that flow experience and companionship can influence whether players continue to play games (Bickmore et al., 2005; Chang, 2013; Choi & Kim, 2004; Jackson & Eklund, 2002; Kaplan, 2000; Mival & Benyon, 2007; Novak, Hoffman, & Yung, 2000; Voiskounsky et al., 2004). However, how game motivation affects the relationship between flow experience and companionship is unclear. Therefore, game developers have difficulty using the relationship among game motivation, flow experience, and companionship to increase players' positive game experience.

Various online games, such as role-playing and educational games, provide game avatars for players. Online pet games also allow players to gain flow

experience and build companionship with their game avatars, online pets. Some studies have shown that online pets provide entertainment, relaxation, education, and companionship for players (Altschuler, 2008; Isbister, 2006; Lee, Tseng, & Huang, 2007; Wang & Chang, 2009). Compared with other online games, which involve offensive team tactics and are often violent, online pet games are simpler. Online pet game players focus mainly on raising their online pets and performing game tasks involving these pets. Online pets have features that are similar to those of artificial pets, such as companionship functions, autonomous mechanisms, and personality feedback. Therefore, this study chose online pet games as the study sample, and the results may also be applied to artificial pets.

In this study, we identified the factors influencing game motivation, flow experience, and companionship. We also explored how game motivation affects the relationship between flow experience and companionship. The study results can be applied to online pets, online games that include game avatars for players, and relevant artificial pets.

## 2. Literature review

In online pet games, players are pet owners who raise and monitor online pet development. Online pets are virtual software-based pets, and the activities of these pet are presented in on-screen games (Lawson & Chesney, 2007a). In some online pet games, players can freely design their online pets and game scenes according to their preferences; this allows for player self-identification and emotional expression (Oulasvirta & Blom, 2008). Vasalou and Joinson (2009) indicated that game avatars are often created to reflect the players' self-image and to represent their own appearance and preferences. The avatar development and identification show the psychological effects (Lim & Reeves, 2009), such as the enjoyment with the avatar (Trepte & Reinecke, 2010). Because of the universality of the Internet and portable devices, online pet games involve raising pets and social interaction. According to game development trends, this study analysed online pet games by using network functions such as Neopets and Pet Society.

Game motivation partially determines whether players continue to play games. Yee (2006) proposed 10 game motivation factors for online games: advancement, mechanics, competition, socializing, relationships, teamwork, discovery, role-playing, customization, and escapism. Zanetta Dauriat, et al. (2011) identified five game motivations for playing MMORPGs: achievement, socializing, immersion, relaxation, and escaping; these motivations are also similar to those determined by Yee (2006) (social motivations, achievement, and immersion, which includes escaping). Jin (2014) showed that the players of social network games desire

entertainment, fantasy, the challenge of competition, and escapism when playing these SNGs; among these four game motivations, the challenge of competition and escapism are similar to two of the motivations mentioned in the study by Yee (2006). According to the 10 factors in the study by Yee (2006), Yee developed 39 items for evaluating player game motivation and then integrated these 39 items into three game motivation factors: achievement, social, and immersion.

When players are motivated to begin playing games, flow experience crucially influences players' continued interest in playing games. A player's motivation to play a game should result in longer game play and greater flow experience (Hunnicke, LeBlanc, & Zubeck, 2004). Flow experience occurs when people are completely immersed and involved in activities (Csikszentmihalyi, 1975). The positive experience that online users derive from flow process can enhance their motivation to continue engaging in activities (Chen, 2006).

Flow includes three phases (Chen, 2000): flow antecedents, flow experience, and flow consequences. Different activities require various flow antecedents and can produce different flow consequences. Therefore, flow antecedents and consequences alone cannot be used to confirm whether players attain flow experience. Compared with its antecedents and consequences, flow experience is a superior indicator of player flow state. According to relevant studies, the factors that indicate whether players attain flow experience/state include concentration (Chang, 2013, Chen, 2000; Ghani, 1995; Sweester & Wyeth, 2005), which occurs when people are totally focused on activities; loss of self-consciousness (Chang, 2013; Chen, 2000), which occurs when people are indifferent to their performance and the evaluations of others during activities; time distortion (Chang, 2013; Chen, 2000; Novak et al., 2000; Skadberg & Kimmel, 2004), which occurs when people are unaware of the passage of time during activities; and telepresence (Chen, 2000; Novak et al., 2000; Skadberg & Kimmel, 2004), which occurs when people are temporarily unaware of their actual environment and are immersed in their virtual environment during activities (such as virtual scenes of online games).

Three methods can be used to measure people's flow experience: Narrative/survey, active survey, Experience Sampling Method (ESM) (Yang & Chen, 2006). (1) Narrative/survey: Researchers ask participants to recall their flow experience during a specific activity, such as playing games, and the participants answer the flow questionnaires according to their experiences. (2) Active survey: Researchers ask participants to answer a questionnaire immediately after or during an activity. (3) ESM: Researchers provide a pager and flow questionnaires for each participant and randomly call the participants during the testing period (approximately 1 week to several weeks). When the researchers call, the participants are asked to stop the activities and immediately complete the flow questionnaires. Finally,

the researchers collect several flow questionnaires from each participant for a specific activity.

The purposes of this study were to determine a player's overall flow experience over time when playing games. A single flow experience is not representative of a player's overall flow experience over the course of 1 week or even over 2 years. For example, runners may have a different flow experience during each run, but they could describe their typical flow experience when running if they were asked to do so.

The most effective method that we use to measure player flow experience is to ask players to complete the flow questionnaire immediately after each session of playing online pet games. However, if we wish to use the active survey method, entering every player's house several times is not easy because of privacy problems. Furthermore, the ESM tends to irritate players, causing them to become impatient and unlikely to complete the experiment. Additionally, we cannot be sure whether the participants immediately complete the flow questionnaire when the researcher calls. Therefore, this study employed the narrative/survey method to ask the participants to recall their overall flow experience when playing online pet games. The only problem is ensuring that the players remember the game situation that they have experienced.

Regarding the flow experience scale, the Flow State Scale 2 (FSS-2) can be used to evaluate people's flow state during physical activities (Jackson & Eklund, 2002) according to three factors: concentration, loss of self-consciousness, and time distortion. Novak et al. (2000), exploring the flow model of online environments, used telepresence and time distortion to assess user flow experience. Chang (2013) also developed items to evaluate player flow experience during social network games. According to these studies, we integrated and developed a scale to measure the flow experience of online game players.

Game motivation affects whether players begin to play online games, and flow experience affects whether players continue to play these games. The relationship between players and their game roles determines player motivation to build long-term relationships (companionship) with games. Relevant studies have indicated that emotion is one of the crucial factors that determines whether a player wishes to continue playing a game (Lazzaro, 2007; Ng, Khong, & Thwaites, 2012). Positive experiences and emotions are more critical to a player than increasing productivity and effectiveness when playing a video game. A game that evokes players' positive emotions can encourage them to play a game (Ng, Khong, & Thwaites, 2012).

Lazzaro (2007) asserted that emotion is one of the crucial factors that encourages people to play a game and used a player experience framework to show the different reasons for playing games; the framework includes four parts: hard fun, easy fun, people fun, and serious fun. These four parts provide a useful reference

for researchers to explore why people play games. Positive emotions encourage game play; however, the aforementioned emotion models (Lazzaro, 2007) can explain in detail why a person wishes to play a game. Nevertheless, in this study, the content of the player experience framework (Lazzaro, 2007) is not appropriate to explain the relationship between players and game roles.

Companionship is a relationship involving company, including relationships with partners, families, friends, and pets. Companionship can provide psychological satisfaction (Beverland, Farrelly, & Lim, 2008; Cavanaugh, Leonard, & Scammon, 2008; Mival & Benyon, 2007), enabling people to build long-term relationships with their objects of interaction. Kaplan (2000) asserted that the purpose of artificial pets, such as online pets, was to offer companionship to users. Lawson and Chesney (2007b) surveyed the companionship between Nintendo online pets and users and found that the level of companionship was similar to that between humans and real pets. Turkle (2007) stated that emotion that is derived from a digital companion is more crucial for users than machine functionality is (Banks & Bowman, 2013). Some studies have indicated that virtual agents, such as virtual pets, can be believable if they have their own personalities, emotions, and motivations (Cutumisu et al., 2006; Livingstone, 2006; Romano & Wong, 2004). This showed that the online game roles or artificial pets, which share characteristics with real pets or real human, can form relationships with users through continuous interaction.

We developed the Companionship Scale of Artificial Pets (CSAP; Luh, Li, & Kao, 2015) to evaluate the companionship between users and artificial pets, such as online pets. This scale was used twice in surveys, and the results of the two surveys had a high reliability and validity (Luh et al., 2015). This scale included 34 items, divided into three factors: enjoyment, satisfaction, and responsibility, all of which promote companionship. This scale was used to evaluate the companionship between players and virtual pets; it can also be used to assess the relationship between players and their online pets.

According to the aforementioned research, game motivation, flow experience, and companionship all affect whether users play online games. Exploring the relationships among these three factors can help game designers increase user willingness to continue playing or using online games or products. This promotes the development of suitable products in order to expand marketing and enhance positive feelings created through online games, artificial pets, and companionship products.

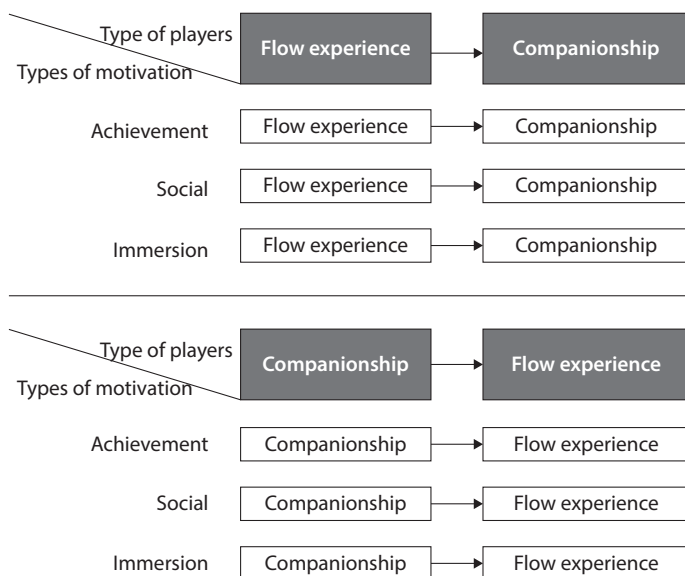
### 3. Methodology

#### 3.1 Hypotheses and experiment design

The value of game motivation is similar to that of flow antecedents for deciding whether games appeal to players. Flow experience can be attained by players when playing games. Companionship is a relationship that players can maintain with their objects of interaction, such as their online pets.

In online games, some players focus more on flow experience than other players do. Flow experience enables players to derive enjoyment and a sense of achievement from games (Ducheneaut, Yee, Nickell, & Moore, 2006). For these players, companionship is one of the many results of playing games. By contrast, other players focus more on companionship with their game roles; they view their game roles as companions. For these players, companionship with their game avatars increases flow experience each time they play the games.

This study hypothesized that irrespective of whether players focus on flow experience or companionship, three types of game motivation can be observed: achievement, social, and immersion (Yee, 2006). This study explored how these three types of game motivation affected the relationship between flow experience and companionship. The hypotheses of this study are shown in Figure 1.



**Figure 1.** Hypothesized relationships among game motivation, flow experience, and companionship

### 3.2 Questionnaire design

A quantification method could be used to explain the relationships among game motivation, flow experience, and companionship. Therefore, three scales were designed: one to evaluate participant game motivation, one to evaluate participant flow experience, and one to evaluate participant companionship with online pets.

In this study, Yee's (2006) scale was used to evaluate participant game motivation. This scale includes three factors: achievement, social, and immersion. These three factors were integrated with 10 subfactors to produce a total of 39 items. Because participants may lose patience when responding to 39 items, 10 representative items were selected from the 10 subfactors of Yee's scale to evaluate game motivation in this study (Table 1).

**Table 1.** The game motivation scale (factors and items)

Factors	Aspects	Items
<b>Achievement</b>	Advancement Mechanics	1. How important is it for you to level up your character as fast as possible?
	Competition	2. How important is it to you that your character is as optimized as possible for their profession / role?
		3. How much do you enjoy competing with other players?
<b>Social</b>	Socializing, Relationship, Teamwork	1. How much do you enjoy helping or chatting other players?
		2. How often do you find yourself having meaningful conversations with other players?
		3. Would you rather be grouped than soloing?
<b>Immersion</b>	Discovery, Role-playing, Customization, Escapism.	1. How much do you enjoy collecting distinctive objects or clothing that have no functional value in the game?
		2. How much do you enjoy trying out new roles and personalities with your characters.
		3. How much time do you spend customizing your character during character creation?
		4. How often do you play to relax from the day's work?

Source: Yee, 2006.

Four factors can be used to evaluate whether participants attain flow experience: concentration, loss of self-consciousness, time distortion, and telepresence. This study's flow experience scale included some items from the FSS-2 (Jackson & Eklund, 2002), the study by Chang (2013), and the study by Novak et al. (2000). In total, 22 items were included in the flow experience scale (Table 2). Finally, this study used the 34-item CSAP to assess participants' companionship with their online pets.



**Table 2.** The flow experience scale (factors, items, and resources)

<b>Concentration</b>	(Jackson & Eklund, 2002)
<ol style="list-style-type: none"> <li>1. My attention was focused entirely on what I was doing.</li> <li>2. It was no effort to keep my mind on what was happening.</li> <li>3. I had total concentration.</li> <li>4. I was completely focused on the task at hand.</li> <li>5. When I was playing this game, I felt totally captivated.</li> </ol>	
<b>Time distortion</b>	(Jackson & Eklund, 2002; Chang, 2013)
<ol style="list-style-type: none"> <li>1. Time seemed to alter (either slowed down or speeded up).</li> <li>2. The way time passed seemed to be different from normal.</li> <li>3. It felt like time stopped while I was performing.</li> <li>4. At times, it almost seemed like things were happening in slow motion.</li> <li>5. When I was playing this game, time seemed to pass very quickly.</li> </ol>	
<b>Loss of self-consciousness</b>	(Jackson & Eklund, 2002; Chang, 2013)
<ol style="list-style-type: none"> <li>1. I was not concerned with what others may have been thinking of me.</li> <li>2. I was not worried about my performance during the event.</li> <li>3. I was not concerned with how I was presenting myself.</li> <li>4. I was worried about what others may have been thinking of me.</li> <li>5. When I playing this game, nothing seemed to matter to me</li> </ol>	
<b>Telepresence</b>	(Novak et al., 2000)
<ol style="list-style-type: none"> <li>1. When I playing this game, my body is in the room, but my mind is inside the world created by the websites visit.</li> <li>2. I forget about my immediate surroundings when I play this game.</li> <li>3. After playing this game, I feel like I come back to the “real world” after a journey.</li> <li>4. Playing this game creates a new world for me, and this world suddenly disappears when I stop browsing.</li> <li>5. Playing this game often makes me forget where I am.</li> <li>6. When I play this game, I feel I am in a world created by the games I visit.</li> <li>7. When I play this game, the world generated by the sites I visit is more real for me than the “real world.”</li> </ol>	

Some items of the game motivation scale (Table 1) were applied in the studies by Yee (2006), Lin et al. (2015), and Snodgrass et al. (2013). In addition, some items of the FSS-2 (Table 2) were applied in the studies by Fournier et al. (2007), Jackson, Martin, and Eklund (2008) and Kawabata, Mallett, and Jackson (2008). The seven items of telepresence (Table 2) were applied in the studies by Kim and Biocca (1997), Novak et al. (2000), and Klein (2003). Although the CSAP was published in 2015 (Luh et al., 2015), but has been tested twice, and both tests met the standard of reliability and validity (Luh et al., 2015). Therefore, we used the CSAP to explore players' companionship with their online pets. The aforementioned studies have indicated that the items of the three scales are valid; thus, these scales were used in this study to explore the effect of game motivation on flow experience and companionship.

A 7-point Likert scale was used to measure the experiences of the participants according to the items on the three scales, with a high score indicating a high level of agreement with the descriptions of these items. In addition to responding to the items on the three scales, participants were asked to provide basic information, including gender, age, favourite online pet game, and years of experience playing games. The three scales (motivation scale, flow experience scale, and the CSAP scale); because this was too many items for one questionnaire, a two-phase survey was administered in order to maintain a high reliability and validity.

The methodology was as follows: (a) The questionnaires were designed, and the questionnaire content was validated; (b) the first phase of the survey, which included game motivation and flow experience scales, was performed for the participants; (c) the participants from the first survey were invited to complete the second questionnaire, and the second phase was conducted to investigate the participants' companionship with their online pets; (d) invalid data were deleted, SPSS statistical software was adopted to increase the study reliability, and factor, cluster, and regression analyses were conducted to verify the hypotheses.

We asked the participants to complete the game motivation, flow experience, and companionship scales according to their overall game experience. Moreover, for the flow experience scales, we offered a narrative description of flow for the participants to provide them with a definition of flow experience. To assist the participants in remembering their game situation, we also asked them to rate their game memory on a 7-point Likert scale (a higher score indicating a clearer game memory) at the bottom of the questionnaires. The question was as follows: "To what extent did you remember your game situation when you completed the previous questions?" If the participants' scores were lower than 3 points, then the participants' game memories were considered to be lower than 50%; thus, the questionnaire data were viewed as invalid, and the data were deleted.

Two items were incorporated from the CSAP scale into the first questionnaire to test validity. The two items were as follows: "My pet makes me happy when I play with it," and "my pet provides me with companionship." If the responses to the same question conflicted (subtracting the two scores  $\geq 3$ ) in the second questionnaire, then the questionnaire was considered invalid. Questionnaires were also considered invalid if the responses to all questions were the same and if participants were not online pet game players.

Content validation was performed by four online pet users who had continuous interaction with online pets for more than 2 years. Scale items were revised according to their recommendations. A convenience sampling method was adopted for the first phase survey. Online questionnaires were posted on various online forums such as Neopets, Meromero, Pet Society, and My Fishbowl. The members of these online forums were encouraged to complete the questionnaires.

Printed questionnaires were also provided to those who had played online pet games, which from our families, friends and colleagues. Participants were encouraged to provide their contact information on the first questionnaire, which could be used to invite them to complete the second questionnaire. After collecting the two-phase questionnaire, we compared every participant's basic information data (including gender, age, and favorite online pet game) according to this questionnaire. If the basic information answers were the same, then we assumed that the two-phase questionnaire was completed by the same participant.

For the printed questionnaires, we contacted gamers individually and confirmed that these gamers had completed the questionnaires. For the online questionnaires, the network IP addresses of the all participants were recorded. After collecting the questionnaires, we checked for repeat IP addresses and compared the answers. If the basic information of the participants, such as gender, age, favorite online pet game, and years of experience playing games, was the same, then only one of the datasets was retained.

### 3.3 Analysis method

After the two-phase survey was administered, invalid data were removed, and participant responses were subjected to a descriptive statistical analysis. This study followed the statistical analysis process (Chiou, 2006; Chiou, 2008), a Cronbach's  $\alpha$  was applied to evaluate the reliability of the three scales, and an exploratory factor analysis was conducted to test the validity of game motivation, flow experience, and CSAP scales. The Cronbach's  $\alpha$  value of each scale must exceed 0.7, indicating that a scale has a high coefficient of internal consistency (Chiou, 2006); the higher the Cronbach's  $\alpha$  value, the higher the reliability of a scale.

Two assessment methods, the Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy and Bartlett test of sphericity, were used to assess whether the three scales were suitable for a factor analysis. For suitability, the KMO value for each scale must be higher than 0.5, and the outcome of the Bartlett test of sphericity must reach the significance level ( $p < .05$ ) (Chiou, 2006). The meanings of the KMO test values are as follows:  $< 0.50$  is unacceptable,  $> 0.50$  is miserable,  $> 0.60$  is mediocre,  $> 0.70$  is middling,  $> 0.80$  is meritorious, and  $> 0.90$  is marvellous (Chiou, 2006). In this study, the KMO test values of the three scales were required to exceed 0.60 (mediocre).

If all three scales reached the necessary standard for a factor analysis, then a principal component method was employed. According to the statistical standard, the factor loading of each item in the three scales must exceed 0.32 (Chiou, 2006) to indicate that items sufficiently contribute to the scale validity. A factor loading that exceeds 0.45 indicates that the item contribution is normal; a factor loading

that exceeds 0.55 indicates that the item contribution is high (Chiou, 2006). Moreover, the Cronbach's  $\alpha$  of each factor in the three scales must be higher than 0.7, and the cumulative variance must be higher than 50%, indicating that a scale is valid for testing a single concept (Chiou, 2006), such as game motivation, flow, and companionship. After a factor analysis was performed, the items with higher factor loadings were selected as the basis for identifying and interpreting the factors in this study.

In the first survey, one question was designed to classify participants: "Why are you willing to continue playing this game? [Option 1] Because I often achieve flow experience in this game, and this helps me develop a companionship with my online pet. [Option 2] Because I view the online pet as my companion, and this companionship increases my flow experience in the game." According to the responses to this question, the participants were classified into *flow experience*  $\rightarrow$  *companionship* and *companionship*  $\rightarrow$  *flow experience* groups.

A hierarchical cluster analysis, which is appropriate for analyzing several hundreds of data, was performed to classify the types of game motivation of each participant. For classifying the type of game motivation for each cluster, this study first calculated the means of the three game motivation factors for the all participants, and then this study performed the ANOVA analysis for each cluster to identify which motivation factor (achievement, social, and immersion) was significant higher than the other factors. Finally, a regression analysis was performed to verify the hypotheses (Figure 1) and determine whether different types of game motivation had different effects on the relationship between flow experience and companionship. For the regression analysis, the significant level  $\alpha$  is set 0.05. That is, the  $p$  value of the Pearson correlation must be lower than 0.05, indicating that the variables are appropriate for performing regression analysis (Chiou, 2008). For instance, if we wish to perform the regression analysis of the two variables flow and companionship, the  $p$  value of the Pearson correlation must be  $<0.05$ . If all the variables reached the necessary standard for a regression analysis, then a regression analysis was performed; the significant level  $\alpha$  is set 0.05, which means the  $p$  value of ANOVA in the regression analysis must be lower than 0.05, indicating that the regression variance ( $R^2$ ) is meaningful to the hypotheses (Chiou, 2008).

## 4. Results and discussions

### 4.1 Results

After the two-phase survey was administered, 216 questionnaires were valid. Of the valid participants, 64.8% were female ( $n = 140$ ), and 35.2% ( $n = 76$ ) were

male. Regarding age, 58.8% ( $n = 127$ ) of the participants were young adults (16–24 years), and 41.2% ( $n = 89$ ) were adults (25–45 years). Of the 216 participants, 59.3% ( $n = 128$ ) had interacted with their online pets for longer than half a year. Moreover, all 216 of the participants scored their game memory higher than 4 points, and 190 of the participants (87.96%) scored their game memory between 5 and 7 points.

The Cronbach's  $\alpha$  values of the game motivation scale, flow experience scale, and CSAP questionnaire was 0.769, 0.904, and 0.960, respectively. All three values were  $> 0.7$ , indicating that the 216 valid participants and three scales all had a high reliability.

The  $p$  values of the Bartlett test of sphericity of the three scales also reached the level of significance ( $p < .05$ ). Furthermore, the KMO values for the game motivation scale, flow experience scale, and CSAP were 0.681, 0.915, and 0.966, respectively, which were moderate and marvelous (Chiou, 2006), confirming that the three questionnaires were suitable for a factor analysis.

After the principal component method was used, the factor loadings for all the items were higher than 0.32. On the game motivation scale, the factor loadings for all the items exceeded 0.55; on the flow experience scale, the factor loadings of 1 item was 0.360, 2 items were between 0.45 and 0.55, and 17 items exceeded 0.55; for the CSAP scale, the factor loadings of 1 item was 0.441, 9 items were between 0.45 and 0.55, and 24 items exceeded 0.55. Moreover, the total variance of each scale was at least higher than 58%, further confirming the validity of the three scales. The reliability (Cronbach's  $\alpha$  values) of all the factors on the three scales was at least higher than 0.745 after the factor analysis was completed (Table 3). The results of the factor analysis were applied for further cluster and regression analyses.

**Table 3.** Factor analysis

Scales	Factors	Items	Cronbach's $\alpha$	% of Variance	Cumulative%
Motivation scale	Achievement	3	.745	23.192	23.192
	Social	3	.777	21.537	44.728
	Immersion	4	.752	20.537	65.266
Flow experience scale	Telepresence/ loss of self-consciousness	9	.893	26.985	26.985
	Concentration	7	.871	18.496	45.481
	Timedistortion	4	.807	15.548	61.029
CSAP	Satisfaction	15	.946	24.920	24.920
	Enjoyment	11	.882	17.802	42.722
	Responsibility	8	.878	15.390	58.111

The original flow experience scale had 22 items, and the first time factor analysis showed that two items (a. It was no effort to keep my mind on what was happening; b. I was worried about what others may have been thinking of me.) of the flow experience scale were classified into one factor. However, one factor has at least three items (Chiou, 2006); therefore, the two items were deleted and finally there were 20 items for the flow experience scale (Table 3).

After the factor analysis, the cluster and regression analyses were performed. In the regression analysis, all the variables reached the necessary standard (the  $p$  values of the Pearson correlation were lower than 0.05, and the  $p$  value of ANOVA in the regression analysis was required to be lower than 0.05).

Of the 216 participants, 120 were classified into the *flow experience* → *companionship* group. The results of the regression analysis showed that flow experience could increase the companionship of participants with their online pets ( $R^2 = .533, p = .000 < .05$ ).

Among the 120 *flow experience* → *companionship* participants, 23 were classified into the achievement group, and a regression analysis showed that experience can increase companionship ( $R^2 = .262, p = .000 < .05$ ). A regression analysis showed that the effect of flow experience on companionship was higher in the immersion group ( $R^2 = .539, p = .000 < .05$ ) than in the achievement group. Except for the two game motivations of players; this study also found out that there was a cluster of players who had both immersion and achievement motivation within the 120 *flow experience* → *companionship* participants. A cluster analysis revealed there were 66 participants; a regression analysis showed that the companionship of participants with immersion and achievement motivation could be more enhanced by flow experience ( $R^2 = .559, p = .000 < .05$ ), whereas the companionship of participants with only one of these types of motivation could not be more enhanced by flow experience.

Of the 216 participants, 96 were classified into the *companionship* → *flow experience* group. The regression analysis showed that companionship could increase participant flow experience ( $R^2 = .383, p = .000 < .05$ ).

Among the 96 *companionship* → *flow experience* participants, 22 were classified into the achievement group, and a regression analysis showed that companionship could enhance participant flow experience ( $R^2 = .256, p = .000 < .05$ ). A regression analysis showed that the effect of companionship on flow experience was higher in the immersion group than in the achievement group ( $R^2 = .342, p = .000 < .05$ ). This study also found out there was a cluster of players who had both immersion and achievement motivation within the 96 *companionship* → *flow experience* participants. Among the participants who had immersion and achievement motivation, a cluster analysis revealed there were 36 participants; a regression analysis showed that the companionship of participants with both types of motivation

could be more enhanced by flow experience ( $R^2 = .353$ ,  $p = .000 < .05$ ), whereas the companionship of participants with only one of these types of motivation could not be more enhanced by flow experience. The results are shown in Table 4.

**Table 4.** Regression analysis results showing the relationship among game motivation, flow experience, and companionship

The relationship of flow and companionship	Motivation groups	Numbers	Regression analysis results
Flow experience → companionship (120 participants, $R^2 = 0.533$ , $p = 0.000 < 0.05$ )	Achievement	23	$R^2 = 0.262$ , $p = 0.000 < 0.05$
	Immersion	97	$R^2 = 0.539$ , $p = 0.000 < 0.05$
	Achievement + Immersion	66	$R^2 = 0.559$ , $p = 0.000 < 0.05$
Companionship → flow experience (96 Participants, $R^2 = 0.383$ , $p = 0.000 < 0.05$ )	Achievement	22	$R^2 = 0.256$ , $p = 0.000 < 0.05$
	Immersion	74	$R^2 = 0.342$ , $p = 0.000 < 0.05$
	Achievement + Immersion	36	$R^2 = 0.353$ , $p = 0.000 < 0.05$

## 4.2 Discussions

In this study, achievement and immersion were the crucial types of motivation behind online pet gaming. Social interaction was not shown to motivate online pet gaming in this study. In this study, game motivation was determined with the cluster analysis results, and the factor with stronger effects than those of the other two factors was selected as the group name. Every player almost has three motivations to play a game, and the social factor was not significant outstanding than the immersion and achievement factors in this study. Moreover, some social interaction in online pet games involves achieving game requirements, such as visiting friends' game scenes or completing game tasks through teamwork. This situation showed that even players have some social interaction behaviours, but the purpose of the social interaction is for game achievements.

The cluster analysis showed that 102 of the 216 participants had achievement and immersion motivation to play online pet games. Thus, many online pet game players have more than one type of game motivation. The possession of multiple types of game motivation was found to have a greater effect on flow experience and companionship than a player only has one type game motivation. Therefore, if game developers can trigger increased motivation in players, then

they can enhance player enjoyment (flow experience) and loyalty (companionship), prompting them to continue playing games.

Regarding flow experience, the results of the factor analysis confirmed the original hypotheses, except that telepresence and loss of self-consciousness were not obviously separated into two factors. This study inferred that players may experience telepresence and the loss of self-consciousness separately in similar situations or simultaneously during activities such as decorating an online pet's virtual house. In this study, when participants decorated pet virtual houses, they often felt that they were fully immersed in the virtual environment and unaware of the perceptions of others. Players may also this experience during similar activities such as feeding their online pets or visiting friends' online pets. Therefore, the aforementioned two factors were not separated in this study.

Regarding player companionship, the results of the factor analysis were almost identical to those of the original CSAP scale (Luh et al., 2015). Thus, even though the pets in this study were online pets; enjoyment, satisfaction, and responsibility were crucial in determining whether owners had companionship with their pets. If game developers aim to increase players' companionship with their online pets, then they can use the CSAP scale as a reference when designing games. The aforementioned three companionship factors can be applied to other products as well, such as game roles or avatars in online games, robots for children, and other companionship products.

No obviously objective standard can be used to classify game players as *flow experience*→*companionship* and *companionship*→*flow experience* players. Thus, we asked participants to classify themselves into one of these two groups. However, if participants could not determine the group to which they belonged, then they were not required to answer the question. The results showed that, of the initial 282 participants, at least 216 understood why they continued playing games. Of the 66 invalid questionnaire responses, four did not include an answer to this question. However, because some invalidated participants did not respond to many questionnaire items, we could not categorize them.

The results showed that *flow experience*→*companionship* and *companionship*→*flow experience* were positively related. Therefore, enhancing player flow experience or companionship strengthens player willingness to continue playing games. Moreover, in this study, participants who built companionship through continued flow experience ( $R^2 = .533$ , Table 4) maintained a stronger willingness to play games than those who built companionship initially did ( $R^2 = .383$ , Table 4). This indicated that when the participants enjoyed online pet games, they built companionship with their online pets.

The number of participants in the immersion group was substantially greater than that in the achievement group. Thus, the crucial type of game motivation for



online pet game players was immersion. Moreover, compared with achievement, immersion motivation had a greater positive effect on the relationship between flow experience and companionship. This result applies to online pet games; studies on other online games may yield different results.

In this study, online pet games were selected as a basis for exploring the effect of game motivation on the relationship between flow experience and companionship. The three scales used in this study may also be applied in related research, such as research on role-playing games, embodied companionship products, and artificial pets. Furthermore, many features of online pets are similar to those of electronic pets, robot pets, or online game roles and include companionship functions, autonomous responses, and personality feedback. The results of this study can be a reference for researchers in the fields of artificial companions and role-playing games.

## 5. Conclusions

This study explored the effect of game motivation on flow and companionship. Although we chose online pet games as an example, we hope that our research method can be applied to other relevant fields such as role-playing games and artificial pets.

The results showed that achievement and immersion were the main types of motivation for playing online pet games. The flow experience factors included concentration, time distortion, and telepresence or loss of self-consciousness. Enjoyment, satisfaction, and responsibility indicated whether participants had companionship with their online pets.

Some of the participants focused on gaining flow experience in games, which helped them build companionship with their online pets. By contrast, other participants continued playing games because they viewed their online pets as companions, and this companionship increased flow experience. In addition, compared with participants in the preceding situation, participants who gained continual flow experience built stronger relationships with their online pets. These two situations: *flow experience*→*companionship* and *companionship*→*flow experience* can be a reference for developers in relevant industries in developing game models and environments.

Among the types of game motivation, immersion had a greater effect on flow and companionship than achievement did in this study. Moreover, participants with both types of motivation had enhanced flow experience and companionship. Regardless of game motivation, flow experience and companionship were positively related in this study. Therefore, game motivation, flow experience, and companionship encourage players to continue playing games.

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