

Understanding Online Game Addiction: Connection between Presence and Flow

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Abstract. Addictive behavior in online gaming has been an important research topic since it has been one of the most popular activities in entertaining for younger people in Korea. However, despite the growing popularity of online games, empirical studies about the effects of immersion to the online game behavior are relatively rare. By applying two psychological concepts –presence and flow–the present study investigates how different types of immersion affect on online game addiction. Results show that both presence and flow play significant roles in online game addiction, however, flow mediates the relationship between presence and online game addiction. Based on these findings, implications and suggestions for future studies are discussed.

Keywords: Presence, Flow, Online Game, Addiction, Virtual Reality.

1 Introduction

Online gaming has emerged as a popular and successful source of entertainment and play for people of all ages. According to a white paper from the Korea Game Industry Agency[1], the world market for online video games increased from \$ 2.1 billion in 2003 to \$ 5.7 billion in 2006, representing a nearly three times market increase in less than half a decade.

In light of this fact, the impact of online games has received much attention and become a popular research topic. By combining presence theory and the concept of flow, this research aims to explore how and to what extent presence and flow influence entertainment and additional behavior in online game.

Some of the research on Internet use indicated that during the browsing of the Internet, persistent involvement may result in the experience of presence. Based on empirical evidence, researchers found out a sense of presence, commonly defined as “sense of being there” is an important factor for the online game users. It seems to be that experience of presence is a key factor to generate playfulness in the online game

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studies. Hence, the present studies argue that immersion into online games is after all a result of experiences of presence and this feeling of presence may be correlated to addictive behavior in online games.

On the other hand, Choi and Kim [2] found that people continue to play online games if they have optimal experience commonly known as the concept of flow. In addition, previous research found that flow state is positively related with the addiction to online game.

Some scholars have insisted that presence can be defined as a special type of flow experience that occurs during teleoperations. For example, Fontaine [3] states that flow experience produces peaks of involvement that seem to be similar to the vividness of presence. Although previous research suggested that the two concepts—presence and flow—share similarities such as the immersive component and intensive feelings of involvement, it is not well understood relationships between these two concepts and how experiences of presence and flow are related to online games addictions. Therefore, this study aims to examine whether presence and flow are related in the context of online game. Moreover, the study explores the impact of the experience of presence and flow on online game entertainment and addiction.

2 Theoretical Background: Social Presence

2.1 Presence and Online Game

The concept of presence has become central to theorizing about the advanced human-computer interaction such as virtual reality systems, as well as traditional media such as television, film and books. Researchers have begun to realize that the feeling of presence is at the heart of all mediated communication environments, because presence is at the heart of human's desire to use media to move beyond the limits of body and sensory channels[4]. After an extensive review of presence-related concepts and their explications, Lombard and his colleagues define presence as "the perceptual illusion of non-mediation" [5,6]. This illusion of nonmediation refers to a phenomenon in which "...a person fails to perceive or acknowledge that the existence of a medium in his or her communication environment and responds as he or she would if the medium were not there." Therefore, presence describes a state of consciousness that gives the impression of being physically present in a mediated world. Commonly, presence is defined as the sensation of 'being there' in a mediated environment

Since presence is primarily a subjective sensation, it has been argued that 'subjective report is the essential basic measurement'. Indeed, the majority of studies measure presence through post-test questionnaires and rating scales, which have the advantage that they do not disrupt the media experience and are easy to administer. For instance, Slater et al [7] asked participants, after exposing them to a Virtual reality systems, to answer three questions on Likert scales (1-7) that served as an indication of presence: (1) their sense of 'being there' in the computer-generated world, (2) the extent to which there were times when the experience of the computer-generated world became the dominant reality for the participants, thereby forgetting about the 'real world' outside, and (3) whether they remembered the computer-generated world as 'something they had seen' or as 'somewhere they had visited'.

According to Slater et al.[7], the ‘experiencing-as-a-place’ is central to understanding presence in Virtual environments: people are there, they respond to what is there and they remember it as a place.

As such, presence has received substantial attention from the virtual reality programs, it is becoming increasingly relevant to online game environment. Presence has been recently been identified as a potentially important variable in online game research because it may affect use and a variety of outcomes of exposure, ranging from enjoyment to aggression. Although few studies have examined the relationship between the experience of presence and online game use, Tambrini et al. [8] found that playing a game created a strong sense of presence than observing a game, presumably due to the additional interactivity. Even though many technological features of online games are expected to contribute to the sense of “being there”, Bracken and Skalski [9] suggest that image quality impact both the level and types of presence dimensions experienced by video game players.

In addition, previous studies provide compelling evidence for the mediating effect presence in the context of e-commerce [10], human-robot interaction [11] and entertainment games [12]. Especially in the context of entertainment games, the enjoyment and evaluation of video games are mediated by feelings of presence during game playing [12,13].

Consequently, the above research findings indicate that the experience of online games relatively complies with the psychological state of “being there” in a mediated virtual environment. Following this logic, are game users who are more immersed into online games more likely to become addicted? Few studies, however, concern with this topic, the investigation is worthwhile of intense exploration.

2.2 Flow and Online Game

Flow theory can be referred to as the ‘psychology of optimal experience,’ which in recent years has been applied to the Internet behavior by some research. Studies suggest that cyberspace behavior has been reported as highly correlated with flow experience. As in his early definition, Csikszentmihalyi [14] sees "the holistic experience that people feel when they act with total involvement" (p.36)

Further, he states (p.3) that flow experience are those optimal and enjoyable experience in which we feel “in control of our actions, masters of our own fate...we feel a sense of exhilaration, a deep sense of enjoyment” [15]. As a result, flow experience is more an emotional state during the process of the user’s activity. Csikszentmihalyi [14] originally identified four flow components: control, attention, curiosity, and intrinsic interest.

To supplement Csikszentmihalyi's concept of flow experience, Trevino and Webster characterized four dimensions of flow [16]. According to them, within the human-computer interaction experience, flow incorporates the extent to which (1) the user perceives a sense of control over the computer interaction, (2) the user perceives that his or her attention is focused on the interaction, (3) the user’s curiosity is aroused during the interaction, and (4) the user finds the interaction intrinsically interesting. In Hoffman and Novak [17] flow is defined in terms of the experience of flow (intrinsic enjoyment, loss of self-consciousness), behavioral properties of the flow activity (seamless sequence of responses facilitated by interactivity with the

computer and self-reinforcement), and its antecedents (skill/challenge balance, focused attention, and telepresence).

Drawing upon this suggestion, Ghani and Deshpande [18] further argue that two important components-enjoyment and concentration- leads to diminished sense of time during the particular activity. It seems that while in the flow state, a user experiences a sense of happiness, accompanied by a feeling of an exploratory distortion in time perception, which often occurs in the absence of time pressure when conducting a specific activity that brings in positive feedback. As a result, the time allocation for the activity increases.

However, similar to the distortion in time perception, during activities users may experience another perception--distortion of the sense of space. Such perception is related to the concept of presence as Heeter [19] uses the term "(tele) presence" to describe the sense of presence when an individual is physically far away from the scene. Indeed, some scholars insist that flow and presence shares similarities because these are terms to describe immersive component and intense feeling of involvement [3]. It is believed that flow experience produces peak of involvement that seem to be similar to the vividness of presence.

Similar to presence, some studies argue that flow is significantly related to online game behavior since in online games, continuous scoring, promotion, immediate feedback, and achievement of self satisfaction have become the channels for upgrading individual self-esteem of the Internet users. Therefore, the experience described by flow state such as clear objective and immediate feedback, challenge encounter and adequate skill, combination, sense of control, curiosity, loss of self consciousness, purposeful experience, and inner interests are the states which can be experienced and accomplished by online games. Indeed, in study of Taiwan college students' Internet behavior, Hwang [20] found that the college students actually experience flow state when using the Internet. Also Choi and Kim [2] found that people continue to play online games if they have optimal experience and flow state had an impact on user's loyalty. In addition, motivations for online gaming influence users' flow state and online game addiction. Kim and Park [21] identified seven needs for online game in Korean generation: escaping, leisure, community, character/compensation, satisfaction, entertainment, and pass time. Among these factors, they also found that the need for entertainment has an effect on immersion, while the need for community has a significant impact on addictive behavior in online game.

In sum, evidence from flow studies has shown that enjoyment is of key value to generate optimal flow. Though the state of flow is temporal and highly subjective, it is suspected that people who enjoy flow experience during an activity may develop a tendency to repeat the activity and repetition of a particular activity may eventually develop into a tendency toward addiction. Therefore, flow experiences may play a key role in activating addiction through repetition of online game activities.

3 Research Questions

Based on the claims and findings examined above, this study explores whether presence and flow are related in the context of online game especially focusing on the

relationships with entertainment and moreover, explores the impact of the experience of presence and flow on online game entertainment and addiction. Therefore, the following research questions are proposed.

RQ1. How the experience of flow and a sense of presence are related online game entertainment?

RQ2. How the experience of flow and presence predict online game addiction?

4 Method

4.1 Participants

The Participants for this study were Korean college students. The total number of the sample was 133, with 78 males and 55 females. The average participant was 22 years old and the distribution of academic level was freshman (43.3%, N=57), sophomore (24.1%, N=31), junior (21.1%, N=27), and senior (8.3%, N=11).

4.2 Measures

The survey questionnaires were distributed to participants and measure includes presence, flow, entertainment, and addictive behavior.

Presence. Presence was measured with presence scale by selection from previous studies [5,6,8,22]. The scale represents three dimensions: arrival (the feeling of being present in a mediated environment, a sense of 'being there' in the virtual environment), departure (the feeling of no longer being present in the physical environment, my body was in this room, but my mind was inside the world created by online game), and perceived realism (extent to which the virtual environment became the dominant reality, extent to which the virtual world seems to be real). Six items were used and responses were scored on 5-point scales ranging from strongly disagree to strongly agree. The presence index was reliable (Cronbach's $\alpha=.89$).

Flow. Participants' flow state while playing online game was measured by the scale developed by Choi et al.[23]. The measurement includes 5 items such as attention of focus, sense of potential control, loss of self-consciousness, sense of ecstasy, and time distortion. Participants received that definition of flow with a short description at the beginning of questionnaire. Responses were scored on 5-point scales ranging from strongly disagree to strongly agree. The flow index was reliable (Cronbach's $\alpha=.90$).

Online Game Addiction. Online game addiction was measured with the scale developed by Kim and Park [21]. This measurement includes 5 items to test addictive online game behavior for Korean people [21]. The items include 'how often do you fear that life without the online game would be boring, empty, and joyless?', 'how often do you try to cut down the amount of time you spend online game and fail?', 'how often do you find yourself anticipating when you will go on-line again?', 'how often do your grades or school work suffer because of the amount of time you spend online game?', 'how often do you lose sleep due to late-night gaming?' Responses were scored on 5-point scales ranging from strongly disagree to strongly agree. The index was reliable (Cronbach's $\alpha=.88$).

Entertainment. Online game entertainment was measured with two items. These are 'how much you enjoy the game?', 'To what extent the online game entertains you? Responses were scored on 5-point scales ranging from not at all to very much.

4.3 Analysis

Person correlations were computed for the relationships among presence, flow, and entertainment. Then regression was conducted to see the predictors of online game addiction. To investigate further how these two concepts--presence and flow--predict online game addiction, a path analysis was conducted using *Amos*.

5 Results

First, to examine the relationships among presence, flow, and entertainment Pearson correlations were conducted. The findings suggest that presence ($r=.18$, $p<.05$) and flow ($r=.13$, $p<.05$). were significantly correlated with online game entertainment. However the findings indicated that presence has a more positive relationship with online game entertainment than flow does. Korean college student in the sample reported that the more they experience of being there in the online game environment, they feel more that the online game entertained and made them enjoyable.

Next, to investigate the predictive power of presence and flow in online game addiction, multiple regressions were conducted. Due to multicollinearity, stepwise regression was used to identify that best predictor among the independent variables. The result indicates that both presence ($\beta=.23$, $p<.01$) and flow ($\beta=.19$, $p<.01$) had an impact on online game addiction (see table 1). This means that the more online game users feel sense of presence and experience of optimal state, the more they are addicted to online gaming.

To investigate further how the concept of presence and flow predict online game addiction, a path analysis was conducted using *Amos*. The result shows that flow mediates the relationship between presence and online game addiction (see figure 1). The model fit that data. ($df=1$, $p=.11$, $GFI=.98$, $RMSEA=.07$).

This result indicates that feeling of presence facilitates the occurrence of flow and flow in turn seems to enhance online game addiction. When analyzing the data in another way, the result shows that flow does mediate the relationship between presence and online game addiction.

Table 1. Stepwise Regression: Predictors of Online game addiction

Model	Predictors	Beta	t-value	Sig.
1	Presence	.30**	6.558	.000
2	Presence	.23**	3.813	.000
	Flow	.19**	.3689	.000

*Model1: Adjusted R²=.34, Model2: Adjusted R²=.39, **p<.01.*

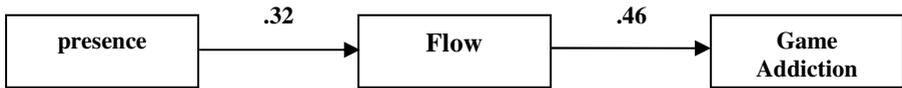


Fig. 1. Path model off relationships among presence and flow and online game addiction

6 Discussion

The present study aims to examine whether presence and flow are related in the context of online game and moreover, explores the impact of the experience of presence and flow on online game entertainment and addiction. Within our investigation, presence and flow are correlated in relation to online game addiction, and flow mediates the connection between presence and online game addiction. Thus, the experience of being there in which immersed in a virtual reality facilitates the occurrence of mental state operation in which a person is highly involved in playing gaming. What following is a discussion of the implications of the present study with respect to online game activity in virtual environments.

First, this study provides empirical evidence supporting the anticipated powerful effect of experience of flow in online games. More importantly, it was found that online game players experience high level of flow state and their addiction to online games can be explained by the flow experience. This finding seems to be consistent with previous research [9] and thus, the study confirms that flow might play an important role of addiction to online games.

Second, the present study shows that there are significant mediating effects of presence between flow and online game addiction. Having experience of sense of presence applies significantly to the experience of flow and addictive behavior to online game activity. Theoretically, this result is in line with previous literature about the mediating effects model of presence in human-computer interaction especially, with respect to entertainment games. These findings, however, call for further investigation to elaborate the mediating role of presence in the context of online games.

As a final remark, we would like to provide some suggestions for future studies. A limitation of the present study is that this was conducted with Korean college students as the convenience sample, thus future studies need to examine the effects of presence and flow on online game addiction with more diverse topics in other countries in order to validate and corroborate the present findings. Another interesting extension of the present study would be to examine individual difference in terms of feeling of presence and flow in relation to online game addiction. Furthermore, since this study merely employed the survey research, it might not reveal the authentic Internet situation. In the future, researchers could conduct field studies or field experiments to examine the finding obtained in this research.

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