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Correlating the effects of flow and telepresence in virtual worlds: Enhancing our understanding of user behavior in game-based learning

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ABSTRACT

Recent research on online learning suggests that virtual worlds are becoming an important environment to observe the experience of *flow*. From these simulated spaces, researchers may gather a deeper understanding of cognition in the context of game-based learning. Csikszentmihalyi (1997) describes *flow* as a feeling of increased psychological immersion and energized focus, with outcomes that evoke disregard for external pressures and the loss of time consciousness, issuing in a sense of pleasure. Past studies suggest that flow is encountered in an array of activities and places, including those in virtual worlds. The authors' posit that flow in virtual worlds, such as Second Life (SL), can be positively associated with degrees of the cognitive phenomenon of immersion and telepresence. Flow may also contribute to a better attitude and behavior during virtual game-based learning. This study tested three hypotheses related to flow and telepresence, using SL. Findings suggest that both flow and telepresence are experienced in SL and that there is a significant correlation between them. These findings shed light on the complex interrelationships and interactions that lead to flow experience in virtual gameplay and learning, while engendering hope that learners, who experience flow, may acquire an improved attitude of learning online.

1. Introduction

"Flow" or "optimal experience" is a highly enjoyable state of consciousness that occurs when our skills match the challenges that we are undertaking. Csikszentmihalyi (1997) describes flow as a feeling of enjoyment and psychological immersion, energized focus, and involvement, often accompanied by positive emotions or sense of pleasure. In such a state of mind, time appears to stand still, we lose our sense of self, and we enjoy engaging in an activity for its own sake. Flow's benefits relative to other states of consciousness make it a useful goal as people look to building virtual environments for online business, health care, education, and gaming.

Salmon (2009) suggests that virtual space has created a context for the "new cultural experience" (p. 532). Many of the activities we currently associate with the two-dimensional Web will eventually develop into the three-dimensional (3D) Web (Manyika, Roberts, & Sprague, 1965), including 3D applications that integrate real-life with virtual "learning activities that enable unstructured spaces for interaction" (Savin-Baden, 2008, p. 528). Such environments already provide affordances, such as particular game styles, visual features, personalization, independence (ownership), and immersion that appeal to high school and college age users (Salmon, 2009). Ultimately, what the so-called "play-learner" experiences is what Warburton (2009) refers to as "experiential learning, cooperative learning, and game-based learning" (p. 421). This has major implications for the field of education.

Virtual worlds now allow educators to extend the traditional pedagogical formula for learning well beyond both brick (traditional schools) and click (traditional educational software) paradigms currently employed. In addition to individual or personal flow experiences, students may also experience social flow while using computer games that cause them to interact with one another within a virtual learning community (Inal and Cagiltay, 2007). In 3D space participants learn to play, establish group affiliations, and create a strong sense of presence. The small groups of users (represented by avatars) formed in these settings have the ability to learn a range of topics together (Salmon, 2009). By applying Csikszentmihalyi and Csikszentmihalyi's (1988) flow principles to the areas of online gameplay and learning, designers can create virtual worlds that present more opportunities for flow. Early attempts at applying flow theory to such ends include investigations of online consumer behavior and marketing (Hoffman & Novak, 1996), computer-mediated communication (Trevino & Webster, 1992), and user intrinsic interest, curiosity and attention (Webster, Trevino, & Ryan, 1993).

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The studies described above suggest that flow experience is a significant cognitive state in online virtual community behavior that may influence serious gameplay and learning. In the future, online environments (and the functions and tasks they present to users) will need to facilitate flow experience. Hence, it is imperative that designers of virtual worlds understand the mechanisms underlying the enjoyment of virtual experiences and flow. This is argued by Finneran and Zhang (2003), who called for further research into flow because of its important contribution to our understanding of the optimal experience.

Telepresence is also a sensation unique to online environments, which causes users feel they are part of the action (Novak, Hoffman, & Yung, 2000). Telepresence has been shown to support exploratory behavior in online environments such as virtual communities (Finneran & Zhang, 2005) and may be a critical means of increasing the user's sense of "being there," i.e., being completely immersed in virtual space. For example, video gamers often become totally absorbed in the experience of a game's flow, thereby experiencing a distorted sense of time and many positive emotions. In such a mental state, telepresence transports the player to a virtual place where their connection with real time and space slowly fade into the background of consciousness, while flow takes a prominent place. Gamers consider this an optimal experience, one that is highly valued, desired, and indicative of the "flow experience." Work of several researchers who have published findings on the relationship between flow and telepresence and virtual learning and gameplay is also significant (Draper & Blair, 1996; Finneran & Zhang, 2003; Novak & Hoffman, 1997; Sheridan, 1992; Steuer, 1992).

With the emergence of virtual worlds, such as Second Life (SL), calls for research into flow in the context of game-based learning have also increased. None of this research, however, focuses specifically on flow and telepresence as virtual phenomena that can enhance the learning experience while promoting exploration and creativity. Therefore, this paper first examines past research on flow phenomenon to better identify and understand telepresence in a virtual world and then examines its application and relevance to gameplay and virtual learning. Also, the purpose of the study described here is to determine the degree to which flow and telepresence are experienced in a virtual environment, such as SL, as well as the level of correlation between them. Finally, this paper examines the implications of the findings of the research, building on an earlier pilot study (Faiola & Smyslova, 2009). From these findings, the authors argue that subjective levels of flow may be positively associated with degrees of immersion and telepresence.

2. Implications of flow for learning

The notion of 'flow' was introduced by Csikszentmihalyi (1975) as a technical term to describe the good feeling or "optimal experience" people have as a motivating factor in their daily activities such as work, sports, and artistic performance. Although Csikszentmihalyi's research was part of the larger field of intrinsic motivation, his investigation of flow was contrary to the traditional utility-centric motivational theories of the time (Csikszentmihalyi & Csikszentmihalyi, 1988; Moneta & Csikszentmihalyi, 1996). Csikszentmihalyi referred to flow as an experience people had when they "worked hard, not in order to get conventional rewards, but because the work itself was rewarding. . . ." (Csikszentmihalyi and Csikszentmihalyi, 1988, p. 5). Similar to the work of Csikszentmihalyi, Maslow (1965) ascribed this motivation to the need to find one's potentiality or limitations through an activity that is intensely focused.

A number of studies by Csikszentmihalyi and Csikszentmihalyi (1988), Csikszentmihalyi (1990, 1997) analyze how users experience flow in online information-seeking, and the correlation between user skill level and propensity to experience flow. Other researchers found that flow and high levels of enjoyment and control in computer-mediated interactions were correlated with higher online experimentation and exploration (Ghani & Deshpande, 1994; Ghani, Supnick, & Rooney, 1991; Katz, 1987).

Key to understanding flow is the concept of the *autotelic experience*. The autotelic experience is the result of an activity or situation that produces its own intrinsic motivation, rewards, or incentives, specifically without any outside goals or rewards. The autotelic experience is a common feeling among all people that experience flow when their attention is focused on a limited stimulus field. Csikszentmihalyi and Csikszentmihalyi (1988) states that in an autotelic state, people "forget personal problems, lose their sense of time and of themselves, feel competent and in control, . . . have a sense of harmony and union with their surroundings. . . and cease to worry about whether the activity will be productive and whether it will be rewarded" (p. 182).

Flow is a complex concept that is difficult to operationalize because of a range of qualifiers. Csikszentmihalyi (1990) describes nine dimensions of flow, which include: (1) clear goals, (2) immediate feedback, (3) a match between personal skills and challenges, (4) merger of action and awareness, (5) concentration on the task, (6) sense of control, (7) loss of self-consciousness, (8) altered sense of time, and (9) the experience of becoming "autotelic," i.e., doing an activity for its own sake or its own intrinsic reward. A review of the literature by Rodriguez-Sanchez and Schaufeli (2008) suggests that a more condensed definition of flow as an *optimal experience* can be composed of three basic elements, including: absorption, enjoyment, and intrinsic interest.[1] Also, in a study by Hoffman and Novak (1996) to validate correlations between flow experience and online learning, findings support the existence of five sub-constructs, including: enjoyment, telepresence, focused attention, engagement, and time distortion.

2.1. Flow and learning in a virtual world

The notion of intrinsic motivation has significant implications for researchers seeking to understand how learning activities and environments can engender motivation in students. This motivational phenomenon is often seen when the goals and rewards of learning are meaningful or when the learning assists the learner in obtaining valued accomplishments (Brandt, 1995; Chance, 1992). The concept of intrinsic motivation is associated directly with flow, because whatever produces flow becomes its own reward, its own intrinsic motivation.

As a balance between challenge and skill, flow occurs during the learning process as a feeling of pleasure that issues from achieving realistic goals and overcoming prescribed challenges (Csikszentmihalyi, 1990). Many researchers argue that the composition of an activity must be in the context of explicit challenges, focused goals and concentration, and control (Chan & Ahern, 1999), and Finneran and Zhang (2005) hold that the effect of flow is increased in learning, at which time it has a direct impact on attitude and behavior. They cite several studies that indicate that flow

[1] Absorption refers to the sense of involvement with total concentration or immersion (being entirely engrossed in the activity at hand), with focused attention and loss of self-consciousness (Csikszentmihalyi, 1997; Ghani & Deshpande, 1994; Lutz & Guiry, 1994; Moneta & Csikszentmihalyi, 1996; Trevino & Webster, 1992; Novak & Hoffman, 1997). Enjoyment refers to the positive affect with the experience of pleasure (i.e., being intrinsically enjoyable) being directly associated with the activity at hand (Ghani & Deshpande, 1994; Moneta & Csikszentmihalyi, 1996; Privette & Bundrick, 1987; Novak & Hoffman, 1997). "Intrinsic Interest" refers to the interest or drive to perform an (*autotelic*) activity for its own sake, rather than for any other extrinsic reason or purpose (Moneta & Csikszentmihalyi, 1996; Trevino & Webster, 1992; Novak & Hoffman, 1997).