Identifying Flow in Video Games: Towards a New Observation-Based Method

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ABSTRACT

The flow, or optimal experience, is a highly focused mental state leading to immersion and high performance. Although flow theory has been widely applied to research on videogames, methods based on behavior observation to identify flow states are limited in this domain. The aim of the present study was to develop a new method to detect flow episodes occurring during a gaming session from observation of players’ behaviors and analysis of game replays. The authors developed an optimal experience behavior pattern and a related coding scheme. In-depth interviews were then conducted to determine whether episodes coded as flow by researchers were also described as such by the players themselves. Findings showed that intense concentration followed by an expression of satisfaction could be a useful pattern to detect flow. Unexpectedly, the interviews suggested that frustration, as well as joy, may also be an emotional signature of flow. This study shed new light on the relationship between gameplay and flow.

KEYWORDS
Coding Scheme, Combo, Concentration, Emotional Signature, Flow, Game Replay, Gameplay, In-Depth Interviews, Observation Method, Player Behavior

INTRODUCTION

As playing video games has become a major activity in many people’s daily lives, gaming is now a substantial field of research (Garris, Ahlers, & Driskell, 2002). The Flow (or optimal experience) theory (Csikszentmihalyi, 1990), which tries to explain what could promote enjoyment during an activity, has been widely extended to research on video games, exploring some of the processes at work in gaming activities (Chen, 2006; Sherry, 2006; Sweetser & Wyeth, 2005). Nonetheless, ways of identifying and measuring flow states are still limited. Indeed, while researchers have long been calling for direct qualitative measures (Csikszentmihalyi, 1992; Jackson & Marsh, 1996), a review of the literature reveals that the most widely used method to measure the optimal experience is still the self-report questionnaire. A comprehensive review of the literature revealed that there are no flow identification methods based on players’ spontaneous behavioral reactions during a gaming experience. Consequently, the aim of the present study was to explore the effectiveness of a new method to identify flow episodes not only from observation of players’ behaviors in real-time, but also from game replay analysis. First, flow and related concepts will be defined, as well as existing methods to measure them. Secondly, the self-confrontation method used by the authors and the coding scheme designed...
to identify players’ behaviors during a gaming session will be described. Thirdly, results of in-depth interviews with the players, used to explore the validity of the tool, will be presented. Preliminary results of this method will then be discussed in relation to previous research. Finally, limitations of this study and perspectives for future work will be presented.

**Flow Theory**

Flow theory (Csikszentmihalyi, 1990) describes a mental state that may occur while carrying out activities perceived as autotelic (doing is intrinsically rewarding). This optimal experience is likely to emerge when activities are steered toward a precise goal and provide clear feedback about performance. The activity must be challenging but feasible, otherwise anxiety (challenge too high or skill too low) and boredom (challenge too low or skill too high) may emerge (Figure 1). When experiencing flow, the individual is totally focused and immersed in the activity and may feel a loss of self-perception, a great sense of control and an alteration of time perception. The optimal experience has been described as having eight conceptual dimensions: clear goal, intense concentration, explicit feedback, balance between level of challenge and skill, alteration of time perception, merging of action and awareness, sense of control, autotelic experience (Csikszentmihalyi, 1990).

In the video game context, the most widely discussed concepts are immersion, presence, and flow (Nacke & Lindley, 2008). These concepts have certain similarities in terms of user experience so they may need to be defined more precisely. Brown and Cairns (2004) defined immersion as a process organized in three sequential steps (engagement, engrossment, and total immersion), where the progression from a one step to the next depends on different barriers (contextual, human, and computing factors). Slater (2002) defined presence as the sense of being in a virtual world. Thus, in terms of experience it is very close to the total immersion level, although presence is possible without immersion. In their model, Ermi and Mayra (2005) defined immersion as having three different components: sensory immersion, challenge-based immersion, and imaginative perception.

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Figure 1. Flow Channel: The challenge matches the skills (adapted from Csikszentmihalyi, 1990)
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