Gamification of Sport in Virtual Reality: Stimulating Uncertainty

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Virtual reality (VR) technology in sports represents an area of intense interest, as it has the potential to become a viable alternative leisure and recreation activity because it allows for sporting experiences that are not feasible in real life (e.g., defying gravity; Jeng et al., 2017). One remaining question is how VR sports content can be created and configured in order to maximize its attractiveness and user engagement. Accordingly, the utilization of gamification elements such as stimulating uncertainty has gained attention (Nor et al., 2020).

Uncertainty is a crucial factor in attraction to sports entertainment (Bryant & Raney, 2000). For instance, the uncertainty of goal attainment in game settings induces players to immerse themselves in the game and facilitates their transition into a flow state (Garris et al., 2002). Flow state is the optimal experience as a mental state of extremely rewarding concentration that emerges in the space between frustration and boredom (Csikszentmihalyi, 1996). The idea is that when a task is demanding enough to be interesting but not difficult enough to cause frustration, it provides the possibility for a flow experience. Moreover, appropriate levels of uncertainty are considered important when developing sports games, as it engenders players' sense of challenge, accomplishment, and enjoyment (Klimmt et al., 2009), and, in turn, behavioral outcomes such as purchase intent (DeSouza & DeFreitas, 2017). Nevertheless, not much attention has yet been paid to the levels of uncertainty necessary for players to perceive these factors in game contexts.

The purpose of this study is to examine tactics for the development of entertaining VR sports content through the manipulation of uncertainty. We questioned (1) whether the uncertainty factor can strengthen a gamer’s flow state, enjoyment, and purchase intention, and (2) whether these variables are perceived differently depending upon the degree of uncertainty. Thus, we hypothesized that uncertainty will positively affect a player’s flow state, enjoyment, and purchase intention.

For the current study in progress, we developed two versions of a VR table tennis game, each with different odds of winning, by employing artificial intelligence (AI) to automatically control the game difficulty in order to accommodate the participant's skill level. Participants will be recruited and randomly assigned to experimental groups. Under the control of AI, one group will experience a VR sports game with a relatively easy and non-challenging task, while the other group will experience a game with a relatively difficult and challenging task. Flow state, enjoyment, and purchase intention will be measured using questionnaires. Between-group differences will be analyzed through a multivariate analysis of variance.

The findings are expected to contribute to the understanding of game experience by elucidating the impact of the degree of uncertainty on the player’s flow state, enjoyment, and purchase intention. Furthermore, results are expected to elucidate the tactics for developers of VR sports content to stage immersive environments and marketing implications for the use of VR sports content (e.g., in sports fan event, training, education, and rehabilitation). Theoretical implications and suggestions for future studies will be discussed.