Exploring the Psychological and Physiological Responses to In-Game Advertisements in Different Immersion Conditions

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Abstract

In light of the growing prominence of gaming as a prominent form of entertainment, an increasing number of companies are attempting to leverage this medium for advertising purposes. This study examines the effects of in-game advertising (IGA) on consumer behavior, with a particular focus on how different levels of immersion influence consumers' responses and the effectiveness of IGA. The research employs an experimental methodology to investigate how players' cognitive and emotional responses to in-game advertising (IGA) may vary based on immersion levels, and how this affects IGA effectiveness. Two between-subjects experiments were conducted, in which the level of immersion was manipulated by the addition of visual stimuli and the use of immersive technologies. The responses of the participants to the IGA were measured using eye-tracking and physiological sensors, in addition with the administration of questionnaires. The preliminary findings shed light on how IGA can be optimized for enhanced consumer engagement and IGA effectiveness.

Keywords: *in-game advertising; video games; virtual reality; IGA; consumer behavior*

Introduction

In the contemporary landscape, gaming has emerged as a formidable mass medium, rivaling the societal influence of traditional media such as television, and engaging an estimated 3.2 billion individuals worldwide by 2022. Economically, the gaming industry commands a significant market value, estimated at $185 billion, with an additional $65 billion contributed by in-game advertising (IGA), surpassing even popular streaming services in growth and attracting substantial investments from major

corporations (The Economist, 2023). Thus, the gaming environment represents fertile ground for integrating advertising elements to interact with consumers in innovative ways (De Pelsmacker et al., 2019). This involves various formats such as product placements, billboards, video ads, or events that can be a native part of the gaming experience (Terlutter and Capella, 2013; Van Berlo et al., 2022; Welden et al., 2022).
Although IGA has the potential to influence consumer perceptions of brands and their purchasing decisions (Hussain et al., 2021; Ghosh et al., 2022), also presents several challenges that advertisers need to be aware of. Different gaming companies have been criticized for including advertising elements in the game environment, such as Ubisoft and Electronic Arts. This occurs when IGA disrupts the gaming experience, triggering a psychological reactance in consumers (Mishra & Malhotra, 2021) This requires a thorough understanding of how to integrate effectively branded content within the game environment. IGAs that are aligned with the game narrative and characteristics tend to be perceived as less intrusive and more effective in conveying persuasive marketing messages (Dardis et al., 2018; Ghosh et al., 2022; Sreejsh & Ghosh, 2024). Furthermore, player experiences during gameplay, including immersion, impact how consumers process the game environment and in-game ads. Thus, the presence of IGA may affect consumer engagement as it affects the game experience (Berger et al., 2018; Van Berlo & Chen, 2024). Engaging players with the game is essential for the success of IGAs, as it enhances monetization, fosters customer loyalty, provides unique marketing opportunities, and facilitates product development (Rutz et al., 2019).
The study aims to provide comprehensive insights into how different immersion levels influence key consumer responses such as brand recall, recognition, attitudes toward advertisements, and perceived intrusiveness. The extent of immersion, which defines the depth of a player's engagement within the virtual environment, serves as a critical determinant in shaping attention, emotional, and cognitive responses to ads. Consequently, it influences the efficacy and player attitude toward IGA (Vashisht and Chauhan, 2017).
To understand this phenomenon, the study employs an experimental methodology, comprising two between-subject experiments in which individuals are exposed to different levels of immersiveness in the gaming experience.

Theoretical background

To better understand how players process IGA in different immersive game experiences, we integrate the flow (Csikszentmihalyi, 1990; Cowley et al., 2019) and Cognitive Load Theory (CLT) which posits that the human cognitive system is limited in processing information (Sweller, 1988).
Prior research has demonstrated that varying degrees of immersion have an impact on the experience of flow. Higher levels of immersion allow for a deeper state of flow, which is characterized by high concentration and engagement in the activity. Conversely, lower levels of immersion reduce the probability of attaining this state. Therefore, immersion represents a pivotal element in the generation of flow (Colombo et al., 2023). Furthermore, being engaged in the game has a clear positive effect on learning, while the challenge of the game has a positive effect on learning outcomes (Hamari et al., 2016). However, high levels of immersiveness in the gaming experience

also result in higher cognitive load.
Although previous studies align with flow theory, indicating that enjoyment increases brand recall, immersion in games, characterized by extreme concentration impacts cognitive load during gameplay. As digital environments become increasingly sophisticated, the immersion provided by platforms such as virtual reality (VR) significantly alters the cognitive processing of embedded advertisements (Burns & Fairclough, 2015). Thus, contributions that rely on CLT show conflicting results on the impact of cognitive load on brand recall and recognition. IGA within a gameplay experience that generates a higher cognitive load hurts brand recall, suggesting challenges in effectively integrating advertising within games. Thus, the limited cognitive capacity available during complex video games poses challenges for the recall and recognition of in-game advertising, depending on its positioning and integration within the game environment (Vyvey et al., 2018). Based on the theoretical approach this study aims to address the following research questions:

RQ1: How do different immersive levels of gameplay experience influence consumers' attention to in-game advertisements?
RQ2: How do different immersive levels of gameplay experience influence consumers' recognition and recall of in-game advertisements?
RQ3: How do different immersive levels of gameplay experience influence consumers' attitudes towards in-game advertising?

Methodology
To thoroughly investigate the effectiveness of in-game advertising (IGA) across different levels of immersion, we designed two between-subjects experiments using "Grand Theft Auto V" (GTA), a game that blends real and fictitious brands within its environment. Our study modifies GTA's graphics to incorporate real products, allowing interaction with brands like Adidas, Reebok, Coca-Cola, and Pepsi.
In the first experiment, immersion was manipulated with the presence (vs. absence) of a YouTuber. Participants saw a pre-recorded session of GTA gameplay that included both integrated product placements and brand integrations, with a first-person perspective. The first group includes those who see the gameplay with no streamer, while the second group includes those who observe a YouTuber engaged in gameplay. During this session, we measure participants' visual attention and physiological responses through eye-tracking and skin conductance sensors.
In the second experiment, the level of immersion was manipulated by subjecting participants to two game sessions under different conditions: 2D vs. VR. Furthermore, pre- and post-experiment questionnaires were administered in both experiments. The pre-experiment questionnaire assesses their initial attitudes towards IGA and the featured brands, utilizing a ten-item scale from Fortin and Dholakia (2005). The post-experiment questionnaire evaluates brand recall and recognition based on criteria from Martí-Parreño et al., (2017) and measures the perceived intrusiveness of the advertisements using a scale from Li et al. (2002). This comprehensive approach aims to capture both cognitive and emotional responses to in-game advertising, providing insights into how immersion influences advertising effectiveness.

Preliminary Findings

The preliminary results refer to partial data (Group Play= 15; Group YouTuber= 16) from the first experiment and reveal that the Youtuber group exhibited significantly higher total fixation durations compared to the Play group. This suggests that watching a streamer interact with the game leads participants to focus longer on in-game advertising elements. Moreover, the Youtuber group not only fixated on these elements more frequently, but each fixation also lasted longer on average, indicating a more intense and focused engagement.

Moreover, the time to first fixation (TTFF) was shorter in high immersion conditions, indicating that they can recognize brand elements with greater readiness. However, their overall engagement does not reach the depth or duration observed by Youtuber viewers. This indicates that in higher immersive conditions, players may have been initially responsive to the stimuli, but that their subsequent cognitive processing was less pronounced than those who were watching a streamer. Furthermore, the duration of time spent by YouTuber viewers on branded content was longer than that spent by other viewers, as evidenced by the longer duration and total time spent on visits. Furthermore, the elements were revisited with greater frequency, as evidenced by the elevated visit count. This pattern highlights the enhanced recurrent attention to the advertisements, thereby reinforcing the trend that passive viewing, particularly through streamer sessions, enhances cognitive engagement with advertising content.

Overall, the results of the eye-tracking metrics indicate that passive observation of gameplay, particularly when guided by a streamer, not only draws more attention to in-game advertisements but also encourages a deeper and more sustained engagement with them. These findings have significant implications for the design and targeting of in-game advertising, particularly in contexts where content is consumed passively, such as during streaming or in spectator scenarios.

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