Proceedings of ICEIPI 2025 Symposium: Understanding Religious Identity in Educational Contexts
DOI: 10.54254/2753-7048/2025.ND26841

Analysis of Immersive Design Elements in Player-Centric Digital Games

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Abstract. This study systematically examines the fundamental design elements that enhance player immersion in digital games, responding to evolving gaming demands and increasing societal pursuit of psychological fulfillment. Through comprehensive case analysis of critically acclaimed titles including Elden Ring, Black Myth: Wukong, ASTLIBRA Revision, and Half-Life: Alyx, this research employs case study analysis and literature review methodologies to investigate five core dimensions: multisensory stimulation, spatial mapping, narrative architecture, and hardware technology integration. Theoretically grounded in immersion theory, flow theory, and multimodal interaction frameworks, this study reveals how strategic implementation of coordinated sensory experiences, thoughtful spatial design, compelling narratives, and advanced hardware capabilities collectively contribute to optimal player engagement. The research demonstrates that successful immersion enhancement requires balanced integration across sensory modalities, emphasizing synergistic effects between visual fidelity, environmental audio design, and intuitive interface elements. Key findings indicate that while technological advancement provides the foundation for immersive experiences, strategic orchestration of design elements proves more critical than raw specifications. The study proposes that game development must achieve balanced multisensory integration and dynamically adjust reward mechanisms to address technological limitations and user expectations. These insights offer valuable guidance for industry practitioners and contribute to theoretical understanding of human-computer interaction in gaming contexts.

Keywords: Immersive experience, human-computer interaction, game industry, user experience, digital media technology

1. Introduction

The 21st century has witnessed remarkable advancements in computer technology alongside growing societal pursuit of psychological fulfillment, catalyzing unprecedented growth in the video game industry. As player expectations continue to evolve, optimizing in-game immersion has emerged as a critical challenge in game design. While genre-specific approaches exist, our analysis identifies five universal immersion-enhancing elements: visual presentation, auditory design, spatial mapping, narrative architecture, and hardware affordances.

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When players engage with game content as experiential explorers in a state of “deep immersion” --characterized by hyper-focused cognitive absorption--they achieve significantly enhanced experiential quality. Through comparative case analysis of these core dimensions, this study systematically examines methodologies for amplifying player immersion.

2. Definition of immersion in games

Research on immersion originated in the late 20th century with virtual reality (VR) technology. Early scholars such as Luo Fuyuan et al. explored immersion-enhancing solutions in virtual battlefields through sound rendering techniques [1]. By the 21st century, the proliferation of new media technologies expanded immersion research into fields such as education and healthcare. Cao Zhonglu proposed five key characteristics of immersion (autonomy, interactivity, multimodality, emotional resonance, and spatiotemporal continuity), laying the foundation for subsequent studies [2]. In the post-pandemic era, immersive experiences have been widely applied in digital exhibitions (e.g., Liu Pan's “Stone City Mirror” experiment) and gamified cultural tourism projects.

As Hungarian psychologist Mihaly Csikszentmihalyi stated “People reach a state of immersion when they become completely absorbed in an activity, focusing their attention and filtering out all irrelevant perceptions [3].” According to Zhang Jing's research, game immersion occurs when players are “so captivated by the game that they lose themselves in it [4].” Based on this, the game immersion can be defined as “The state in which players devote significant attention to game content, engaging in deep cognitive processing and experiential interaction during gameplay .”

This study employs case analysis and literature review methods, drawing on existing research on immersion, with the aim of exploring methods to enhance players' immersion in modern game development, thereby ultimately improving their gaming experience. The study analyzes games such as Elden Ring, Black Myth: Wukong, ASTLIBRA Revision, and Half-Life: Alyx as case studies. These games each exhibit outstanding strengths in their respective fields, offering valuable insights for industry practitioners. Among them, Elden Ring and Black Myth: Wukong have achieved global sales exceeding ten million copies and maintain over 90% positive ratings on Steam, while Half-Life: Alyx is currently one of the most popular VR games on the market. The games discussed in this study are either industry leaders or highly acclaimed among players. However, due to the scope of the research, mobile games were not included. Table 1 presents the rating data from games across multiple platforms, demonstrating their commercial success.

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Table 1. The case cited in the text has a rating on different websites

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Name	Rating on Steam	media rating on Metacritic	player rating on Metacritic
Elden Ring (without DLC)	93% positive rating. A total of 1074506 reviews	96/100 (PC/PS5)	8.3/10
BLACK MYTH: WUKONG	96% positive rating. A total of 1,165,734 reviews	81/100 (PC/PS5)	8.2/10
ASTLIBRA Revision	95% positive rating. A total of 27,513 reviews	79/100 (switch)	7.5/10
Half-Life: Alyx	98% positive rating. A total of 98,120 reviews	93/100 (PC with VR)	9.1/100
Street Fighter 6	84% positive rating. A total of 59,134 reviews	92/100 (PS5)	7.5/10
The Last of Us Part II	NONE	93/100 (PS4)	5.8/10
ドンキーコング バナンザ	NONE	91/100 (switch2)	9.2/10
Yu-Gi-Oh! Master Duel	73% positive rating. A total of 88,576reviews	80/100 (PC)	7.5/10
Balatro	97% positive rating. A total of 163,505 reviews	90/100 (PC)	8.3/10
Animal Well	95% positive rating. A total of 21,456 reviews	90/100 (PC)	8.0/10

3. The relationship between flow theory and immersion

The term “flow” was first introduced by M. Csikszentmihalyi in his book Flow, where it is defined as “a state of complete immersion in an activity driven by intrinsic motivation .” Throughout the work, the author repeatedly cites immersion in various contexts, such as intellectual pursuits, active lifestyles, debates, and games, as integral components of the flow experience. This suggests that when players achieve deep immersion in games, they are likely to experience the characteristic pleasures of flow states.

This study applies flow theory’s immersion manifestations to operationalize positive player experiences stemming from increased game immersion.

4. Analysis of different game elements

4.1. Enhanced immersion through visual effects

As the primary channel for human perception, visual elements play a crucial role in immersion. As Miao Simeng noted in her research “A mainstream perspective holds that game-based virtual reality simulates authenticity, where advancements in graphics technology aim to comprehensively enhance user immersion [5].” With the continuous upgrading of game engines, modern titles now achieve unprecedented levels of visual fidelity.

In Elden Ring, the development team created distinctive landscapes deeply integrated with the lore—colossal ruins, the omnipresent Erdtree, and scarlet rot-infested terrains -- delivering intense

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visual impact. Such designs instantly capture player attention, facilitating flow states. Similarly, Cyberpunk 2077's intricate neon lighting and Black Myth: Wukong's photogrammetry-based models, though stylistically divergent, share this immersion-boosting effect.

Even in games with limited environmental freedom, strategic use of visual elements effectively establishes atmosphere. Balatro employs vibrant colors and dynamic patterns to create a lighthearted mood and Inscryption utilizes dim lighting, obscured enemies, wooden carvings, and oppressive backgrounds to evoke dread.

UI design further critically impacts immersion. Gapyuel Seo from Hongik University's Game Graphics Department emphasizes that has conducted relevant research that players experience games through UIs; thus, natural interaction design is essential for immersion [6]. Style-consistent interfaces prevent cognitive dissonance when switching between screens.

4.2. Enhanced immersion through audio effects

Game Science implemented extensive voice acting, interactive sound effects, and environmental audio in Black Myth: Wukong. According to incomplete statistics, the game features over seven hours of character voice lines alone. As Zhou Yuxue notes in her research that through the strategic use of music and sound effects, players can be provided with an immersive gaming experience that enhances their engagement and focus. Music creates depth and dimensionality for game environments, while sound effects deliver refined auditory experiences—together they construct a rich and varied game world [7]. During gameplay, players often cannot rely solely on visual cues due to camera angles and dynamic lighting conditions. Audio supplementation enables players to better process in-game information and perceive their surroundings.

In certain game genres—such as card games as Yu-Gi-Oh! Master Duel or fighting games like Street Fighter 6—the visual information load can accumulate rapidly during extended play sessions, leading to fatigue and diminished attention. In these cases, well-designed audio effectively alleviates sensory fatigue, thereby enhancing immersion and prolonging players' engagement.

4.3. Enhancing immersion through map design

As a crucial medium for player engagement in many games, the success of map design significantly impacts the immersive experience. Research by Wilhelmina Zoe Statham et al. demonstrates one potential consequence of poor map design: “Suboptimal map design may compromise intended optimization outcomes, frequently manifesting in visual redundancy and aesthetic exhaustion that potentially induces navigational disorientation [8].” Taking Elden Ring's map design as an example, it ensures most players experience a relatively smooth and reasonable difficulty curve, allowing players to progress through the game's story more smoothly. Maps of certain areas, such as the Eternal City Nokron and the Shadowkeep, enhance players' exploratory immersion through three-dimensional path designs, while also providing a great sense of accomplishment upon completion of exploration.

Using the early-game map “Stormveil Castle” as an example, this area offers players, it approves two distinctly different entry routes and Over ten explorable spaces for collection. These spaces are distributed across approximately three vertical layers, connected by five sub-paths.

Beyond open-world games like Elden Ring or interconnected-world games like the Dark Souls series, other genres such as Metroidvania games as Hollow Knight or puzzle-platformers as Animal Well require deeper exploration in map design. They can add more hidden rooms and Easter eggs for players to discover or giving more significance to map elements to aid progression

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Some games, like Nintendo's newly released Donkey Kong: Bananza, even incorporate terrain interaction as a core gameplay mechanic, providing players with tremendous freedom while stimulating their desire to explore.

4.4. Enhancing immersion through narrative design

While game maps provide the fundamental framework for gameplay, the construction of narrative (in story-driven games) plays an equally crucial role in player immersion. According to Guo Zheng's research, maintaining a game story's novelty and appeal requires thorough design and careful orchestration of plot developments [9].” Taking the traditional Japanese side-scrolling RPG ASTLIBRA Revision as an example, while its narrative structure largely follows Joseph Campbell's “Hero's Journey” framework from The Hero with a Thousand Faces as show in figure 1 [10], it implements several innovative techniques by periodically introducing parallel narratives during the adventure that serve as driving forces for plot progression. Unlike conventional “side quests,” all such narratives strictly serve the main storyline, through which players' understanding of the main plot undergoes continuous reinforcement and updating. Developer KEIZO successfully guides players to form narrative hypotheses through precise timing of plot revelations, then validates partial player predictions while exceeding expectations, and concludes each chapter by organically prompting speculation about subsequent developments. This cyclical narrative rhythm creates an effective attention-retention mechanism. Such narrative architecture not only subverts traditional frameworks but also provides players with adequate space to process plot developments, thereby significantly enhancing immersion.

Figure 1. The Hero's Journey proposed by Joseph Campbell [11]

Poorly designed narratives can severely disrupt players' flow state during gameplay, with significant negative impacts. A prime example is The Last of Us Part II -- while it received strong critical acclaim (including winning The Game Awards' 2020 Game of the Year) with a high Metascore, its narrative contained excessive meaningless content and suffered from structural disorganization, resulting in a mere 5.8/10 user score on Metacritic.

4.5. Enhancing immersion through hardware devices

The continuous advancement of hardware devices (particularly the widespread adoption of VR equipment) has provided gamers with new interactive platforms. VR technology primarily utilizes computer systems, employing 3D graphics, multimedia technologies and simulation techniques to generate realistic virtual environments. As Tan Sihui states: “VR technology delivers immersive

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gaming experiences, with its enhanced sense of presence significantly extending both the duration and depth of user engagement [11].” A prime example is Half-Life: Alyx, which was developed for mature VR platforms, allowing players to control in-game actions through natural head and hand movements. Current mainstream VR devices typically feature resolutions of 2K or higher and refresh rates between 60-90Hz, meeting basic player requirements. Compared to traditional input methods like keyboard/mouse or controllers, VR interactions demonstrate superior capacity for maintaining focus and stimulating emotional responses. While most current VR titles on Steam haven't achieved blockbuster status, the growing library of content drives iterative refinement that will ultimately improve quality. The combined advantages of VR hardware and software are expected to attract broader audiences and inject new vitality into the VR gaming industry. Concurrently, controller innovations like haptic feedback have gained widespread implementation - in It Takes Two, for instance, tactile responses during actions like shooting and grabbing provide intuitive cues that facilitate entering flow states once players adapt. Additionally, specialized peripherals including fitness rings (Ring Fit Adventure) are gradually entering mainstream households. Like controllers and VR systems, these hardware advancements significantly enhance interactive immersion through multimodal sensory engagement and kinesthetic correspondence, ultimately creating more compelling gaming experiences.

5. Future prospects

Game immersion can be enhanced through various approaches. While game preferences vary among individuals, different game genres can improve player immersion through similar fundamental methods. In developing large-scale games, in addition to artistic design and gameplay mechanics, in-depth research should be conducted on details like sound effects. For narrative-driven games, developers should focus on logical storytelling while considering player perspectives. Independent game developers can strive to create distinctive features and craft unique atmospheres for players. As game companies continue to develop and share experiences, production standards will gradually improve. The continuous evolution and upgrading of game engines will enable developers to create games more efficiently and effectively, while advanced game engines will provide players with better experiences. More sophisticated rendering engines can produce higher-fidelity graphics, while advanced physics engines can deliver more realistic interactions with environmental objects, reduce critical bugs, and enhance gameplay freedom. The rapid development of AI technology offers limitless possibilities for interactions between NPCs and players. As VR technology becomes more affordable and widespread in the future, players will have opportunities to experience games with unprecedented levels of immersion.

6. Conclusion

In response to the increasing societal demand for psychological fulfillment, game immersion has demonstrated growing significance. The induced “flow state” effectively enhances players' gaming experiences. During development, creators can improve immersion through multiple dimensions including visual presentation, auditory design, spatial mapping, narrative construction, and hardware capabilities.

These research findings provide valuable insights for China's gaming industry. As the domestic sector develops rapidly, professionals across various game genres can employ these approaches to elevate player experiences, thereby enriching mental wellbeing while injecting vitality into the entire industry and establishing a virtuous cycle of development.

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