ISSN 2509-2817 KiDRS Korea Institute of Design Research Society 통권 33호, 2024. Vol.9 No.4

A Study on the Application of Emotional Design in Smartphone MMORPGs and Impact on Player Immersion

스마트폰 MMORPG에서 감성 디자인의 적용과 플레이어 몰입감에 미치는 영향에 관한 연구

주 저 자 : 엄문준 (Yan Wenjun) 홍익대학교 국제디자인전문대학교 디자인학과 박사과정

교 신 저 자 : 나 건 (Ken Nah) 홍익대학교 국제디자인전문대학교 디자인경영전공 교수
knah@idas.ac.kr

https://doi.org/10.46248/kidrs.2024.4.11

접수일 2024. 11. 25. / 심사완료일 2024. 12. 01. / 게재확정일 2024. 12. 09. / 게재일 2024. 12. 30.

Abstract

The purpose of this paper is to analyze the impact of emotional design on the players' immersion in a massively multiplayer online role-playing game (MMORPG) running on a smartphone, and to propose a design direction for future MMORPGs suitable for smartphones. To this end, the literature analysis revealed that with the rapid development of communication technology, smartphones have become a very important gaming platform. the MMORPG genre has become the central genre of gaming platforms. Most of the existing research focuses on improving player immersion through sensory stimulation, which poses difficulties and limitations in solving the problem of lack of immersion. this study conducted surveys and interviews with smartphone MMORPG players to analyze the three stages of immersion - building, deepening, and declining - and comprehensively summarize how emotional design affects the player's immersive experience, suggesting strategies to enhance immersion. The value of this study lies in the new perspectives and approaches to game design that allow developers to gain a deeper understanding of players' needs, and we hope that this research will provide a theoretical foundation for the improvement and development of the MMORPG genre on smartphones.

Keyword

Smartphone Game(스마트폰 게임), Game Immersion(게임 몰입), Emotional Design(감성 디자인), MMORPG

요약

본 논문의 목적은 스마트폰에서 구동되는 대규모 다중 사용자 온라인 롤플레잉 게임(MMORPG)의 감성 디자인이 플레이어의 몰입감에 미치는 영향을 분석하고 이를 바탕으로 향후 스마트폰에 알맞은 MMORPG의 디자인 설계 방향성을 제안하는 것이다. 이를 위해 선행연구 분석을 수행하여 스마트폰은 빠르게 발전한 통신 기술로 인해 매우 중요한 게임 플랫폼이 되었으며, 그중 MMORPG 장르는 게임 플랫폼에서 중심 장르가 된 것을 확인하였다. 이후 설문조사와 인터뷰를 수행하여 스마트폰 MMORPG 플레이어를 중심으로 몰입감을 형성, 심화 그리고 감소의 세 단계로 분석하고, 감성 디자인이 플레이어의 몰입 경험에 어떻게 영향을 미치는지 종합적으로 요약하여 몰입감을 강화하기 위한 전략을 제안하였다. 본 연구를 통해 스마트폰의 MMORPG 장르의 개선 및 발전을 위한 이론적 토대가 되기를 기대한다.

목차

1. Introduction

2. Theoretical research

2-1. Immersion

2-2. Smartphone MMORPGs

2-3. Emotional Design

3. Research Status and Analysis

3-1. Research Process

3-2. Analysis of the Impact of Emotional Design on Smartphone MMORPG Players' Immersion

3-3. Result

4. Strategies to Enhance Immersion in Smartphone MMORPGs Through Emotional Design

4-1. Visceral Design Strategies: Emotional Guidance Through Sensory Experience

4-2. Behavioral Design Strategies: Optimizing Playability, Operability, and Interaction
4-3. Reflective Design Strategies: Deep Integration of Social and Narrative Elements
5. Conclusion
References

1. Introduction

With the rapid development of mobile communication technology, people's leisure and entertainment habits have undergone significant changes. Smartphones, as the most mainstream personal mobile communication devices today, have profoundly transformed people's lifestyles and entertainment habits. Providing diverse entertainment options has become one of the essential functions of smartphones. Among these, the mobile gaming market has experienced rapid growth due to advancements in smartphone technology. Currently, mobile phones have become a dominant gaming platform[1], and smartphone MMORPGs (Massively Multiplayer Online Role-Playing Games) are a crucial part of this category, attracting increasing user attention.

In his book Emotional Design: Why We Love (or Hate) Everyday Things[2], Professor Donald A. Norman points out that the emotional aspects of product design often satisfy user needs more effectively than functionality. Emotional design, as an important theory proposed by Norman, has been validated in various design fields and has become a critical issue that designers cannot overlook. Game design, as a form of design centered on emotional experiences, greatly relies on the quality of emotional experiences users have during gameplay for its success[3].

However, in the current design of smartphone MMORPGs, although designers focus on providing players with high-quality sensory experiences, they often neglect deeper emotional needs. This neglect may be one of the main reasons for the short lifespan of mobile game user groups. Additionally, the short retention periods of players are closely related to their level of immersion in smartphone games[4]. While many studies have explored game immersion and emotional design, research on the relationship between emotional design and immersion in smartphone MMORPGs, as well as how emotional design enhances player immersion, remains limited. This research gap has become a bottleneck for further development in the smartphone gaming industry.

To address these issues, this study aims to explore the impact of emotional design on the immersion of smartphone MMORPG players, analyze the characteristics and influencing factors of the different stages of player immersion, and propose strategies for integrating emotional design into smartphone MMORPG game design. Through this research, we hope to provide new perspectives and references for the design practice of smartphone MMORPGs and offer theoretical support for the sustainable development of the mobile gaming industry.

1) Feijoo, Claudio, et al.: Mobile gaming: Industry challenges and policy implications, Telecommunications policy, Vol.36, No.3, 2012, pp.212-221.

2) Norman, Don.: Emotional design: Why we love (or hate) everyday things, Basic books, 2007, pp.78-85.

3) Johnson, Daniel, and Janet Wiles.: Effective affective user interface design in games Ergonomics, Vol.46, 2003, pp.1332-1345.

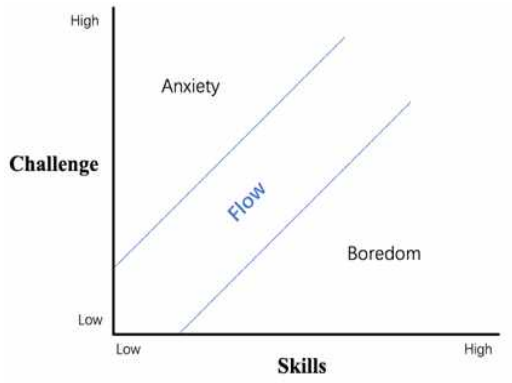
4) Rutz, Oliver, Ashwin Aravindakshan, and Olivier Rubel.: Measuring and forecasting mobile game app engagement, International Journal of Research in Marketing, 2019. Vol.36, No.2 , pp.185-199.

This study first employs literature review methods to examine the different stages of player immersion, the current status of smartphone MMORPGs, and the theory of emotional design, laying a theoretical foundation for the research. Subsequently, qualitative research methods, including surveys and interviews, were conducted to summarize the dynamic changes in player immersion and invite game industry designers to discuss and explore these issues. Based on the research findings, corresponding improvement strategies are proposed to offer new perspectives for the development of the smartphone MMORPG industry.

2. Theoretical research

2-1. Immersion

When we attempt to describe the state of players losing themselves in games, "flow" is one of the most frequently mentioned concepts. The initial definition of flow was introduced by Csikszentmihalyi, who described it as a holistic feeling that arises when people fully immerse themselves in an activity[5] —a highly positive psychological state. Flow occurs when individuals feel focused, interested, and enjoy an activity[6] (Figure. 1). This state is typically achieved when the challenge of the task matches the individual's skills, allowing them to enter a highly pleasurable and focused state. In this state, individuals are fully engaged in the present moment, experiencing a deep sense of satisfaction and accomplishment.



[Figure. 1] The Flow Theory

Csikszentmihalyi outlined eight key elements of flow: the balance between challenge and skill, the merging of action and awareness, clear goals, immediate feedback, high concentration, a sense of control, loss of self-consciousness, and a transformation of time[7]. He summarized these eight elements into a ninth core element: "autotelic experience," which refers to an intrinsic reward derived from the activity itself. This experience is independent of external rewards, offering satisfaction and joy purely from the activity. Flow theory has been widely applied in various fields, including psychology, education, sociology, sports, and more[8)9)10)].

Flow theory emphasizes the need to maintain a

5) Csikszentmihalyi, M.: Beyond boredom and anxiety: Experiencing flow in work and play. San Fransisco: Jossey-Bass, 2000, pp.27-31.

6) Csikszentmihalyi M.: Finding flow: The psychology of engagement with everyday life, Basic Book, 1997, pp.57-62.

7) Marsh H W, Jackson S A.: Flow experience in sport: Construct validation of multidimensional, hierarchical state and trait responses, Structural Equation Modeling: A Multidisciplinary Journal, Vol.6, No.4, 1999, pp.343-371.

8) Chan T S, Ahern T C.: Targeting motivation—adapting flow theory to instructional design, Journal of Educational computing research, Vol.21, No.2, 1999, pp.151-163.

9) Swann C, Keegan R J, Piggott D, et al.: A systematic review of the experience, occurrence, and controllability of flow states in elite sport, Psychology of sport and exercise, Vol.13, No.6, 2012, pp.807-819.

10) Castells M.: Flows, networks, and identities: A critical theory of the informational society, Critical education in the new information age, 1999. pp.37-64.

balance between the difficulty of the challenge and the skills required to address it. When this balance is disrupted, individuals are likely to experience negative emotions[11]. Csikszentmihalyi described flow as a state of high focus or absolute immersion in an activity[12], and in some ways, games and art are designed to provide this kind of experience[13].

Some studies suggest that the term "immersion" may be more appropriate than "flow" for describing players' experiences in video games. It is argued that immersion can be a precursor to flow, as the feeling of being fully engaged, where everything else becomes unimportant, aligns with the common definition of immersion[14]. Flow, however, is considered a unique and optimal experience, representing the most extreme state of engagement[15]. In contrast, immersion is not always as intense and can therefore be seen as a secondary, less extreme state to describe players' level of engagement in games[16].

11) Csikszentmihalyi M., Finding flow: The psychology of engagement with everyday life, Basic Book, 1997, pp.57-62.

12) Chan T S, Ahern T C.: Targeting motivation—adapting flow theory to instructional design, Journal of Educational computing research, Vol.21, No.2, 1999, pp.151-163.

13) Csikszentmihalyi M. Flow.: The Psychology of Optimal Experience. New York (HarperPerennial). 1990, pp.75-77.

14) Beard, K.S.: Theoretically Speaking: An Interview with Mihaly Csikszentmihalyi on Flow Theory Development and Its Usefulness in Addressing Contemporary Challenges in Education, Vol.27, 2015, pp.353-364.

15) Brown, Emily, and Paul Cairns.: A grounded investigation of game immersion, CHI'04 extended abstracts on Human factors in computing systems. 2004, pp.1297-1300.

16) Ermi, Laura, and Frans Mäyrä., Fundamental components of the gameplay experience: Analysing immersion. Proceedings of DiGRA 2005 Conference: Changing Views: Worlds in Play, 2005, pp.65-82.

In the gaming field, some games provide high levels of immersion without meeting the basic criteria for flow. For example, certain open-world or sandbox games lack clear goals and feedback mechanisms but still deliver strong immersive experiences. These games allow players to explore, create, or interact with the environment freely without specific objectives. A notable example is the Nintendo Switch game 〈Animal Crossing: New Horizons〉 (Figure. 2). In this social simulation game, players can live on a virtual island at their own pace without mandatory goals or tasks. Activities such as planting, fishing, and interacting with other characters can be performed freely. At its peak, this game attracted an estimated 11 million monthly players[17], showcasing its ability to provide a satisfying and immersive experience despite not inducing a state of flow.

[Figure. 2] Animal Crossing: New Horizons[18]

Research suggests that immersion may better describe video game experiences compared to flow, as players can become deeply immersed in a game without necessarily reaching a state of flow. Brown and Cairns attempted to define immersion and proposed three stages: engagement, engrossment, and total immersion. These stages involve certain barriers that players must overcome to progress to deeper levels of

17) Jennett, Charlene, et al.: Measuring and defining the experience of immersion in games. International journal of human-computer studies, Vol.66, No.9, 2008, pp.641-661.

18) https://screenrant.com (2024.10)

immersion.

In the engagement stage, players need to meet two conditions: access and involvement. Access means that players must choose a game that interests them in order to begin experiencing immersion. Involvement refers to the increasing amount of time and energy players invest in the game, leading them to focus more deeply on the game's progression.

As players' involvement in the game increases, they transition to the engrossment stage. Similarly, in this stage, players need to meet two conditions. First, their perception of the real world diminishes, including their awareness of the environment and their own physical body. Second, their self-awareness decreases, and their attachment to the game grows stronger. Their emotions become directly influenced by the game, and they may feel emotional distress when they stop playing.

The final stage is total immersion. At this stage, players experience a sense of complete presence in the game. They lose all self-awareness, fully embody their in-game character, detach from reality, and perceive the game as the most important aspect of their experience[19] (Table. 1).

[Table. 1] Three Stages of Immersion

Stage	Description
Engagement	Players choose games they find interesting and begin their experience. They invest time and energy in the game, primarily focusing on the game's progression.
Engrossment	Players' awareness of the real-world decreases, and their self-awareness diminishes. Their emotions are influenced by the game.
Total Immersion	Players experience a complete loss of self-awareness, fully embody the game character, detach from reality, and view the game as the most important experience.

The findings of Ermi and Mäyrä on the three components of immersion support, to some extent, the research of Brown and Cairns on the three stages of immersion. Ermi and Mäyrä divided immersion into three components: sensory immersion, imaginative immersion, and imaginative immersion. Their study also demonstrates that, compared to flow, immersion is a more effective concept for describing the complexity of players' states and experiences in games, as well as their level of participation during gameplay.

Therefore, when discussing game-related experiences, it is essential to distinguish between flow and immersion. Immersion is better suited to describe the specific states that players experience while engaging with a game.

2-2. Smartphone MMORPGs

In the era of mobile internet, mobile communication technology has developed rapidly and brought significant changes. People's lifestyles and leisure activities have become more diverse as a result[20][21]. Smartphones, as the most commonly used communication tools in daily life, are closely integrated into people's lives. They serve not only as core computing devices but also as essential communication platforms, with their functionalities continuously expanding

19) Cheng, M-T., H-C. She, and Leonard A. Annetta.: Game immersion experience: its hierarchical structure and impact on game-based science learning, Journal of computer assisted learning, Vol.31, No.3, 2015, pp.232-253.

20) Mahmud A, Islam M R.: Smartphone and Social Capital: Changing Lives and Lifestyles of the Youth[M] The Palgrave Handbook of Global Social Change. Cham: Springer International Publishing, 2023, pp.1-19.

21) Fritsch T, Ritter H, Schiller J.: User case study and network evolution in the mobile phone sector (a study on current mobile phone applications)[C] Proceedings of the 2006 ACM SIGCHI international conference on Advances in computer entertainment technology, 2006, p.10.

to meet growing demands. In recent years, online games have emerged as a dominant form of entertainment. A key trend has been the reduction in the size of gaming devices and the enhancement of their portability. Consequently, smartphones have become one of the most popular gaming platforms. Their high accessibility and rapid technological advancements have also made them an ideal choice for gaming devices[22].

Mobile games are one of the most successful derivatives of the mobile internet era. Their development pace keeps up with smartphone technology and, in some cases, even surpasses it, becoming a key driver of hardware innovation. Currently, smartphone games in the market can be categorized into two types based on functionality: serious games and entertainment games. At present, the smartphone gaming industry is primarily focused on entertainment games, with the majority of revenue for major gaming companies relying on this category[23].

In 2023, the global gaming market generated over $184 billion in revenue, with mobile games accounting for 49%, console games for 29%, PC games for 21%, and browser-based PC games for only 1%. Games on mobile devices contributed approximately half of the total revenue from all game types. According to SensorTower, RPG mobile games generated $20.2 billion in revenue in 2023, making them the most profitable type of mobile game. This also demonstrates the widespread popularity of RPG mobile games. In terms of downloads, MMORPGs were the most popular subgenre of mobile games (Figure. 3).

[Figure. 3] The most downloaded mobile game genre in 2023[24]

Massively Multiplayer Online Role-Playing Games (MMORPGs) encompass a wide range of game genres. When a platform allows a large number of players to be online simultaneously, the game is classified as a Massively Multiplayer Online (MMO) game. MMO games connect players globally via the internet, providing them with rich experiences by allowing them to interact in real time. In these games, participants can form teams with other players to achieve specific goals or objectives, or they can establish adversarial relationships to compete against others. These dynamics of cooperation and competition often appear in one or multiple combinations across different game genres [25][26][27].

22) Sela A, Rozenboim N, Ben-Gal H C.: Smartphone use behavior and quality of life: What is the role of awareness?, PloS one, Vol.17, No.3, 2022, e0260637.

23) Jiang Junyi.: Measurement Method for User Experience of Mobile Games. Northeastern University, 2019, pp.89-103. pp.89-103.

24) www.blog.udonis.com (2024.10)

25) Barnett J, Coulson M.: Virtually real: A psychological perspective on massively multiplayer online games. Review of General Psychology, Vol.14. No.2, 2010, pp.167-179.

26) Stavropoulos V, Gomez R, Motti-Stefanidi F.: Internet gaming disorder: A pathway towards assessment consensus, Frontiers in psychology, Vol.10, 2019, p.1822.

27) Adams B L M, Stavropoulos V, Burleigh T L, et al.: Internet gaming disorder behaviors in emergent adulthood: A pilot study examining the interplay between anxiety and family cohesion,

MMORPGs introduce role-playing features by enabling players to create virtual characters within the game[28]. Based on the game's default character models or conceptual frameworks, players can create personalized and stylized characters according to their preferences[29]. Players then control these characters to explore and experience the virtual world. MMORPGs allow for a large number of players to be online simultaneously and provide social functionalities such as real-time communication, enabling cooperative or competitive interactions through team play[30].

In MMORPGs, players can take on one or multiple roles, which adds complexity to their identities. Players not only retain their real-world identities but also adopt the virtual identities of the roles they play in the game. These dual identities are not isolated. Players can interact with real-life friends in the game or establish new social relationships in the virtual space, some of which may evolve into offline social connections over time. Research suggests that MMORPGs may be the most immersive game genre[31].

International journal of mental health and addiction, Vol.17, 2019, pp.828-844.

28) Stavropoulos V, Gomez R, Mueller A, et al.: User-avatar bond profiles: How do they associate with disordered gaming?, Addictive behaviors, Vol.103, 2020, 106245.

29) Schwind V, Wolf K, Henze N, et al.: Determining the characteristics of preferred virtual faces using an avatar generator[C] proceedings of the 2015 annual symposium on computer-human interaction in play. 2015, pp.221-230.

30) Zhang, Fan, and David Kaufman.: Can playing massive multiplayer online role playing games (MMORPGs) improve older adults' socio-psychological wellbeing?, Computer Supported Education: 7th International Conference, Springer International Publishing, 2016, pp.504-522.

31) Molyneux L, Vasudevan K, Gil de Zúñiga H.: Gaming social capital: Exploring civic value in multiplayer video games, Journal of Computer-Mediated Communication, Vol.20, No.4, 2015, pp.381-399.

2-3. Emotional Design

From a user's first impression of a product to the actual usage experience, emotional factors significantly influence users' perceptions and preferences. At its core, a game is about delivering emotional experiences—it can be described as a product that "sells emotions." Games that fail to provide emotional experiences are unlikely to attract users. Therefore, emotional experiences in games are a critical standard for evaluating a game's value, and emotional design is the key to enhancing that value.

Cognitive psychologist Donald A. Norman, in his book Emotional Design, highlighted the crucial role of emotions in design and analyzed how emotional effects can be incorporated into product design. He proposed three levels of emotional design: visceral, behavioral, and reflective levels[32].

In 2001, Prensky proposed six structural elements of games that attract players: rules, goals and objectives, feedback and outcomes, challenges, interaction, and narrative[33]. His study established a foundational framework for player-centered game design research by introducing these six structural elements. Shahrel et al. built upon Prensky's work to develop a player-centered methodological framework for game design, linking Norman's three levels of emotional design, Bloom's three domains of learning, and Prensky's six structural elements of games[34]. Gerhard et al. (2005) explored the

32) Norman, Don. Emotional design: Why we love (or hate) everyday things. Basic books, 2007.

33) Marc Prensky.: Digital game-based learning. Comput. Entertain, Vol.1, No.1, 2003, p.21.

34) Baharom S N, Tan W H, Idris M Z.: Emotional design for games: A framework for player-centric approach in the game design process, International Journal of Multimedia and Ubiquitous Engineering, Vol.9, No,10, 2014, pp.387-398.

application of these six structural elements in mobile phone games, focusing on mobile learning. Their findings demonstrated that mobile games could effectively immerse users in mixed-reality environments, thereby enhancing their learning experiences[35]. This underscores the positive impact of the six structural elements on mobile phone games. Based on this foundation, the present study refines Prensky's structural elements of games and proposes specific game factors informed by emotional design to study their influence on player immersion.

The Visceral Level focuses on the sensory stimuli brought by a product's appearance, which can instantly trigger positive or negative emotional reactions from users. In games, the visceral level of emotional design is reflected in the player's immediate sensory experience of visual effects, artistic styles, character design, scene design, music, and tactile feedback. This level closely aligns with Prensky's structural element of Feedback and Outcomes. Game art styles (e.g., character appearance, animations, scene colors, and lighting effects) create a strong visual impact that rapidly establishes emotional connections with players. Their uniqueness and aesthetic appeal significantly enhance attraction—for instance, the relaxation of cartoon styles, the immersion of realistic styles, or the technological feel of futuristic styles—all of which optimize the player's initial sensory experience.

Simultaneously, sound effects, through variations in rhythm and style, evoke emotions: cheerful music enhances the sense of achievement after completing tasks, while somber tones heighten the tension of failure, thereby strengthening the emotional bond between players and the game through immediate feedback. Tactile feedback, such as vibration functionality, provides instant responses at key moments like successful attacks or unlocking rewards, allowing players to perceive the outcomes of their actions more intuitively and further enhancing immersion.

The Behavioral Level emphasizes functionality and user experience, which in games is closely related to the structural elements of Rules, Challenges, and Interaction proposed by Prensky. Its core lies in interface design, gameplay mechanics, and operability. Rules are implemented through interface design to clearly define the player's operational scope, helping players quickly understand objectives and operational logic. Clear and reasonable rule design, such as dynamic displays of task objectives or intuitive guidance for reward conditions, reduces the negative experiences caused by overly complex rules.

Challenges are reflected in the design of gameplay mechanics, which incorporate gradually increasing task difficulty and diverse gameplay to stimulate players' use of skills and strategies. This provides a multi-dimensional gaming experience and enhances playability. For example, by unlocking new abilities or tackling more complex tasks, players can experience growth and satisfaction through progressive challenges, maintaining long-term engagement with the game.

Interaction bridges players and game mechanics, directly impacting operability and experience. Optimized interaction design focuses on intuitiveness and fluidity. For instance, precise control feedback and efficient interaction logic strengthen operational experiences and enhance player immersion. Through the seamless integration of interface design, gameplay mechanics, and operability, behavioral-level design not only fulfills functional requirements but also optimizes the overall gaming experience, significantly enhancing immersion.

The Reflective Level focuses on the deep emotional experiences users gain after engaging with a product. In games, it is closely related to

35) Schwabe G, Göth C.: Mobile learning with a mobile game: design and motivational effects, Journal of computer assisted learning, Vol.21, No.3, 2005, pp.204-216.

Goals and Objectives and Narrative, as proposed by Prensky. The reflective level primarily utilizes narrative design, social features, and positive feedback to evoke long-term contemplation and emotional engagement from players. Narrative design allows players to deeply immerse themselves in the game world and build emotional resonance with characters. Well-crafted narratives not only drive the progression of the game's storyline but also provide players with a stronger sense of participation and belonging. For example, branching storylines or complex character backstories enable players to explore characters' emotions and motivations during gameplay, further enhancing their immersion.

Goals and Objectives offer players a clear sense of direction and achievement, motivating them to remain engaged through task and reward systems. Goal design is often integrated with positive feedback mechanisms, such as reward animations, achievement unlock notifications, or experience point increases upon task completion, reinforcing players' satisfaction with achieving their goals and their sense of self-worth. Additionally, social features (e.g., guilds, mentor-apprentice systems) strengthen players' virtual identities through virtual social relationships, enabling them to find belonging and presence in cooperation and competition. Interactions among players often trigger emotional engagement and reflections on the significance of social connections[36)37)] (Table. 2).

[Table. 2] Emotional Design Levels and Game Elements Influencing Immersion

Levels of Emotional Design	Levels of Emotional Design	Game Factors Influencing Immersion
Visceral	Feedback and Outcomes	Sensory Experience (Art Style, Character and Scene Design, Music and Sound Effects, Tactile Feedback)
Visceral	Rules	Interface design based on rules (defining the player's operational scope), game mechanics design based on challenges (providing playability), interaction design (ensuring operability)
	Challenges	
	Interaction	
Visceral	Goals and Objectives	Appropriate goals and objectives bring positive emotions to players, enhancing their sense of self-satisfaction. Social features provide players with identity recognition and a sense of belonging, while narratives foster emotional resonance between players and characters.
	Narrative	

Emotional design spans all three levels—visceral, behavioral, and reflective—to build a comprehensive emotional experience system, enhancing a game's appeal and value. This design not only deepens players' immersion and engagement but also encourages them to reflect on and revisit the game after playing, thus extending the game's lifecycle and increasing user retention. In the highly competitive gaming market, prioritizing emotional design has become a core strategy for attracting players and maintaining market competitiveness.

3. Research Status and Analysis

3-1. Research Process

To explore in greater depth the application of emotional design in smartphone MMORPGs and its impact on player immersion, this study adopts a qualitative research approach, combining

36) Tao Lei, Tao Zonghua, Li Kehan.: Research on the application of emotional design in mobile independent game apps. Journal of Jilin Engineering Normal University, Vol.36, No.6, 2020.

37) Chen, Weiwen, Xiaobo Lu, Xuelin Tang.: Toward a theory-driven model of emotional interaction design in mobile games research. International Conference on Human-Computer Interaction. Cham: Springer International Publishing, 2021.

questionnaire surveys and in-depth interviews to summarize and analyze players' immersive experiences and the specific effects of emotional design on their immersion. The questionnaire design is based on prior research in areas such as emotional design, game structural elements, and immersion, further refining how different elements within the levels of emotional design influence player immersion.

on player immersion during different stages of immersion. By analyzing these data, this study aims to uncover the logical framework of emotional design in smartphone MMORPGs and provide theoretical support and design recommendations for enhancing player immersion.

The references and examples for the impact of game factors on immersion in the questionnaire are shown in the (Table. 3).

[Table. 3] Explanation of Questionnaire Design

Immersion Dimension	Game Factors and Levels of Emotional Design	Example Survey Questions	Reference
Generating Immersion	-Visceral Level: Visual (Art style), Auditory (Sound effects), Tactile Feedback -Behavioral Level: Smooth controls, UI design -Reflective Level: Simple narratives, Basic social mechanics	Does the art style of a mobile MMORPG attract you and encourage you to continue playing? Do the music and sound effects of a mobile MMORPG attract you and encourage you to continue playing?	Norman (2004)(1); Csikszentmihalyi (1990)(2)
Deepening Immersion	-Visceral Level: Dynamic visual effects, Atmospheric music -Behavioral Level: Complex task design, Interactivity -Reflective Level: Narrative depth, Social interaction	When you deeply engage with a game, does the design of sensory experiences (including visual, auditory, and tactile elements) influence your immersion in the game? When you deeply engage with a game, do the game's mechanics, rules, and playability influence your immersion in the game? (Including game mechanisms, controls, and interaction methods)	Brown & Cairns (2004)(3);Yee (2006)
losing Immersion	-Visceral Level: Repetitive visuals, Monotonous sound -Behavioral Level: Repetitive tasks, Lack of interaction mechanisms -Reflective Level: Insufficient or negative social interactions	Which game design elements make you feel a decline in immersion?	Kim et al. (2018)(5); Paul Cairns et al.(2014)(6)

The questionnaire consists of two parts: The first part collects demographic information about the respondents, while the second part investigates the specific influence of game elements at each level of emotional design (including art style, character design, scene design, music and sound effects, tactile feedback, UI design, playability, operability, interactivity, narrative, social features, and positive feedback)

Before distributing the formal questionnaire, a small-scale pretest was conducted, and feedback from the pretest participants was used to further refine and modify the questionnaire. A total of 294 questionnaires were distributed. Using the invalid sample function in SPSSAU, samples from players who had no experience with MMORPGs and responses completed in less than 60 seconds were treated as invalid. Ultimately, 277 valid

questionnaires were identified, resulting in a valid response rate of 94.2%.

Based on the theoretical analysis of the three levels of the emotional design model and the stages of player immersion in smartphone MMORPGs, this study categorized the game factors that might affect player immersion according to the three levels of emotional design. For each stage of player immersion (generating immersion, deepening immersion, and declining immersion), these game factors were analyzed through the lens of the three levels of emotional design. Participants were asked to identify the specific factors influencing their immersion during each of these stages.

Based on the results of the questionnaire survey, this study categorized and analyzed the factors influencing the immersion of smartphone MMORPG players and proposed targeted recommendations to enhance player immersion. By integrating the three-level theory of emotional design—visceral, behavioral, and reflective levels—the study further explored how to optimize design to enhance players' immersive experiences during different stages of immersion. Finally, specific improvement strategies were summarized with the aim of comprehensively enhancing the overall gaming experience for players.

We invited 9 experts from the gaming and design industries to conduct in-depth interviews on the design recommendations proposed in this study (Table. 4). The primary objectives of these interviews were, on the one hand, to explore the impact of emotional design on the immersion and overall gaming experience of smartphone MMORPG players, and on the other hand, to evaluate the feasibility of the recommendations for enhancing player immersion proposed in this study.

[Table. 4] Interview Respondent Information

No.	Work content	Educational background	Work experience
Interviewee 1	Game Producer	Master	11 Years
Interviewee 2	Game UI/UX Designer	Master	7 Years
Interviewee 3	Game Animator	Master	7 Years
Interviewee 4	Game System Designer	Master	5 Years
Interviewee 5	Game 3D Modeler	Master	9 Years
Interviewee 6	Game Sound Designer	Master	3 Years
Interviewee 7	Design Studies Professor	Doctor	11 Years
Interviewee 8	Design Scholar	Doctor	26 Years
Interviewee 9	Design Student	Doctor	5 Years

3-2. Analysis of the Impact of Emotional Design on Smartphone MMORPG Players' Immersion

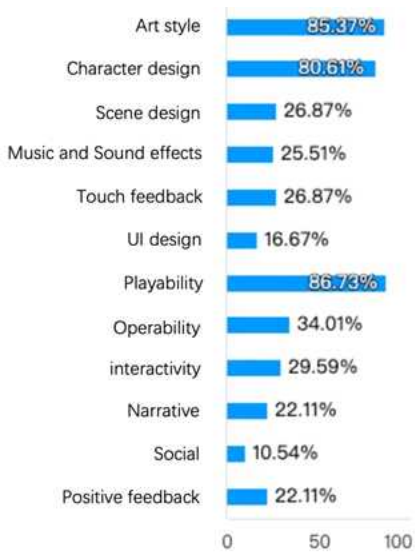
By integrating the game factors within the three levels of emotional design into the three stages of player immersion—initial formation, deepening immersion, and declining immersion—this study categorized and analyzed the factors influencing immersion at each stage. The findings highlight existing issues in immersion among smartphone MMORPG players

3-2-1. Formation of Immersion

When players engage with smartphone MMORPGs, the primary factors that initially capture their attention are game art style, playability, and character design. These factors are categorized as the core drivers of players' initial immersion and are identified as key elements in the initial stage of immersion

(Figure. 4).

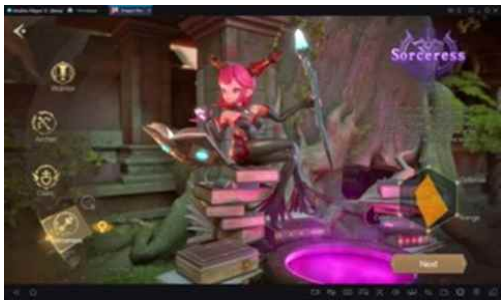
According to the findings, game art style plays a critical role in attracting players to enter the game, with 85.37% of players reporting that it directly impacts their immersion. For example, the unique art style and exquisite visual design in 〈Honkai Impact 3rd 〉 (Figure. 5) significantly draw players' attention, making many players deeply engaged solely through visual appeal. Character design follows closely, with 80.61% of



[Figure. 4] The Impact of Game Factors on the Formation of Immersion

players indicating that it has a substantial impact on their initial immersion. This reflects the importance players place on character appearance and personalization when entering a game. For instance, 〈Dragon Nest 2〉 (Figure. 6) allows players to customize their characters' appearance and equipment, enabling a high level of freedom that helps players immerse themselves in the game world. Additionally, 86.73% of players identified playability as one of the most important factors influencing their initial immersion. This indicates that the fun and challenge of gameplay during the early stages are essential for capturing and retaining players' attention. For example, 〈Blade & Soul Revolution〉 (Figure. 7) uses an open world and a rich quest system to quickly engage players and sustain their interest.

[Figure. 5] Art Style of 〈Honkai Impact 3rd〉[38)]



[Figure. 6] Character Design of 〈Dragon Nest 2〉[39)]

[Figure. 7] Open world and a rich quest system of 〈Dragon Nest 2〉[40)]

Other factors, such as scene design, music

38) www.tvtropes.org (2024.10)

39) www.mumuplayer.com (2024.10)

40) www.ch.netmarble.com (2024.10)

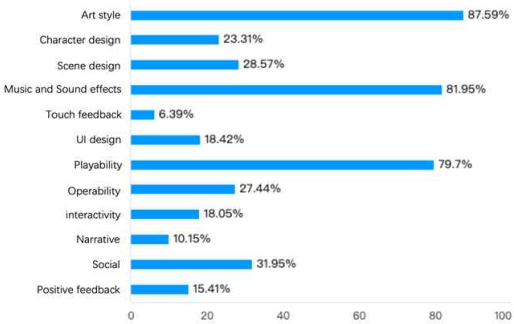
and sound effects, and tactile feedback, also contribute to initial immersion, though to a lesser extent, with 26.87%, 25.51%, and 26.87% of players citing these as influential. While these factors are not as significant as art style or playability, they still play a role in creating an initial immersive atmosphere. Notably, game operability and interactivity have a relatively significant impact on initial immersion. 34.01% of players reported that operability directly affects their early experience, highlighting the importance of smooth and intuitive controls in reducing initial frustration. Meanwhile, 29.59% of players regarded interactivity as a key factor influencing initial immersion, especially in MMORPGs, where social interaction is a major attraction.

Narrative and social elements have relatively low influence during the initial stage of immersion, with only 22.11% and 10.54% of players, respectively, considering them critical factors. However, this does not imply that these elements are unimportant; rather, they tend to play a more significant role in the later stages of deeper engagement. Positive feedback showed a slightly higher impact during the initial stage, with 22.11% of players stating that rewards and positive incentives in the game help sustain their early interest. This indicates that although the reflective level has a limited influence during the initial stage, providing positive emotional experiences can still motivate players to explore the game further.

In summary, the findings confirm prior research conclusions: game visuals (such as art style and character design) and early playability are crucial in attracting players and maintaining their attention. During the initial formation of player immersion, design elements at the visceral and behavioral levels are more impactful than those at the reflective level.

3-2-2. Deepening Immersion

As players delve deeper into their gaming experience, the factors influencing their immersion undergo significant changes. During the phase of deepened immersion, game art style remains one of the most important factors, with 87.59% of players indicating that it plays a critical role in their sense of immersion. This highlights that visual appeal continues to be vital in maintaining the game's atmosphere and player engagement (Figure. 8).



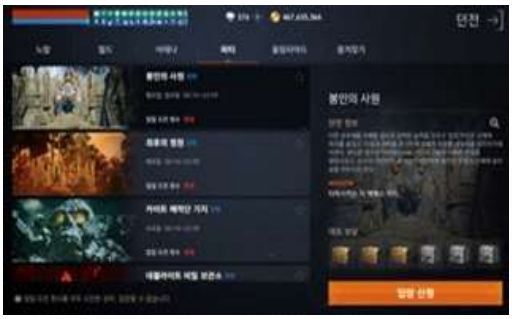
[Figure. 8] The Impact of Game Factors on the Deepening of Immersion

At the same time, the impact of music and sound effects increases significantly during this phase, with 81.95% of players acknowledging their importance to their sense of immersion. Music and sound effects not only convey emotions and enhance atmosphere but also guide players' emotions. For example, in 〈Sky: Children of the Light〉 (Figure. 9), the background music, characterized by its soft melodies and close alignment with the game environment, creates a calming and mysterious ambiance, further enriching the player's emotional experience during exploration. Moreover, the dynamic changes in music interact with players' in-game actions, such as rhythm shifts in key scenes that evoke excitement or tension, drawing players deeper into the game world. Sound effects also contribute to a more realistic sensory experience, further strengthening the sense of immersion.

Playability continues to be a major driving factor in this phase, with 79.7% of players reporting its strong influence on their immersion.

This indicates that during the deepening phase, players still demand diverse and challenging gameplay. For instance, 〈Lineage 2M〉 (Figure. 10) sustains player immersion through rich task designs and high levels of gameplay freedom, encouraging continuous exploration.

[Figure. 9] 〈Sky: Children of the Light〉[41)]



[Figure. 10] 〈Lineage 2M〉[42)]

In contrast, the influence of character design diminishes during this phase, with only 23.31% of players considering it a significant factor. This decline may stem from players' familiarity with their in-game characters, reducing the appeal of their appearance and personalization. Conversely, scene design (28.57%) and social elements (31.95%) gain greater importance in this phase. Players increasingly value interaction with the game environment and social experiences with other players. The heightened influence of social elements reflects players' growing need for social connections during deeper immersion. For example, in 〈Black Desert Mobile〉 (Figure. 11), guild activities and team missions enable players to establish deeper relationships with other players, enhancing overall immersion.

[Figure. 11] Team missions of 〈 Black Desert Mobile〉[43)]

During this phase, the influence of operability (27.44%) and interactivity (18.05%) declines, suggesting that players' focus on smooth controls and interaction design becomes less critical compared to the initial phase. Instead, they prioritize the overall experience derived from the storyline and social interactions. Other factors, such as tactile feedback (6.39%), interface design (18.42%), game narrative (10.15%), and positive feedback (15.41%), play a relatively minor role, acting as supplementary elements that help sustain players' overall interest in the game.

In summary, during the deepening phase of immersion, game art style, music and sound effects, playability, and social elements are key contributors to players' sustained immersion. These factors are essential for maintaining players' deep engagement and emotional investment in the game.

3-2-3. Loss of Immersion

During the phase of immersion loss, the factors influencing players' immersion undergo significant changes, with certain shortcomings in game design causing players to gradually lose

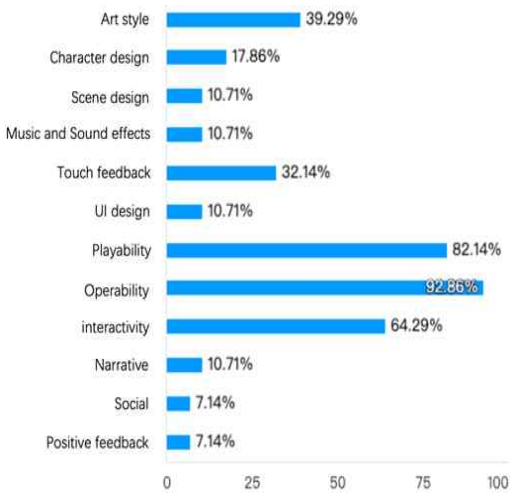
41) www.play.google.com (2024.10)

42) www.blog.naver.com (2024.10)

43) www.blog.naver.com (2024.10)

their sense of immersion. Survey data shows that game operability is the most critical factor leading to the loss of immersion, with 92.86% of players stating that issues with operability negatively impacted their experience. Unresponsive controls or laggy gameplay frustrate players, causing them to lose interest in the game. Hardware limitations of mobile devices, such as small screen sizes, low touch precision, and performance inconsistencies, play a significant role in hindering smooth control and navigation in complex scenarios (Figure. 12).

Playability is another major reason for the loss



[Figure. 12] Team missions of 〈 Black Desert Mobile〉

of immersion, with 82.14% of players attributing their reduced engagement to repetitive gameplay and a lack of challenges. On the smartphone platform, due to hardware constraints and fragmented user time, games must deliver sufficient fun and challenges within a short timeframe to maintain players' attention. If the game fails to provide innovative content or feels repetitive and monotonous, players' immersion quickly diminishes. For instance, when tasks or challenges become overly repetitive and lack variation, players' enthusiasm tends to wane significantly.

Game art style and tactile feedback were cited by 39.29% and 32.14% of players as contributing factors to immersion loss. A lack of variation in art style or its failure to meet players' aesthetic preferences can lead to visual fatigue, causing players to lose motivation to continue. Similarly, poorly designed or overly frequent tactile feedback may irritate or annoy players, negatively impacting their overall immersive experience.

Other factors, such as character design (17.86%), scene design (10.71%), music and sound effects (10.71%), and interface design (10.7%), also contribute to the loss of immersion. While these elements may have played a positive role during the initial or deepening phases of immersion, in later stages, players often have higher expectations for these aspects. If these expectations are not met, these design elements may instead lead to a loss of immersion.

Game interactivity also has a significant impact on immersion loss, with 64.29% of players indicating that issues with interactivity reduced their sense of engagement. When social interactions in the game become dull, uncoordinated, or players cannot find like-minded gaming partners, their immersion decreases rapidly. This highlights the critical role of social interaction in maintaining long-term player immersion. However, poorly designed social features may accelerate the loss of immersion instead.

Game narrative and social elements have relatively minor impacts during this stage, cited by 10.71% and 7.14% of players, respectively. This may be because players have already lost interest in the storyline and social features during the immersion loss phase, or these elements were not engaging enough to retain their attention.

In conclusion, during the phase of immersion loss, game operability, playability, art style, and interactivity are the key factors contributing to players' disengagement. These shortcomings

directly affect players' sustained interest and emotional investment in the game, causing them to gradually withdraw from deeper immersive experiences.

3-3. Result

Multiple game factors have a significant impact on players' immersion, and the details can be analyzed by summarizing and categorizing players' gaming experiences. Factors such as sensory experience, game playability, music and sound effects, and social interaction have a particularly prominent influence on immersion (Table. 5). By utilizing the three levels of emotional design—visceral, behavioral, and reflective—to examine the formation, deepening, and loss of immersion, it is possible to preliminarily identify the game elements responsible for these phenomena. Based on the relevant findings, a systematic analysis and summary can be conducted, followed by proposing targeted solutions to enhance players' overall gaming experience and immersion.

4. Strategies to Enhance Immersion in Smartphone MMORPGs Through Emotional Design

4-1. Visceral Design Strategies: Emotional Guidance Through Sensory Experience

The design strategy of the Visceral Level focuses on enhancing player immersion through sensory experiences, which are the core embodiment of the visceral level in emotional design. Sensory stimuli in games directly trigger players' positive or negative emotions, which serve as critical drivers of immersion.

The visceral level leverages multi-sensory experiences, including visual, auditory, and tactile senses, playing a vital role in the generation and deepening of immersion. Visual perception is crucial in the initial phase of immersion, as detailed visual designs, appealing artistic styles, and personalized character creation quickly capture players' attention and establish early emotional connections. As the experience progresses, auditory perception becomes increasingly significant. Music and sound effects

[Table. 5] An Analysis of the Impact of Game Factors on Player Immersion

Emotional design level	Formation of Immersion	Deepening of Immersion	Loss of Immersion
Visceral Level	• Art style directly impacts immersion • Character design has a significant effect on immersion • Scene design, music, sound effects, and vibration feedback influence immersion	• Art style significantly enhances immersion • Music and sound effects have a strongly increased impact on immersion • Scene design's influence on immersion grows • Vibration feedback affects immersion • The impact of character design on immersion weaken	• Art style significantly impacts immersion loss • Character design, scene design, music, and sound effects strongly contribute to immersion loss
Behavioral Level	• Playability significantly affects immersion • Operability and interactivity have a limited impact on immersion	• Playability significantly enhances immersion • Operability and interactivity remain influential on immersion	• Operability significantly contributes to immersion loss • Playability is a key factor in immersion loss • Interactivity also plays a role in immersion loss
Reflective Level	• Narrative, social interaction, and positive feedback have a minimal impact on immersion	• Social interaction becomes significantly more influential • Narrative and positive feedback have limited impact on immersion	• Social interaction, narrative, and positive feedback have minimal influence on immersion loss

tailored to game contexts deepen emotional engagement by creating tense or joyful atmospheres. For instance, intense rhythms and dynamic melodies in challenge stages can significantly enhance immersion. Tactile feedback runs throughout the process, transmitting immediate operational outcomes, such as vibrations during successful attacks or reward unlocks, helping players perceive game actions more intuitively and strengthening the immersive experience. By coordinating multi-sensory designs, the visceral level not only optimizes emotional engagement and sensory experiences but also establishes the depth and coherence of immersion.

The study also finds a connection between the visceral level and the decline in player immersion. After extended immersion, players naturally compare sensory information in the game to real-world objects. As this comparison progresses, players develop higher demands for the realism of game content. If the game's artistic style lacks sufficient refinement to meet these expectations, it may directly undermine their immersion.

Based on these findings and expert suggestions, several strategies are proposed to enhance immersion from the visual, auditory, and tactile perspectives through visceral-level design. For visuals, improving the realism of artistic styles with high-resolution graphics and detailed models, along with providing personalized character design options, enhances character identification and emotional connections. For auditory design, creating precise and layered music and sound effects that align with game scenarios and narratives can evoke contextually appropriate emotional atmospheres, further deepening emotional engagement. For tactile feedback, controlling feedback frequency and rhythm, prioritizing support for visual and auditory cues, and avoiding excessive interference, while enhancing immediate perception at critical moments, can optimize immersion. Coordinated multi-sensory design significantly strengthens the visceral sensory experience, comprehensively elevating player immersion.

4-2. Behavioral Design Strategies: Optimizing Playability, Operability, and Interaction

Based on the study, the main reasons for the decline in immersion among smartphone MMORPG players are the limitations in playability, operability, and interaction methods. These three aspects are closely tied to the behavioral level of emotional design. In other words, the hardware limitations of smartphones restrict players' gaming experience, thereby negatively impacting their immersion. To enhance player immersion, it is essential to enrich game playability, optimize operational experiences, and diversify interaction methods.

At the behavioral level of emotional design, the key factors influencing player immersion are game playability, operability, and interaction methods. During the initial stages of immersion, playability is crucial for attracting players; as immersion deepens, playability may become a primary cause of immersion decline. Thus, playability is one of the core components of games and is largely dependent on game mechanics. Game mechanics differ from rules, which define the limitations and executable actions for players. Instead, mechanics are more complex and implicit, requiring players to continuously explore and discover within the game world. Mechanics form the backbone of the gaming experience, determining the length, pacing, and depth of engagement players can achieve. Excellent game mechanics are not restrictive but player-centered, using ingenious designs to allow players to naturally explore and experience the game world, thereby maximizing immersion.

Operability is crucial for enhancing player immersion. Players control their virtual avatars and experience the game world through the interface. In other words, players achieve

immersion by simulating real-world actions through smooth operations. Therefore, operability significantly determines whether players can seamlessly experience the game world. However, due to the limitations of smartphone devices (e.g., screen size and touch precision), operations may negatively impact player immersion. Game design should fully consider these device constraints and balance the challenges within the game with players' operational capabilities.

Interaction methods are another essential component of the behavioral level. Players control virtual characters through physical interactions, such as touchscreen controls. Effective interaction design should provide players with a sense of complete control over virtual avatars, thereby enhancing immersion. The core challenge lies in making interaction methods both natural and diverse.

Based on the above findings and expert recommendations, several strategies are proposed to enhance player immersion from the perspectives of playability, operability, and interaction methods at the behavioral level of emotional design.

For playability, dynamic game mechanics should be introduced, such as incorporating variability into task design, combining short, fragmented tasks tailored to player needs with in-depth tasks for extended gameplay sessions. Balancing the game's pacing ensures that players remain consistently within an optimal challenge range. For operability, interfaces should be designed to align with player habits, and multi-level difficulty options should be provided based on players' skill levels. For interaction, diversity should be increased by incorporating voice commands, advanced motion-sensing technologies, and other innovative features.

By optimizing playability, operability, and interaction methods, game design can effectively enhance player immersion. The integration of dynamic mechanics, personalized settings, and diverse interaction methods not only meets players' immersion needs but also enhances the game's appeal and encourages long-term engagement.

4-3. Reflective Design Strategies: Deep Integration of Social and Narrative Elements

In MMORPG games, game narratives and social systems are closely related to the reflective level of emotional design. Excellent game narratives enable players to form strong emotional resonance with the characters and the game world. This resonance goes beyond immediate sensory and operational experiences, creating a profound emotional connection that bridges the virtual and real worlds. Even after the game ends, players recall their emotional experiences and epic adventures in the virtual world, forming deep emotional ties with the game. This reflects the value of the reflective level of emotional design, allowing players to derive inner satisfaction and a sense of meaning through revisiting narrative content after leaving the game.

However, in smartphone MMORPG games, the role of narrative design in enhancing player immersion is relatively limited. Most players believe that current mobile game narratives fail to deliver deep emotional experiences and do not effectively activate the reflective level's value. Although mobile games have made continuous progress in sensory stimulation, operational fluidity, and interaction diversity, their narrative content often lacks sufficient depth and appeal, making it difficult to provoke player reflection or extend emotional engagement. This suggests that narrative design in smartphone MMORPGs needs further optimization to fully realize its core role in immersion.

Currently, smartphone MMORPG games have not fully activated this profound emotional experience through narrative design. The lack of depth and appeal in narrative content makes it difficult to elicit player reflection or extend

emotional value. Narratives and social systems in games play an important role in player immersion, collectively reflecting the core value of the reflective level of emotional design. Excellent game narratives allow players to develop deep emotional resonance with characters and the game world. This connection transcends immediate sensory experiences, forming a deep link between the virtual and real worlds, enabling players to achieve inner satisfaction through memory and reflection even after leaving the game. Meanwhile, the social system shapes players' emotional experiences through virtual identities and social relationships, establishing emotional continuity between the virtual and real worlds. Players' social counterparts may be real-life friends, unfamiliar players, or even diverse relationships formed through game mechanics, such as mentor-apprentice, couples, or hierarchical guild roles. These social connections not only shape immersion within the game but also allow players to experience the emotional value and sense of belonging brought by virtual social relationships after the game ends.

Positive feedback mechanisms, such as reward prompts for completing tasks, achievement displays after social interactions, or reward animations for successful teamwork, satisfy players' psychological needs by providing positive emotional experiences during gameplay. After the game ends, these mechanisms encourage players to reflect on their successes, fostering recognition of their virtual achievements and a lasting sense of meaning, further highlighting the value of the reflective level.

Based on the above insights and expert recommendations, several strategies are proposed to enhance player immersion from the narrative, social, and positive feedback perspectives at the reflective level of emotional design. For narrative design, it is necessary to enhance immersion by enriching narrative depth and coherence while creating multi-linear and dynamic narratives based on player needs to increase their engagement in the storyline. For social systems, diverse social relationships should be designed to cater to varied player groups. Offline social functions, such as friend activity reminders and cross-platform sharing, can also be introduced to extend emotional connections between players, allowing virtual social experiences to transcend gameplay time. For positive feedback, reward systems that satisfy players' needs should be implemented, such as exclusive titles or items based on their choices in the game narrative. Through the collaborative optimization of narrative depth, strengthened social systems, multi-level positive feedback, and comprehensive immersion strategies, smartphone MMORPG games can significantly enhance player immersion while effectively activating the value of the reflective level of emotional design. This enables players to experience profound emotional engagement and a sense of meaning both inside and outside the game.

5. Conclusion

With the rapid growth of the smartphone gaming industry and its expanding user base, players' in-game experiences have become increasingly significant. Immersion, as a crucial component of the gaming experience, remains in the exploratory phase within the current gaming industry. Integrating emotional design into the study of enhancing smartphone gamers' immersion not only introduces new perspectives to the gaming industry but also provides theoretical support for the development of future games.

This study, grounded in the three levels of emotional design, deeply explores its influence on the three stages of player immersion: formation, deepening, and decline. It identifies the role of emotional design in these stages and proposes specific design strategies tailored for smartphone MMORPGs.

As communication technologies and smartphone hardware continue to advance, the potential of smartphone games will be further unlocked. At the same time, research on immersion in smartphone games requires ongoing reflection and refinement. It is essential to note that smartphone games encompass various genres, each requiring tailored design optimizations. However, the core goal remains to enhance players' gaming experience. By leveraging emotional design to optimize player immersion, a player-centered game design framework can be established, offering new ideas for the ongoing innovation of the gaming industry.

References

1. Csikszentmihalyi M. Flow.: The Psychology of Optimal Experience. New York (HarperPerennial). 1990.
2. Csikszentmihalyi M.: Finding flow: The psychology of engagement with everyday life, Basic Book, 1997.
3. Norman, Don. Emotional design: Why we love (or hate) everyday things. Basic books, 2007.
4. Adams B L M, Stavropoulos V, Burleigh T L, et al.: Internet gaming disorder behaviors in emergent adulthood: A pilot study examining the interplay between anxiety and family cohesion, International journal of mental health and addiction, 2019.
5. Baharom S N, Tan W H, Idris M Z.: Emotional design for games: A framework for player-centric approach in the game design process, International Journal of Multimedia and Ubiquitous Engineering, 2014.
6. Barnett J, Coulson M.: Virtually real: A psychological perspective on massively multiplayer online games. Review of General Psychology, 2010.
7. Beard, K.S.: Theoretically Speaking: An Interview with Mihaly Csikszentmihalyi on Flow Theory Development and Its Usefulness in Addressing Contemporary Challenges in Education, 2015.
8. Chan T S, Ahern T C.: Targeting motivation—adapting flow theory to instructional design, Journal of Educational computing research, 1999.
9. Cheng, M-T., H-C. She, and Leonard A. Annetta.: Game immersion experience: its hierarchical structure and impact on game-based science learning, Journal of computer assisted learning, 2015.
10. Feijoo, Claudio, et al.: Mobile gaming: Industry challenges and policy implications, Telecommunications policy, 2012.
11. Jennett, Charlene, et al.: Measuring and defining the experience of immersion in games. International journal of human-computer studies, 2008.
12. Johnson, Daniel, and Janet Wiles.: Effective affective user interface design in games Ergonomics, 2003.
13. Marc Prensky.: Digital game-based learning. Comput. Entertain, 2003.
14. Marsh H W, Jackson S A.: Flow experience in sport: Construct validation of multidimensional, hierarchical state and trait responses, Structural Equation Modeling: A Multidisciplinary Journal, 1999.
15. Molyneux L, Vasudevan K, Gil de Zúñiga H.: Gaming social capital: Exploring civic value in multiplayer video games, Journal of Computer-Mediated Communication, 2015.
16. Rutz, Oliver, Ashwin Aravindakshan, and Olivier Rubel.: Measuring and forecasting

mobile game app engagement, International Journal of Research in Marketing, 2019

17. Schwabe G, Göth C.: Mobile learning with a mobile game: design and motivational effects, Journal of computer assisted learning, 2005.
18. Sela A, Rozenboim N, Ben-Gal H C.: Smartphone use behavior and quality of life: What is the role of awareness?, PloS one, 2022.
19. Stavropoulos V, Gomez R, Motti-Stefanidi F.: Internet gaming disorder: A pathway towards assessment consensus, Frontiers in psychology, 2019.
20. Stavropoulos V, Gomez R, Mueller A, et al.: User-avatar bond profiles: How do they associate with disordered gaming?, Addictive behaviors, 2020.
21. Swann C, Keegan R J, Piggott D, et al.: A systematic review of the experience, occurrence, and controllability of flow states in elite sport, Psychology of sport and exercise, 2012.
22. Tao Lei, Tao Zonghua, Li Kehan.: Research on the application of emotional design in mobile independent game apps. Journal of Jilin Engineering Normal University, 2020.
23. Jiang Junyi.: Measurement Method for User Experience of Mobile Games. Northeastern University, 2019.
24. Brown, Emily, and Paul Cairns.: A grounded investigation of game immersion, CHI'04 extended abstracts on Human factors in computing systems. 2004.
25. Castells M.: Flows, networks, and identities: A critical theory of the informational society, Critical education in the new information age, 1999.
26. Chen, Weiwen, Xiaobo Lu, Xuelin Tang.: Toward a theory-driven model of emotional interaction design in mobile games research. International Conference on Human-Computer Interaction. Cham: Springer International Publishing, 2021.
27. Csikszentmihalyi, M.: Beyond boredom and anxiety: Experiencing flow in work and play. San Fransisco: Jossey-Bass, 2000.
28. Ermi, Laura, and Frans Mäyrä., Fundamental components of the gameplay experience: Analysing immersion. Proceedings of DiGRA 2005 Conference: Changing Views: Worlds in Play, 2005.
29. Fritsch T, Ritter H, Schiller J.: User case study and network evolution in the mobile phone sector (a study on current mobile phone applications)[C] Proceedings of the 2006 ACM SIGCHI international conference on Advances in computer entertainment technology, 2006.
30. Mahmud A, Islam M R.: Smartphone and Social Capital: Changing Lives and Lifestyles of the Youth[M] The Palgrave Handbook of Global Social Change. Cham: Springer International Publishing, 2023.
31. Schwind V, Wolf K, Henze N, et al.: Determining the characteristics of preferred virtual faces using an avatar generator[C] proceedings of the 2015 annual symposium on computer-human interaction in play. 2015.
32. Zhang, Fan, and David Kaufman.: Can playing massive multiplayer online role playing games (MMORPGs) improve older adults' socio-psychological wellbeing?, Computer Supported Education: 7th International Conference, Springer International Publishing, 2016.
33. www.ch.netmarble.com
34. www.tvtropes.org
35. www.mumuplayer.com
36. www.play.google.com
37. www.blog.naver.com
38. www.blog.udonis.com
39. www.screenrant.com