Research on Scenario-Based Optimization of Game UI Based on a Multi-Dimensional Theoretical Framework-Taking "Black Myth: Wukong", "Cyberpunk 2077", and "God of War" as Examples

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Abstract: As contemporary games increasingly pursue immersive experiences, the User Interface (UI) has become critically important as the bridge connecting players to virtual worlds. Current game UI design generally faces a significant challenge: how to effectively balance Cognitive Efficiency, Interaction Usability, and Artistic Immersion across diverse scenarios such as intense combat, immersive exploration, and complex management. To address this challenge, this study constructs a three-dimensional theoretical analysis framework and selects "God of War", "Cyberpunk 2077", and the highly anticipated "Black Myth: Wukong" for comparative case studies and in-depth analysis. The core finding of this research is that successful UI design does not adhere to a static optimal solution, but rather involves a dynamic trade-off among the three dimensions based on scenario requirements. Specifically, the study reveals an inverse complementary relationship between "Cognitive Efficiency" and "Narrative Immersion" in extreme scenarios: in high-intensity combat, to maximize information processing efficiency, UI design tends to suppress immersive elements to reduce visual interference; conversely, in free exploration scenarios, to pursue ultimate immersive experiences, design necessitates strategic compromises in Interaction Usability, such as removing navigation aids to encourage environmental observation. The results of this study are crystallized into a "Scenario-Based UI Design Strategy Matrix," contributing an optimization scheme with both theoretical value and practical guiding significance to the field of game UI design.

Keywords: Game UI Design; Scenario-Based Design; Cognitive Psychology; Human-Computer Interaction (HCI); Immersion; User Experience (UX)

1. Introduction

1.1 Background and Problem Statement

With AAA masterpieces such as "God of War", "Cyberpunk 2077", and "Black Myth: Wukong" leading video games toward a deep evolution of "immersive experiences," the UI is no longer merely a carrier of information and commands, but the neural endings connecting players to the virtual world. However, a core contradiction prevails in the current game UI design field: the disconnect between "one-size-fits-all" static design solutions and the dynamic, variable requirements of game scenarios.Although the importance of UI has reached a consensus, in practice, developers often attempt to use a fixed set of interaction logics to address all situations, resulting in a severe fragmentation of player experience across different stages: in high-intensity combat, overloaded visual elements lead to a surge in cognitive load, obscuring key actions; during immersive exploration, persistent toolbars destroy the narrative atmosphere, alienating an emotional journey into mechanical navigation; and in system management interfaces, convoluted logic often forcibly interrupts the game's Flow state.Therefore, scientifically balancing and dynamically optimizing the Cognitive Efficiency, Interaction Usability, and Narrative Immersion of UI across distinct scenarios such as combat, exploration, and management-breaking the binary opposition between "function" and "aesthetics"-has become a core problem that urgently needs to be solved to enhance contemporary gaming experiences.

1.2 Research Objectives and Significance

This study aims to construct a multi-dimensional UI analysis framework that integrates theories from cognitive psychology, human-computer interaction, and immersion. Through an in-depth analysis of three representative cases-"God of

War", "Cyberpunk 2077", and "Black Myth: Wukong"-it seeks to induce and summarize an actionable "Scenario-Based UI Design Strategy Matrix," providing development teams with priority references and implementation roadmaps for different contexts. This research hopes to promote a fundamental shift in game interface design philosophy from "function-oriented" to "experience-oriented," thereby contributing to the improvement of the overall design level and user experience in the game industry.

2. Literature Review & Theoretical Framework Construction

2.1 The Evolutionary Trajectory of Game UI Design: From Functionalism to Experience Integration

Reviewing the history of game UI, its evolutionary trajectory clearly presents a path of continuous exploration from "functional efficiency" to "artistic immersion." From pure numerical displays constrained by early hardware [1], to Skeuomorphic simulations of realistic materials [2], and finally to the rise of Diegetic/Narrative UI concepts, the design focus has shifted from simple information transmission to the deep construction of immersive experiences [3]. This marks the elevation of UI from a mere information carrier to a shaper of emotional experiences [4].Recent research (2023) further indicates that next-generation Action RPGs are exhibiting a trend of "Returning to Minimalism," where reducing the visual proportion of UI has become a key method to enhance player autonomy [16]. laying the historical and theoretical foundation for constructing the multi-dimensional analysis framework in this study.

2.2 Dimension I: Cognitive Efficiency

Cognitive efficiency aims to allow players to comprehend interface information with minimal cognitive effort, focusing on the application of attention allocation, Gestalt principles, and Cognitive Load Theory [5, 6]. According to Multiple Resource Theory, UI design must prioritize the allocation of players' limited attention to key information through rational layout and visual guidance [5]. Meanwhile, using Gestalt principles to logically group visual elements can effectively enhance information readability. Furthermore, Cognitive Load Theory suggests that design should strive to reduce extraneous cognitive load caused by cluttered layouts to avoid operational errors triggered by information overload [6, 7].

2.3 Dimension II: Interaction Usability

Interaction usability focuses on the quality of the closed loop between "player input" and "system feedback," aiming to ensure precision and fluidity of operation. This dimension is primarily based on Nielsen's 10 Usability Heuristics and Fitts's Law [8, 9]. Additionally, good operational visibility and immediate feedback mechanisms enable players to instinctively perceive functions and confirm operational results, thereby transforming fluid interaction into a part of intrinsic motivation [10].

2.4 Dimension III: Narrative Immersion

Narrative immersion concerns how UI assists players in entering a selfless "Flow" state, or breaking this state when necessary [11]. The quadrant model proposed by Fagerholt and Lorentzon provides a classic tool for analyzing the degree of integration between UI and the game world [3]. In this dimension, UI is not merely a functional component but an artistic carrier bearing the worldview and cultural connotations. The core of immersive narrative design lies in avoiding "cognitive dissonance" [12], that is, by artistically coordinating the relationship between interface elements and the environment to eliminate the immersion-breaking effect of the "Fourth Wall," ensuring the protection of the player's emotional experience [13].

2.5 Theoretical Integration and Framework Construction

Through the review of the above theoretical dimensions, it is evident that Cognitive Efficiency, Interaction Usability, and Narrative Immersion constitute the three core pillars for evaluating modern game UI design. However, existing literature often discusses them in isolation, failing to fully reveal the dynamic tension among them: if Cognitive Efficiency is held as the sole standard, design easily falls into the trap of homogenized "standard answers" [14]; adhering strictly to traditional HCI usability principles may disrupt specific game atmospheres [15]; conversely, frequent operational failures caused by an excessive pursuit of Narrative Immersion can destroy the

immersion itself [12]. Therefore, this study constructs a three-dimensional theoretical framework of "Cognitive Efficiency-Interaction Usability-Narrative Immersion," aiming to analyze how designs balance these three dimensions across different scenarios to achieve experience optimization.

The innovative value of this framework is reflected in:

1) Shifting the focus from "Is this UI good?" to "How does this UI balance efficiency, usability, and immersion in a specific scenario? Is this trade-off appropriate?"

2) Providing designers with a comprehensive diagnostic tool capable of systematically identifying the strengths and weaknesses of a specific UI design in a given scenario and explaining the design decisions behind it.

3) The framework is not only for analysis; its ultimate goal is to guide practice. By comparing the three-dimensional performance of multiple successful or failed cases across different scenarios, a universally applicable "Scenario-Based UI Design Strategy Matrix" can be distilled for developers' reference.

In summary, the three-dimensional theoretical framework established in this study represents a systematic integration and deepening of existing theories. It directly addresses the core contradiction of game UI design under scenario-based requirements, providing an analytical perspective with greater explanatory power and guiding significance. In the subsequent chapters, this paper will utilize this framework to conduct an in-depth, cross-scenario analysis and comparison of the three selected representative cases.

3. Research Design & Methodology

This chapter systematically outlines the overall design and specific implementation path of the research, addressing the core issues raised in the Introduction. The content covers the selection of research methods, the underlying logic for case selection, and the operationalization of the three-dimensional theoretical framework, while detailing the procedures for data collection and analysis.

3.1 Research Method

This study adopts a multi-case comparative research method. Given that game UI design is not a static stack of functions but a dynamic system highly dependent on gameplay context and narrative context, purely quantitative data is insufficient to explain the complex trade-offs behind design decisions. This method enables researchers to deeply investigate how UI design responds to the dynamic needs of complex scenarios such as "high-intensity combat" and "immersive exploration" without detaching from the natural context of the complete game experience. Simultaneously, by horizontally comparing the differentiated strategies of different design philosophies in response to the same challenges, it helps identify universal laws transcending single products, laying the foundation for distilling the "Scenario-Based UI Design Strategy Matrix."

3.2 Case Selection and Rationale

To effectively test the theoretical framework constructed in this study, case selection followed three principles: representativeness, differentiation, and maximization of research value. The three selected cases collectively constitute a typical sample covering the spectrum of contemporary AAA game UI design philosophies:

"God of War" (2018 & 2022 Series)

This series is widely regarded in the gaming industry as a paragon of highly integrating functional requirements with immersive experiences. Its UI design ensures extremely high cognitive efficiency and operational usability while achieving a seamless interface with the game's iconic "single-shot" cinematic experience through narrative integration and minimalist techniques. Thus, it represents the design orientation pursuing "Optimal Balance" within the three-dimensional framework.

"Cyberpunk 2077"

The UI design of this game deeply serves the Cyberpunk worldview, becoming a part of the narrative itself and embodying the design concept of "UI as Worldview." While its intense stylization creates extreme immersion, it has also sparked widespread controversy regarding cognitive efficiency and interaction usability in certain scenarios, making it an excellent critical sample for analyzing the pros and cons of design trade-offs.

"Black Myth: Wukong"

As a phenomenal work that has achieved immense commercial success and artistic acclaim, its UI design represents the radical philosophy of "bold trade-offs for extreme immersion." It upholds the concept of "UI

Dissolution," setting a new benchmark in the dimension of narrative immersion; meanwhile, its strategy of deliberately discarding elements like traditional maps and mission guides provides a unique perspective for examining the conflicts and trade-offs between different design dimensions.

3.3 Data Collection and Analysis Process

First, an analytical foundation is built through rigorous multi-channel data collection. The primary data source includes over 150 hours of the researcher's direct gameplay footage (approximately 50 hours per title) to capture real-time UI interactions across different difficulty levels. Secondary sources involve the analysis of official design documents, specifically "The Art of God of War" and "The World of Cyberpunk 2077," alongside Game Science's 2024 developer diaries. To validate these findings, the study collected and analyzed 300 "Most Helpful" user reviews for each game from Steam and Reddit (specifically filtering for post-August 2024 reviews for "Black Myth: Wukong"), focusing on keywords related to "UI," "HUD," "Navigation," and "Immersion."Second, scenario slicing is performed, uniformly selecting three types of typical scenarios from each game: "High-Intensity Combat," "Free Exploration and Environmental Interaction," and "System Management." Subsequently, theoretical coding and case analysis are conducted using the three-dimensional framework constructed in Chapter 2 to evaluate specific trade-off strategies in each scenario. Finally, a cross-case comparison is conducted to summarize the similarities and differences of various design philosophies in the same scenarios, ultimately distilling and constructing the core result of this study-the "Scenario-Based UI Design Strategy Matrix."

4. Case Analysis

This chapter enters the core empirical phase of the thesis. It will utilize the "Cognitive Efficiency-Interaction Usability-Narrative Immersion" three-dimensional theoretical framework constructed earlier to conduct a systematic and contextualized in-depth analysis of the UI design of the three representative games: "God of War", "Cyberpunk 2077", and "Black Myth: Wukong".

The Analysis Process Adopts a Unified Structure First, the design philosophy of each case is distilled, followed by an in-depth examination of three typical scenarios: "High-Intensity Combat Scenarios," "Free Exploration and Environmental Interaction," and "System Management," to evaluate the specific performance and design trade-offs of their UI across the three dimensions. By meticulously deconstructing these details, this chapter aims to reveal how different design philosophies address identical challenges, thereby providing a solid foundation for the cross-case comparison and the construction of the "Scenario-Based UI Design Strategy Matrix" in Chapter 5.

4.1 "God of War" Series: The Paragon of Balance

4.1.1 Overview of design philosophy

The design philosophy of "God of War" (2018) and its sequels can be summarized as "The Elegant Invisibility of Functionalism." It rejects radical stylization or complete dissolution, choosing instead a steady middle path: prioritizing that cognitive efficiency and interaction usability reach top industry standards, then using contextualization and minimalist techniques to "dissolve" UI elements into the game experience. Here, the UI acts as an assistant, striving to provide the most precise information without interrupting the "single-shot" flow.

4.1.2 High-Intensity combat scenarios

In 360-degree combat with enemies attacking from multiple directions, the core design difficulty lies in handling blind-spot threats. "God of War" employs a combined strategy of "Ring Threat Indicators" and "Multi-Sensory Feedback." regarding cognitive efficiency, the design compresses the complex 3D battlefield space into 2D curved arrows around the protagonist's waist, using colors (white/red/purple) to distinguish attack urgency. This drastically reduces the player's spatial cognitive load, enabling instant reactions without adjusting the camera angle.At the level of interaction usability, this visual system is tightly bound with auditory and haptic feedback-when the red ring lights up and the player successfully parries, the accompanying metallic clash sound and controller vibration provide definitive confirmation of "successful operation." In terms of narrative immersion, these non-diegetic UI elements are rationalized through the setting as the "God of War's"

battlefield intuition, psychologically eliminating the barrier between UI and narrative, achieving a dual guarantee of efficiency and immersion.

4.1.3 Free exploration and environmental interaction scenarios

After disengaging from combat, to resolve the conflict of "looking at the map vs. looking at the world," the game adopts a strategy of "Dynamic Compass" paired with "Contextual Interaction Anchors." The game discards the persistent mini-map in favor of a compass at the top of the screen that only indicates direction. While this trade-off sacrifices precise terrain mastery in terms of cognitive efficiency, it forces the player's gaze back to the game world in the center of the screen, significantly enhancing the immersive experience.To compensate for interaction uncertainty, the game introduces a strict "Display on Demand" logic: minimalist button icons only appear when the player approaches a chest or mechanism within effective interaction distance. This design avoids visual noise while preventing the frustration of missing key content through clear distance judgment.

4.1.4 System management scenarios

In complex RPG menu interfaces, the design focus returns to standardized efficiency priority, but retains narrative consistency in visual presentation. The menu system uses standardized hierarchical logic and red-green color coding, greatly reducing cognitive load when comparing equipment stats. Although the interaction logic is traditional, its visual packaging is highly immersive: the background is not a static image but a real-time dynamic rendering of the protagonist. When the player changes armor, the model on the right seamlessly displays the wearing effect, making the player feel they are inspecting the character's inventory rather than operating a database, maintaining the continuity of the "single-shot" style.

4.1.5 Section summary

"God of War" represents the "Robust Balance" orientation within the three-dimensional framework. It never sacrifices basic usability for artistic style; instead, through minimalist graphics and dynamic situational mechanisms, it polishes functional elements to be sufficiently "transparent," serving the overall experience.

4.2 "Cyberpunk 2077": The Pinnacle of Stylization

4.2.1 Overview of design philosophy

"Cyberpunk 2077" demonstrates the "Maximization of Diegetic UI." Its core concept is "UI as Worldview," meaning all interface elements seen by the player are essentially Augmented Reality (AR) images projected by the protagonist V's Kiroshi optics system. This design strategy, in order to create an extreme Cyberpunk atmosphere, does not hesitate to actively create "visual noise" or even sacrifice operational efficiency in certain scenarios, representing a high-risk, high-return artistic expression.

4.2.2High-Intensity combat scenarios

In combat, the game simulates the cyborg sensory experience through "Information Overload" and "Glitch Art." From the perspective of narrative immersion, the screen full of jumping damage numbers, hacking progress bars, and screen artifacts upon taking damage perfectly fits the "data torrent" setting of the genre. Especially when the protagonist's health is critical or when being hacked, the UI interface exhibits severe pixel tearing and chromatic aberration, allowing players to intuitively feel the collapse of the cybernetic system. However, this design pays a price in cognitive efficiency. High-density dynamic information creates severe visual obstruction, often making it difficult for players to see enemies' telegraphing animations. This is a typical radical trade-off of "exchanging functional loss for atmospheric immersion."

4.2.3 Free exploration and environmental interaction scenarios

In city exploration, "High-Density AR Navigation" becomes a core feature, triggering the typical "Tunnel Vision Effect." The game retains a dense mini-map in the top right corner and projects conspicuous guide lines on the road. While this design ensures precise navigation in terms of interaction usability, it creates a rupture between cognitive efficiency and immersion: overly conspicuous guide lines force the player's gaze to lock dead onto the navigation path, turning them into a "machine following the line," thereby ignoring the Night City landscape built by developers at great cost. Although this strong guidance is "useful," it substantially weakens the player's desire for exploration and depth of perception of the game world.

4.2.4 System management scenarios

In menu interaction, the game adopts a "Simulated Mouse Cursor" design, a classic case

of stylization overpowering usability. To simulate the feeling of operating a computer terminal, the console version forces players to use the joystick to control a virtual cursor for clicking. This design severely violates the best practices of Fitts's Law regarding controller interaction; the cursor moves slowly and lacks the magnetic snap of physical buttons, resulting in low operational efficiency and frequent accidental inputs. Although regarding narrative immersion, combined with the anatomical diagrams in the "Cyberware" page, it reinforces the brutal aesthetics of "body modification," the cost is an extremely high sense of operational drag, making it the most controversial interaction experience among the three games.

4.2.5 Section summary

"Cyberpunk 2077" represents the extreme of "Stylization Priority." It proves that UI can become a protagonist of the narrative, but also warns of the friction and burden on user experience that can arise when artistic pursuit overrides engineering principles (such as Signal-to-Noise Ratio, Fitts's Law).

4.3 "Black Myth: Wukong": Radical Exploration of Immersion

4.3.1 Overview of design philosophy

"Black Myth: Wukong" opts for a "subtractive" minimalism, with a philosophy that can be summarized as "UI Dissolution." Influenced by the Eastern aesthetic concept of "Leaving Blank" (Liubai), the game strives to eliminate the "Fourth Wall," attempting to make the UI exit the stage completely and guide players back to a classical gaming experience that relies more on observation and intuition. This design strategy aligns with the philosophy articulated by the development team in 2024, which attempts to shift the player's psychological guidance mechanism from explicit commands to implicit environmental cues through "De-UI-fication" [17], and is regarded by the industry as a radical "No-UI" psychological experiment [18]. This uncompromising attitude has achieved immense success in creating immersion but also poses severe challenges to players' cognitive abilities.

4.3.2 High-intensity combat scenarios

The combat interface adopts strategies of "Dynamic Hidden HUD" and "Concretization of Spell Effects." In non-combat states, all UI elements vanish completely, leaving the player with a pure, cinematic visual. Upon entering combat, core information relies not solely on icon countdowns but is presented through immersive narrative means-for example, the Immobilize spell displays the giant Chinese character Fix/Stop directly on the enemy, transforming functional feedback into spell VFX. Regarding interaction usability, transformation skills are cast via a "Skill Wheel," accompanied by a time-dilation effect upon activation. This not only gives players time for tactical thinking but also avoids frantic inputs during real-time combat, achieving a unity of minimalist visuals and deep gameplay.

4.3.3 Free exploration and environmental interaction scenarios

This is the game's most controversial design point: the "Complete Removal of the Map System." To pursue extreme narrative immersion and recreate the unknown and confusion of the "Journey to the West," the dev team deleted the mini-map and even the compass. This decision creates a massive cognitive gap, forcing players to mobilize all attention to memorize environmental features. While this successfully allows some players to experience the realism of being a "pilgrim," the extremely high risk of getting lost and the lack of interaction feedback lead to severe frustration. The only remaining visual guide is the golden pillar of light from the Earth Temples (Shrines), but this extremely restrained guidance often feels inadequate in vast scenarios.

4.3.4 System management scenarios

Unlike the radical approach during exploration, the menu design returns to a combination of "Skeuomorphism and Standard Interaction." The menu is packaged as an ancient scroll or scripture, accompanied by melodious traditional instrument sound effects in the background, and the text and image descriptions are rich in cultural heritage, greatly reinforcing narrative immersion. Regarding interaction usability, the game wisely reverts to traditional controller operation logic, avoiding inefficient virtual cursors. This "tradition" retained at the system level ensures player comfort during long sessions of equipment configuration and skill reading, demonstrating rational restraint beneath its radical philosophy.

4.3.5 Section summary

"Black Myth: Wukong" represents an experimental exploration of "Immersion Supremacy." Its abandonment of convenience in exploration scenarios is a rare "regression" in modern game design, yet it is precisely this

regression that trades for a unique aesthetic experience. It indicates that under specific cultural contexts and experiential goals, sacrificing cognitive efficiency and usability is sometimes a necessary cost to achieve unique artistic expression.

5. Comparative Analysis & Discussion

The previous chapter, based on the three-dimensional theoretical framework, conducted contextualized independent case analyses of the UI design in "God of War", "Cyberpunk 2077", and "Black Myth: Wukong". Each case revealed a unique design philosophy and its performance and trade-offs in specific scenarios. The core task of this chapter is to horizontally integrate these longitudinally deep independent analyses, distilling design patterns and trade-off laws that transcend single products from a higher dimension, and constructing the "Scenario-Based UI Design Strategy Matrix."

5.1 Design Philosophy and Strategic Trade-offs

Placing the three works side-by-side, a design spectrum composed of "Functional Efficiency" and "Artistic Immersion" clearly emerges. They are not isolated design samples but occupy three milestone coordinates on this spectrum. The essential differences among them stem from the divergence of their core design philosophies. It is this philosophy that determines how they prioritize the three core dimensions-Cognitive Efficiency, Interaction Usability, and Narrative Immersion-when design conflicts arise, and ultimately what strategic sacrifices and trade-offs they make.

(1) "God of War"

"God of War" occupies the "Golden Mean" of this spectrum. Its philosophy of "Elegant Invisibility of Functionalism" is essentially a strategy of risk aversion and experience maximization. It first ensures that cognitive efficiency and interaction usability reach top industry-recognized standards as a cornerstone, then applies design techniques to pursue narrative immersion. Artistic pursuit never overrides basic experience, making it ultimately an "Optimal Solution" with almost no shortcomings, widely recognized by the player community.

(2) "Cyberpunk 2077"

In contrast, "Cyberpunk 2077" chooses the philosophy of "Maximizing Narrative UI," a high-risk, high-return artistic strategy, shifting its coordinate towards the narrative immersion end of the spectrum. It places the transmission of the worldview at the absolute core, requiring both cognitive efficiency and interaction usability to serve and even submit to this stylized expression. This choice makes it unparalleled in atmosphere creation but inevitably leads to compromises in traditional engineering metrics like usability, coloring its experience with a nuance of being "user-selective."

(3) "Black Myth: Wukong"

"Black Myth: Wukong" pushes this exploratory path to the extreme; its philosophy of "UI Dissolution" carries a strong experimental tone. It also places narrative immersion at the highest priority, but its implementation path seeks the "absence" and "melting" of UI, rather than its "presence" and "manifestation." To achieve this pure immersion, it makes the boldest trade-off-almost completely abandoning traditional interaction usability in exploration scenarios. This uncompromising attitude makes its artistic achievement remarkable but significantly raises the threshold for player experience.

5.2 Scenario-Based UI Design Strategy Matrix

Based on the aforementioned philosophical differences and by horizontally comparing specific solutions of the three games in different high-frequency scenarios, we can distill the previous theoretical analysis into a concrete "Scenario-Based UI Design Strategy Matrix." This section will not list tables but will analyze the operational mechanisms of different strategies through a deep horizontal review of scenario dimensions.

A. High-Intensity Combat Scenarios: Presentation and Inhibition of Information

In combat requiring millisecond-level reactions, the core design contradiction lies between "providing critical information" and "avoiding visual interference."

High Cognitive Efficiency Strategy (God of War)

Adopts the "Threat Visualization" strategy. By abstracting and visualizing off-screen information through threat indicators, combined with a minimalist HUD, it provides the highest information clarity without interfering with the field of view. This is the primary choice for

pursuing a robust experience.

Immersion-First Overload Strategy (Cyberpunk 2077)

Adopts the "Information Overload" strategy. It allows and even encourages visual noise generated by damage numbers and hacking effects. This strategy sacrifices some battlefield information reading efficiency in exchange for the chaotic combat thrill consistent with the Cyberpunk theme, representing a style-oriented exception.

Dynamic Minimalist Strategy (Black Myth)

Adopts the "Display on Demand" strategy. Combat UI is completely hidden normally and appears only at critical moments. It surpasses "God of War" in minimalism, realizing dual extremes of cognitive efficiency and immersion by substituting traditional UI with audio-visual effects, though it demands extremely high capability in integrating art resources.

B. Free Exploration Scenarios: Explicitness and Implicitness of Navigation

In the exploration phase, the core contradiction lies between "guiding the player to the target" and "encouraging the player to observe the world."

Compromise Guidance Strategy (God of War)

Uses "Compass and Spatial Anchors." Removes the mini-map but retains the directional compass. This design finds a balance between "preventing getting lost" and "immersion," neither forcing players to stare at the bottom-left corner nor leaving them completely lost.

Strong Explicit Guidance Strategy (Cyberpunk 2077)

Relies on "AR Navigation." Covers the screen with high-density UI like mini-maps and ground guide lines. While guaranteeing absolute navigational efficiency, it triggers a severe "Tunnel Vision Effect," causing players to ignore the meticulously built game world.

Strong Implicit Guidance Strategy (Black Myth)

Implements "De-UI-fication." Completely removes maps and guidance markers, relying solely on scene landmarks for direction. This strategy pushes exploration immersion to the apex but sacrifices interaction convenience massively, placing demanding requirements on players' sense of direction and memory-a typical "Hardcore" trade-off.

C. System Management Scenarios: Fusion of Function and Aesthetics

In menu and system interaction, the core contradiction lies between "operational efficiency" and "worldview packaging."

Standardization Strategy (God of War)

Prioritizes "Muscle Memory," with all menu logic following standard console operation specifications. Aesthetic elements serve only as background embellishments, ensuring the lowest learning cost and highest tolerance for error.

Simulation Strategy (Cyberpunk 2077)

Pursues "Diegetic Simulation." Forces the use of a cursor to simulate computer operation, even simulating cyberware malfunction effects. Although the sense of substitution is intense, the non-standardized operation logic leads to a significant decline in interaction efficiency.

Cultural Packaging Strategy (Black Myth)

Achieves "Unity of Form and Meaning." It returns to standards in operation logic (such as D-pad selection) but deeply integrates cultural symbols (like scrolls, calligraphy) in visual presentation. This proves that aesthetic expression does not necessarily have to sacrifice usable interaction logic, making it the most excellently balanced case among the three in this scenario.

5.3 Discussion: UI Design as a Dynamic Art of Balance

The cross-case comparison in this chapter is not intended to judge superiority but to reveal the essence of modern game UI design as a dynamic, contextualized art of balance full of trade-offs. First, there is no "Optimal UI" or "Standard Answer" that fits all scenarios. Three works that have achieved success in both commerce and art adopted vastly different, even contradictory, design strategies. This fully illustrates that the judgment of design quality cannot be detached from the specific game genre, core experience goals, and design philosophy it serves. The radical "no-map" design suitable for "Black Myth: Wukong" could be a disaster if placed in the high-information-density "Cyberpunk 2077"; conversely, introducing complex AR interfaces into "God of War" would destroy the gravitas of its mythological epic.Secondly, the role of the designer has shifted from an executor of fixed rules to a "Master of Trade-offs." The matrix constructed in this study clearly shows that designers must, like strategists, lucidly judge which of the three dimensions (Cognitive Efficiency, Interaction Usability, Narrative Immersion) should take precedence and which can be compromised in each specific scenario. Such decisions directly shape the "personality"

of a game. The personality of "God of War" is restraint and inclusivity; "Cyberpunk 2077" is flamboyance and chaos; while "Black Myth: Wukong" is solitude and seeking.Finally, "Scenario-Based" thinking is the key to resolving the core contradictions of UI design. The inherent tension among Cognitive Efficiency, Interaction Usability, and Narrative Immersion is an eternal challenge facing game UI design. Traditional static design often attempts to solve all problems with one solution, leading to mediocrity or fragmentation of experience. By adopting dynamic priority strategies across different scenarios-for example, pursuing extreme efficiency during combat and extreme immersion during exploration-designers can meet the changing needs of players while minimizing the loss of overall experience. This dynamic balance is precisely the necessary path for contemporary AAA game UI design to move from "Function-Oriented" to "Experience-Oriented."

6. Conclusion

The starting point of this research originated from the observation of the core contradiction in contemporary game UI design: homogenized static design can no longer meet the increasingly complex and scenario-based experience needs of modern games. To address this challenge, the core objective of this study lies in exploring how game UI can scientifically balance and optimize its three core dimensions-Cognitive Efficiency, Interaction Usability, and Narrative Immersion-across different scenarios.Following this path, this paper first laid the theoretical cornerstone through a literature review; subsequently, it constructed an integrative three-dimensional theoretical analysis framework of "Cognitive Efficiency-Interaction Usability-Narrative Immersion." Using this framework as a tool, this study conducted in-depth cross-scenario case analyses of three distinct design philosophies: the "Way of Balance" represented by "God of War", the "Stylized Manifestation" embodied by "Cyberpunk 2077", and the "Immersive Dissolution" advocated by "Black Myth: Wukong".Ultimately, through systematic cross-case comparison, this paper revealed the essence of game UI design as an art of dynamic balance, and crystallized all theoretical insights and empirical findings into a three-dimensional theoretical analysis framework with practical guiding significance. Thus, the research objectives of this thesis have been substantially achieved. This chapter will summarize the entire process, clarify the main contributions of the research, reflect on existing limitations, and provide an outlook on feasible future exploration directions.

6.1 Research Summary

The core findings of this study can be summarized as: Excellent UI design is not about pursuing the extreme of a single dimension, but the art of dynamic trade-offs in specific scenarios. Through the deep analysis of three representative cases, this study confirms that the success of contemporary excellent UI design does not stem from the extreme pursuit of a single dimension, but from the clear design philosophy behind it and the dynamic trade-off strategies supporting this philosophy. Whether it is "God of War's" ingenious harmonization of function and immersion, "Cyberpunk 2077's" trade-offs in usability for worldview construction, or "Black Myth: Wukong's" subversion of traditional guidance for extreme immersion, they provide evidence that UI design has evolved from an engineering/technical issue into a strategic art full of choices and trade-offs. The "Scenario-Based UI Design Strategy Matrix" constructed in this study is precisely the systematic distillation and explicit presentation of these implicit trade-off laws.

6.2 Main Contributions

The value of this research is mainly reflected in two levels: theoretical and practical:

(1) Theoretical Contribution

The core theoretical contribution lies in the construction and validation of the "Cognitive Efficiency-Interaction Usability-Narrative Immersion" three-dimensional theoretical framework. The innovative value of this framework is reflected in its integrality and scenario-based perspective: it systematically integrates core concepts from cognitive psychology, human-computer interaction, and immersion theory into a unified analytical tool for the first time. More importantly, it shifts the research focus from the static judgment of "Is the UI good or bad" to the dynamic analysis of "How the UI operates and trades off in specific scenarios." This provides a more explanatory systematic analysis perspective for game UI design criticism and academic research,

effectively filling the gap in existing research regarding cross-dimensional, scenario-based integrated analysis.

(2) Practical Contribution

The practical contribution of this study is transforming the results of theoretical analysis into a "Scenario-Based UI Design Strategy Matrix" available for game developers and UI/UX designers. This matrix is not a rigid design specification but a decision support tool and a mental map. It helps design teams define UI design priorities for different scenarios based on the game's core experience positioning in the early stages of a project; provides theoretical basis and tactical reference for specific trade-off decisions during the design process; and serves as a systematic evaluation language and diagnostic tool during design reviews. Ultimately, this matrix aims to promote the industry to form a more self-conscious and strategic "scenario-based" design thinking, thereby creating game products with more coherent experiences and more immersive emotions.

6.3 Limitations and Future Prospects

In the spirit of academic rigor, this study still has the following limitations, which also point out directions for future exploration:

(1) Expansion and Validation of Case Types

The cases selected in this study are all concentrated in the Action Role-Playing Game (ARPG) genre, and the universality of the conclusions remains to be further verified. Future research should apply the three-dimensional framework to game genres with vastly different interaction paradigms, such as RTS, SLG, or VR/MR, to explore the commonalities and specificities of UI trade-off laws under different genres.

(2) Introduction of Quantitative Research Methods

This study mainly adopts qualitative case analysis and lacks the support of quantitative data such as eye-tracking and A/B testing. Subsequent research could attempt to combine experimental psychology methods to quantify players' gaze distribution and reaction times under different UI layouts, providing more precise empirical data support for "Cognitive Load" and "Operational Efficiency."

(3) Restructuring of UI Morphology by Frontier Technologies

With the development of AIGC (Artificial Intelligence Generated Content) and adaptive technologies, static UI design arguments may face restructuring. Future research should focus on the feasibility of "Dynamic Adaptive UI," that is, using AI to analyze player behavior in real-time and dynamically adjust the information density and presentation of the interface, thereby achieving true "Personalization" and extreme scenario customization.

In summary, through the construction of a theoretical framework and in-depth case analysis, this thesis clarifies the trade-off logic of modern game UI design in complex contexts. Despite the limitations, it is hoped that the results of this study can lay a conceptual foundation for subsequent exploration in academia and bring beneficial inspiration to the innovative practice of the game industry.

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