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Research on the Design of Open World Games for the Communication of Distinctive Ethnic Cultures — A Case Study of the Tibetan Culture Game the Legend of Guge

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Abstract In the digital era, video games have emerged as a dominant medium within popular culture and have demonstrated a mutually reinforcing relationship with the communication of distinctive Chinese ethnic cultures. Open-world games, characterized by their realism, freedom, and immersive qualities, have proven particularly effective in cultural preservation and educational engagement, establishing themselves as a vital medium for cultural transmission in recent years. Building upon this foundation, this study proposes an integrated open-world game design model tailored for the communication of distinctive ethnic cultures, drawing on environmental storytelling theory and the MDA (Mechanics, Dynamics, Aesthetics) game design framework. To validate the feasibility of this model, the research team developed The Legend of Guge, an open-world game prototype based on the ruins of the ancient Guge Kingdom in Tibet. The findings suggest that this model provides a novel theoretical framework for designing educational open-world games centered on ethnic cultural heritage, thereby expanding the avenues through which such cultures can be represented in educational gaming contexts.

Keywords Environmental Storytelling; Distinctive Ethnic Cultures; Tibetan Culture; Open World Games; MDA Framework

1. Introduction

China, as a multi-ethnic nation, has cultivated a rich cultural system throughout its five-thousand-year history, characterized by distinctive diversity, variability, and regionality. Ethnic cultural heritage, a vital component of China's outstanding traditional culture, encompasses the unique cultural expressions created and developed by various ethnic groups. Its essence lies in distinctiveness—possessing intrinsic value unmatched by others—and includes not only tangible cultural artifacts but also intangible aspects such as language, art, religion, customs, moral concepts, and social structures (Hu & Jiang, 2022). This heritage plays a crucial role in enriching global cultural diversity and safeguarding human cultural legacy. Digital technology has provided multifaceted platforms for the communication and education of ethnic cultures, opening new avenues for their preservation and revitalization (Liu., 2018). However, current digital cultural products in China suffer from homogenization, fragmented cultural data resources, and insufficient interactivity, leading to monotonous formats, poor user experience, and

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ineffective educational outcomes (Liu., 2023). Unlike traditional educational games, open-world games offer players a fully interactive virtual world with a coherent worldview, leveraging high-fidelity realism, unparalleled freedom, and deep immersion (Jørgensen & Mortensen., 2022). These features enable the seamless integration of ethnic cultural elements across all gameplay aspects, making them highly effective vehicles for cultural education and transmission (Bowman et al., 2024). Nevertheless, existing research and applications of open-world educational games for ethnic cultures remain scarce, often plagued by imbalanced edutainment, forced cultural incorporation, and weak interactivity, resulting in superficial cultural engagement. To address these challenges and enhance the educational and communicative efficacy of ethnic cultures in open-world games, this study proposes the EST-MDA integrated design model, combining Environmental Storytelling Theory (EST) and the Mechanics-Dynamics-Aesthetics (MDA) framework. A proof-of-concept open-world game, The Lost Dynasty: Legend of Guge, was developed to validate the model's feasibility and effectiveness, focusing on Tibetan cultural education. This research aims to expand the representational pathways for ethnic cultural heritage in gaming, offering a novel theoretical and practical foundation for future developments.

2. The Symbiosis Between Open World Games and Distinctive Ethnic Culture

2.1 Mechanistic Characteristics of Open World Games

Open world games, also termed free-roam games, represent a genre characterized by seamless expansive maps, a coherent worldview, and rich interactive elements. Players enjoy unparalleled freedom to explore and complete tasks at their own pace, unconstrained by linear progression—a hallmark of traditional game design. By constructing worlds that dynamically interact with diverse design elements, these games profoundly shape players experiences. Their core features—simulational realism, high freedom, and immersion—render them particularly effective for cultural transmission and content representation, establishing them as pivotal mediums for contemporary cultural communication.

2.1.1 The "Body" of the Game: The Simulated State of the Open World

"Simulation" refers to the characteristic of objects, phenomena, artistic works, or virtual worlds exhibiting features resembling reality, particularly through meticulous design and presentation that render elements within virtual spaces authentic and credible, as if they were part of the real world. The state of simulation emphasizes the imitation and reproduction of reality without requiring complete replication; rather, it achieves a degree of verisimilitude through attention to detail and logical rigor, making the subject appear as though it could exist in reality. As a product of the digital age, open world games also embody this characteristic of "simulation." The "simulated reality" in open world games is manifested through their imitation and reconstruction of the real world. Through elaborate design, these games strive for a high degree of verisimilitude in physical spaces—such as natural landscapes, architectural styles, and ecosystems—as well as in non-material dimensions like social structures and cultural contexts.

2.1.2 The "Soul" of the Game: The Freedom of the Open World

Through the relationship between "body and soul", freedom can be regarded as the "soul" of an open world. That is to say, only a game with a

high degree of freedom can be considered an open world game. It is specifically manifested in three aspects: exploration freedom, interaction freedom, and narrative freedom. Exploration freedom allows players to move independently in a vast game world and discover hidden secrets and game elements. Interaction freedom is reflected in the fact that players can interact with any elements in the game world, such as the environment, characters, and mission events. Narrative freedom allows players to shape their own stories through non-linear narrative.

2.1.3 Unity of Body and Soul: Immersion in Open World Games

In open world games, the establishment of immersion does not merely depend on the high-level restoration of the virtual environment in terms of senses like vision and hearing. Instead, it stems from the multi-dimensional comprehensive effects, including the in-depth interaction between players and the game world, the narrative experience, and the emotional resonance. Through the organic combination of "body" and "soul", that is, the coordinated function of the simulated state and the degree of freedom, open world games are able to fully integrate players into the virtual world, enabling them to break away from reality temporarily and become a part of the game world. This sense of immersion is not only reflected in players' perception of the game environment, but also further strengthens the psychological connection between players and the virtual world through interactive design, narrative structure, and emotional bonding, ultimately achieving a deep-level immersive experience.

2.2 Innovative Mechanisms of Open World Games in Facilitating the Communication of Distinctive Ethnic Cultures

With the acceleration of globalization, enhancing a country's cultural soft power and the international influence of outstanding traditional Chinese culture is of great significance for boosting international competitiveness. Especially for ethnic groups with unique historical and cultural backgrounds, how to utilize modern technological means to spread their characteristic cultures has become a challenging and significant issue at present. The huge overseas success of *Black Myth: Wukong* demonstrates the great potential of characteristic Chinese ethnic cultures in cross-cultural communication. Relevant empirical studies have shown that the ideal relationship between game play and culture should be a deep integration of the "body" and the "soul" (Cao et al., 2024). Thanks to their high degree of simulation, freedom, and immersion, open-world games possess great potential in cross-cultural communication, serving as ideal "breakers" and "openers" in cross-cultural communication. They can reduce the cultural discount effect, skillfully integrate characteristic ethnic cultures into game mechanisms and play, add unique aesthetics and cultural connotations to games, and enhance the vitality and appeal of games.

2.2.1 Game Play: Open World as a "Bridge" for the Communication of Distinctive Ethnic Cultures

In academic and industrial circles, there is still no clear definition of game play. However, it is generally recognized that it refers to what players can do, how they can act, and how they can interact in a game. Game play is the concrete manifestation of game rules and the product of the interaction between rules. Its core lies in the interaction strategies between the challenges set in the game and the actions taken by players (Adams., 2010).

2.2.2 Culture as the Essence: Three Dimensions of Incorporating Characteristic Ethnic Cultures into Open World Games

"Symbols, knowledge, and concepts" can be regarded as the three dimensions of disseminating

culture in digital games. The symbolic dimension means making flexible use of ethnic cultural elements and forms, presenting cultural symbols through audio-visual expressions, aesthetic styles, literary and artistic works, etc., with the aim of generating an emotional resonance with players. The knowledge dimension refers to embedding and spreading knowledge and information in aspects such as humanities, geography, history, and folk customs within the game. The conceptual dimension implies presenting, exploring, and spreading various cultural thoughts, customs, and values contained in the culture through game narratives and interactions (He & Li., 2024). There are numerous cases both at home and abroad where characteristic ethnic cultures have been integrated into open-world games. The case details are shown in Table 1. Taking Black Myth: Wukong as an example, the game has integrated rich Chinese mythological stories as well as cultural elements of Buddhism and Taoism, endowing it with unique aesthetics and profound connotations, enabling overseas players to experience the charm of Eastern culture.

Table 1. Ethnic cultural features in excellent open-world games from different countries

Game Name	Region and Developer	Year	Integrated Cultural Elements
Black Myth: Wukong	China - Game Science	2024	Chinese mythological legends, cultures of Taoism, Confucianism, and Buddhism, etc.
Assassin's Creed: Valhalla	Europe - Ubisoft	2020	Viking culture, Norse mythology, etc.
Genshin Impact	China - miHoYo	2020	Chinese-style gardens, traditional Chinese operas, Huizhou-style architecture, etc.
Sekiro: Shadows Die Twice	Japan - From Software	2019	Japan's Sengoku period, Bushido soul, and ninja culture
Assassin's Creed: Odyssey	Europe - Ubisoft	2018	Ancient Greek culture and legendary stories, etc.
Red Dead Redemption 2	USA - Rockstar Games	2018	American Western cowboy culture, Native American culture, etc.

2.2.3 Integration of the Body and the Essence: Open World Games Create a New Trend in the Communication of Characteristic Ethnic Cultures

A group of domestic open world games represented by Black Myth: Wukong and Genshin Impact have effectively promoted the external communication and acceptance of characteristic ethnic cultures, and enhanced the goodwill and recognition of people around the world towards Chinese culture. From this, we can derive the underlying logic of "cultural going global" in the gaming field, that is, game play serves as the body, culture serves as the soul, and the integration of the body and the soul drives the process together.

As a new form of media, video games are different from traditional narrative media such as books, radio, films, and short and long videos. The dynamic behavioral interaction of players is the foundation of game communication and the driving force of game narrative. In the process of games going global, the primary factor driving cultural communication is usually not the cultural connotation, but the game mechanisms and play. As the core selling point of a game, game play can transcend cultural contexts, and be compared, felt, and appreciated by players from various countries based on their shared gaming experiences. It is a language that requires no translation. Once the game play is accepted and recognized, the barriers to cross-cultural communication can be broken through. The exquisite "bottle" of game play stimulates players' enthusiasm for exploring the treasures within, enabling the in-depth communication of the cultural connotations embedded in the game. At the same time, the freshness and profoundness of the heterogeneous culture brought by the "soul of culture" carried by the game further enhance the competitiveness and vitality of the game products. The success of a series of domestic

open-world games such as Black Myth: Wukong, The Song of Yan Yun and Genshin Impact verifies that the ideal relationship between game play and traditional culture should be a deep integration of the "body" and the "soul", that is, using the body of game play to contain and display culture, and using the soul of culture to endow the game play with unique aesthetic tastes and depth. With the characteristics of high-fidelity to the real world, high freedom in the game, and a sense of immersion, open-world games can embed characteristic ethnic cultural elements in all aspects of the game, and become a "powerful tool" for the cross-cultural communication of characteristic ethnic cultures.

3. Construction of the Design Model of Open World Games for the Communication of Characteristic Ethnic Cultures

3.1 Theoretical Foundations

3.1.1 Environmental Storytelling Theory

The Environmental storytelling Theory (EST), originates from the spatial narrative in literature and the landscape narrative in architecture. It means that in addition to the traditional linear narrative thinking with a complete structure, narrative can also be designed from the perspective of the environment and space, that is, the thinking mode of environmental storytelling. Through environmental storytelling, the construction of the virtual environment in games can serve the storytelling by integrating narrative fragments into the space that users can explore. From the perspective of morphology, these spaces must contain important narrative elements, constantly stimulating players to explore in order to understand the whole story. This process has been defined as "environmental storytelling" by Carson (2000) and Jenkins (2004). It means conveying important parts of the narrative through the environmental exploration of virtual characters, and a solid worldview and level design are the prerequisites for environmental storytelling. Subsequently, based on Carson's viewpoint, Jenkins further proposed four environmental storytelling strategies, namely Evocative Spaces, Enacting Stories, Embedded Narratives, and Emergent Narratives, to emphasize the role of space and environment in game narrative. In this paper, by combining the application of the environmental storytelling theory in games proposed by scholars Carson, Jenkins and Worch (2010), a pyramid model of environmental storytelling is further put forward, as illustrated in Figure 1.

Figure 1. Pyramid model of Environmental storytelling

3.1.2 MDA Game Design Framework

The MDA (Mechanics, Dynamics, Aesthetics) framework was initially proposed jointly by game designers and scholars Hunicke, LeBlanc, and Zubek (2004). As a methodology focusing on game structure design, it conducts design by means of three

aspects: Mechanics, Dynamics, and Aesthetics. It is committed to comprehensively and systematically planning game mechanics, game dynamics, and game aesthetic experiences, effectively building a smoother communication bridge between game designers and players' experiences, thus helping game designers better design and optimize games.

Each component of the MDA framework can be regarded as a unique "lens" or "method" for observing games, as illustrated in Figure 2. They are independent of each other, yet there are causal connections among them (Hunicke et al., 2004). Its fundamental concept is that games, as a tool, will generate behavioral actions with players. Game content is not just media flowing from games to players, that is to say, there is an interaction between games and players. Games, as carefully designed building blocks, can assist games in becoming a system that constructs behaviors through interaction, thereby providing a clear train of thought for the selection and analysis of game design. From the perspective of designers, mechanics can trigger dynamic system behaviors, thus giving rise to special aesthetic experiences. From the perspective of players, aesthetics set a certain tone for the game. This aesthetic feeling originates from observable dynamics and ultimately boils down to operable mechanics.

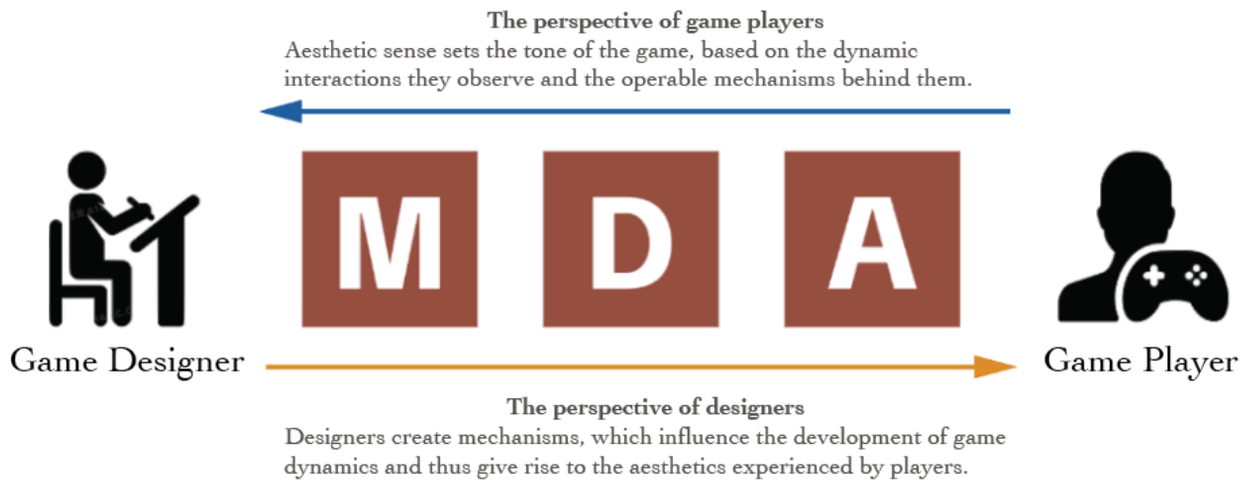

Figure 2. MDA as a lens for observing games

3.2 Feasibility Demonstration of the Integration of the Environmental Storytelling Theory and the MDA Game Framework

Relevant empirical studies have proven that the MDA game design model, as a framework widely used by game designers and scholars, can provide clear guidance for understanding how games work. However, when facing the rapidly developing digital games, the MDA game design model currently has the problem of oversimplifying complex game designs. Especially when dealing with in-depth story narratives and character development, the emotional and narrative depth of games may not be easily fully unfolded through a simple Mechanics-Dynamics-Aesthetics structure (Cardona et al., 2020). Therefore, in the field of digital game design, combining two or three theories for dealing with more complex game design issues has become an important development trend. And a few researchers have already started to attempt to combine two to three theories to construct a comprehensive game design model, and have carried out some empirical studies (Dai et al., 2024; He et al., 2024; Duarte & Battaiola., 2017; Hu et al., 2013). Such an integrated theory can help game designers and game researchers have a more targeted and systematic model framework for analyzing and designing games when facing more complex research objects.

Therefore, based on the research object of this paper, which is open-world games with the theme of characteristic ethnic cultures, this type of game is

usually accompanied by grand story narratives and rich gameplays. Although the MDA game design model can provide a method of designing games from the perspective of players' experiences through the analysis of game mechanics, generated dynamics, and ultimate aesthetic experiences, it ignores the relevant elements of narrative design in games. If the MDA model is simply used to design open-world games with characteristic ethnic cultures, it will result in insufficient cultural communication power and attractiveness. The environmental storytelling theory emphasizes the use of game spaces as narrative tools to tell stories through the environment itself, which exactly fits the characteristics of the large maps in open-world games. Therefore, for open-world games themed with characteristic ethnic cultures, the environmental storytelling theory can help designers effectively integrate cultural story elements into the game environment, while the MDA framework ensures that these cultural contents are appropriately presented and experienced through game mechanics, dynamics, and aesthetics.

3.3 Construction of the EST-MDA Integrated Model

Environmental storytelling presents stories through the design of a detailed world, while the MDA framework ensures that these environmental elements can showcase their narrative significance in players' interactions through the interaction of mechanics, dynamics, and aesthetics. From the perspective of theoretical integration, the integration of environmental storytelling and the MDA framework essentially stems from their common goal orientation, that is, they are committed to creating a more immersive gaming experience for players. The environment is no longer just the "background" of the game. It is deeply integrated into players' gaming experience by being inspired through game mechanics, through players' dynamic participation, and by conveying emotions and information through aesthetic design.

The three elements of the EST pyramid model, namely the environmental storytelling world, environmental storytelling strategies, and environmental storytelling elements, have a certain mapping relationship with the three elements of mechanics, dynamics, and aesthetics in the MDA game framework. In the EST pyramid model, the architecture layer plays the role of a cornerstone, aiming to construct a virtual game world that follows a strict narrative logic. In this self-contained world, the design concepts of all game mechanics need to comply with the operating logic of the game world. Therefore, it forms a close mapping relationship with the mechanics (M) in the MDA framework. The architecture layer provides space for game mechanics, allowing rules and gameplay to be naturally integrated into the game world, and the mechanics layer of MDA drives the operation of the game ecosystem with detailed rule settings. The two are interdependent and jointly lay the foundation for a high-quality gaming experience. At the same time, the middle layer of the EST pyramid model, that is, the environmental storytelling strategies, aims to select suitable environmental storytelling strategies according to the characteristics of different environmental storytelling spaces. For example, evocative storytelling awakens players' deep emotional memories with the help of specific environmental elements and guides players to actively immerse themselves in the narrative; enacted storytelling gradually unfolds plot clues within a given space, allowing players to feel as if they are on the scene; embedded storytelling hides story fragments in environmental details, and players need to observe and excavate the profound meaning behind them; emergent storytelling generates stories in the interaction between players and the environment based on the theory of complex systems. Different narrative strategies lead to different game interaction

methods, and the coordinated effect of multiple narrative strategies can expand the breadth and depth of interaction, and this interaction experience forms a mapping relationship with the dynamics (D) in the MDA game model. Finally, the top layer of the EST pyramid model, that is, the environmental storytelling elements layer, constructs a game environment that can be perceived by users through environmental storytelling space elements and image elements. This layer is mapped to the aesthetics (A) in the MDA framework and can be directly perceived by users' audio-visual senses. Specifically, this level skillfully combines different narrative elements to create environment fields with different styles and atmospheres, and uses them as carriers to convey rich, diverse, and delicate aesthetic experiences to players, evoking players' aesthetic understanding and emotional resonance during the gaming process.

In summary, by analyzing the structural elements of the EST pyramid model and the MDA game framework, it is found that there are mapping relationships in concepts and applications among the elements. Therefore, this study, based on the MDA game framework, integrates the EST pyramid model into it, and then obtains a new EST-MDA integrated model that is more suitable for the design of open-world games, as shown in Figure 3. The model includes three dimensions: the environmental storytelling gameplay mechanics layer, the environmental storytelling dynamic interaction layer, and the environmental storytelling aesthetic experience layer, which provide practical guidance for the design work of open-world games in terms of mechanism construction, dynamic creation, and aesthetic presentation.

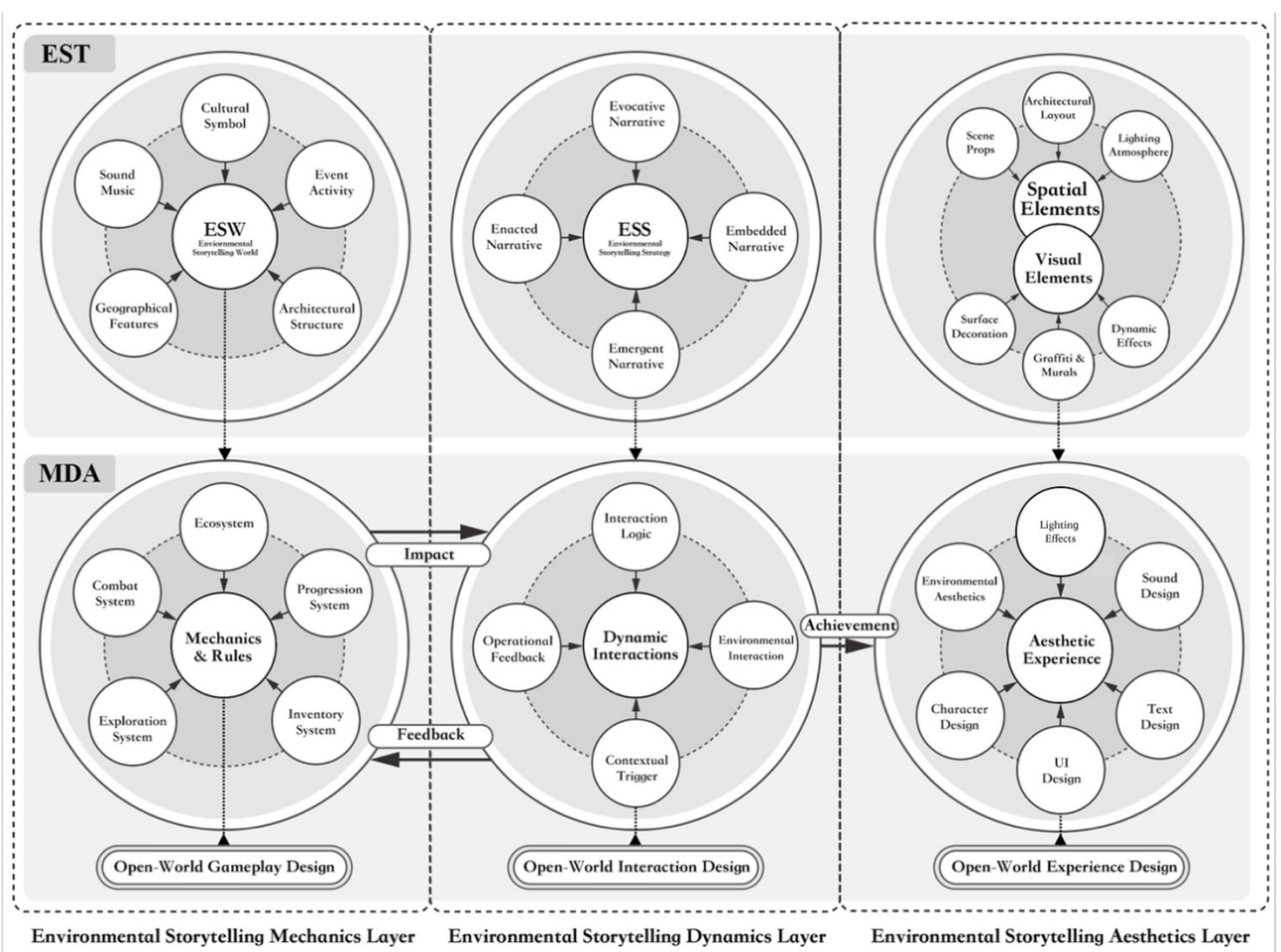

Figure 3. EST-MDA Integrated Model for Open World Game Design

4. Design Path of Open-World Games with Characteristic Ethnic Cultures Based on the EST-MDA Integrated Model

Open-world games with characteristic ethnic cultures are those with a specific characteristic ethnic culture as the thematic background, and the elements of characteristic ethnic cultures run through the entire game design. Therefore, by embedding the genes of characteristic ethnic cultures into the EST-MDA integrated model applicable to open-world games, a design strategy path applicable to open-world games with characteristic ethnic cultures is obtained, as shown in Figure 4. This design path is divided into four dimensions: the characteristic ethnic culture layer, the environmental storytelling mechanism layer, the environmental storytelling interaction layer, and the environmental storytelling experience layer. These four dimensions are closely connected, outlining a wonderful picture of open-world games with characteristic ethnic cultures for players.

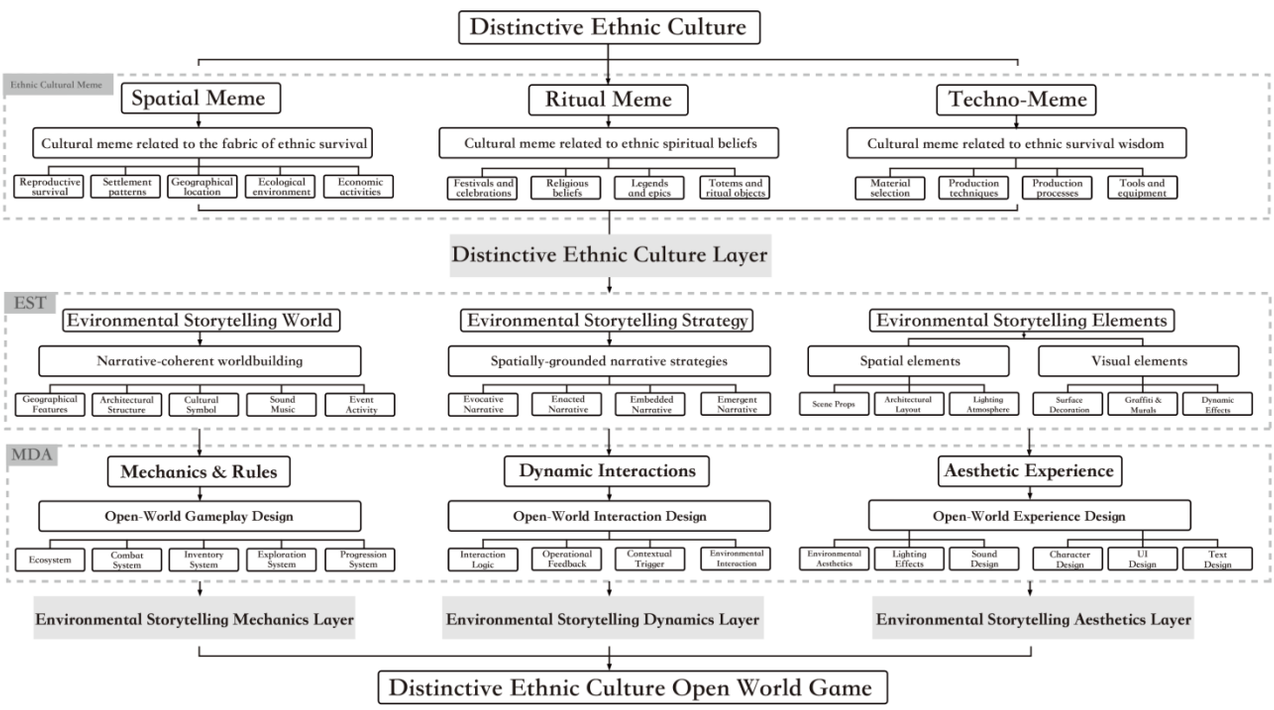

Figure 4. Design Framework for Distinctive Ethnic Culture Open World Games Based on EST-MDA Integrated Model

4.1 Distinctive Ethnic Culture Layer: The Multimodal Fusion Path of the essence of Culture

The ethnic cultural heritage layer embodies the essence of national culture and serves as the soul of open-world games featuring distinctive ethnic characteristics. The cultural spatial genes, customary genes, and production technology genes inherent in ethnic cultural heritage can be multidimensionally integrated into various aspects of open-world game design, including gameplay mechanics, quest narratives, and environmental spatial design. This integration enables game designers to construct highly authentic cultural scenarios with greater precision and efficiency, while simultaneously facilitating players' formation of identity that aligns with the game's contextual framework. Consequently, this approach not only significantly enhances players' immersion during gameplay, encouraging deep engagement with the ethnic cultural atmosphere created by the game, but also substantially amplifies the efficacy of cultural communication in subtle yet profound ways. By implementing this methodology, new pathways

are opened for the preservation and promotion of distinctive ethnic cultural heritage, creating innovative channels for cultural transmission through interactive digital mediums.

4.1.1 The Symbolic Dimension: Constructing Culturally Authentic Landscapes Through Spatial Cultural Genes

The cultural space genes of characteristic ethnic cultures refer to all cultural genes related to the survival texture of ethnic groups, including aspects such as reproduction and survival, settlement patterns, geographical locations, ecological environments, and economic activities. These elements, as carriers of culture, not only constitute the actual places of social relations but also possess the function of shaping cultural characteristics. Some scholars hold the view that "any space reflects, contains, and conceals social relations - although in fact, space is not an object, but a series of relations among objects (objects and products) (Deng., 2022)." Therefore, cultural space genes can endow buildings, environments, and identification symbols in open-world games with rich cultural connotations. This not only enables these game elements to effectively convey and express unique cultural information but also enhances players' gaming experience, and strengthens the sense of reality and immersion in the game.

4.1.2 The Knowledge Dimension: Weaving Cultural Context Through Production Technology Genes

The production technology genes of characteristic ethnic cultures refer to the cultural genes related to the survival wisdom of ethnic groups, including manufacturing technologies, agricultural production, technological processes, and other skills or knowledge directly related to survival and production. These production technology genes have been continuously explored and developed by a nation throughout history. They are not only the core of the ethnic group's survival activities but also an important manifestation of its cultural identity and technological achievements. In open-world games, production technology genes can be integrated into the gameplay mechanisms, narrative plots, and task designs of the game in various ways, thus providing a rich and authentic gaming context for players to acquire and understand relevant cultural knowledge.

4.1.3 The Ideological Dimension: Constructing Cultural Atmosphere Through Customary Genes

Cultural custom genes refer to elements of cultural heritage intrinsically linked to the soul beliefs and collective identity of an ethnic group, including festivals, religious practices, local traditions, and customs. These genes are inherently transmissible across generations, encapsulating the collective memory of a people and serving as a crucial medium for fostering emotional cohesion and cultural identity (Chang., 2024). Leveraging the immersive and interactive nature of open-world video games, such cultural elements can transcend temporal and spatial limitations, achieving vivid and dynamic representation through gameplay mechanics, narrative structures, quest design, and artistic expression.

4.2 Gameplay Mechanism Layer of Environmental Storytelling: Game System Design under a Cultural Worldview

The environmental narrative gameplay mechanism layer builds upon the material provided by the distinctive ethnic cultural layer to construct compelling storylines, integrating cultural genes into character development, quest progression, and event unfolding. This integration allows players to experience the richness and depth of traditional culture through immersive gameplay. Open-world games are typically composed of various

interlocking gameplay systems, including character development systems, combat mechanics, resource management, quest and narrative systems, social interaction modules, inventory and equipment systems, as well as puzzle-solving and challenge-based subsystems (Hunicke., 2004). Given the unique features of open-world games rooted in ethnic cultures, this study focuses on how four core mechanisms—environmentally oriented survival systems, resource collection systems, growth and learning systems, and quest exploration systems—contribute to the construction of culturally expressive open-world games.

4.2.1 Environmentally Oriented Character Survival System

The environmentally oriented character survival system is a pivotal gameplay mechanism in open-world games, particularly those designed with a distinctive ethnic cultural backdrop. By simulating real-world survival challenges, this system not only enhances the educational value of the game but also deepens players' cultural understanding and sense of immersion. Players must continuously adapt their survival strategies in response to environmental changes, managing basic physiological needs such as hunger, fatigue, and body temperature. Moreover, players encounter culturally specific challenges that arise from dynamic environmental factors, including weather patterns, terrain types, local flora and fauna, and traditional activities rooted in specific cultural contexts.

4.2.2 Environmentally Oriented Resource Collection System

In open-world games grounded in ethnic cultural heritage, the environmentally oriented resource collection system stands out as a key feature that enriches both exploratory depth and cultural resonance. This system is intricately tied to the game’s environmental design, where diverse landscapes and geographical features serve as the cradle for unique resources. The acquisition and utilization of these resources are not only essential for gameplay progression but also serve as a medium through which players engage with the symbolic and practical dimensions of local culture.

4.2.3 Environmentally Oriented Growth and Learning System

The growth and learning system within a culturally contextualized environment play a vital role in the structure of open-world games centered on ethnic traditions. By embedding rich cultural elements into the player’s progression, this system facilitates a learning-by-doing approach, where gameplay organically introduces players to historical knowledge and traditional practices. Character development is thus reflected not merely in numerical enhancements or skill upgrades but also in the player's increasing familiarity with and adaptability to the cultural and environmental context of the game world.

4.2.4 Environmentally Oriented Quest Exploration System

The environmentally oriented quest exploration system functions as a core driver of player engagement and immersive narrative experience. By embedding main and side quests within specific environmental scenarios, the system enables meaningful interaction with the game's cultural and historical underpinnings. In this system, quests and level design are interdependent and co-evolve to support the game's storytelling. Each mission is carefully embedded within distinct environmental scenes, where spatial layout, atmospheric design, and gameplay challenges provide a vivid and contextually rich stage. Quests act as narrative threads linking various environmental settings, guiding players across diverse terrains through goal-oriented tasks and unfolding plotlines. As

players overcome the intricacies of these tasks—ranging from solving complex puzzles to defeating powerful adversaries—they progressively engage with the game's storyline, advancing narrative objectives. Through this synergy, environmental storytelling unfolds in a coherent and dynamic manner, constructing a compelling and culturally resonant game world.

4.3 Dynamic Interaction Layer of Environmental Storytelling: Interaction Design Guided by Narrative Strategy

Environmental narrative design plays a crucial role in shaping atmosphere and enhancing the player's sense of identity within the game world. Rather than offering explicit instructions, environmental storytelling encourages players to discover hidden secrets and narrative clues through subtle environmental cues and contextual details. Such narratives are typically realized through four major strategies—evocative spaces, enacted stories, embedded narratives, and emergent narratives—each of which fosters distinct interactive experiences.

4.3.1 Evocative Environmental Storytelling: Implicit Perception Stimulated by Environment

Evocative environmental storytelling is often employed at the beginning of a game or when a player enters a new area, where the visual and atmospheric design immediately begins shaping the player's identity. This approach taps into the player's subconscious, awakening emotional resonance and stored memories by crafting immersive and believable settings. It operates through abstract interaction—engaging the player's cognition and allowing them to "persuade" themselves of their role within the game world. The authenticity and plausibility of these settings are critical to the strategy's success. For games grounded in ethnic cultural narratives, designers should draw from the tangible legacy of human civilization—such as regional histories, environmental features, and socio-cultural logics—thereby awakening player cognition through culturally meaningful environmental design. This approach is particularly effective in photorealistic open-world games, which are often praised for their strong sense of immersion—not only due to visual fidelity but also because their environments reflect everyday life, reinforcing players' prior knowledge and emotional connections.

4.3.2 Enacted Environmental Storytelling: Embodied Exploration through Multimodal Perception

A well-defined player-avatar relationship, or a coherent "self," is essential to enacted environmental storytelling. This design strategy enables players to project emotions onto their in-game character, whose role allows them to integrate into the game world. Players explore game environments through multiple sensory modalities—sight, sound, touch, and inferred smell—forming an embodied and immersive perceptual network. Storytelling unfolds through both global and local narrative structures: global conflicts and objectives are distributed across the environment (e.g., hostile factions), aligning with traditional level design; local or micro-narratives—unrelated to the main storyline—provide emotionally resonant experiences, such as atmospheric cutscenes or symbolic encounters. This form of storytelling transforms players from passive recipients of information into active agents who explore and understand the world through their actions.

4.3.3 Embedded Environmental Storytelling: Fragmented Clues and Player Inference

Amid the popularity of fragmented storytelling in "Souls-like" games, embedded environmental storytelling has garnered widespread attention in the industry. This strategy transforms players

into narrative co-constructors by allowing them to infer, imagine, and reconstruct stories based on environmental clues. This shift from passive consumption to active interpretation leads to greater emotional investment. Rather than offering full exposition, the narrative is distributed through seemingly minor elements that carry major implications—such as an unsealed letter referencing a hidden conspiracy or a set of faded family photos hinting at generational trauma. Though individually modest, these narrative fragments are critical to the construction of the overarching story world. Effective implementation depends on two core design components: the narrative content embedded in the clues, and the manner of presentation that invites logical reconstruction. A practical design approach involves integrating story theme + mechanics + content, ensuring that clues align with player agency and game progression.

4.3.4 Embedded Environmental Storytelling: Fragmented Clues and Player Inference

Emergent environmental storytelling refers to the creation of narrative through player-driven interaction, where gameplay mechanics enable the organic formation of unique stories. Unlike other methods—where narrative is authored and revealed in stages—emergent storytelling transfers authorship to the player. Even in embedded narratives, the story is ultimately predetermined; players uncover a hidden whole. In emergent design, however, the story is created through interaction. Each action a player takes—whether planned or spontaneous—can generate new narrative possibilities. This form of storytelling is enabled by systemic gameplay mechanics that interact with each other and respond dynamically to player input, often yielding unexpected outcomes. From a narrative design perspective, creating emergent storytelling experiences requires carefully crafting foundational gameplay systems and clearly defining the logic that governs their interactions. Through the convergence of these systems, designers can generate branching, meaningful feedback loops that empower players to become both protagonists and storytellers of their own journeys.

4.4 Aesthetic Experience Layer of Environmental Storytelling: Cultural Ambience and Emotional Resonance through Atmospheric Aesthetics

The aesthetic experience layer of environmental storytelling leverages the interplay of sensory elements—visuals, sound, touch—to construct diverse atmospheric aesthetics that evoke specific emotional and psychological responses. In open-world games centered around ethnic and indigenous cultures, atmospheric aesthetics play a crucial role in conveying cultural ambience, reinforcing narrative depth, and enhancing emotional engagement, thereby enriching the overall aesthetic experience. These atmospheres are often achieved through a synthesis of narrative spatial elements and narrative visual elements embedded within the environment.

4.4.1 Visual Translation of Cultural Symbols

In culturally themed open-world games, the visual translation of cultural symbols is central to crafting atmospheric aesthetics. Abstract cultural meanings are materialized into visible and intuitive visual elements—such as architectural styles, clothing designs, motifs, and color palettes—which vividly express the distinctive characteristics of a specific culture. These visual translations not only communicate cultural values but also construct immersive and resonant cultural environments, allowing players to inhabit and experience an alternative cultural reality.

4.4.2 Environmental Music and Emotional Resonance

Environmental music is equally vital in shaping

atmosphere and eliciting emotional resonance. Effective integration of music and sound effects can trigger deep emotional responses and heighten the cultural tone of specific scenes. Depending on its functional context, game music typically falls into two categories: cutscene/ theme music and in-game background music. While the former aligns with cinematic scoring conventions and offers greater flexibility, the latter follows stricter structural rules due to the interactive and unpredictable nature of gameplay. Especially in action and adventure games, background music often adopts the Intro–Loop–Outro format, consisting of an introductory segment, a seamlessly loopable core motif with minor variations, and a conclusive passage. This design ensures emotional continuity without disrupting gameplay flow.

4.4.3 Light, Shadow, and Cultural Landscapes

The artistic use of light and shadow extends beyond technical demonstration; it is a powerful medium for emotional and cultural expression. By simulating day-night cycles, seasonal shifts, and abstract emotional atmospheres, lighting design adds depth, rhythm, and narrative nuance to the environment. When combined with culturally rich landscapes, lighting further enhances cultural ambience. Landscapes in games are not mere aggregates of natural or man-made elements; rather, they are aesthetic constructs imbued with symbolic or cultural significance. Whether it's dense forests and classical pavilions, wind-swept deserts or tranquil riverside towns, these environments acquire meaning through their ability to evoke distinctive atmospheres. In Chinese aesthetics, this is often referred to Chinese "yijing"—a poetic sense of mood or soulual resonance. Classical allusions such as “a solitary plume of smoke rises straight from the desert, the setting sun rounds the river” or “icy towers fringe the boundless sea, sorrowful clouds freeze across a thousand miles” are not merely decorative, but evoke profound spatial and emotional experiences for players familiar with Chinese culture. Such culturally anchored visual poetics transform the landscape into a meaningful storytelling medium.

5. Empirical Case Study: The Design Practice of Legend of Guge as a Tibetan Culture-Themed Open World Game

5.1 Project Background

The Kingdom of Guge emerged in the early 9th century and eventually fell in the early 17th century. Its archaeological remains—including monumental architecture, wall paintings, and sculptural art—are of profound historical and cultural significance. Since 1977, scientific expeditions and archaeological investigations have been conducted, generating valuable yet relatively inaccessible academic findings. In the context of today’s rapidly evolving digital landscape, leveraging the open-world video game format as an innovative medium offers a unique opportunity to revitalize and disseminate the rich cultural legacy of the Guge Dynasty. Through interactive storytelling, immersive design, and global accessibility, the game medium brings the long-sealed heritage of Guge vividly to life, transcending temporal and spatial boundaries. This digital transformation breathes new vitality into the scientific achievements of past explorers and the artistic treasures that once astonished the world. It builds a cultural bridge between the virtual and the real, allowing the hidden “jewel” of the Tibetan Plateau to emerge from the mists of history. As a result, the broader public is granted unprecedented access to the aesthetic and philosophical depth of ancient Tibetan civilization, thereby advancing both

cultural preservation and global cultural exchange.

5.2 Distinctive Ethnic Cultural Layer: Excavation and Multimodal Translation of Tibetan Cultural Genes

5.2.1 Excavation of Tibetan Cultural Genes and the Construction of a Genealogy Map

Tibetan culture refers to the cultural form created and developed by the Tibetan ethnic group, one of the fifty-six ethnic groups of China, primarily within the geographic boundaries of the Qinghai-Tibet Plateau. It is mainly distributed in Tibet, Gansu, Qinghai, Sichuan, and Yunnan provinces. Tibetan culture boasts a profound history and, over time, has interwoven with multiple cultural elements, gradually evolving into a tradition centered on nomadic culture and Tibetan Buddhism. This unique cultural heritage encompasses a wide array of cultural types, customs, and practices, with distinct features and characteristics. This study, based on literature analysis, work reviews, and field research conducted in Tibet's Ali region and the ancient Guge Kingdom, aims to explore Tibetan cultural genes through three levels: cultural space genes, production technology genes, and cultural customs genes. By identifying the underlying logic and cultural connotations reflected in these dimensions, we construct a Tibetan cultural gene map for the Ali region, as shown in the Figure 5. This map serves as a preparatory foundation for subsequent open-world game design practices, ensuring that the rich cultural heritage of Tibet is authentically represented and integrated into the virtual environment.

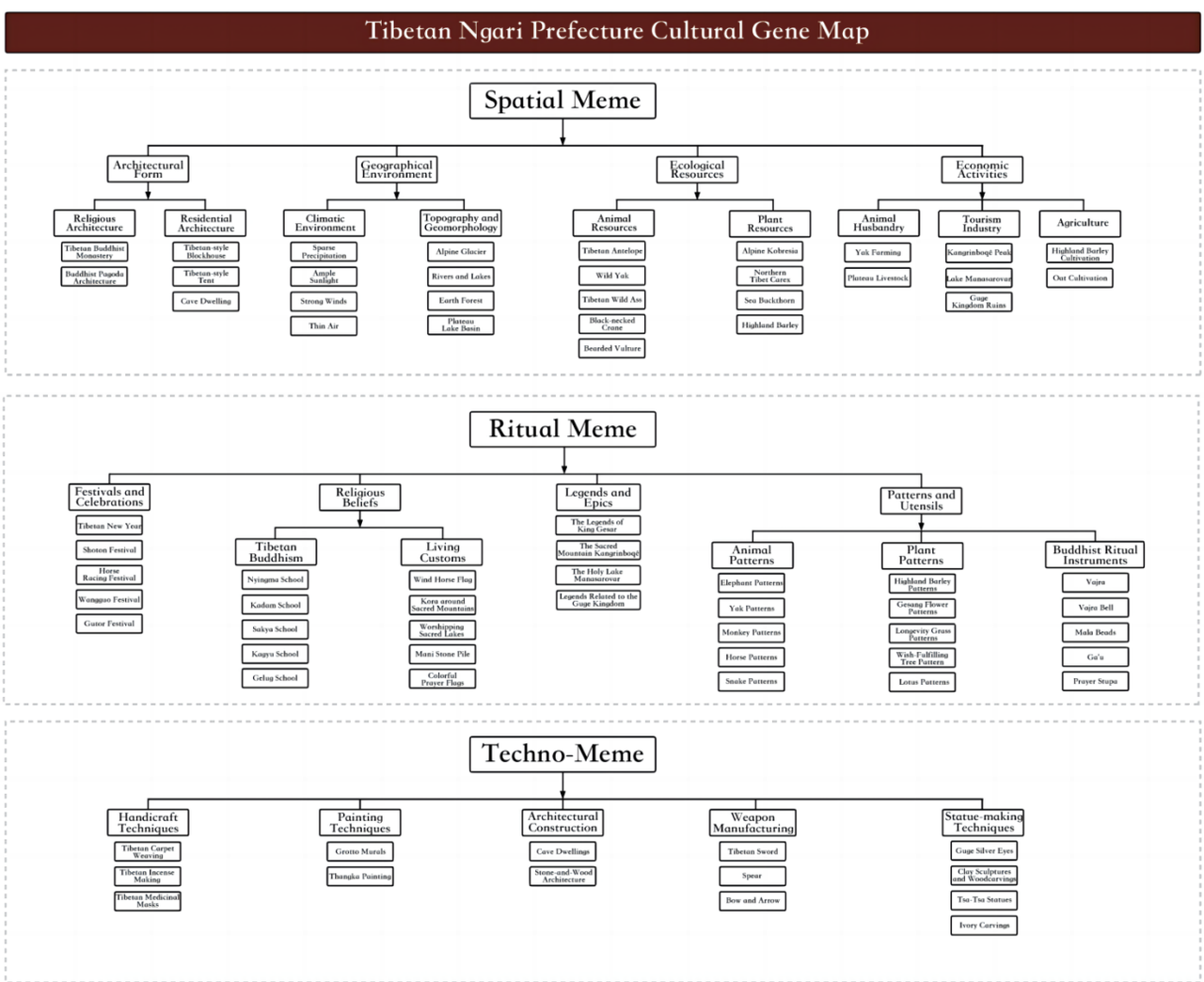

Figure 5. Tibetan Ngari Prefecture Cultural Gene Map

5.2.2 The Symbolic Dimension: Constructing a Realistic Representation of Tibetan Cultural Space Genes

The symbolic dimension plays a crucial role in shaping the player's first impression when entering the game world. Through The Legend of Guge, players can experience the unique cultural landscape of the Tibetan people. By extracting Tibetan cultural space genes and representing them through symbols such as sound, visuals, and other sensory elements, the project creates an open world rich in Tibetan aesthetic styles and characteristics, stimulating the player's recognition and curiosity toward Tibetan culture. In the process of simulating a real ecological environment, the natural landscapes in the game feature typical Tibetan regions such as grasslands, snow-capped mountains, and lakes. Animals such as Tibetan antelopes, yaks, and Tibetan wild asses are vividly presented in the game world through 3D modeling. As shown in the Figure 6, these creatures are not only a part of the ecological environment but also embody the wisdom of the Tibetan people in harmoniously coexisting with nature. In the game, players can interact with these animals, deepening their understanding of the close relationship between Tibetans and the natural world, thereby enhancing their identification with Tibetan culture.

Figure 6. The modeling of plateau animals and the final game scenes in The Legend of Guge

5.2.3 The Knowledge Dimension: Constructing Craft Contexts Based on Tibetan Production Technology Genes

The Legend of Guge spreads Tibetan culture in the knowledge realm, building upon the symbolic realm. By refining and applying traditional Tibetan cultural symbols, and through methods such as research, adaptation, and documentation, Tibetan cultural knowledge is integrated into the game world through tasks, items, and mechanics. This process conveys Tibetan production techniques, craftsmanship, and traditional skills to the players, creating a rich cultural knowledge space. For example, the game features a rich Tibetan medicine system. As an important part of the game, it allows players to experience the mysteries of traditional Tibetan medicine while deeply conveying the wisdom of Tibetans in the fields of nature and

human health. The Tibetan medicine system in the game combines historical data with traditional herbal knowledge to create a Tibetan medicine system that fits the game world setting. The process and effects of making Tibetan medicine are presented to players through side quests and storylines. Players can delve into the unique properties and usage of various herbs through these tasks. The game sets up multiple scenarios where players face sudden health issues such as hypoxia, frostbite, burns, fever, vomiting, and fatigue, among other negative states. These challenges form part of the survival mechanics in the game, and players must collect various herbs in the expansive open-world game to create different Tibetan medicines to alleviate these negative effects.

5.2.4 The Ideological Dimension: Creating Embodied Experiences of Tibetan Cultural Customs Genes

In The Legend of Guge, the embodied experience of Tibetan cultural customs is deeply integrated into the player's interactions and experiences. The game expresses a wide array of Tibetan cultural concepts, including justice, benevolence, devotion, resilience, harmony with nature, destiny, and the cycles of karma, which draw from Confucianism, Daoism, Buddhism, and other schools of thought and soulful pursuits. Among these concepts, the idea of “devotion” and “self-cultivation” runs throughout the game. As players engage in exploration and puzzle-solving, they undergo a continuous process of self-improvement and soulful growth. For instance, the game incorporates the Tibetan custom of the "Kora" pilgrimage (circumambulating sacred mountains), designed as a main quest titled "The Pilgrimage of the Sacred Mountain." During this journey, players will face various difficulties and challenges, as shown in the Figure 7. The design of this quest not only represents Tibetan faith and culture but also carries a deeper meaning of personal growth and transformation for the player.

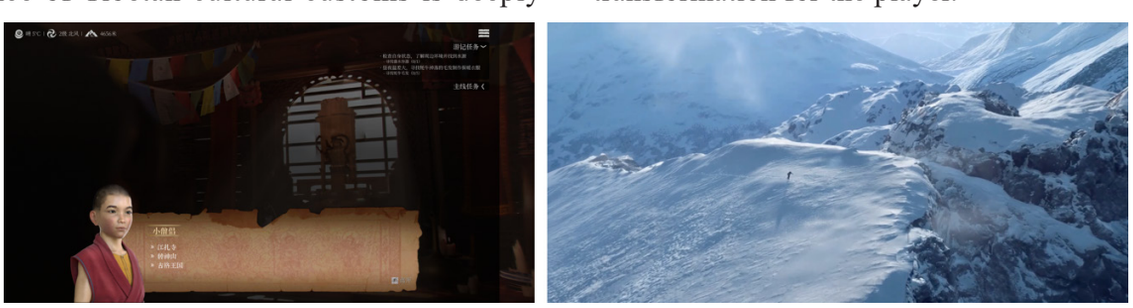

Figure 7. The process of the main quest "Journey to the Sacred Mountain" in The Legend of Guge

5.3 Gameplay Mechanism Layer of Environmental Storytelling: Game System Design under the Context of Tibetan Culture

The key to a game's playability lies in its mechanism design. Whether a series of game systems, based on the core mechanism design, are well-coordinated plays a significant role in enhancing the game's playability. The Legend of Guge, as a role-playing puzzle-adventure game, aims to allow players to explore the mysterious world of the Guge Kingdom, continuously challenge themselves, solve puzzles, and advance the plot. The core mechanics of the game will mainly revolve around the puzzle-adventure concept, with relevant game system designs emerging from this core theme. To better showcase the profound depth of Tibetan culture and achieve the grand narrative goals, the project has designed four core game systems based on environmental storytelling: a character survival system, a resource collection system, a growth and learning system, and a task exploration system. These four core systems

derive a series of specific gameplay elements that work in harmony, collectively contributing to the overarching narrative goal of telling the grand story of Tibetan culture.

5.3.1 Character Survival System Design under Tibetan Cultural Context

In open-world games, the design of the character survival system is key to providing an immersive experience. The game needs to simulate the survival requirements of the character played by the player. The climate conditions of the Ali Plateau are extremely harsh, with large diurnal temperature variations and unpredictable weather changes. To faithfully reproduce these environmental features, the game employs a dynamic weather system that simulates the extreme climate characteristics of the plateau region. This system not only impacts the player's visual experience but is also directly linked to the character's survival status. The dynamic weather system further enhances the sense of realism and immersion in the game. Temperature in the game is affected by factors such as time, region, wind speed, and altitude. Players must adjust their character's clothing according to the temperature fluctuations. Extremely low or high temperatures will decrease the character's health points. When temperatures drop sharply at night, players need to find shelter or light a campfire to maintain body heat. The game also incorporates an interesting mechanism based on Tibetan culture: in Tibetan culture, weather is considered an embodiment of the will of the gods. Therefore, the weather system in the game is integrated with elements of Tibetan Buddhism. For example, players can pray or build a mani pile to ask for favorable weather, thus enhancing the immersion and cultural depth of the game.

5.3.2 Resource Collection System Design under Tibetan Cultural Context

The resource collection system is one of the core mechanisms for player interaction with the game world. It not only provides the necessary materials for survival and exploration but also enhances the strategic and immersive aspects of the game through resource management and utilization. In The Legend of Guge, the resource collection system is tightly integrated with the natural environment of the Ali Plateau and the unique aspects of Tibetan culture. It includes various resource types such as weapons, equipment, items, food, and medicinal herbs.

For example, in the weapon system, the game design fully reflects the combat traditions and craftsmanship of the Tibetan people. The primary weapons in the game include Tibetan knives, bows, and spears. These weapons are not only functional but also embody the combat style and lifestyle of the Tibetan people. For instance, the Tibetan knife is designed as an everyday carry for Tibetan men, used both in combat and daily life. As such, the Tibetan knife is set as a secondary weapon, and the character design includes the knife worn on the waist to highlight this aspect, as shown in the Figure 8.

Figure 8. The design and wearing style of the secondary weapon Tibetan sword in The Legend of Guge

5.3.3 Growth and Learning System Design under Tibetan Cultural Context

In open world games, the growth and learning system is a crucial mechanism for character ability development and game progression. It provides players with diverse character development options while enhancing the immersive experience and cultural interaction through the process of learning and growth. In The Legend of Guge, the growth and learning system is designed based on the geographic environment of the Ali Plateau and Tibetan cultural characteristics. It is developed through four dimensions: the skill learning system, cultural heritage system, growth feedback system, and soulful practice system.

For example, the design of the soulful practice system closely integrates the practice philosophy and methods of Tibetan Buddhism. It aims to enhance the character's comprehensive abilities through soulful practice, while providing players with a deep cultural experience and immersion. In The Legend of Guge, monasteries serve as the main places for players to engage in soulful practice, as shown in the Figure 9. The practice methods include meditation, chanting, asceticism, and pilgrimage, each of which is closely linked to Tibetan Buddhist traditions.

Figure 9. The scene environment of Tibetan Buddhist temples where players practice in The Legend of Guge

5.3.4 Task Exploration System Design under Tibetan Cultural Context

The task exploration system design in the game is closely linked to the natural environment of the Ali Plateau and the uniqueness of Tibetan culture, aiming to restore the life wisdom and cultural heritage of the Tibetan people. The game's route design references the real-world tourist route, the Ali Grand Circle. As players follow this route, they embark on a true exploratory journey. The main game route includes the following locations: Mapam Yumco (Māyángyòngcuò) - Small Oasis - Mount Kailash (Gang Rinpoche) - Jiangza Monastery - Zhada Earth Forest - Dongga Caves

- Silver Eye Mysteries - Guge Ruins, as shown in the Figure 10. To guide players in exploring the map, the game includes a variety of clues and hints. Furthermore, the game features main quests, side quests, and hidden quests. The main quests are closely related to the game's narrative goal of uncovering the truth behind the fall of the Guge Kingdom. Side quests are less directly related to the narrative goal but aim to help players better understand the cultural context of the game. Hidden quests are designed as Easter egg-like tasks to increase the game's playability and fun, providing players with unexpected surprises.

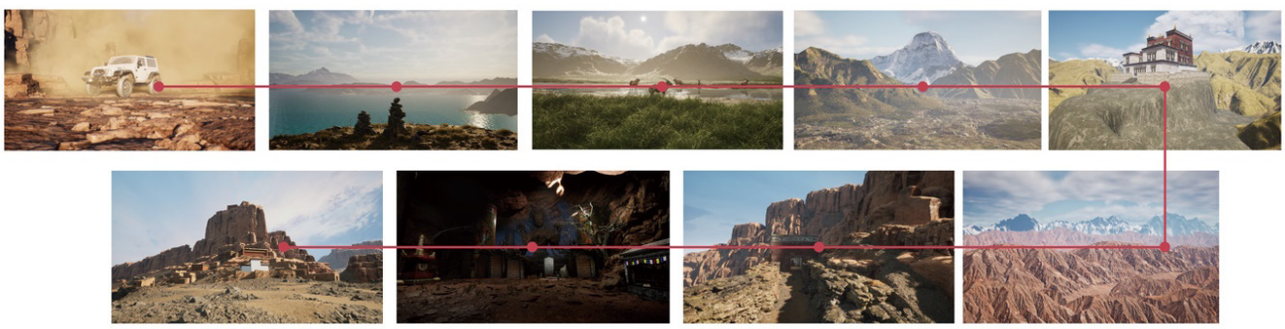

Figure 10. Game Scene Path Map

5.4 Dynamic Interaction Layer of Environmental Storytelling: Environmental Storytelling Strategies in the Context of Tibetan Culture

Based on the four environmental narrative strategies mentioned earlier—evocative environmental narrative, deductive environmental narrative, embedded environmental narrative, and emergent environmental narrative—this design practice aims to provide players with an immersive cultural experience through three narrative strategies: evocative environmental narrative, deductive environmental narrative, and embedded environmental narrative.

5.4.1 Evocative Environmental Storytelling: The Invisible Perception Triggered by Tibetan Cultural Atmosphere

Evocative environmental storytelling utilizes the game environment itself to stimulate the player's perception and emotional experience, thereby conveying the deep meaning and emotional atmosphere of Tibetan culture in an indirect way. This storytelling approach relies not only on visual art and sound effects but also on the physical interaction, environmental layout, and dynamic events within the game, creating a rich cultural experience space. It enables players to intuitively feel the essence of Tibetan culture without direct instruction. The environmental design in the game has been meticulously crafted, with every stone and the arrangement of mountains imbued with symbolic meanings and cultural significance related to Tibetan culture. The evocative environmental storytelling design allows players to sense the historical accumulation and religious beliefs of Tibetan culture as they explore the game world. For example, at the beginning of the game, the player-character "Gu Yuan" wakes up by the holy lake, Manasarovar. The first sights the player encounters are distinctive Tibetan symbols such as Mani stones, prayer flags, and yak bone ornaments, along with the distant, endless mountain ranges and glaciers. This opening scene immediately makes the player aware that they are immersed in the magnificent landscapes of Tibet. The unique cultural scene and contextual background of the game are quickly established, setting the stage for an exciting and immersive journey into Tibetan cultural exploration, as shown in the Figure 11.

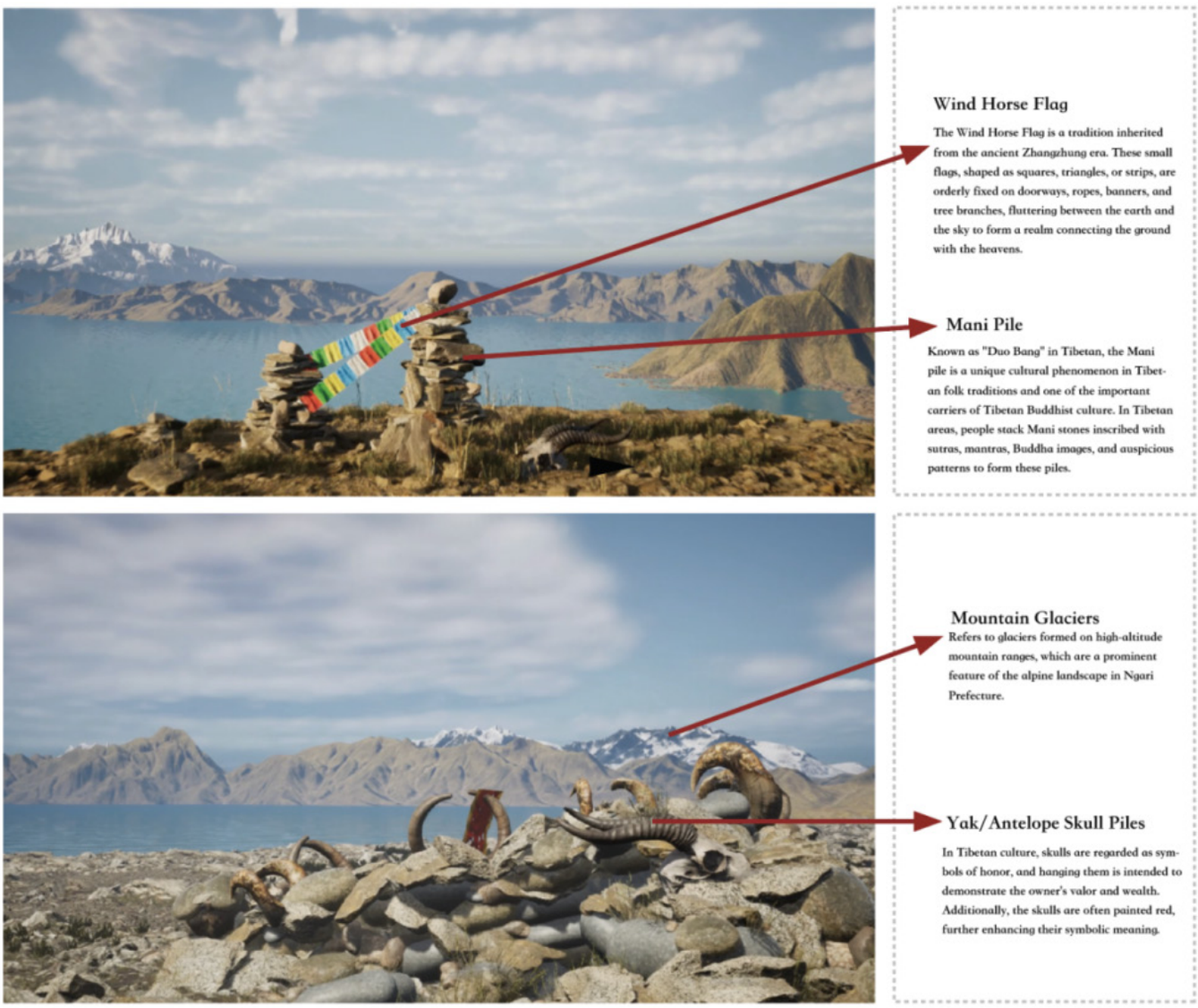

Figure 11. Tibetan Cultural Narrative Elements in the Initial Scene of The Legend of Guge

5.4.2 Enacted Environmental Storytelling: Embodied Exploration Through Multisensory Interaction in Tibetan Culture

In "The Legend of Guge," deductive environmental storytelling serves as a key narrative strategy that immerses players deeply into the world of the Tibetan region of Ngari. It transcends the limitations of traditional storytelling, which relies solely on text or simple audiovisual presentations, by integrating multiple sensory channels—visual, auditory, and tactile—enabling players to explore and experience the unique charm of Ngari's Tibetan culture in a more embodied manner.

(1) Visual Feast: An Intuitive Presentation of Tibetan Culture

In "The Legend of Guge," players encounter elements highly characteristic of the Ngari Tibetan region, such as mani stones, prayer flags, yaks, Tibetan antelopes, and Buddha statues. Notably, prayer flags are lavishly integrated into the game's environments, as shown in Figure 12. These visual elements consistently remind players that they are immersed in an open-world game centered on Tibetan culture.

Figure 12. Prayer flags featured in The Legend of Guge

When players overcome numerous challenges and finally arrive at the ancient capital of Guge, they are greeted by the magnificent and awe-inspiring ruins of the Guge Kingdom, nestled among the earth forests, as shown in Figure 13. Sculpted by time, the earth forests exhibit a spectacular array of forms—towering pillars and deep ravines—as if they were mysterious chapters written by the earth itself, forming a natural and fantastical barrier around the ruins. Within the complex, cave dwellings are scattered across the steep cliffs. These caves once served as living and meditation spaces for the people of the Guge Kingdom and, despite centuries of erosion, still reflect the ingenuity of their original layout. As players ascend along winding paths, they encounter the remnants of a majestic Tibetan-style palace. The walls, thick and robust, are constructed from massive stone blocks. Although partially collapsed, the surviving structure offers a glimpse of its former grandeur and splendor. Surrounding the ancient capital are numerous cave dwellings built into the cliffs, varying in form from single-chamber, double-chamber, to multi-chamber clusters.

Figure 13. The Ancient Capital of Guge Scene in The Legend of Guge

（2）Auditory Immersion: A Sonic Journey into Tibetan Culture

Auditory elements play a crucial supporting role in environmental storytelling through deduction. As players wander through the temple, the low, resonant chanting of lamas envelops

them—a devout recitation of Buddhist teachings. To enhance the emotional impact of the sound, Tibetan singing bowl tones were intentionally incorporated during the music production. When gently struck, the prolonged reverberations of the bowls harmonize with the chanting, imbuing each syllable with a mystical quality that draws players into an immersive religious atmosphere. The ritual horns used in the temple were recorded using traditional Tibetan long horns, known for their deep and powerful tones. These are complemented by the resonant peals of ancient bronze temple bells, which mark specific ceremonial moments with profound and far-reaching acoustics. During post-production, natural reverb effects were deliberately preserved to simulate the echoing soundscape of the temple's vast spaces, thereby enriching the three-dimensional auditory experience.

In the design of the game's audio system, multi-channel spatial audio technology is employed to achieve precise restoration of the acoustic environment in the Ngari region. The sound effect system utilizes layered sampling techniques, decomposing the grassland ambient sounds (with an average sound pressure level of 45–60 dB) into three acoustic layers: near-field sounds (0–10 meters, including hoofbeats and animal calls), mid-field sounds (10–50 meters, including wind and vegetation rustling), and far-field sounds (beyond 50 meters, featuring Tibetan folk songs). Additionally, the soundtrack incorporates traditional instruments unique to the Ngari region, such as the lute, dramyen, Tibetan eagle bone flute, and piwang, enriching the harmonic texture of the music. Folk melodies extensively employ the pentatonic scale, characterized by wide melodic contours and distinctive ornamentation and vibrato techniques, infusing the songs with the Tibetan people's profound love for life and reverence for nature. As players gallop on horseback, the meticulously captured and processed sounds of howling winds and rhythmic hoofbeats—recorded in layers based on wind intensity and grassland terrain, with hoofbeats dynamically adjusted according to the horse's speed and ground surface—enhance the game's realism and immersion, making players feel as if they are truly traversing the vast, boundless plateau of Ngari.

5.4.3 Embedded Environmental Storytelling: Deep Integration of Tibetan Cultural Clues in Story Construction

Embedded environmental storytelling is an important narrative strategy in The Legend of Guge that deeply immerses players in Tibetan culture. It cleverly and deeply integrates narrative clues into the story construction of the game, allowing players to naturally encounter and understand the essence of Tibetan culture as they progress through the game. The main quest of the game revolves around searching for the Guge Silver Eyes to uncover the truth behind the fall of the Guge Kingdom. During their exploration, players frequently encounter various narrative clues related to the kingdom's demise. Players must continuously explore environmental clues and gather corresponding items to ultimately obtain the key artifact— the "Guge Silver Eyes," which will reveal the truth about the kingdom's disappearance, as shown in Figure 14.

Figure 14. Embedded Environmental Narrative in The Legend of Guge

5.5 Aesthetic Experience Layer of Environmental Storytelling: Cultural and Emotional Resonance under Tibetan Aesthetics

In The Legend of Guge, the environmental storytelling experience layer, through multi-dimensional design, centers on Tibetan aesthetics. It aims to build a bridge of cultural and emotional resonance between the player and the game, allowing players to deeply immerse themselves in the unique charm of Tibetan culture. To enable players to better experience Tibetan aesthetics and thus evoke emotional resonance deep within, the game adopts a realistic artistic style with a certain level of artistic processing, bringing it closer to the authentic scenery of the Ali Plateau.

5.5.1 "Clothing" and "Props" as Embodiments of Tibetan Aesthetics

（1）Character Design

The character costume design in the game strictly adheres to the styles and fashion of traditional Tibetan clothing. Taking the main character "Gu Yuan" as an example, he wears a gray-white Tibetan robe. The robe is wide and spacious, and the material is primarily made of khampa wool. This design is meant to adapt to the harsh environment of the plateau, effectively protecting against the cold while also highlighting the bold and heroic soul of the Tibetan people, as shown in Figure 15. A colorful waist belt is tied around his waist, adorned with silver or copper decorations, both practical and aesthetic, accentuating the masculine and heroic aura. At the same time, "Gu Yuan" is designed as a character who travels from the modern world to the 18th century Ali Plateau. His modern attire is that of an explorer, which further emphasizes his identity and background, as seen in the images. In addition to the main character, the game also features various other background characters such as a Tibetan grandmother, a little girl riding a yak, monks, and others. The monks in the temple wear red robes, a color that is sacred in Buddhism, symbolizing devotion to Buddhist teachings and steadfast practice. The clothing of Tibetan herders focuses more on practicality, with durable materials that are suitable for working and herding on the grasslands. The project aims for players to experience the aesthetic and cultural depth of Tibetan clothing through interactions with the characters in the game.

Figure 15. Protagonist Gu Yuan's Original Artwork and Character Modeling

(2) Prop Design

The prop design in the game also cleverly incorporates Tibetan aesthetics. For example, the prayer wheel is recreated with high precision using 3D software. The appearance is exquisite, and the body of the wheel is made of copper, with the surface carved with intricate patterns of the six-syllable mantra and Buddhist Eight Auspicious Symbols. The carving craftsmanship is delicate, fully restoring the superb skill of traditional Tibetan handcrafts, as shown in Figure 16. Additionally, the game uses 3D Max software to accurately replicate ritual objects from Tibetan Buddhism, such as the vajra, vajra bell, Gawu box, conch shell, and others. A total of 58 digitally reconstructed props is included in the game.

Figure 16. The Renderings and Modeling Process of the Prayer Wheels in The Legend of Guge

5.5.2 Tibetan Culture at the Core of Light-and-Shadow-Based Adventure

The design of light and shadow in the game serves not only an aesthetic function but also carries deep symbolic meaning and soulful connotation rooted in Tibetan culture. For instance, in Tibetan belief systems, light is often regarded as a sacred symbol—representing wisdom and enlightenment. In the game, specific lighting is used to subtly guide the player; for example, in the Dongga Caves, faint rays of light are intentionally placed to hint at the presence of important clues. Shadows and darker areas, on the other hand, are used to enhance the sense of mystery and depth, simulating the challenge of the unknown that is inherent to real-world exploration. These dark zones often conceal

vital clues, requiring players to venture into them despite uncertainty. In the scene design for the "Silver Eye Sanctuary" in Legend of Guge, this cultural feature and the unique role of lighting were fully considered, as shown in Figure 17. The overall ambient lighting is intentionally subdued, stimulating a strong desire for exploration and drawing players deeper into the environment to uncover the hidden secrets lurking in the shadows.

Figure 17. The Light and Shadow Landscape in the Silver-Eye Secret Realm

5.5.3 Integrating Tibetan Cultural Concepts Through "Playing" and "Viewing"

The design of the interactive interface in the game goes beyond mere functionality; it also serves as a medium for cultural transmission. The development team has skillfully integrated Tibetan cultural concepts into the game's graphical user interface (GUI), ensuring that every player interaction subtly conveys the essence of Tibetan culture. The GUI incorporates a variety of Tibetan cultural elements so that players are continuously exposed to and educated about this unique culture as they navigate and operate within the game. Icons, buttons, and other visual components are inspired by traditional Tibetan patterns and symbols. For instance, game icons are designed using cultural motifs such as the Eight Auspicious Symbols, lotus flowers, mountain peaks, cloud patterns, and Buddhist halos—each rich in cultural and soulful significance and visually compelling, as shown in Figure 18.

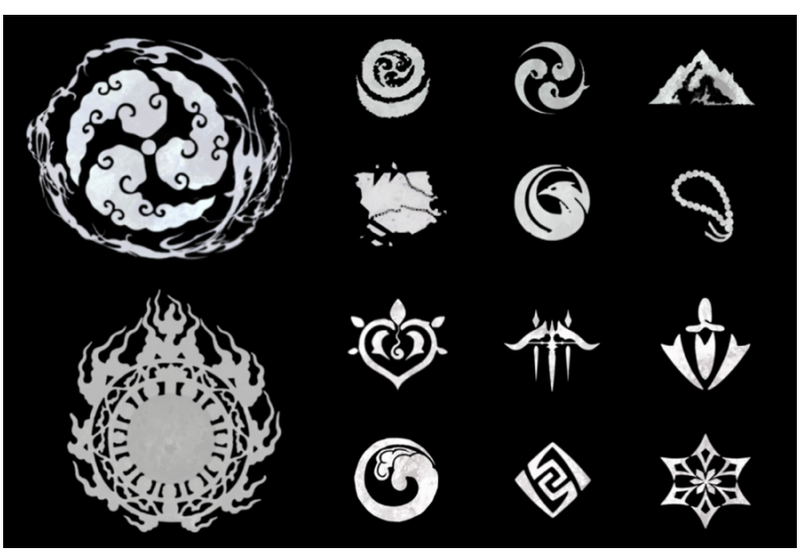

Figure 18. Game Icon Design Incorporating Tibetan Cultural Elements in The Legend of Guge

The emotional design of the user interface allows players to experience the unique emotional resonance of Tibetan culture, both visually and interactively. For instance, in the game's loading screens, the Buddhist Eye, a symbol from Tibetan culture, is used as the design for the progress bar. In Tibetan culture, the Buddhist Eye is regarded as a symbol of profound wisdom, representing prajna (wisdom) and enlightenment. Additionally, the loading screen is accompanied by cultural knowledge about Tibet, offering players an opportunity to learn while they wait. This subtle integration of Tibetan culture through the Buddhist Eye symbol implies that players are gaining a deeper understanding and insight into the world, mirroring the concept of enlightenment, as shown in Figure 19.

Figure 19. Loading Page Design in The Legend of Guge

The overall interactive interface in the game adopts a flat, low-saturation, light-colored design, with extensive use of gradient and fragmented effects. Visually, this creates an ancient, nostalgic feel, evoking a sense of historical depth and the passage of time. This approach helps immerse players in the Tibetan cultural atmosphere. The gradient and fragmented effects are inspired by the weathered traces of ancient Tibetan manuscripts and the damaged beauty of Tibetan murals after enduring the ravages of time. The design preserves the charm of Tibetan cultural art while also innovatively presenting it through modern design techniques. In the icon design, traditional Tibetan patterns are subtly integrated into the background, preserving their cultural significance while adhering to a modern minimalist design style. This allows players to appreciate the unique charm of Tibetan culture without consciously realizing it during their interactions, as shown in Figure 20.

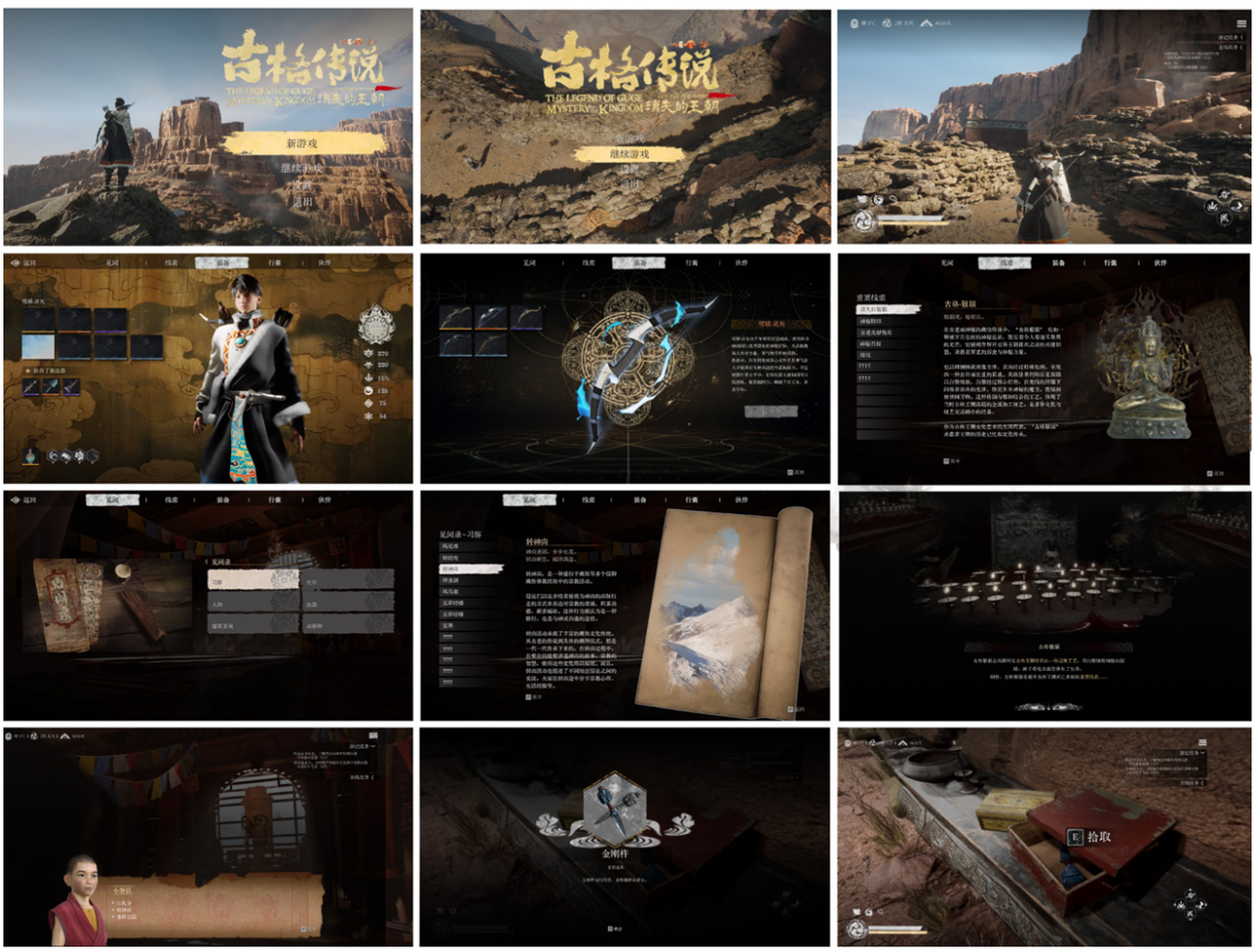

Figure 20. Key Interactive Interface Design in The Legend of Guge

The interactive interface of The Legend of Guge deeply integrates Tibetan cultural concepts into the dynamic process of "playing" and "seeing." Through a thorough exploration of symbols, colors, texts, and interactive logic, the interface not only enhances the user experience but also serves as an important medium for conveying the essence of Tibetan culture. This design not only strengthens the game's educational value in terms of culture but also significantly enhances the players' immersion and cultural experience.

6. Conclusion

Given the current scarcity of research and application cases on open-world educational games featuring distinctive ethnic cultures, as well as existing issues such as imbalanced education and entertainment, forced cultural integration, and insufficient interactive immersion, this study is based on environmental storytelling theory and the MDA (Mechanics, Dynamics, Aesthetics) game design framework. It constructs the EST-MDA integration model. Based on this model, the study further integrates distinctive ethnic cultural genes to form open-world educational game design strategies tailored to specific ethnic cultures, and develops the Tibetan culture-based open-world educational game The Legend of Guge to test the feasibility of this model. Through meticulously designed game mechanics, interaction, and aesthetic experiences, the open world of the game uses its high degree of realism to subtly incorporate the essence of the distinct ethnic culture into the player's gaming experience. This experience not only increases

players' understanding and acceptance of the unique ethnic culture, but also promotes deep reflection and discussion through free interaction, effectively achieving the cultural education and communication goals.

It should be noted that this study still has some limitations, such as only selecting a few key cultural scenes for digital reconstruction in the design practice. It has not yet achieved a truly seamless open world, and more complex emergent environmental storytelling strategies were not applied. Based on these limitations, future research will consider introducing technologies such as 3D scanning and AIGC (Artificial Intelligence Generated Content) to further enrich the game world map and enhance the game experience. Additionally, the breadth and depth of game storytelling and cultural background will be strengthened, and a more comprehensive narrative system will be built to improve the cultural depth and immersion of the game.

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