GAME-BASED TRANSLATION OF DALI BAI JIAMA CULTURE BASED ON EMBODIED INTERACTION THEORY*

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Abstract

The Dali Bai Jiama culture is an intangible cultural heritage that combines folk beliefs, ritual practices, and visual art. However, it currently faces challenges such as a generational gap in transmission, limited dissemination methods, and a lack of awareness among younger generations. To explore innovative pathways for the transmission and dissemination of Jiama culture, this paper draws on embodied interaction theory. Through an analysis of the behavioral logic of Jiama culture, it distills the principles of embodied interaction, examines the translational relationship between culture and game mechanics, and constructs a design framework for a cultural heritage board game.

The research findings indicate that: (1) Embodied interaction theory provides a theoretical foundation for the translation of Jiama cultural practices into game mechanics; (2) The ritual practices and iconographic systems within Jiama culture can be effectively transformed through game rules, mission structures, and interactive mechanisms, thereby enhancing players' understanding of and experience with Jiama culture. The framework constructed on this basis not only offers new insights for the preservation and transmission

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of Jiama culture but also provides a reference path for the gamification design of intangible cultural heritage characterized by ritual and practical elements.

Keywords: Jiama Culture, Embodied Interaction, Board Game Design, Intangible Cultural Heritage

Introduction

The Dali Bai Jiama is a form of folk woodblock print art prevalent in the Dali region of Yunnan Province, widely used in rituals, prayers for blessings, exorcisms, and festive celebrations. In other provinces of China, this art form is known as “Zhima,” “Shenma,” “Shenlingma,” or “Guiren,” and is widely practiced across the country (Kawano, 2010). Regarding new approaches to inheritance and preservation, although some studies have begun to focus on the application of Jiama in cultural and creative products and digital dissemination, and have verified its dissemination potential (Wu et al., 2025), most remain confined to the level of individual designs or media. There is relatively insufficient attention paid to the behavioral logic and experiential processes embodied in the actual use of Jiama, and there is a lack of integrated design methods and systematic research frameworks.

The theory of embodied interaction stems from the development of embodied cognition. Its core premise holds that cognition is not limited to information processing within the brain, but rather emerges through the dynamic coupling of the body, the environment, and action (Lakoff & Johnson, 1999). Compared to traditional cognitive perspectives that emphasize the transmission of knowledge, embodied interaction places greater emphasis on the relationship between action, experience, and the generation of meaning. For intangible cultural heritage, its value often lies not only in material carriers but also in the cultural practices accumulated over time.

In recent years, gamified design has been widely adopted in the field of cultural dissemination due to its interactive, participatory, and immersive nature. Existing research indicates that board games, within gamified learning contexts, can effectively enhance learners' engagement and knowledge retention through their rule systems and experiential gameplay; their interactivity and contextual nature provide significant support for the transmission of cultural content (Sousa et al., 2023). However, most existing culturally themed board game designs remain limited to the mere transplantation of cultural elements, directly applying visual symbols and cultural content to game art design. They lack a process of translating the behavioral logic of traditional culture into game mechanics, which limits the depth of cultural dissemination.

Based on this, this study focuses on the Dali Bai Jiama culture. By incorporating the theory of embodied interaction, it analyzes the behavioral structures and embodied characteristics of Jiama culture, constructs a translational framework linking the principles of embodied interaction, the logic of cultural behavior, and game mechanics design, and demonstrates its application through the design of a board game. The study aims to explore methodological approaches for transforming intangible cultural heritage from ritual practices into game experiences, thereby providing new design insights for the preservation and experiential dissemination of traditional culture.

Objectives

1. Examine and analyze the behavioral logic and design translation characteristics of the Dali Bai Jiama culture.

2. Distill the principles of embodied interaction and establish a translational relationship between them and game mechanics.

3. Develop a design framework for translating cultural behavioral logic into board game mechanics.

Literature Review

1. Dali Bai Jiama

The Dali Bai Jiama culture is deeply rooted in traditional Chinese folk culture and possesses a rich historical heritage. Jiama is a general term for various woodblock-printed materials that are burned, posted, or offered during folk rituals such as prayers for blessings and exorcism of disasters (Gao et al., 2024). Beyond serving as a bridge of communication between humans and deities and a medium for the exchange of beliefs, the primary purpose and function of Dali Bai Jiama is to provide people with a sense of hope and solace (Ding, 2013).

From an international research perspective, this study examines Jiama from a multidisciplinary angle, covering aspects including historical background, cultural beliefs, and artistic expression. By tracing the origins and evolution of Jiama from a historical development perspective, the study notes that while there remains academic debate regarding its dissemination pathways and exact origins across different periods, it was already fairly widespread by the Ming Dynasty (Liu, 2020). In terms of design transformation and application research, studies interpret Jiama through the lens of artistic semiotics, translating theoretical analysis into artistic expression and emphasizing its potential for regeneration and reconstruction in a contemporary context (Dong, 2025).

2. Embodied Interaction Theory

Embodied interaction is characterized by significant bodily engagement, contextuality, and dynamism. Bodily engagement emphasizes that individuals participate in cognitive processes through movement and manipulation; the body is no longer a passive vessel but an integral component of cognitive generation (Wilson, 2002). Furthermore, multisensory engagement and social interaction are also key characteristics; the interaction process typically integrates visual, tactile, and spatial perception, and fosters shared meaning through multi-person interaction (Hornecker & Buur, 2006).

Embodied interaction provides a new theoretical framework for game design, enabling players to construct cognitive processes through physical engagement with the environment, thereby enhancing immersion and learning outcomes (Melcer & Isbister, 2021). The manipulation of rules, role-playing, and situational interactions in board games constitutes an embodied learning environment that facilitates players' cognitive construction and behavioral transformation through experience (Epstein et al., 2021). Physical engagement and situational experiences can strengthen learning motivation, transforming abstract knowledge into tangible experiences (Lin et al., 2023).

3. Board Games

Research generally views board games as a medium with significant educational potential, emphasizing their positive role in fostering learning motivation, cognitive engagement, and cultural understanding. The introduction of board games can significantly improve the classroom atmosphere and enhance students' emotional intelligence and social skills, demonstrating their important value in social and emotional learning (Rodríguez-Ferrer et al., 2024). Cultural board games are not only entertaining but also hold significant educational value. By designing contextualized game activities to enhance students' comprehension of content and learning outcomes, the potential for applying board games in cultural courses has been demonstrated (Damprasit, 2024).

Methodology

This study aims to explore methods for translating the behavioral logic of the Dali Bai Jiama culture into board game mechanics and to construct a gamification design framework based on embodied interaction theory. Since the research focuses on cultural behavior analysis, the generation of design knowledge, and framework construction—rather than user behavior

measurement or effectiveness validation—qualitative research methods were employed.

Combining literature review and field research, this study analyzes the behavioral logic of Jiama culture to distill principles of embodied interaction. It further establishes a translational relationship between cultural elements and game mechanics, ultimately forming a gamification design framework for Jiama culture.

1. Literature Review

The literature review is primarily used to synthesize research findings in the fields of Jiama culture, embodied interaction theory, and board game design. By reviewing relevant academic literature and research reports, this section analyzes the historical development, visual characteristics, and ritual functions of Jiama culture to identify the core behavioral structures underlying its cultural practices. Additionally, it systematically outlines the key tenets of embodied interaction theory, providing a theoretical foundation for the subsequent extraction of embodied interaction principles and the translation of these principles into game mechanics.

2. Fieldwork

To gain a deeper understanding of the actual contexts and behavioral processes of Jiama culture, this study employs field research methods to conduct on-site investigations of Jiama cultural inheritors and related cultural practices in the Dali region. Through on-site observation and video documentation, behavioral data regarding the production, use, and ritual activities of Jiama are collected to analyze their modes of practice and expressions of meaning within specific cultural contexts. The findings of this field research not only provide primary data for behavioral logic analysis but also offer a cultural foundation for subsequent game mechanism design.

3. Design Research

Building on the analysis of the behavioral logic of Jiama culture and the extraction of embodied interaction principles, this study conducts a comparative analysis between cultural behavioral structures and board game mechanics, continuously refining the translation relationship through design practice. Ultimately, a translation framework linking embodied interaction principles, cultural behavioral logic, and game mechanics design is established and applied to the design of a board game themed around Jiama culture. The design process demonstrates the specific pathways through which cultural behaviors are transformed into interactive experiences, thereby integrating theoretical research with design practice.

Based on the aforementioned research methodology, this paper establishes a research pathway spanning cultural analysis, theoretical translation, and design practice, thereby providing a research foundation for subsequent analyses of Jiama cultural behavioral logic, the construction of game mechanics, and the practical design of board games.

Results

1. Extraction of the Behavioral Logic and Analysis of Embodied Characteristics of Jiama Culture

Through a review of the literature and analysis of field survey data, it has been found that Jiama is not merely a form of folk woodblock printing, but rather a cultural practice rooted in specific ritual behaviors. Its cultural significance derives not only from the visual symbols themselves, but also from the ongoing processes of interaction between humans and deities, humans and the environment, and humans and their communities.

This study organizes the data on Jiama patterns collected during field research and establishes a framework for translating this information into

subsequent board game design. It categorizes and analyzes Jiama patterns from multiple dimensions, including functional attributes, visual language, compositional characteristics, and cultural relationships. By organizing the commonalities and differences among various types of Jiama in folk beliefs, ritual practices, and visual expressions, we extract their core characteristics in terms of cultural connotations, image structure, and interactive logic to construct a foundational framework for the subsequent design of game mechanics and visual elements (Table 1).

Table 1 A Visual Atlas of the Dali Bai Jiama Ethnic Group

Dimension	Category	Key Characteristics	Design Application Directions
Functional Classification	Benzhu Belief	Centered on the Bai people's Benzhu deity	Character Roles, Faction Mechanics
	Daily Life Beliefs	Related to daily life, including family, marriage, and safety	Quest Cards, Event Cards
	Production Beliefs	Related to agriculture, animal husbandry, and commerce	Resource Management, Income Mechanics
	Nature Beliefs	Includes the worship of nature deities such as mountain gods, water gods, and dragon gods	Map Interaction, Environmental Events

	Exorcism and Banishing Evil Spirits	Primarily focused on deities that ward off evil spirits	Combat Mechanics, Risk Events
	Confucian, Buddhist, and Taoist Beliefs	Incorporates elements of Buddhist, Taoist, and Confucian culture	Multi-Faction Mechanics, Special Abilities
Use of Points, Lines, and Shapes	Stylistic Function	Shaping the forms of figures, deities, and scenes through the combination of points, lines, and planes.	Card Borders, Decorative Patterns, Layout Structure, Overall Visual Style
	Decorative Function	Enhancing the decorative quality of the composition through patterns, borders, and repetitive elements.	
	Symbolic Function	Conveying symbolic meaning through the direction of lines, the arrangement of shapes, and compositional relationships.	
	Aesthetic Function	Creating visual beauty through the interplay of light and dark, contrasts between sparse and dense areas, and the overall layout.	
Element Arrangement	Text Placement	Text is often placed at the top or on the sides	Card Name, Description

	Pattern Placement	Center-aligned compositions are common	Card Design
Image Composition	Polytheistic Combinations	Multiple deities associated with the same function are depicted together	Card Pattern and Structure
	Main Deity and Attendants	The main deity is depicted on a larger scale, while the attendants are simplified	
	Scenic Composition	Scenes of public activities are used to highlight the main deity	
Cultural Relationship Map	Jiama Patterns	Features deities, symbols, and folkloric imagery as its core visual elements	Card Art and Character Design
	Folk Beliefs	Links the belief in local deities with folkloric concepts	World-building and Faction System
	Ritual Practices	Includes folk activities such as rituals, offerings, and prayers for blessings	Turn-based Mechanics, Event Mechanics, and Quest Mechanics
	Usage Contexts	Applied in contexts such as festivals, rituals, and rites of passage	Story Quests and Map/Scene Design

	Group Interaction	Involves the collective participation of many people in rituals and folk activities	Cooperative, Negotiation, and Resource Exchange Mechanics

2. Establishing the Relationship Between the Principles of Embodied Interaction and the Adaptation of Game Mechanics

Through a review of research on embodied interaction, we have identified bodily engagement, situational experience, action feedback, and social interaction as core representative principles. These principles correspond closely with player behavior, rule systems, and interactive processes in board game design. Physical engagement emphasizes that cognition arises from the process of action; situational experience emphasizes that meaning generation depends on specific contexts; action feedback emphasizes the causal relationship between behavior and outcomes; and social interaction emphasizes the crucial role of collaboration and communication between people in the construction of meaning.

In the design of cultural board games, game mechanics not only serve to organize the rules but also act as a crucial medium through which players engage physically, experience the game's setting, and develop cultural understanding. Based on the above analysis, this study combines embodied interaction theory with game mechanics to identify types of mechanics within existing systems that are relevant to physical engagement, situational experience, and cultural interaction, and further transforms them into a framework for designing board game rules suitable for the dissemination of Jiama culture (Table 2).

Table 2 Correspondences Between Embodied Interaction and Mechanics

Principles of Embodied Interaction	Corresponding Mechanism	Forms of Expression	Mechanism of Action
Physical Engagement	Action Points Square Grid Area Movement Ownership Set Collection Pattern Building	Players participate in the game by moving, placing, flipping, and manipulating	Enhance players' physical engagement with space, movement, and the flow of rules.
Contextual Experience	Race Turn Order: Progressive Lose a Turn Variable Player Powers Contracts	Physical components. Players advance the game within specific rules, tasks, and event scenarios.	Create game scenarios grounded in cultural context and goal-oriented objectives.
Environmental Interaction	Area Movement Square Grid Open Drafting Trading Negotiation Auction / Bidding Play Elimination	Players continuously interact with the environment and other players through communication, competition, and resource exchange.	Strengthen the dynamic relationship between players and the game environment and resources, fostering a social experience through

			multiplayer interaction.
Sensory Feedback	Events Dice Rolling Probability Management Income Hand Management Memory	Players adjust their strategies in real time based on repetitive actions, random outcomes, changing events, and resource conditions.	Provide real-time feedback and experiences of uncertainty to reinforce cognitive and cultural memory.

The findings indicate that the principles of embodied interaction can provide a theoretical foundation for game mechanics design and establish a connection between cultural experiences and gaming experiences, thereby laying the groundwork for the subsequent translation of Jiama cultural behavioral logic into game rules.

3. Construction of a Design Strategy Framework for Cultural Board Games Based on Embodied Interaction Theory

Through an analysis of the behavioral logic and design transformation characteristics of the Dali Bai Jiama culture, as well as the establishment of a relationship between the principles of embodied interaction and the translation of game mechanics, this study further explores systematic approaches to the gamification of cultural heritage. The study found that existing cultural board game designs primarily rely on the extraction of visual symbols and the incorporation of cultural elements, with a focus on the reproduction of cultural content. However, for intangible cultural heritage characterized by ritual, practice, and experiential qualities, cultural value exists not only at the symbolic level but

is also embodied in behavioral processes, environmental relationships, and mechanisms of meaning generation. Therefore, relying solely on the transplantation of patterns, colors, or narrative backgrounds makes it difficult to fully convey cultural significance.

Building on the theory of embodied interaction and incorporating findings from research on Jiama culture, this study integrates these research outcomes into a design framework for the gamified adaptation of intangible cultural heritage. Centered on embodied interaction theory, this framework employs a process involving cultural extraction, information analysis, behavioral translation, mechanism mapping, and interactive experience to transform ritual behaviors, visual symbols, and cultural relationships from traditional culture into participatory and perceptible board game experiences, thereby establishing a design methodology characterized by reproducibility and transferability (Figure 1).

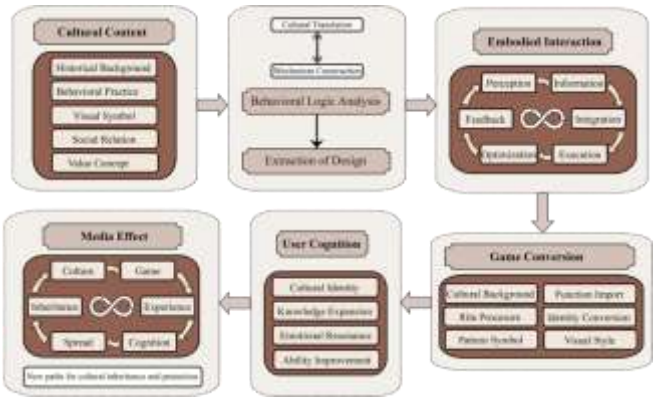


Figure 1 Design Framework
(Source: Constructed by the researcher)

The framework for cultural board game design is grounded in the analysis of cultural behavioral logic and guided by embodied interaction theory. By establishing connections between cultural content, experiential principles, and

game mechanics, it creates a progressive relationship that bridges cultural content and the gaming experience. This framework is not only applicable to the gamification of Jiama culture but also provides a reference for the design of other intangible cultural heritage with behavioral and practical characteristics, thereby expanding innovative pathways for the transmission and preservation of traditional culture. In the future, designers can adjust game mechanics and interactive forms based on the core spirit, behavioral logic, and visual characteristics of different cultural objects, thereby achieving the systematic translation and dissemination of traditional culture within a gaming context.

Discussion

1. Translate Cultural Symbols into Cultural Behaviors

Existing gamification designs for cultural heritage primarily focus on the extraction and application of cultural symbols such as patterns, colors, and stories. While this approach enhances the cultural distinctiveness of the product, it pays relatively little attention to the behavioral logic underlying cultural practices. An analysis of Jiama culture reveals that its cultural significance resides not only in visual symbols but also in specific practical activities such as production, ritual, and use. Therefore, compared to the simple translation of visual elements, gamification design grounded in behavioral logic is more effective in showcasing the living nature of intangible cultural heritage. This study proposes a gamification approach rooted in cultural behavior, which can deepen players' understanding of cultural significance within the game while providing new pathways for the preservation and transmission of traditional culture.

2. Implications of Embodied Interaction Theory for the Gamification Design of Traditional Culture

Embodied interaction theory emphasizes the dynamic relationship between the body, the environment, and cognition, which aligns closely with the

practical nature of intangible cultural heritage. By establishing a translational relationship between the four principles of bodily engagement, situational experience, environmental interaction, and perceptual feedback and game mechanics, this study provides a theoretical foundation for transforming cultural behaviors into gaming experiences, thereby converting cultural content from static knowledge into an interactive process that is both participatory and experiential. Compared to mere information transmission, design approaches based on embodied interaction help players actively construct cultural cognition through participation and experience, rather than passively receiving cultural information.

3. The Value of the Cultural Board Game Design Strategy Framework

The cultural board game design strategy framework developed in this study is grounded in an analysis of the logic of cultural behavior. By establishing relationships among cultural content, embodied interaction theory, and game mechanics, it provides a systematic design approach that shifts the research focus from the reproduction of cultural elements to the reconstruction of cultural experiences. This framework is not only applicable to Jiama culture but also serves as a reference for other forms of intangible cultural heritage characterized by behavioral practices.

Recommendations

1. Theoretical Recommendations

The framework for cultural board game design developed in this study demonstrates reproducibility and transferability and can serve as a reference for gamification design in other intangible cultural heritage projects. In future gamification design processes for traditional culture, greater emphasis should be placed on exploring and analyzing the logic underlying cultural behaviors, rather than merely applying visual symbols and cultural elements. At the same time,

the guiding principles of embodied interaction theory should be prioritized, with a focus on experiential factors such as physical engagement, situational immersion, environmental interaction, and perceptual feedback, thereby reconstructing cultural practices through interactive mechanisms.

2. Future Research Recommendations

Since this study primarily focused on developing a design strategy framework, its practical effectiveness has not yet been validated. Future research could combine specific design practices with user testing to evaluate and optimize the framework's applicability and effectiveness. Additionally, the framework could be applied to other types of intangible cultural heritage projects to further validate its transferability. Furthermore, interdisciplinary collaboration across fields such as traditional culture studies, design, and digital technology should be strengthened to explore more diverse pathways for cultural dissemination.

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