



Research on the Innovative Development of Huaiyang Mud Dog Souvenirs Based on Narrative Design Theory

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Abstract

Background and Aim: At present, the creative transformation and innovative development of intangible cultural heritage have emerged as cutting-edge issues in design research. As a typical representative of China's intangible cultural heritage, the Huaiyang Mud Dog faces dual challenges of cultural regeneration and market promotion. This study aims to construct an innovative design framework for Huaiyang Mud Dog souvenirs that meets market demands and aligns with modern sustainable development requirements, thereby promoting the dual enhancement of its cultural and market value.

Materials and Methods: Through literature research, field investigations, and consumer preference surveys, this paper distills the core design elements of the Huaiyang Mud Dog and constructs an innovative design model for its souvenirs based on narrative design theory. Utilizing this model, a range of Huaiyang Mud Dog souvenirs were developed, particularly focusing on character IP and its derivatives. Comprehensive evaluations were conducted, and optimization strategies were proposed based on the evaluation results.

Results: The findings indicate that the innovative design approach grounded in narrative design theory effectively balances cultural heritage with modern design, significantly enhancing the user experience and cultural identity associated with the product.

Conclusion: The study contributes to the design of Huaiyang Mud Dog souvenirs by providing a scientific narrative design framework, deepening the application of narrative design theory in the field of intangible cultural heritage, offering a viable path for the transformation and practice of Huaiyang Mud Dog in modern design, and serving as an academic reference and innovative paradigm for the design of other intangible cultural heritage souvenirs.

Keywords: Intangible Cultural Heritage; Huaiyang Mud Dog; Narrative Design Theory; Souvenirs; Innovative Design

Introduction

As a rare form of Chinese folk art, the Huaiyang Mud Dog is not only an important object of intangible cultural heritage preservation but also a vital resource for the revitalization of traditional culture. Originating from the ancient Fuxi worship over 8,000 years ago, the Huaiyang Mud Dog's form, color, material, and craftsmanship are strictly regulated, encapsulating the historical memory of the people, their understanding of nature and society, and their aspirations for a better life. As a living representation of early Chinese culture, the Huaiyang Mud Dog has been lauded by scholars both domestically and internationally as a "true totem and living fossil" (Song, 1989). The Huaiyang Mud Dog embodies the cultural, utilitarian, and artistic value typical of intangible cultural heritage (Xu & Shaharuddin, 2024), and it demonstrates a strong capacity for resilience and self-renewal amidst societal changes.

Today, innovative design has become a core driver of cultural industry development. Notably, in 2022, ten ministries, including the Chinese Ministry of Culture and Tourism, the Ministry of Education, and the National Rural Revitalization Administration, jointly issued the Notice on Promoting High-Quality Inheritance and Development of Traditional Crafts, emphasizing the importance of upholding traditional Chinese culture, strengthening the system for preserving and transmitting intangible cultural heritage, and promoting the creative transformation and innovative development of traditional crafts to better serve social and economic development and improve the quality of life. This policy backdrop provides an opportunity for the innovative development of intangible cultural heritage, including the Huaiyang Mud Dog.

However, the Huaiyang Mud Dog still faces multiple challenges in terms of innovative design. For instance, current design concepts are relatively outdated, and there is a lack of innovation in materials,



production techniques, and design content (Yun, 2024). The product range is limited, failing to meet the diverse cultural needs of consumers (Li et al, 2023); visual presentation modes are also limited (Su et al, 2023); and there is a lack of depth and breadth in related academic research, making it difficult to provide strong theoretical support for its innovative development.

To address these challenges, this study aims to apply narrative design theory to promote innovative design in Huaiyang Mud Dog souvenirs and explore sustainable pathways for its transmission within a contemporary context. As a design method grounded in narratology, narrative design emphasizes human-centered thinking, focusing not only on the basic functionality of products but also on conveying rich cultural connotations through design. It aims to establish profound informational exchanges between users and products, enabling users to gain a deeper cultural perception through experience.

The Huaiyang Mud Dog, as a cultural product and narrative act expressed through folk symbols, is inherently suited to serve as a narrative design text due to its rich cultural elements and unique artistic expression. In the design of Huaiyang Mud Dog souvenirs, designers conduct in-depth analyses of audience needs, product characteristics, and usage contexts to reconstruct new interactions between people, products, and environments. This design approach not only endows products with unique cultural connotations and emotional value but also enhances the design process to foster strong emotional connections with users during their interactions (Xia & Yuan, 2024), turning them into loyal users and cultural ambassadors. As a result, the market competitiveness and cultural impact of Huaiyang Mud Dog souvenirs in modern markets are significantly enhanced.

In summary, based on the unique attributes of the Huaiyang Mud Dog as an intangible cultural heritage item, this study demonstrates the feasibility and specific methods of souvenir development using narrative design theory. This research contributes to further validating narrative design as an effective innovative design strategy that can promote the Huaiyang Mud Dog's development in modern society, enhancing its market competitiveness while deepening the application of narrative design theory within the field of intangible cultural heritage. Furthermore, it offers universal theoretical references and practical guidance for the innovative design of other intangible cultural heritage items.

Objectives

1. To deeply explore the practical models of sustainable innovation development for Huaiyang Mud Dogs, this study systematically constructs a model for the innovative design of Huaiyang Mud Dog souvenirs, based on narrative design theory.
2. To ensure the market adaptability and feasibility of the constructed model, this study designs and develops Huaiyang Mud Dog souvenirs that meet modern sustainable development standards and conducts a comprehensive market evaluation of these products.

Literature Review

The artistic form of the Huaiyang Mud Dog originates from a profound cultural tradition, with its cultural implications deeply rooted in primitive belief systems such as totem worship, ancestor worship, and fertility worship. Its creative themes encompass a vast array of animal figures, resonating with the narratives found in the Classic of Mountains and Seas (Zhao, 2007) and Fuxi culture (Song, 1989), reflecting a psychological reverence for the origins of life, ancestral veneration, and totemic deities. The decorative patterns of the Huaiyang Mud Dog are expressed through abstract languages of dots, lines, and planes, characterized by symmetrical and orderly compositions. The color scheme predominantly features black as the background, complemented by red, yellow, white, and green, embodying the traditional "Five Colors" cultural concept of the Chinese civilization (Peng, 2008). The Huaiyang Mud Dog is not only a material expression of folk artists' emotions and aesthetic pursuits but also a profound reflection on nature, life, and cosmic order.

Although Huaiyang Mud Dogs are widely recognized in folk culture, academic research on this topic remains relatively limited. According to data from CNKI, there were only 459 studies focused on "Huaiyang Mud Dog" from 1988 to August 2024 (see Figure 1). This limited quantity of research reflects a relatively

underexplored area in academia. However, these studies reveal a progression in thematic focus and research direction, evolving logically from cultural origins to modern preservation.

From 1988 to 2004, research primarily concentrated in the fields of anthropology, folklore, and semiotics. Scholars explored the cultural and artistic value of Huaiyang Mud Dogs through initial investigations into their archaeological origins, symbolic meanings, and folk significance. This early research, mostly descriptive, focused on the origins, stylistic features, and uniqueness of Huaiyang Mud Dogs as a form of folk art. For instance, Song (1989) interpreted Huaiyang Mud Dogs from the perspective of totemic worship, considering them as a living representation of religious beliefs in ancient society. However, this phase of research generally lacked a deeper theoretical framework, remaining at a descriptive level regarding the cultural attributes of the Mud Dogs and providing a foundational understanding for subsequent studies.

With the establishment of China's intangible cultural heritage protection system, the study of Huaiyang Mud Dogs entered a phase of academic deepening. Two primary research trends emerged. One trend focused on cultural preservation and transmission, particularly on how to maintain and promote their cultural value amidst social change. Scholars like Qin (2011), Xin (2012), and Cheng (2014) analyzed the complex religious and cultural symbolism inherent in Huaiyang Mud Dogs. This phase of research not only enhanced the academic understanding of their cultural significance but also contributed to examining them as a dynamic model for intangible heritage preservation. Another trend concentrated on fostering their transmission and development through innovative design. Scholars such as Sang (2011) and Li (2011) explored methods to innovate through material improvement, craftsmanship enhancement, and transformation paths for design. Art design practitioners like Bu Aiyang (2010), Gao (2011), and Zhang (2013) proposed initial frameworks for the potential of Huaiyang Mud Dogs in visual communication and interdisciplinary innovation. Luo & Zhang (2021) and Zhao (2021) discussed the repositioning of Huaiyang Mud Dogs' value in social transformation, while Gao (2024), Li & Gao (2023), and Song (2023) analyzed their innovative pathways within modern contexts from both artistic and cultural perspectives. Additionally, Yuan (2024) examined the modern communicative potential of Mud Dogs through brand development and media expansion, while Sun & Liu (2023) proposed digitalization and creative development models for Mud Dogs through AI and digital innovation perspectives. Although these studies have proposed effective strategies for innovative design, they primarily focus on redesigning the functionality and artistry of the product, with limited attention to user experience and emotional connection. Notably, under the framework of narrative design theory, the exploration of cultural transmission pathways for Huaiyang Mud Dogs through a user-centered perspective remains in its early stages. Narrative design theory emphasizes human-centered emotional connections, aiming to construct a deep user experience through cultural narratives in product design. This approach offers new perspectives for the innovative transmission and market application of Huaiyang Mud Dogs. Accordingly, this paper further examines the innovative design of Huaiyang Mud Dog souvenirs through the lens of narrative design, aiming to promote their sustainable development in modern society.

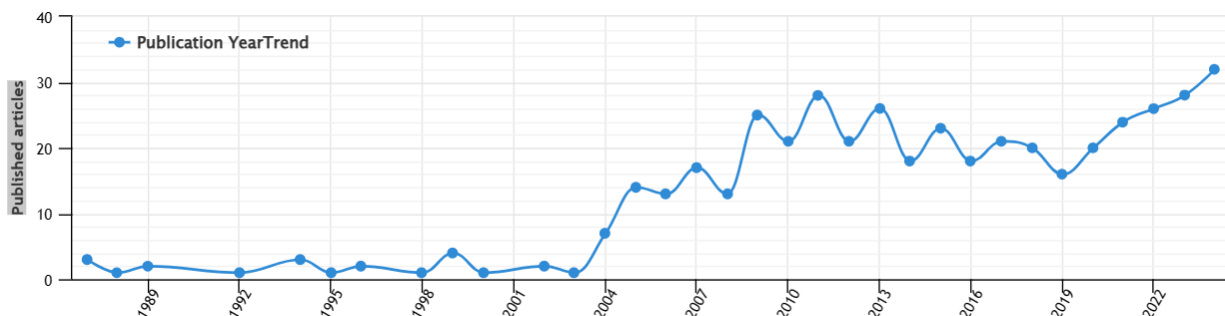


Figure 1 General Trend Analysis of Huaiyang Mud Dog Research (1988-2024)

Note: CNKI (China National Knowledge Infrastructure) <https://oversea.cnki.net/kvisual/article/center?>
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Conceptual Framework

Narrative design involves analyzing, understanding, and creating products through narratological methods, examining the relationships among a product's intrinsic elements, structural forms, semantic order, and strategies within the design process. This approach effectively constructs a product's sociocultural significance. (Zhang, 2013) Based on narrative design theory, the three core elements of narrative design include the narrator, the medium, and the audience, and it operates on two levels: the story level and the discourse level. The story level pertains to the content being expressed, encompassing the plot, characters, setting, and events, answering the question, "What story is being told?" The discourse level pertains to the manner of expression, involving language, visual elements, sound, interaction methods, etc., addressing the question, "How is the story being told?" These two levels together constitute a complete narrative design system.

When applying narrative design theory to the design of Huaiyang Mud Dog souvenirs, the corresponding relationships are as follows: narrator—designer; medium—Huaiyang Mud Dog souvenirs; audience - consumers. The designer, as the narrator, restructures the relationship between people, products, and the environment by deconstructing and reorganizing the target audience, product, and usage context, thereby conveying the product's emotions and story to the user. This design process not only makes users loyal consumers of the product but also turns them into emotional participants and cultural communicators.

Through the above analysis, this study constructs a conceptual model of narrative design for Huaiyang Mud Dog souvenirs (Figure 2). This model demonstrates how designers apply narrative design theory in the innovative design of Huaiyang Mud Dog souvenirs, endowing traditional cultural products with new vitality and forms of expression to meet consumers' demands for a cultural experience and emotional resonance

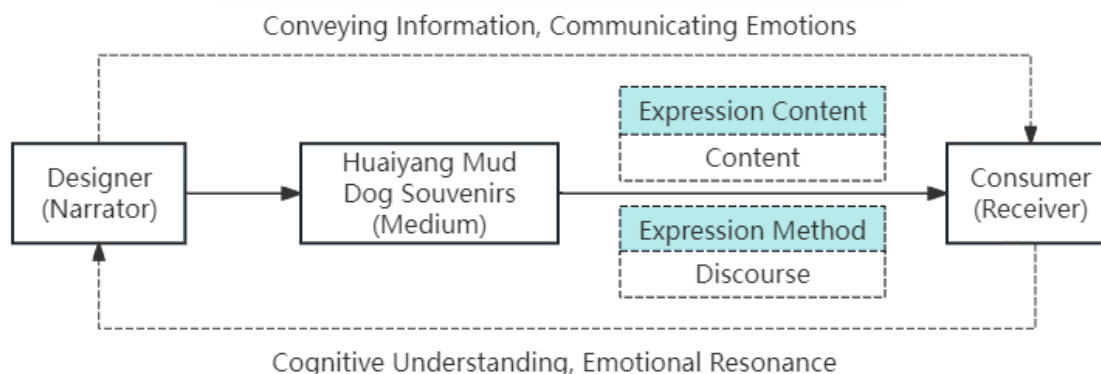


Figure 2 Conceptual Model of Narrative Design for Huaiyang Mud Dog Souvenirs

Note: Constructed by the researcher

Methodology

This study employs a mixed-methods approach that combines qualitative and quantitative research to comprehensively reveal the key factors influencing the market performance of Huaiyang Mud Dog souvenirs, providing empirical support and strategic recommendations for their market positioning and product innovation. The research area is located in Huaiyang District, Zhoukou City, Henan Province, China. The sample comprises three groups: four cultural inheritors, selected through purposive sampling based on official recognition at various government levels (one national-level and three provincial-level inheritors); three design experts with significant research contributions in related fields such as intangible cultural heritage, art design, and folklore; and 400 visitors to the Taihao Mausoleum Fair in Huaiyang, selected through stratified sampling by age to ensure broad and representative sample coverage.

1. Research Methods

1.1 Qualitative Research Methods

1) Literature Review: A systematic review of literature on Huaiyang Mud Dog and narrative design theory to establish the theoretical foundation for the study and provide contextual support for subsequent field research.

2) Field Research: Collection of first-hand data on the production and sales of Huaiyang Mud Dog souvenirs, accompanied by in-depth observation of consumer behaviors and responses during product purchase and interaction, aiming to understand market demands and consumer behavior patterns.

3) In-Depth Interviews: Semi-structured interviews with Huaiyang Mud Dog cultural inheritors and design experts to gather professional insights and explore pathways for integrating traditional craftsmanship with modern design.

4) Data Analysis: Framework analysis, content analysis, and thematic analysis were employed, using qualitative analysis software to code and categorize field notes and interview data, thereby identifying core themes and patterns affecting souvenir design and market performance.

1.2 Quantitative Research Methods

Quantitative data were collected through a structured questionnaire, which underwent Item Objective Congruence (IOC) evaluation by experts, achieving an overall evaluation coefficient of 0.86, indicating a high standard of scientific rigor and validity in the questionnaire design. The questionnaire gathered data from visitors to the Taihao Mausoleum Fair, quantifying consumer needs, market potential, and key elements of narrative design. Data from cultural inheritors, design experts, and visitors were also collected to systematically evaluate Huaiyang Mud Dog souvenirs from a narrative design perspective. After data collection, PSPP and other statistical software were used to conduct an in-depth analysis.

2. Data Collection and Analysis

2.1 Interviews with Inheritors: Data and Analysis

This study conducted semi-structured interviews with four inheritors of the Huaiyang Mud Dog tradition, aiming to explore the key factors influencing the transmission and innovation of Huaiyang Mud Dog, as well as the interrelationships between these factors.

During the data analysis process, a combination of qualitative content analysis, systematic coding, and thematic analysis was employed to systematically summarize and categorize the interview texts, identifying core themes. Additionally, framework analysis was applied to systematically compare the views of the inheritors, with a focus on analyzing trends in innovative design for Huaiyang Mud Dog and the role of narrative design. The interview results are as follows (Table 1):

Table 1 Interview Results from Huaiyang Mud Dog Inheritors

Question	Interview Responses
Contemporary Value and Social Significance of Huaiyang Mud Dog	The Huaiyang Mud Dog is not only a vehicle for cultural transmission, possessing unique historical, artistic, and academic research value, but it also promotes local economic development, showcasing the dual value of culture and economy.
Greatest Challenges Faced	Its core value is being diminished, with insufficient public awareness of its cultural and historical significance, low interest among young people, and limited market demand.
Methods for Innovative Design	Innovations in product shape, form, materials, and craftsmanship.
Role of Narrative Design in the Innovative Design of Huaiyang Mud Dog	Enhances the cultural value of souvenirs; Increases design depth and complexity; Balances tradition with modernity.



Question	Interview Responses
Future Directions and Suggestions for Innovative Design	Design modern brand images and packaging; Employ market segmentation and multi-channel marketing strategies; Introduce modern design elements and technology to enhance product-added value.

2.2 Data and Analysis from Interviews with Design Experts

This study conducted semi-structured interviews with three design experts to explore their perspectives on the innovative design of Huaiyang Mud Dog, the challenges they face, and the application of narrative design theory. The collected data were analyzed using narrative analysis and content analysis methods. The interview results are summarized as follows (Table 2, Table 3):

Table 2 Data from Interviews with Design Experts (Innovative Design Practices and Challenges for Huaiyang Mud Dog)

Theme	Content
Design Principles	The integration of cultural heritage and innovation is the core design principle. User-centered design, emotional resonance, and sustainability are essential design principles.
Design Elements	Focus on five aspects: patterns, colors, shapes, materials, and visual narratives.
Design Challenges	How to achieve design innovation while preserving traditional artistic characteristics.
Solutions	Propose solutions such as interdisciplinary collaboration, user research and feedback, cross-cultural studies and comparisons, multiple design iterations, technological innovation, and digital applications.
Future Trends	Four directions for future trends: digitization and intelligence, functional expansion and lifestyle integration, internationalization and branding, cross-disciplinary cooperation, and diversified development.

Table 3 Data from Interviews with Design Experts (Understanding and Application of Narrative Design Theory)

Theme	Content
Understanding of Narrative Design Theory	Narrative design theory involves storytelling through design, imbuing products with emotional resonance and cultural depth.
Application Potential	Deeply explore and organize the cultural stories and historical backgrounds of Huaiyang Mud Dog, ensuring the originality and appeal of the stories. Express narrative elements through design techniques such as form, color, and materials; Enrich narrative methods through multimedia technology; Emphasize user participation and interaction to foster strong brand interaction and user engagement.
Suggestions for Applying Narrative Design Theory	Involve cultural scholars, technical experts, and marketing teams collaboratively; Establish a systematic narrative database. Engage in cross-industry collaborations with film, gaming, etc.. Develop immersive experience platforms.

2.3 Analysis of Tourist Survey Data

This study conducted a random sampling of tourists at the Taihao Mausoleum Fair in Huaiyang to collect data through questionnaires. The survey aimed to gain an in-depth understanding of consumers' basic information, purchase motivations, key design elements, perceptions, preferences, and related opinions and suggestions. The total sample size was N=400, and a mixed-methods approach combining quantitative and qualitative analysis was employed.



For the closed-ended questions, descriptive statistics were conducted using PSPP software to analyze consumers' basic information, purchasing behavior, product preferences, and needs for innovative designs. The statistical significance of preference differences between different groups was verified through a chi-square test, thereby identifying overall trends and patterns in consumer preferences (Table 4). For the open-ended questions, NVivo software was used to conduct a qualitative analysis, including coding and thematic analysis of the respondents' answers. This approach extracted major themes and patterns, providing deeper insights into consumers' perceptions, opinions, and underlying motivations regarding Huaiyang Mud Dog souvenirs. The qualitative analysis further clarified the trends and differences observed in the quantitative data, offering a more comprehensive understanding of the findings (Table 5).

Table 4 Results of the Closed-Ended Questions on Tourists' Purchasing Behavior of Huaiyang Mud Dog Souvenirs

Question	Result
Have you purchased Huaiyang Mud Dog souvenirs before?	Frequent buyers: 62 people (15.5%); Occasional buyers: 163 people (40.5%); Never bought: 175 people (44.0%). This result indicates a low market penetration and influence of Huaiyang Mud Dog, with most consumers purchasing infrequently.
What are your motivations and purposes for purchasing Huaiyang Mud Dog souvenirs?	The main purchase motivations are for gifts, decorations, and travel souvenirs.
Which aspects of Huaiyang Mud Dog do you find most distinctive?	Consumers must recognize the artistic features of shape (73.3%), color (61.1%), patterns (48.8%), and material (46.5%), which are the main factors attracting them.
In which aspects do you find Huaiyang Mud Dog most valuable?	Cultural value is highly recognized by 81.0% of consumers, followed by artistic value (71.5%) and economic value (49.8%). Consumers' perceptions of Huaiyang Mud Dog are primarily focused on its cultural and artistic value.
When selecting souvenirs, which level of innovation do you prefer?	Consumers prefer souvenirs that combine traditional and modern elements, indicating a dual demand for innovation and cultural heritage.
What qualities do you prioritize when purchasing Huaiyang Mud Dog creative products?	Innovation is most valued by consumers (79.0%), followed by aesthetics (71.8%) and cultural significance (65.8%). Practicality (60.5%) and traditional aspects (41.0%) also receive considerable attention.
Which elements do you think must be preserved in the innovative design of Huaiyang Mud Dog?	Cultural connotations (83.3%) and shape (77.5%) are deemed the most important, followed by patterns (71.8%) and color (28.5%).
In which aspects does Huaiyang Mud Dog most urgently need innovation?	Material/medium (71.5%), functionality (65.8%), production techniques (60.5%), and sales models (48.0%) are identified as needing the most innovation.
What price range do you find acceptable for Huaiyang Mud Dog souvenirs?	The majority of consumers find the acceptable price range to be between 50-300 RMB.
Through which channels would you prefer to learn about and purchase Huaiyang Mud Dog creative products?	Social media (42%) and websites (33.5%) are the primary channels, followed by physical stores and exhibition events.

Table 5 Results of the Open-Ended Questions on Tourists' Suggestions for the Innovative Design of Huaiyang Mud Dog Souvenirs

Question	Thematic Classification	Frequency (N)	Percentage (%)
What suggestions or	Design style optimization	110	27.50%
	Enhanced functionality	95	23.75%



expectations do you have for the innovative design of Huaiyang Mud Dog souvenirs?	Material improvement	65	16.25%
	Integration of cultural elements	60	15%
	Packaging and display improvement	35	8.75%
	Increased interaction and participation	20	5%
	Broader media promotion	10	2.50%
	Price rationalization	5	1.25%

Results

1. Model for Innovative Design of Huaiyang Mud Dog Souvenirs Based on Narrative Design Theory

1.1 Demand Exploration

A thorough understanding of user needs is the foundational basis for ensuring that product design meets market expectations. Based on the results of qualitative and quantitative analyses, the market demand and strategies for Huaiyang Mud Dog souvenirs are as follows:

Target Consumer Groups: The study found that the primary consumer groups for Huaiyang Mud Dog souvenirs include young, middle-aged, and elderly individuals, with young and middle-aged consumers being the dominant market forces.

Market Strategy: The core strategy for Huaiyang Mud Dog souvenir design lies in the deep integration of cultural heritage and modern innovation. Data analysis reveals that the demand focus across the three sample groups is highly concentrated on the combination of cultural transmission and modern innovation. This strategy effectively enhances both the cultural and commercial value of Huaiyang Mud Dog souvenirs.

Another important strategy is multi-level market positioning. A refined market strategy targeting young and middle-aged consumer groups is crucial: the mass market targets local tourists and residents; the mid-to-high-end market focuses on cultural enthusiasts and tourists; the high-end market is aimed at art collectors and high-quality seekers; the online market caters to a wide range of e-commerce users. Through this multi-level positioning, Huaiyang Mud Dog souvenirs can better meet the needs of different consumer segments, thereby maximizing market coverage.

Product Characteristics: The innovative design of Huaiyang Mud Dog souvenirs should focus on three key characteristics: cultural transmission, artistic innovation, and practical functionality. The design should achieve a blend of traditional and modern aesthetics, enhancing the product's historical and cultural depth and practical value.

1.2 Refinement of Narrative Themes

The core of the narrative design for Huaiyang Mud Dog lies in refining narrative themes that possess cultural depth and symbolic significance. By integrating market demands and cultural contexts, this study identifies four key narrative themes: symbolic meaning, traditional craftsmanship, spiritual essence, and narrative content. The symbolic meaning encompasses traditional concepts such as fertility worship, blessings of offspring, and protection from evil. Traditional craftsmanship covers the integration of technique and artistry. The spiritual essence involves ancient Chinese philosophical thoughts such as the "Five Elements Theory," the "Unity of Heaven and Man," and "Tao Follows Nature." Narrative content includes myths, folklore, and historical stories. These themes collectively form the cultural expression foundation at the narrative level of the product.

1.3 Establishing Expression Levels

The discourse level of narrative design translates narrative themes into specific forms of expression, which are divided into three levels: instinctive expression, behavioral expression, and reflective expression. Instinctive expression focuses on the user's immediate reaction to the product by deconstructing and reconstructing traditional visual symbols such as the Huaiyang Mud Dog's shape, color, and patterns, and optimizing the design through digital tools to ensure that the visual elements quickly capture the user's attention. The behavioral expression emphasizes the functionality and user experience of the product, integrating traditional craftsmanship with modern technology so that users gradually immerse themselves in and understand the product's narrative as they use it, thereby experiencing its cultural connotations. Reflective expression focuses on the emotional and cognitive feedback of the user after using the product, enhancing the product's cultural depth and emotional resonance, thus fostering the user's identification with and emotional attachment to traditional culture, and enhancing the product's market competitiveness and cultural impact.



Through qualitative and quantitative analyses, these three levels of expression were further refined: the instinctive level focuses on visual element design, the behavioral level encompasses functional value design and experiential effect design, and the reflective level emphasizes cultural expression design. The consumer demands for Huaiyang Mud Dog souvenirs were categorized into 14 design factors (Figure 3). These factors effectively correspond to different levels of perception and interaction, providing a scientific basis for souvenir design.

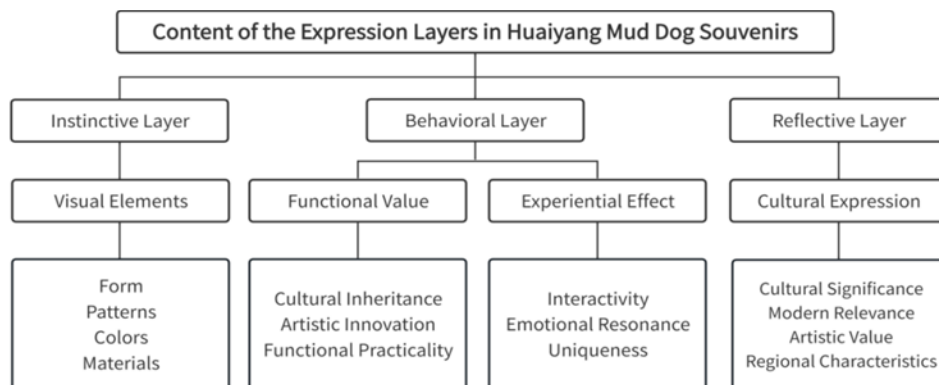


Figure 3 Content of Narrative Design Expression Levels for Huaiyang Mud Dog Souvenirs
Note: Constructed by the researcher

1.4 Setting Narrative Plot

In narrative design, the plot constructs the framework for product narration and serves as the specific pathway for story development. The core of the plot setting lies in the rational arrangement of content sequences and logical relationships to ensure the coherence and logical consistency of the narrative.

Narrative plots are mainly divided into linear and nonlinear forms. In the design of Huaiyang Mud Dog souvenirs, linear plots unfold through temporal or logical sequences, systematically presenting the basic information and core storylines of the product, such as historical origins, crafting techniques, and heritage stories. This approach helps users to deeply understand the cultural background and artistic value of the Mud Dog. Nonlinear plots, on the other hand, introduce multi-layered cultural interactions and user experiences, further enriching the narrative content and enhancing user engagement and emotional resonance, thereby achieving the optimal narrative effect.

1.5 Construction and Weight Analysis of Narrative Text Evaluation Indicators

(1) Construction of the Evaluation Indicator System

Based on literature reviews, expert interviews, and research data, this study has identified three core factors that influence the effectiveness of narrative texts: cultural characteristics, product elements, and market prospects. From these three dimensions, 14 specific evaluation indicators have been identified, forming the evaluation system for Huaiyang Mud Dog souvenirs (Table 6).

Table 6 Construction of Evaluation Indicators for Huaiyang Mud Dog Souvenirs

Evaluation Dimension	Evaluation Indicator	Explanation of the Indicator
Cultural Characteristics	Cultural Element Heritage	Preserving and conveying the core cultural elements of Huaiyang Mud Dog, reflecting traditional craftsmanship and cultural connotations.
	Cultural Imagery Innovation	Infusing new vitality and forms into Huaiyang Mud Dog through innovative methods, reflecting the modern interpretation of culture.
	Storytelling	Narrating the cultural stories behind Huaiyang Mud Dog with clear and compelling narrative content.
	Emotional Resonance	Eliciting emotional resonance in users through narrative design fosters cultural identity and a sense of belonging.

Product Elements	Form Design	Retaining traditional forms while innovating to meet modern aesthetic and functional demands.
	Ornamentation Design	Ensuring that ornamentation design is innovative while retaining traditional elements, providing distinctiveness and aesthetic appeal.
	Color Design	Employing rational, innovative color schemes that align with cultural imagery, enhancing visual appeal.
	Material Usage	Utilizing environmentally friendly and new materials to improve product quality and environmental sustainability.
	Functionality Design	Innovating in functionality design to meet the diverse needs of modern users.
Market Prospects	Interaction Degree	Focusing on user participation and interaction, offering a rich user experience that strengthens the interaction between users and the product.
	Awareness Level	Measuring user recognition and understanding of the product, reflecting the effectiveness of market promotion.
	Repurchase Intention	Assessing the product's adherence to ergonomic standards and its ability to meet the multifaceted needs of users.
	Market Demand Fit	Ensuring that the product design meets market demands, exhibiting high market potential and acceptance.
	Market Influence	Evaluating the product's impact on enhancing the recognition and reputation of Huaiyang Mud Dog.

(2) Factor Analysis and Indicator Selection

First, using a Likert five-point scale, heritage bearers, design experts, and consumers were invited to rate the importance of each evaluation indicator. Subsequently, correlation analysis was conducted using PSPP software, revealing that the correlation coefficients of all indicators were generally above 0.3, indicating a high degree of correlation among the indicators, consistent with the requirements of scientific research. The suitability of the data for factor analysis was verified through the KMO measure and Bartlett's test of sphericity, yielding a KMO value of 0.785 (>0.60), a Chi-Square of 359.589, df = 105, and $p < 0.01$. Four principal factors were extracted using the maximum variance orthogonal rotation method, with a cumulative variance contribution rate of 72.299%, indicating that these factors effectively explained the original variables. The four factors were defined as Cultural Heritage, Design Innovation, User Experience, and Market Value. The reliability of these factors was assessed, with all Cronbach's α coefficients exceeding 0.7, confirming the internal consistency of the factors.

(3) Determining the Weight Values of Evaluation Indicators and Validating Data Rationality

To further quantify the evaluation indicators, the Analytic Hierarchy Process (AHP) was employed, incorporating a group decision-making approach for weight calculation. The study invited 10 design experts and consumer representatives to conduct pairwise comparisons of the indicators using Saaty's 1-9 scale, constructing the judgment matrix. The final weights for each group of evaluation indicators were calculated using the weighted arithmetic mean method (Table 7). For data rationality validation, a 4×4 judgment matrix was constructed based on the first-level indicator weights, yielding a maximum eigenvalue $\lambda_{\max} \approx 4.12$. Using formulas $CI = \frac{\lambda_{\max} - n}{n - 1}$, Consistency was verified by calculating the consistency index ($\bar{CI}=0.04$) and the consistency ratio ($CR=0.044, <0.1$), confirming the consistency of the judgment matrix.

Table 7 Evaluation Indicators and Weights for Huaiyang Mud Dog Souvenirs

Primary Indicator	Secondary Indicator	Weight of Primary Indicator	Weight of Secondary Indicator	Rank
Cultural Inheritance (A)	Cultural Element Inheritance (A1)	0.356	0.15	1
	Cultural Imagery Innovation (A2)		0.09	5
	Storytelling (A3)		0.07	10
	Emotional Resonance (A4)		0.046	11

Design Innovation (B)	Form Design (B1)	0.296	0.11	2
	Pattern Design (B2)		0.076	6
	Color Design (B3)		0.055	9
	Material Usage (B4)		0.04	12
	Functional Design (B5)		0.015	14
User Experience (C)	Interaction Level (C1)	0.236	0.1	3
	Awareness Level (C2)		0.085	4
	Repurchase Intention (C3)		0.051	7
Market Value (D)	Market Demand Compatibility (D1)	0.112	0.06	8
	Market Influence (D2)		0.052	13

Based on the above theoretical and practical analysis of narrative design, the researchers have established an innovative design model for Huaiyang Mud Dog souvenirs (Figure 4).

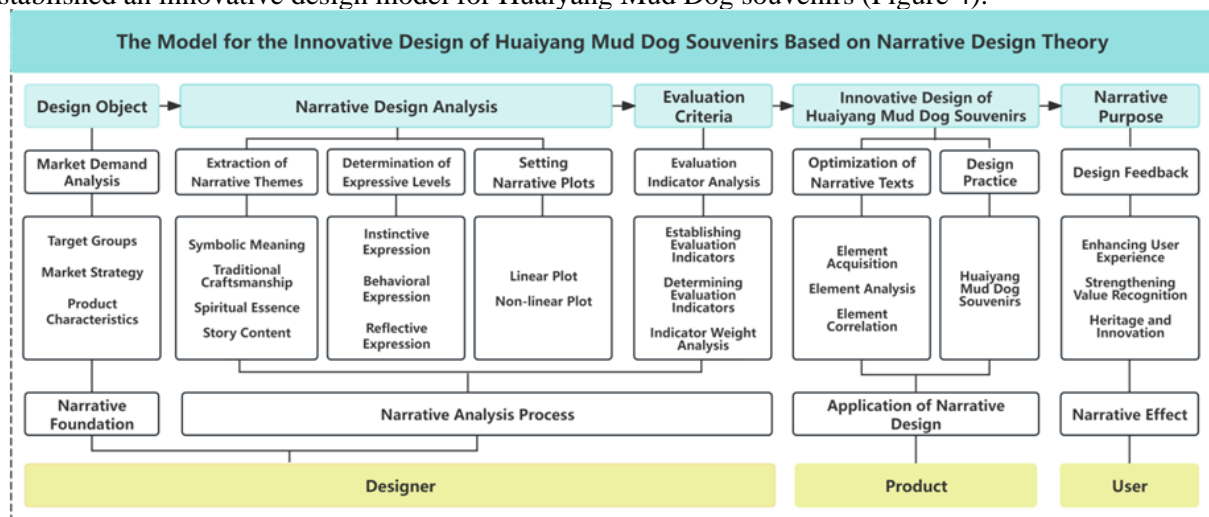


Figure 4 Model for the Innovative Design of Huaiyang Mud Dog Souvenirs

Note: Constructed by the researcher

2. Design Work Display

Based on the aforementioned model, this study focuses on the explicit artistic representation and inherent cultural connotations of the Huaiyang Mud Dog, emphasizing the development of character IP, and derivatives of IP imagery, to engage in souvenir design practice.

2.1 Character IP Design

In the cultural IP economy, character IPs communicate the core elements of the Huaiyang Mud Dog to the public in a more engaging and accessible manner through vivid imagery and narrative. This paper selects the most representative images from the Huaiyang Mud Dog collection, such as "Majestic Tiger," "Monkey with a Human Face," "Unicorn," "Ancestor Figure," and "Auspicious Symbols." These images serve as the basis for extracting their forms, colors, and patterns as "story" elements. Through the processes of deconstruction and reconstruction, these elements are transformed into "discourse," leading to the design of IP character prototypes that are rich in narrative. The key descriptors for these characters include: cute, lively, optimistic, and approachable. In the specific design process, simplified forms are used to accurately represent the characteristics of the objects, utilizing basic elements like points, lines, and planes to create geometric shapes. Traditional patterns such as triangle motifs, sun motifs, vulva patterns, and floral patterns are employed, while the traditional five-color palette of the Huaiyang Mud Dog is retained. To enhance the characters' iconicity, recognizability, and appeal, the color saturation is moderately reduced without compromising the traditional aesthetic (Figure 5).



Figure 5 Huaiyang Mud Dog IP Prototype Imagery
Note: By the researcher

2.2 Character IP Derivative Product Design

Building on the foundation of the Huaiyang Mud Dog IP imagery, a secondary development process was undertaken to design two series of derivative products: daily-use items and digital media. These products aim to enrich the product line, thereby enhancing the value and market impact of the IP imagery.

2.2.1 Daily-Use Product Series

Based on preliminary consumer research and analysis, a series of daily-use products was designed to cater to modern lifestyles while maintaining cultural significance (Figure 6). This series includes items such as phone cases, pen holders, cups, and apparel, designed to meet consumer demands in terms of variety, functionality, and price.



Figure 6 Huaiyang Mud Dog Character IP Derivative Products (Daily-Use Items Series)
Note: By the researcher

2.2.2 Digital Derivative Product Design

Based on the visual transformation of the core cultural symbols of the Huaiyang Mud Dog, digital commemorative products were further developed to expand the IP's dissemination across various application scenarios. These derivative products incorporate consumer behavior in temple fair spaces as well as modern aesthetic needs. The designs are centered around typical Huaiyang Mud Dog imagery with symbolic meanings such as "good fortune," "blessings," and "safety." Representative totem patterns are extracted and reimagined using design techniques such as point-line-plane combinations and deconstruction-reconstruction methods. The resulting visual works are suitable for diverse digital contexts, including digital payments and media design. Examples include the Huaiyang Mud Dog WeChat Red Packet cover (Figure 7) and the Fuxi Taihao Mausoleum electronic admission ticket (Figure 8).



Figure 7 Huaiyang Mud Dog WeChat Red Envelope Cover Design
Note: By the researcher



Figure 8 Huaiyang Fuxi Taihao Mausoleum Temple Fair Electronic Admission Ticket
Note: By the researcher

3. Evaluation of Huaiyang Mud Dog Souvenirs

To ensure the accuracy and reliability of the evaluation, this study conducted a comprehensive assessment of Huaiyang Mud Dog souvenirs using a combination of online and offline methods. The evaluation subjects were consumers attending the Taihao Mausoleum Temple Fair in Huaiyang. The assessment tool was the "Huaiyang Mud Dog Souvenir Evaluation Questionnaire," which had been validated through pre-testing and reliability and validity analysis. The Likert scale used in the questionnaire ranged from 1 (very dissatisfied) to 5 (very satisfied). A total of 471 questionnaires were distributed, with 409 valid responses collected, covering consumers of different ages, genders, and educational backgrounds. To ensure the representativeness of the data, the missing data were processed using the Multiple Imputation method, followed by data cleaning before analysis.

The data analysis process included steps such as data cleaning, and handling missing data. The analytical methods employed included descriptive statistics, correlation analysis, and multiple linear regression analysis to comprehensively reveal the impact of various design dimensions on overall satisfaction.

3.1 Evaluation Results

The mean overall satisfaction (\bar{x}) was 4.41 (S.D. = 0.54), indicating that Huaiyang Mud Dog souvenirs were generally well-received by consumers (Table 8).

Table 8 Consumer Evaluation Results for the Design of Huaiyang Mud Dog Souvenirs (N=409)

Name	Sample Size (N)	Minimum	Maximum	Mean (\bar{x})	Standard Deviation (S.D.)	Median
Cultural Element Inheritance (A1)	409	2	5	4.68	0.48	5
Cultural Imagery Innovation (A2)	409	3	5	4.55	0.5	5
Storytelling (A3)	409	2	5	4.7	0.46	5
Emotional Resonance (A4)	409	3	5	4.6	0.49	5
Form Design (B1)	409	2	5	4.45	0.55	4
Ornament Design (B2)	409	2	5	4.35	0.54	4
Color Design (B3)	409	2	5	4.42	0.52	4
Material Usage (B4)	409	2	5	4.1	0.6	4
Functional Design (B5)	409	2	5	4.32	0.58	4
Interaction Level (C1)	409	2	5	4.2	0.55	4
Awareness Level (C2)	409	2	5	4.38	0.54	4
Repurchase Intention (C3)	409	2	5	4.36	0.55	4
Market Demand Alignment (D1)	409	2	5	4.3	0.58	4
Market Influence (D2)	409	2	5	4.33	0.57	4
Overall Satisfaction (Y)	409	2	5	4.41	0.54	4

Note: The mean value (\bar{x}) represents the average rating given by consumers for each dimension, while the standard deviation (S.D.) indicates the degree of dispersion in the ratings.

3.2 Analysis of Evaluation Results

3.2.1 Descriptive Analysis

The analysis results indicate that cultural heritage (mean = 4.68, S.D. = 0.48) and narrative elements (mean = 4.70, S.D. = 0.46) received high recognition, suggesting that the souvenirs perform exceptionally well in terms of cultural transmission and emotional resonance. In contrast, there were some discrepancies in the evaluations of shape design (mean = 4.45, S.D. = 0.55) and material usage (mean = 4.10, S.D. = 0.60), indicating that these aspects require further optimization. Although user interaction (mean = 4.20, S.D. = 0.55) and market demand compatibility (mean = 4.30, S.D. = 0.58) received relatively high ratings, continuous design improvements are necessary to enhance the product's market adaptability and user engagement.

3.2.2 Correlation Analysis

To further explore the relationships between the various design dimensions, Pearson correlation coefficients were calculated. The correlation matrix results revealed moderate to strong positive correlations between the dimensions (Table 9). Notably, the connections between cultural heritage and design innovation, as well as between user experience and market value, were particularly close, indicating that these factors play a critical role in enhancing the product's market value and user experience.

Table 9 Correlation Matrix of Consumer Evaluations for Huaiyang Mud Dog Souvenirs

Dimension	A1	A2	A3	A4	B1	B2	B3	B4	B5	C1	C2	C3	D1	D2
A1	1	0.72	0.75	0.74	0.68	0.65	0.67	0.64	0.61	0.7	0.69	0.71	0.66	0.68
A2	0.72	1	0.78	0.76	0.71	0.7	0.68	0.67	0.66	0.75	0.74	0.72	0.69	0.71
A3	0.75	0.78	1	0.77	0.72	0.71	0.69	0.66	0.67	0.76	0.75	0.73	0.7	0.73
A4	0.74	0.76	0.77	1	0.7	0.69	0.68	0.66	0.65	0.74	0.72	0.71	0.68	0.7
B1	0.68	0.71	0.72	0.7	1	0.76	0.75	0.73	0.72	0.71	0.7	0.69	0.67	0.69
B2	0.65	0.7	0.71	0.69	0.76	1	0.77	0.75	0.74	0.72	0.71	0.7	0.68	0.7
B3	0.67	0.68	0.69	0.68	0.75	0.77	1	0.73	0.71	0.72	0.71	0.7	0.69	0.71
B4	0.64	0.67	0.66	0.66	0.73	0.75	0.73	1	0.74	0.71	0.7	0.69	0.67	0.7
B5	0.61	0.66	0.67	0.65	0.72	0.74	0.71	0.74	1	0.7	0.69	0.68	0.66	0.68
C1	0.7	0.75	0.76	0.74	0.71	0.72	0.72	0.71	0.7	1	0.75	0.74	0.73	0.75
C2	0.69	0.74	0.75	0.72	0.7	0.71	0.71	0.7	0.69	0.75	1	0.76	0.73	0.74
C3	0.71	0.72	0.73	0.71	0.69	0.7	0.7	0.69	0.68	0.74	0.76	1	0.72	0.74
D1	0.66	0.69	0.7	0.68	0.67	0.68	0.69	0.67	0.66	0.73	0.73	0.72	1	0.75
D2	0.68	0.71	0.73	0.7	0.69	0.7	0.71	0.7	0.68	0.75	0.74	0.74	0.75	1

3.2.3 Regression Analysis

This study employed multiple linear regression analysis to investigate the impact of various design factors on overall consumer satisfaction, aiming to identify the key factors in the design of Huaiyang Mud Dog souvenirs (Table 10). The results indicate a high degree of model fit ($R^2 = 0.756$, adjusted $R^2 = 0.747$), with these design factors explaining 75.6% of the variance in overall satisfaction. Before conducting the regression analysis, the model's validity was confirmed through residual analysis and multicollinearity testing (VIF values all below 5). The assumptions of residual normality (as verified by the Shapiro-Wilk test, $p > 0.05$) and homoscedasticity (as verified by the Breusch-Pagan test, $p > 0.05$) were both satisfied.

Regarding the regression coefficients, cultural heritage ($\beta = 0.21$, $p < 0.001$) and emotional resonance ($\beta = 0.19$, $p < 0.001$) had the most significant positive impact on overall consumer satisfaction, suggesting that emphasizing cultural heritage and emotional connection in the design is crucial for enhancing consumer satisfaction. Additionally, shape design ($\beta = 0.16$, $p < 0.01$), ornamentation design ($\beta = 0.145$, $p < 0.05$), and color design ($\beta = 0.15$, $p < 0.05$) played positive roles in design innovation, indicating that further optimization of these visual elements is necessary to meet consumer aesthetic preferences. Furthermore, market demand compatibility ($\beta = 0.147$, $p < 0.05$) and market influence ($\beta = 0.135$, $p < 0.05$) also showed significance, highlighting the importance of precise market analysis and effective strategy implementation in product promotion and market positioning to enhance the product's market impact.

Table 10 Regression Coefficients and Significance Tests for Consumer Evaluations of Huaiyang Mud Dog Souvenirs

Independent Variable	Regression Coefficient (β)	Standard Error (SE)	t-value	p-value
X1: Cultural Element Inheritance	0.21	0.058	3.62	<0.001
X2: Cultural Imagery Innovation	0.18	0.062	2.903	0.004
X3: Storytelling	0.175	0.064	2.734	0.007
X4: Emotional Resonance	0.19	0.061	3.115	0.002
X5: Form Design	0.16	0.057	2.807	0.005
X6: Ornamentation Design	0.145	0.063	2.302	0.022
X7: Color Design	0.15	0.059	2.542	0.011
X8: Material Usage	0.12	0.065	1.846	0.065
X9: Functional Design	0.13	0.061	2.131	0.034
X10: Interaction Level	0.138	0.062	2.226	0.027
X11: Awareness	0.153	0.06	2.55	0.011
X12: Repurchase Intention	0.144	0.062	2.323	0.021
X13: Market Demand Alignment	0.147	0.064	2.297	0.022
X14: Market Influence	0.135	0.063	2.143	0.033

Discussion

1. Construction of an Innovative Design Framework Based on Narrative Design

This study systematically constructs an innovative design framework for Huaiyang Mud Dog souvenirs based on narrative design theory. The research results indicate that narrative design, through the effective integration of visual elements, emotional communication, and cultural values, provides a new pathway for the transmission and regeneration of intangible cultural heritage. As Zhang et al (2022) pointed out, the continuation of traditional crafts relies on innovation-driven approaches, a viewpoint that is strongly supported by this study.

Through narrative design, the design elements of Huaiyang Mud Dog—comprising colors, symbols, and shapes—successfully combine cultural connotations with modern design requirements, resulting in products that possess unique cultural significance and emotional appeal. The research findings reveal that this narrative design not only enhances the cultural identity of the souvenirs but also fosters a profound emotional resonance with consumers. This design strategy underscores the importance of narrative design in intangible cultural heritage; by endowing products with the ability to "tell" culture, they transcend mere craft items and evolve into deeply experiential cultural goods, thereby promoting the revival and dissemination of traditional culture within a modern context. As Gao (2023) noted, "narrative design, as an

effective design method, not only imparts profound emotional value and cultural connotation to Huaiyang Mud Dog souvenirs," which aligns with the findings of this study and emphasizes the significance of narrative design in cultural products.

2. Verification of Market Adaptability and Feasibility of the Model

To ensure the market adaptability of the constructed model, this study designed and developed several Huaiyang Mud Dog souvenirs that meet modern sustainable development standards and conducted a comprehensive market evaluation. The research demonstrates that consumer interest in the products primarily focuses on multiple dimensions, including cultural transmission, emotional resonance, design innovation, and practical functionality. The Huaiyang Mud Dog serves not only as a significant symbol of intangible cultural heritage but also establishes a complex social and economic relationship network with traditional culture, commercial capital, and the cultural creative industry (Zhao, 2019). This provides a feasible path for balancing cultural transmission with commercialization, effectively integrating the products into contemporary social life, and addressing the cultural needs of the new era (Xie & Fan, 2014).

Conclusion

1. The Huaiyang Mud Dog originates from totemic worship, ancestor worship, and reproductive worship, utilizing abstract symbols of points, lines, and planes in its design to display highly symmetrical and rhythmic aesthetic characteristics. These design elements not only attract attention visually but also resonate emotionally with consumers. For example, its color scheme follows the "Five Colors Theory," with a black base accentuated by red, yellow, white, and green, embodying unique cultural and aesthetic values. These elements play a crucial role within the narrative design framework, enhancing cultural transmission and emotional engagement, and allowing consumers to gain a deeper understanding and experience of this traditional craft.

2. Based on narrative design theory, this study systematically constructs an innovative design model for Huaiyang Mud Dog souvenirs. This model incorporates multiple dimensions, such as the integration of cultural heritage and innovation, user-centered emotional design, visual narrative strategies, and sustainability, to propose a series of product design solutions that meet contemporary social needs. These solutions provide theoretical support to address the tension between traditional culture and modern market demands, while also paving a new path for the sustainable innovation of cultural products.

3. Through stages including demand exploration, narrative theme extraction, determination of expression levels, narrative plot setting, and the establishment of an evaluation index system, this study has developed Huaiyang Mud Dog souvenirs aligned with modern sustainability standards. These products feature innovations in visual effect, functional experience, and emotional resonance, enhancing users' emotional engagement. As a result, users not only become loyal to the product but also actively participate in cultural dissemination. Market assessments indicate that these products possess strong market competitiveness and longevity.

4. An analysis of evaluations from experts, inheritors, and consumers reveals that cultural transmission and emotional resonance are universally recognized advantages of these products. Differences in perspectives indicate that experts and inheritors prioritize cultural expression and design innovation, while consumers focus more on practicality, interactivity, and experiential qualities. Future research should further explore the diverse expressions of the Huaiyang Mud Dog within modern society, promoting a deeper integration of cultural heritage with contemporary design. Additionally, consideration should be given to applying narrative design theory to other forms of intangible cultural heritage to examine its importance in sustaining cultural traditions over time.

Recommendation

This study finds that the innovative design framework based on narrative design theory effectively extracts the core cultural elements of the Huaiyang Mud Dog and enhances both cultural value and user experience through emotional storytelling. The significance of this framework lies in its provision of an innovative pathway for the transformation and preservation of intangible cultural heritage within modern market environments. Strengthening users' emotional connections to cultural products fosters cultural identification and market adaptability. This design framework demonstrates broad application potential and can be adapted for the development of other intangible cultural heritage products, using narrative techniques to deepen cultural resonance and enrich the user experience, thereby enhancing both market influence and cultural dissemination.

Future research should focus on the innovative application of narrative design on digital platforms (such as AR/VR) to promote interactive and immersive experiences of intangible cultural heritage. Specifically, interdisciplinary collaboration is encouraged to further explore the applicability of narrative design theory across diverse cultural contexts, providing forward-looking guidance and innovative models for the global dissemination of cultural heritage, thereby fostering sustainable preservation and innovation of cultural heritage in contemporary society.

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