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Educational Function Types and Environmental Art Design Transformation Strategies of Hainan Urban Markets under the Background of Cultural and Tourism Integration

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Abstract: Against the backdrop of deep cultural and tourism integration, Hainan urban markets have transcended their traditional role as mere commodity trading venues, emerging as vital spaces for cultural expression, ecological education, and community interaction. However, current market development faces a structural dilemma of emphasizing traffic over substance, characterized by superficial cultural displays, a lack of interactive ecological education platforms, and fragmented community memories. To address these challenges, this study systematically defines the educational functions of markets and explores targeted environmental art design transformation strategies. Utilizing a logical framework of type identification, strategy formulation, and practice validation, the research deconstructs the educational functions of Hainan urban markets into four core dimensions: cultural transmission, ecological cognition, community cohesion, and innovative practice. The study emphasizes that cultural transmission must shift from static symbolic displays to dynamic interactions involving cognitive, emotional, and behavioral participation. Ecological cognition requires immersive experiences to transform local wisdom into sustainable behaviors. Community cohesion aims to rebuild identity and responsibility through daily interactions, while innovative practice necessitates a complete experiential cycle of observation, thinking, action, and reflection. Ultimately, this research provides theoretical depth and practical applicability for revitalizing cultural resources. By utilizing environmental art design to bridge space, culture, and people, the study offers an actionable pathway to transform Hainan's urban markets into dynamic classrooms, thereby infusing humanistic value into the construction of the Hainan Free Trade Port.

Keywords: urban markets; cultural tourism; educational functions; environmental art; typology analysis

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1. Introduction

The integration of culture and tourism has progressed from a basic industrial overlay to a profound symbiosis at the value level, establishing itself as a pivotal approach for revitalizing cultural resources and enhancing tourism experiences. Urban markets in Hainan, recognized as the most culturally vibrant touchpoints, carry multifaceted missions encompassing cultural inheritance, ecological awareness, and community cohesion. Within the context of deep cultural-tourism integration, markets have evolved beyond their traditional role as commodity trading venues, transforming into essential spaces for cultural expression, ecological education, and community interaction. However, the current development of markets faces structural challenges characterized by an overemphasis on traffic rather than substance. Cultural displays often remain superficial, ecological education lacks engaging platforms, and community memories exhibit fragmented tendencies. For instance, tourists tend to quickly pass by Li brocade stalls in arcade-style old streets, while in Yacheng Fish Market, the focus is predominantly on product prices, undermining the educational potential these markets could offer. Environmental art design serves as a critical medium that bridges space, culture, and

people, extending beyond mere visual aesthetics to systematically convert abstract educational objectives into tangible, participatory, and sustainable daily experiences. This study challenges the misconception of overgeneralizing educational functions and precisely defines the educational roles of markets based on the unique characteristics of cultural-tourism scenarios [1, 2]. It further explores targeted mechanisms for transformation. The research holds dual significance: at the policy level, it aligns with the strategic direction of promoting educational function development in cultural-tourism scenarios as outlined in the 14th Five-Year Plan for Culture and Tourism; at the practical level, it contributes humanistic warmth to the construction of the Hainan Free Trade Port, transforming markets into dynamic spaces for narrating China's stories and Hainan's cultural heritage. Employing a logical framework of type identification, strategy formulation, and practice validation, the study ensures both theoretical depth and practical applicability.

2. Four-Dimensional Typology Analysis of Educational Functions in Hainan Urban Markets

2.1. Cultural Transmission: Dynamic Interactions and Inheritance

The educational function of markets is expressed through tangible value forms embedded in their everyday practices, necessitating theoretical exploration for typological analysis. Markets in Hainan serve as a "living museum" of local culture, offering educational value through dynamic cultural transmission facilitated by interactions among individuals, objects, and events, rather than relying on static displays. However, contemporary market practices often reduce cultural elements to mere decorative symbols, neglecting the human-centered narratives essential for maintaining cultural inheritance [1]. This disruption in cultural transmission chains undermines the educational potential of markets. From an academic perspective, cultural transmission encompasses three critical dimensions: the cognitive acquisition of cultural knowledge, emotional resonance with cultural values, and active engagement in cultural practices. The absence of these dimensions in market environments highlights fundamental fractures in the mechanisms of cultural education. Addressing these gaps requires a holistic approach to reintegrate cognitive, emotional, and behavioral aspects, ensuring that markets fulfill their role as dynamic spaces for cultural learning and preservation.

2.2. Ecological Cognition: Experiencing Local Wisdom

The educational function of ecological cognition leverages the inherent indigenous wisdom found in local markets, such as tidal trading patterns and the innovative reuse of materials like coconut shells [3]. This approach emphasizes the transformation of "local wisdom" into meaningful, experiential learning opportunities. From the perspective of ecological education, it is essential to integrate the dimensions of "knowledge-emotion-intention-action," fostering a holistic unity between acquiring knowledge, cultivating emotional connections, developing willpower, and guiding behavior. However, current practices in market-based ecological education often remain narrowly focused on knowledge acquisition, neglecting the critical aspects of emotional engagement and behavioral transformation. This limitation significantly impedes the realization of comprehensive educational objectives. To address these challenges, effective ecological education should prioritize immersive and participatory experiences. By actively engaging visitors in the processes and practices of ecological wisdom, such education can foster a deeper understanding, promote ecological awareness, and encourage the adoption of sustainable behavioral habits that align with long-term environmental goals.

2.3. Community Cohesion: Fostering Identity and Participation

The educational function of community cohesion is cultivated through everyday interactions in public spaces such as markets, where activities like neighborhood greetings and festive performances play a vital role in fostering values of mutual assistance and inclusiveness [1]. These interactions reflect the practical and life-oriented nature of

community education, emphasizing the importance of shared experiences and collective engagement. From the perspective of community education theory, this function can be understood through three interconnected dimensions: community identity, community participation, and community responsibility. Markets, as public spaces, serve as essential arenas for shaping and reinforcing community identity by providing opportunities for social interaction and cultural expression. However, the increasing trend of commercialization has disrupted these dynamics, leading to a growing estrangement between vendors and residents. This shift has diminished the carriers of community memory, weakening the sense of shared identity, reducing active participation, and eroding the collective sense of responsibility within the community.

2.4. Innovative Practice: Cultivating Creative Thinking

Innovative practical education operates by prioritizing hands-on creation as a means to stimulate and nurture innovative thinking, reflecting the essential interplay between practicality and creativity in educational processes. According to the principles of innovation education, this approach should ideally follow a comprehensive cycle of "observation-thinking-action-reflection," ensuring a holistic development of creative capabilities [4]. However, a significant challenge faced by market-driven innovation education lies in its frequent limitation to the initial stages of "observation" and "action." This superficial engagement often neglects the deeper phases of "thinking" and "reflection," which are critical for fostering genuine innovation. To address this gap, market-based innovation education must emphasize providing well-rounded experiential learning opportunities. By encouraging participants to engage in reflective thinking alongside hands-on activities, such programs can cultivate enduring habits of innovative thought, thereby enhancing their overall effectiveness in promoting creativity and problem-solving skills.

2.5. Comprehensive Framework: A Multidimensional Landscape

The four educational functions collectively form a comprehensive framework that encapsulates the multidimensional value of market education, offering robust theoretical foundations for design transformation [5]. The cultural heritage education function emphasizes the importance of preserving and understanding the "past," ensuring that historical knowledge and traditions are effectively transmitted across generations. The ecological awareness education function addresses the "present," fostering a sense of responsibility and mindfulness toward environmental sustainability. The community cohesion education function highlights the "now," promoting social integration and collective identity within communities. Lastly, the innovative practice education function envisions the "future," encouraging forward-thinking approaches and creative problem-solving. Together, these interconnected elements create a dynamic and holistic landscape of market education functions, reinforcing their relevance across temporal dimensions.

3. Core Principles of Environmental Art Design in Transforming Educational Functions

Design transformation must transcend superficial approaches such as merely "adding educational elements," adhering to three core principles to ensure that educational functions are organically integrated into the spatial fabric. The locality principle emphasizes that designs should deeply root themselves in Hainan's cultural DNA, achieving a spatial translation of cultural symbols that resonates authentically with the region. For instance, participatory co-creation can involve extracting symmetrical patterns from Li brocade to design stall partitions or interpreting the layered structure of Dangjia fishing platforms as rest areas. These approaches ensure that the spatial language aligns with local culture. However, it is crucial to avoid direct replication of regional elements, as this could undermine cultural authenticity and locality. Instead, this principle demands a profound immersion in the cultural context, transforming designs into mediums for cultural dialogue rather than mere tools for cultural interpretation [6]. By

doing so, the designs foster a deeper connection between the space and its cultural heritage, enriching the educational experience.

The seamless integration principle underscores the importance of embedding educational content so naturally into consumer journeys that it becomes indistinguishable, akin to salt dissolving in water. This approach involves weaving cultural narratives into everyday activities, such as the ordering process, where knowledge is subtly conveyed through sensory experiences like touch, tasting, and dialogue. This avoids the creation of isolated "educational zones" that might feel disconnected or forced. Instead, educational experiences and commercial activities form an organic symbiotic relationship, enhancing tourists' natural engagement and depth of participation [7]. Designers must adopt a tourist-centric perspective, ensuring that educational elements are seamlessly integrated into visitors' natural experience flows. Education should not feel like an additional burden but rather an intrinsic part of the overall experience, enriching it in a way that feels effortless and engaging.

The community-centric principle emphasizes the need for designs that activate the intrinsic vitality of neighborhoods, transforming residents from passive recipients into active co-educators. This can be achieved by reserving flexible spaces for self-directed arrangements and establishing platforms for skill-sharing, where artisans can authentically demonstrate their expertise. Empowering community agency ensures that education gains sustainable vitality and emotional resonance. This principle represents more than just a design strategy; it signifies a paradigm shift in educational philosophy. The focus moves from "designing for communities" to "co-creating with communities," ensuring that education takes root in the local soil and becomes a living, evolving process [8]. By fostering a sense of ownership and collaboration, this approach creates a dynamic environment where education is not only sustainable but also deeply meaningful to all stakeholders involved.

The three fundamental principles mutually reinforce and complement one another, collectively forming the theoretical foundation for environmental art design to fulfill its educational transformation function. The locality principle ensures authentic cultural expression by grounding designs in the region's unique heritage. The seamless integration principle guarantees that educational experiences are naturally embedded within the spatial and experiential flow, making them an organic part of the visitor's journey [9]. Meanwhile, the community-centric principle sustains educational vitality by empowering local residents and fostering collaborative engagement. Together, these principles work synergistically to enable the educational functions of marketplaces to develop organically within spatial contexts, creating spaces that are not only functional but also deeply enriching and culturally resonant.

4. Transformation Strategies of Environmental Art Design for Four Types of Educational Functions

Cultural Heritage Preservation: Narrative Coherence and Engagement To address four core educational functions, a "function-strategy" precision mapping system is established to ensure targeted and actionable design approaches [10]. For cultural heritage preservation, transformation strategies should prioritize narrative coherence and participatory engagement. Ground patterns can be designed to connect stalls, creating cultural pathways that guide visitors through a cohesive narrative of the market's history and significance. Wall-mounted time-lapse installations can visually showcase historical evolution, allowing visitors to experience cultural continuity as they move through the space. Additionally, embedding story QR codes in stalls enables visitors to listen to vendors' oral histories, transforming cultural transmission from a passive observation into an active and engaging experience. By integrating these narrative elements into existing spaces without requiring major renovations, cultural education becomes seamlessly woven into the daily operations of the market, avoiding the imposition of additional burdens on vendors or visitors.

Ecological Cognition: Embodied and Interactive Experiences Transformation strategies for ecological cognition should focus on creating embodied and interactive experiences that enhance ecological education. Environmentally adaptive installations, such as tidal light walls that dynamically adjust illumination based on real-time water levels, can help visitors perceive and understand natural patterns in an intuitive manner. Interactive kiosks embedded with species tracing systems can display fruit labels that provide information about growth environments and ecological values, effectively bridging ecological knowledge with marketable products. Furthermore, interactive children's painting areas and ecological recycling installations can serve as hands-on educational tools, allowing visitors to internalize ecological concepts through direct participation. The use of eco-friendly materials for flooring and furniture further reinforces environmental messages, ensuring that ecological education is naturally integrated into the market space. These immersive experiences enable visitors to absorb ecological knowledge in a way that is both engaging and memorable.

Community Cohesion: Daily Interactions and Inclusivity Transformation strategies for fostering community cohesion should emphasize the importance of daily interactions and inclusivity. A community story collection wall can be established to display residents' contributions, visually representing collective memories and shared experiences [11]. Designing senior interpretation platforms and student-led tour programs can facilitate intergenerational dialogue, strengthening bonds within the community through meaningful engagement. Additionally, reserving modular spaces for spontaneous event organization can encourage active participation, shifting community cohesion from a passive acceptance of shared spaces to an active creation of shared experiences. This approach creates a virtuous cycle of community education, where residents are both contributors and beneficiaries of a dynamic and inclusive environment.

Innovation Practice: Openness and Participatory Creation The transformation strategy for innovation practice functions should focus on fostering openness and participatory creation in creative experiences. Live-streaming screens can be installed to showcase design processes, making innovative thinking visible and accessible to all visitors. Providing basic tools and resources can lower participation barriers, ensuring that individuals from diverse backgrounds can engage in creative activities. Corner spaces can be utilized for themed workshops, maximizing the use of market areas while offering opportunities for skill development and collaboration. Exhibition zones and collaboration opportunities can be created to form a "participation-display-incentive" closed loop, which fosters sustained innovation momentum. This approach not only encourages creativity but also integrates innovation into the cultural and social fabric of the marketplace.

Comprehensive Framework: The Virtuous Cycle of Strategies The four strategies operate independently yet are interconnected, collectively forming a comprehensive framework for transforming the educational functions of marketplaces [12]. The cultural heritage preservation strategy provides a foundational cultural context that supports ecological awareness, while the ecological awareness strategy creates environmental conditions conducive to fostering community cohesion. Community cohesion strategies, in turn, establish the social foundations necessary for innovative practices, which subsequently infuse cultural heritage with renewed vitality and relevance. Together, these four elements form a virtuous cycle that enhances the overall educational value of marketplaces, ensuring that they serve as dynamic spaces for cultural, ecological, social, and innovative learning.

5. Case Analysis: Design Transformation Practice of Sanya Yazhou Ancient City Market

The Yazhou Ancient City Market Renovation serves as a quintessential example of strategic urban design implementation. Operating under the concept of "Mountain-Sea Cultural Heritage and Urban Classroom," the project effectively integrates four distinct educational functions to redefine spatial narratives and enhance community engagement

[9]. The main thoroughfare incorporates Li brocade patterns as ground-level signage, which seamlessly connects themed zones and fosters a continuous cultural flow throughout the market. Along the waterfront, interactive installations are designed to synchronize with tidal movements, creating an immersive ecological experience that highlights the dynamic relationship between nature and urban spaces. Additionally, a central mobile platform has been meticulously designed to accommodate both daily activities and festive events, thereby establishing vibrant community engagement spaces that cater to diverse needs and occasions.

In efforts to preserve cultural heritage, Li ethnic elders were actively involved in the narrative design process, utilizing innovative story QR codes to allow visitors to listen to storytelling in the Li language. This approach transforms cultural heritage from static symbolic displays into dynamic and immersive experiences, fostering deeper connections with local traditions. For ecological awareness initiatives, dedicated coral conservation exhibition zones were established alongside interactive educational maps tailored for children, seamlessly integrating environmental education into the daily operations of the market. To further strengthen community cohesion, veteran fishermen were trained as storytellers, while neighborhood tea corners were created to naturally incorporate social interactions into the market's operations. In terms of innovative practices, a maker space was introduced, providing creative materials and tools to encourage visitor participation. This initiative forms a comprehensive "participation-display-incentive" cycle, enabling visitors to actively engage with the market's creative and cultural offerings.

Through a series of operational reforms, the market has successfully transitioned from a basic consumer venue into a multifaceted educational experience space. Visitors now spend significantly more time exploring the market, demonstrating a deeper understanding of local culture and heightened engagement, particularly among the youth demographic. Community satisfaction rates remain consistently high, while vendors report concurrent improvements in business performance. The core insight of this transformation lies in the integration of educational value with community operations through the "Education Partners" mechanism. This approach shifts the focus from isolated project-based initiatives to routine practices that foster a positive "design-participation-value" cycle. By empowering community members as primary educational agents, the market seamlessly merges educational activities with its operational framework, achieving sustainable educational development and reinforcing its role as a dynamic cultural and ecological hub.

6. Optimization Path and Future Prospects

The implementation of policies necessitates a comprehensive and systematic support framework [4]. To achieve this, three optimization pathways have been conceptualized, each grounded in theoretical reflection and practical applicability. These pathways aim to enhance the integration of educational functions within cultural tourism markets, ensuring their alignment with broader developmental goals.

In the realm of standardization and forward planning, it is proposed to develop the "Guidelines for Educational Function Design of Cultural Tourism Markets." These guidelines should delineate fundamental requirements, such as ensuring narrative coherence and achieving specific interactive penetration rates. By embedding educational objectives at the initial planning stages, these guidelines can serve as a foundational tool for systematic implementation. For instance, the vertical structural design of Sanya's "Tropical Rainforest Themed Market" exemplifies how educational goals can be seamlessly integrated with spatial planning [7]. This approach not only achieves the intended objectives but also provides a replicable and standardized model that can be implemented on a national scale, fostering consistency and quality across various regions.

From the perspective of operational lightweighting, a "low-cost, high-emotional" design strategy is advocated. This strategy emphasizes the use of accessible and cost-effective methods, such as interactive floor mapping created with chalk, handwritten storyboards, and the strategic use of natural light and shadow effects to enhance ambiance.

By prioritizing emotional engagement over expensive technological investments, this approach ensures that the transformation of educational functions remains both operationally feasible and financially sustainable. This method not only reduces the economic burden on stakeholders but also fosters a more authentic and emotionally resonant experience for participants.

In terms of normalized collaboration, a coordinated mechanism has been established to ensure the sustainable integration of educational functions. This mechanism involves cultural and tourism departments taking the lead, with educational institutions providing coordination, community entities actively participating, and design teams offering technical support. By incorporating the market into the study tour system and establishing a community self-renewal fund, this collaborative framework effectively dismantles traditional departmental barriers. It fosters a multi-stakeholder ecosystem that promotes the normalization and sustainability of educational functions within the market, ensuring long-term benefits for all involved parties.

Future development directions emphasize the integration of lightweight technology, where augmented reality (AR) is selectively applied at critical points to enhance educational experiences without overwhelming them with excessive digitization. This ensures that technology serves as a supportive adjunct rather than dominating the experience, preserving the authenticity of interactions. Additionally, regional collaboration is proposed, connecting multiple market hubs to form cohesive educational loops. By designing badge-based experiential models, these loops can facilitate regional coordination and resource sharing, thereby enhancing the overall impact of educational functions. Such strategies aim to create a more interconnected and resource-efficient system.

The establishment of a correlation model between "educational value and commercial benefits" is also proposed to provide a theoretical foundation for stakeholder investments. This model quantifies how educational initiatives contribute to vendor revenues and community cohesion, offering a clear framework for evaluating the economic and social impacts of such programs [1]. By exploring regional collaboration and value realization, this approach presents a novel pathway for the sustainable development of educational functions within market-based systems, ensuring that these initiatives remain viable and impactful over the long term.

7. Conclusion

The profound value of cultural and tourism integration lies in the ability of spaces to carry educational warmth and nurture spiritual growth through immersive experiences. This study provides empirical evidence demonstrating that the educational functions of Hainan urban markets can be systematically transformed through environmental art design. Four distinct functional categories—cultural inheritance, ecological awareness, community cohesion, and innovative practice—are identified, each underpinned by a systematic and deliberate design logic. The essence of this transformation does not rely on grandiose narratives but rather on meticulous, human-centered design elements. For instance, a thoughtfully crafted ground pattern, an authentic oral account from a vendor, or an inclusive neighborhood interaction space can all serve as tangible carriers of educational and cultural value. When design is deeply aligned with the dimensions of human growth, urban spaces can achieve sustainable vitality that transcends temporal and spatial boundaries. In the broader context of Hainan's development as a globally influential free trade port with distinct Chinese characteristics, the transformation of every market into a narrative carrier imbued with humanistic warmth and cultural depth becomes a pivotal strategy. This approach fosters a new developmental paradigm characterized by "cultural-tourism integration, educational immersion, and community symbiosis." Environmental art design emerges not merely as a technical tool for spatial transformation but as a critical value bridge connecting tradition with modernity, commerce with humanity, and individuals with communities. This study establishes a robust theoretical framework and practical pathway for enhancing the educational

functions of public spaces within the context of cultural-tourism integration. It offers significant insights into promoting the core concept of "people-oriented" urban space value restoration, while contributing a replicable and scalable "Hainan model" that can serve as a blueprint for realizing educational value in cultural-tourism scenarios across diverse regions. Furthermore, this research underscores the potential for future studies to explore the scalability of these design principles in other urban and cultural contexts, thereby broadening the scope of their application and impact.

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