

Exploration of Liangzhu Intangible Cultural Heritage Protection and Inheritance Path Based on Semiotics Theory

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Abstract. Liangzhu culture is a crucial heritage of ancient Chinese civilization. Its unique patterns are not only the crystallization of art, but also an important symbol with profound cultural connotation. To promote the inheritance and development of Liangzhu culture, with a focus laid on the special patterns of Liangzhu intangible jade and pottery, in combination with the comprehensive analysis method of semiotics, this paper analyzes the signifier of Liangzhu cultural patterns, that is, the visual language composed of intuitive features of patterns, and expounds on the signifier system, which is about how these patterns reflect the religious beliefs, social concepts, living customs and aesthetic pursuit of ancient society. Through systematic sorting and classification, a pattern classification table is established, which intuitively presents the diversity of Liangzhu patterns in themes and symbolic meanings. On this basis, in addition to exploring the protection and development of Liangzhu cultural patterns in modern society and emphasizing the combination of Liangzhu culture and aesthetic education, this paper cultivates the public cognition and love for Liangzhu culture, especially teenagers, uses digital technology to realize effective protection and wide dissemination of culture, and enhances the sustainable protection of intangible cultural heritage. Meanwhile, Liangzhu elements are integrated into the field of product design, so as to rejuvenate ancient patterns in modern design through cross-border cooperation and innovative design, thus promoting the inheritance and innovation of Liangzhu culture in the new era.

Keywords: Semiotics, Liangzhu Culture, Protection and Inheritance, Intangible Cultural Heritage.

1. Introduction

Liangzhu culture in China is one of the vital cultures from the late Neolithic Age to the early Bronze Age. Represented by black pottery and polished jade articles, Liangzhu culture is also an essential source of Chinese civilization. Jade articles are the most representative of Liangzhu culture, and the exquisite ornamentation depicted in jade articles are even more amazing. Liangzhu cultural pottery is an indispensable type of pottery in the late Neolithic Age in China, which is famous for its exquisite production, mature craftsmanship and high artistic component. Liangzhu pottery is generally depicted, from simple drawing lines to complex ornamentation, from depicting to punching, which makes the utensils more beautiful. Specifically, most remaining depicted symbols are found on pottery. Both jade ornamentation and pottery engravings are cultural symbols with the cultural connotation of Liangzhu.

Because of its uniqueness and superiority, Liangzhu culture has attracted extensive academic attention and produced numerous results. When it comes to the exploration of Liangzhu patterns, Liang Lijun systematically traced the evolution of patterns from Songze to Liangzhu culture in *A Study of the Three Main Pattern Motifs of Songze and Liangzhu Culture*, focusing on the detailed analysis of the three “motifs” including circle and arc triangle, bird image and spiral pattern, and their changes and development [1]. Liu Yangyang, Zhang Yiling, Qian Lixia and Cen Ling further used the modern design of shape grammar to innovatively redesign Liangzhu motif patterns in *Research on the Cultural Connotation and Derivative Design of Liangzhu Motif Decoration* [2]. There are still scholars in different fields who have analyzed the research of Liangzhu jade articles from various perspectives. Wu Hongye emphasized the jade articles in *Mysterious Complexity—Take the Modelling of Liangzhu Jade as an Example*, and discussed the ornamentation, shape and the compound relationship between people and utensils [3]. In the *Research on the Use of Cultural Symbols of Liangzhu Jade in the Design of Cultural and Creative Products*, Liu Jiahui analyzed the

concept, classification and modeling characteristics of Liangzhu Jade cultural symbols, and discussed their cultural symbols. She constructed the corresponding theoretical system, summarized the development law and design concept, and demonstrated its integration and application in modern cultural and creative products through practice [4].

In October 2017, President Xi further emphasized in the Report of the 19th National Congress of the Communist Party of China that “we must strengthen cultural self-confidence and promote the prosperity of socialist culture” [5]. Civilizations are colorful because of exchanges and enriched by mutual learning. Liangzhu culture has witnessed the 5,000-year history of Chinese civilization. Its spread helps us to have a deeper understanding of the diverse Chinese national culture and world civilizations. It is greatly significant to intensify the spread and influence of Chinese culture on a global scale. The 19th Asian Games held in Hangzhou is a vivid example of disseminating Liangzhu culture. The Asian Games is not only a grand sports event, but also a window to show the profound heritage of Liangzhu civilization to the world. During the preparation of the Asian Games, the core concept of Liangzhu culture was integrated into the torch relay and opening theatrical performance. Moreover, the elements of Liangzhu culture were applied to the visual image system of the Hangzhou Asian Games. The mascot of the Asian Games is “Cong Cong”, whose head crown decoration is extracted from Liangzhu Royal Jade Cong, with its ear decoration inspired by Liangzhu Jade Fish. “Fei Fei”, the mascot of the Asian Paralympic Games, refers to the elements of the Liangzhu Jade Bird in its design. The traditional patterns in Liangzhu Royal Jade are adopted in the cultural activity logo. The Asian Games showed the elegance of Liangzhu culture to the world, which made Liangzhu culture receive worldwide recognition in the post-Asian Games era.

At present, although the protection and inheritance of Liangzhu culture have achieved remarkable results, there are still some shortcomings. For example, the publicity of Liangzhu culture is not enough to arouse widespread public attention and participation. Many people don't have sufficient knowledge of the importance of heritage protection. It's necessary to strengthen publicity and public awareness as well as disseminate Liangzhu culture, so as to enhance the protection and inheritance. Through an on-the-spot visit to Archaeological Ruins of Liangzhu City Park and Liangzhu Museum, this paper has an initial understanding of the essence of Liangzhu culture, and then extensively consulted relevant literature at home and abroad. Apart from integrating a large number of literature materials about Liangzhu culture, semiotics, Liangzhu jade articles, depicted symbols, etc., the relevant knowledge was selected to provide a reference and theoretical basis for this paper. Meanwhile, this paper summarized and sorted out different methods and excellent cases of cultural inheritance and protection, thus putting forward the protection and development methods suitable for Liangzhu culture. With emphasis laid on the intangible cultural heritage of Liangzhu culture, this paper further uses semiotic theory to classify the unique ornamentation, dig into the cultural implications behind these symbols, and explore an effective path for the protection and inheritance of Liangzhu culture.

2. Theoretical Overview

2.1. Liangzhu Culture

Liangzhu culture, located in the Taihu Lake Basin in the lower reaches of the Yangtze River, has a duration measured by carbon 14 as the late Neolithic Age from 5,300 to 4,300 years ago. It was named by the famous scholar Xia Nai in 1959, which represents a brilliant apex of Neolithic culture around Taihu Lake. It not only inherits Majiabang and Songze cultures, but also leads the rise of Qianshanyang culture and Guangfulin culture, which is an indispensable key stage in the long history. During this period, the people of Liangzhu created a developed rice farming system and advanced handicraft industry. From the archaeological discoveries of magnificent palace ruins, ancient city ruins and the oldest water conservancy engineering system in the world, we can get a glimpse of the social structure and political system at that time, which confirms that the embryonic form of an early country has appeared in Liangzhu area. The discovery of Liangzhu culture, especially the

archaeological achievements of the Archaeological Ruins of Liangzhu City, has proved the 5,000-year history of Chinese civilization, which greatly advanced the starting point of Chinese civilization history to the late Neolithic Age from 5,300 to 4,300 years ago. In 2019, the Archaeological Ruins of Liangzhu City were listed on the World Heritage List, with its heritage value mainly reflected in the city site, peripheral water conservancy system, graded cemetery and unearthed cultural relics. Its successful application for World Heritage has made the 5,000-year history of Chinese civilization widely recognized by the international community. Meanwhile, the discovery and research of Liangzhu culture have provided an opportunity for countries worldwide to understand ancient Chinese civilization. Thus, scholars from all over the world can have a deeper understanding of the characteristics and achievements of ancient Chinese civilization, thus enhancing communication and understanding among people of all countries.

Liangzhu culture shows the brilliant achievements of Chinese civilization in the late Neolithic Age with its unique cultural relics such as jade, pottery and architecture. Among them, the biggest feature of Liangzhu culture is its unearthed jade articles. These jade articles are not only huge in quantity and variety, but also reach an unprecedented exquisiteness in carving technology, which can be called the pinnacle of prehistoric jade art. Liangzhu jade is a concentrated expression of the highly developed jade civilization and an outstanding representative of the wisdom crystallization and artistic attainments of Liangzhu ancestors. It integrates complex social relations, solemn ceremonial processes and profound religious beliefs, which shows the rich spiritual world of Liangzhu ancestors 5,000 years ago. Liangzhu ancestors created a set of jade ritual vessels system including four iconic jade ritual vessels: jade bi, jade cong, jade yue and jade huang. These jade ritual vessels not only indicate the ancestors' ultimate aesthetic pursuit and mastery of exquisite skills in artistic modeling and decorative techniques, but also outline the social stratum structure at that time through their inherent hierarchical system and quantitative differences, which profoundly embodies the political idea of divine right of monarchy and the social order of ritual system. Especially in the tombs of Liangzhu culture, the large-scale use and careful layout of jade articles form a spectacular scene. In addition to showing that the spiritual belief based on jade articles such as cong, yue and bi has become a value concept respected by the whole people, it indicates that a strict and standardized system of using jade has been established, further strengthening the concept of social hierarchical order and etiquette system. Meanwhile, the pottery production of Liangzhu culture is developed. These pottery vessels are mostly practical utensils, well-made, with various kinds and functions, which constitute an indispensable part of the daily life of society at that time. They can be roughly divided into cooking vessels, food vessels, receptacles and wine vessels, which presents the ancestors' dual pursuit of practicality and aesthetics. In addition, in the funeral customs of Liangzhu culture, pottery also plays an important role, with tripod, bean and pot (jar) as the basic combination. Although the types and fineness of unearthed pottery are not as good as those of jade articles, it is significant to have single or group depiction symbols with ideographic functions on pottery. In short, the ornamentation on Liangzhu jade articles and the engraving symbols on pottery are both cultural symbols, which condense the essence of Liangzhu culture. These concrete symbols not only deepen the understanding and study of Liangzhu culture, but also broaden the communication of Liangzhu culture by virtue of their refined forms and powerful communication power.

2.2. Saussure's Semiotics Theory

As the founder of modern linguistics and semiotics, Saussure, a Swiss linguist, passed his works such as *Course of General Linguistics*. This paper systematically puts forward the basic concepts and methodology of semiotics, and constructs the basic theoretical framework of semiotics. He introduced the concept of "semiotics" in academia for the first time, and the status of semiotics in academia was established as an independent discipline.

The core of Saussure's semiotics lies in the theory of the dualistic relationship between signifier and signified. He pointed out that each symbol consists of two parts. One is the signifier, the specific material form of the symbol, which is the external manifestation of objects, sounds, tastes, etc.

perceived by our senses. The other is the signified, which refers to the concept, meaning or emotion pointed to by the external form and hidden behind it as the real content carried by the symbol. In Saussure's symbolic thought, symbols in semiotics have expressive level (signifier level) and content level (signified level). The expressive level is the external appearance of symbols, which is the part that we can perceive, such as images and sounds, while the content level requires us to obtain the deep meaning and internal information contained in symbols by understanding and interpreting symbols. Therefore, symbols are the perfect combination of signifier and signified, which are interdependent and together constitute the integrity and complexity of symbols [6].

Saussure's semiotic theory not only profoundly influenced the development of linguistics, but also penetrated into many disciplines including design. As a highly comprehensive knowledge system, the formation and development of design knowledge can not be separated from the cross-integration of multi-disciplinary knowledge. It is this relevance of knowledge that makes a close relationship between semiotics and design. Besides, the intervention of semiotics theory is conducive to solving the problems in design.

Since ancient times, people have believed that going to school means reading, which is used to represent learning. But in fact, human civilization is not only written in books, but also painted in paintings and photos. These images are visual artistic expressions and important carriers of knowledge. Thus, to learn and inherit culture, we should not only rely on interpreting texts, but also understand and study the stories and meanings behind images. In this context, the introduction of semiotics has opened up new horizons for image research. By applying semiotics to the study of how images tell stories and spread stories, we can more effectively interpret the profound meaning behind images, and then understand how they construct meaning, convey information and influence viewers [7].

3. Artistic Characteristics of Liangzhu Cultural Patterns

Saussure proposed that symbols are composed of "signifier" and "signified". The former is an external expression and the latter is an internal symbolic meaning, which jointly defines the meaning of symbols. Applying this theoretical framework to the analysis of Liangzhu cultural patterns, jade ornamentation and pottery engraving symbols are used as symbols, with their composition following the principle of symbol duality expounded by Saussure. In other words, the signifier is the visual shape of jade ornamentation and pottery engraving symbols that the viewer can perceive, while the signified is the concrete thing or abstract concept behind the visual shape of jade ornamentation and pottery engraving symbols.

3.1. Ornamental Characteristics of Liangzhu Jade Articles

Many precious cultural relics have been frequently unearthed from Liangzhu cultural sites. Among them, the most striking one is jade articles, whose ornamental design shows regular and solemn symmetrical beauty, smooth and stretched lines and meticulous craftsmanship, showing a harmonious and neat aesthetic pursuit. There are many kinds of ornamentations on jade articles of Liangzhu culture, the common ones include the faces of gods, people and animals, dragon's heads, birds and cloud, etc. These ornamentations not only appear alone, but also are often skillfully combined and arranged together to form more layered patterns.

3.1.1. Signifier System of Liangzhu Jade Ornamentation

(1) Animal Face Pattern

Animal face patterns mainly appear on jade cong, among which the most distinctive ornamentation is the face pattern of gods, people and animals, called "divine emblem" by scholars. The face pattern of god, man and beast on the "Royal Cong" unearthed in Fanshan Cemetery is the most representative, and the ornamentation is composed of god, man and beast. In order to show divinity, the face of the god-man is slightly exaggerated. The face is inverted trapezoidal, with a wide mouth, a wide nose and big eyes engraved. The head of the god-man wears a "Jie"-shaped crown composed of radial

feathers. The godman's limbs were densely covered with cirrus patterns and horizontal and vertical straight lines, with his five fingers spread obliquely above the big eyes of the beast's face. The performance of the animal focuses on depicting the oval eyes with double circles. Its upper and lower fangs stick out of its lips significantly, its claws are extremely sharp and curved, and each part is decorated with cirrus patterns and arcs, which enhances the momentum of the animal. The central axis of the whole ornamentation is symmetrical, and the lines are properly depicted, which organically combines the two images of God, man and animal faces, giving people a sense of solemnity, mystery and terror [8].

(2) Animal Pattern

In addition to animal face patterns, common animal patterns mainly include dragon patterns and bird patterns. The dragon patterns of Liangzhu culture are mostly dragon head patterns, with square mouths, convex kiss, big eyes and hooked ears. The motif of the dragon's head pattern may be crocodile, and the ancestors deified it to make people fear and respect. Bird is the richest theme in Liangzhu culture, and bird patterns in Liangzhu jade articles are manifested in independent bird-shaped jade carvings and line-carved bird patterns. Among them, line-carved bird patterns are more common, mostly with heavy circle-shaped rounds to represent the eyes and body, and mostly exist as foil ornamentations. The inscription of "Bird Standing High Platform" places the bird image in the main body, and the image basically consists of a symmetrical third-order box and a side-standing bird shape.

3.1.2. Signified System of Liangzhu Jade Ornamentation

(1) Early Reflection of Nature Worship

In the early days of Liangzhu culture, ancestors were both curious and full of awe of natural phenomena such as wind, rain, thunder and lightning, the change of four seasons, the sun, moon and stars. Due to the relative backwardness of productive forces, they can't completely counter the forces of nature by their own strength, let alone reasonably explain the mysteries behind these phenomena with scientific logic. Under the simple and primitive mode of thinking, they respect the belief that "all things are animistic", deify the images of animals and plants, and carve them on jade articles to show their awe. Furthermore, the animal patterns in jade ornamentation reflect this primitive worship. Since ancient times, the legend and custom of worshipping birds have been widespread. Because of their flying ability, birds were regarded by the ancestors as messengers to communicate with the sun god, and were deeply worshiped by the ancestors [9]. A large number of bird patterns and their variants in Liangzhu jade ornamentation fully prove this handed down nature worship.

(2) Mid-term Reflection of Ancestor Worship

The development of primitive religion in China has changed from nature worship to ancestor worship. With the development of society, human beings understand nature and have a strong desire to conquer nature. People's self-awareness has increased, and the object of worship has changed from animals and plants to human beings themselves. In Liangzhu culture, the face pattern of gods and beasts depicts the ancestors or chiefs and wizards of ancient Liangzhu ancestors, and the image of gods and beasts who control ferocious beasts. In the era of low productivity, they conquer ferocious beasts, which reflects that human beings have changed from awe of natural forces to the hope of mastering and utilizing natural forces, thus essentially forming the worship of ancestors. The face patterns of gods and animals are not only used as decorative patterns of jade articles, but also widely used in sacrifices and burials. This shows that Liangzhu ancestors believed that the patterns had some mysterious power or magic power, which could communicate with heaven and earth and pray for their ancestors' blessing. While the theme of combining animal face patterns and bird patterns establishes the dominance of ancestor worship, the elements of nature worship still exist as supplements. The organic combination of the two factors forms a complete form of the primitive religious belief theme of the culture [10].

(3) Symbol of Wealth and Power in the Later Period

Liangzhu ancestors integrated the worship of God into jade articles, forming a jade ritual system, which later evolved into a ritual system and became an important symbol to define the difference of

identity and class. Liangzhu jade tomb culture is mostly a symbol of theocracy and royal power, so the jade articles engraved with the faces of gods, people and animals are also high-grade tombs, and the leaders of past dynasties are buried with the jade articles that they used to represent the supreme power during their lifetime. From the development of the ornamentation on jade cong ranging from the complex animal face pattern of gods and people in the middle of Liangzhu culture to the simplified animal face or gods and people pattern in the late period, it can be seen that the religious significance of Liangzhu jade ornamentation became weaker in the development. Besides, it became a symbol of status and wealth in the later period.













3.2. Characteristics of Engraving Symbols of Liangzhu Pottery

At present, about 1,000 depicted symbols from the Liangzhu period have been found, which are often located at the edge or bottom of the utensils and in conspicuous places of the utensils. Most of these depicted symbols are based on pottery, and a few are found on jade utensils. Depicting symbols has always been an important part of Liangzhu culture research. Studying depicting symbols can trace and understand the source of Chinese civilization more comprehensively.

3.2.1. Signifier System of Liangzhu Pottery Engraving Symbols

Liangzhu cultural pottery is a vital type of pottery in the late Neolithic Age in China, which is famous for its exquisite craftsmanship, mature technology and high artistic value. Among them, most of the remaining depiction symbols are found on pottery, which are divided into pictographic engravings and abstract engravings. Some pictographic engravings are depicted as concrete as pictures, while others change their shapes to simplicity and stylization. Abstract inscription characters account for the majority of depicted symbols, which are difficult to interpret with repetition and continuity in depicted symbols (as shown in Table 1).

Table 1. Classification of Liangzhu Patterns

Classification	Examples	Pattern Pictures				Semiotic Meaning
Face Pattern of Gods, People and Animals	Fan Mountain M12:98 Jade Cong Yao Mountain M10:20 Jade Plaque Fan Mountain M15:7 Jade Crown Ornament Fan Mountain M22:8 Jade Huang					Scholars Have Diverse Opinions: the Symbol May Be Related to the Religious Activities of Wizards, May Reflect the Desire of the Working People, or May Be a Form of Fertility Worship.
Animal Face Pattern	Face Patterns of Animals Dragon Head Patterns and Bird Patterns					Symbols Express the Nature Worship
Geometrical Pattern	Pictographic Engravings Abstract Engravings					Symbols Might Have Characteristics of Words and Used for Important Activities Including Recording, Dissemination and Reservation

3.2.2 Signified System of Liangzhu Pottery Engraving Symbols

Liangzhu culture engraving symbols may be related to early characters. The appearance of repeated symbols shows the stable correspondence between specific concepts and symbol shapes. At the same time, repeated symbols are widely found in different sites, indicating that the meaning of symbols can be spread and understood across regions, which reveals that Liangzhu society has a carrier-based information dissemination network, and the use of symbols has a tendency to be preliminarily standardized. Moreover, to carry more complex information content, engravings began to appear in the form of combinations, and the rise of continuous engravings may mark the early exploration and formation of writing formats [11].

4. Path Exploration for the Protection and Inheritance of Liangzhu Intangible Cultural Heritage

4.1. Integrating Liangzhu Culture into Aesthetic Education

Strengthening cultural self-confidence is inseparable from the inheritance of Chinese excellent traditional culture, which constitutes an indispensable theme in art education. During the integration of Liangzhu intangible cultural heritage into the art curriculum, it is necessary to fully consider students' learning stage and characteristics, pay attention to their individual differences, and design flexible and diverse learning modules. In the specific implementation, first of all, the background of the curriculum setting is introduced, and teachers use vivid multimedia teaching resources, such as high-definition documentary films, on-site interviews with archaeologists and photos of cultural relics, to build a comprehensive cultural cognitive framework for students. This link not only helps students establish a macro understanding of Liangzhu culture, but also stimulates their curiosity to explore the unknown. After that, the curriculum sets up the aesthetic analysis stage. The curriculum focuses on Liangzhu jade ornamentation and pottery engraving, and guides students to explore the visual characteristics and meanings behind Liangzhu cultural patterns, so that students can make it clear that these patterns are not only symbols, but also bear strong cultural connotations and historical information. Through this process, students can not only improve their perception of beauty, but also understand the close relationship between art and culture. Finally, the curriculum innovation and expansion section is set up. In this link, students are encouraged to combine the aesthetic elements of Liangzhu culture with modern art creation, and conduct practical exploration through various art forms such as painting and project design. Through cross-border practice, we should innovate and inherit Liangzhu culture, and stimulate students' creativity and artistic potential. Integrating Liangzhu culture into art education can deepen students' cognition and understanding of national culture, thus helping them to build cultural self-confidence and enhance cultural identity. In addition, such an effort effectively stimulates their interest in learning, and then builds cultural self-confidence in a subtle way. Moreover, it opens a door to the vast world for students, broadens their horizons, enhances their concepts of cultural inclusiveness and diversity, and enables students to deeply perceive and respect multiculturalism on the broad stage of global cultural exchanges, thus sticking to and carry forward Chinese culture in the face of cultural collisions. In addition to the traditional aesthetic education in schools, it is necessary to pay attention to the public aesthetic education of society. By implementing educational activities related to Liangzhu culture in museums, communities and other public places, such as lectures, exhibitions, workshops, cultural festivals, etc., more people can get in touch with the charm of Liangzhu culture, thus arousing their interest and sense of responsibility for its protection and inheritance.

4.2. Construction of Digital System of Liangzhu Culture

Digital technology plays a key role in cultural protection and inheritance, which not only promotes the open sharing of resources, but also boosts cultural innovation and design. With the development of science and technology, digitalization has become an important means of cultural heritage protection. As a pioneer in this field, the Palace Museum has demonstrated the unlimited potential of digital museums through innovative projects such as the "Digital Cultural Relics Library". There are online platforms and mobile applications such as "Digital Duobao Pavilion" and "Famous Paintings of the Palace Museum" not only make cultural relics present to the public in a more vivid and intuitive way, but also greatly enhance the global accessibility of cultural relics and spread the profound heritage and unique charm of Chinese culture. In the construction of the digital system of Liangzhu culture, a digital cultural resource database can be firstly established. Based on the digital technologies of cultural relics such as high-definition scanning, 3D modeling and image processing, the pattern elements of Liangzhu culture can be extracted and classified, and the colors of unearthed jade and pottery can be identified and summarized. At the same time, different patterns can be compared and their skills can be deconstructed, and a digital resource system including a pattern

library, color library and process flow library can be constructed. Then, we can create independent-themed digital works to achieve the purpose of publicity. Secondly, according to the element database, we can create cultural experiential communication combined with physical space, and use new technologies such as AR and VR to allow viewers to experience Liangzhu culture immersively, so as to have a deep understanding of Liangzhu culture. We can also use 5G combined with virtual reality technology to carry out real-time online explanations, which makes Liangzhu culture spread in a wider range and faster in a more convenient way. Finally, we can also use the Internet for shared communication, make small videos of popular science publicizing Liangzhu's intangible cultural heritage with the help of online media platforms, and mass media, shoot humanistic documentaries about Liangzhu ornamentation and publish media-integrated books that can be scanned and interacted, so as to realize the re-dissemination of cultural content. Digital development has deepened the integration of culture and technology, integrating real and virtual worlds. The establishment of the Liangzhu culture digital resource database can not only preserve the rich heritage of Liangzhu culture and provide researchers with high-quality research materials, but also help to innovate cultural narrative, create digital cultural experience, promote the diversification of the cultural industry, and enable more people to appreciate and learn Liangzhu culture anytime and anywhere through digital channels such as the Internet, so as to realize the sharing and dissemination of cultural resources.

4.3. Liangzhu Cultural and Creative Product Innovation

At present, the cultural and creative industries are presenting a vigorous development trend. With the upgrading of consumers' demand, they not only pursue practicality, but also pay more attention to the cultural connotation and aesthetic value behind products. In this context, major museums have seized opportunities and participated in cultural and creative industries. As a model of online celebrity Wenchuang IP, Wenchuang of the Palace Museum occupies the market with personalized derivatives and a distinctive image, which has made remarkable achievements in the market in recent years. In the development of Liangzhu cultural and creative products, designers need to dismantle and expand its characteristic cultural symbols such as Liangzhu cultural patterns, clarify its spiritual connotation, integrate practicality, function and interest, and design Liangzhu cultural derivatives that not only carry traditional charm but also conform to modern aesthetics. First of all, we can create the IP image of Liangzhu culture with distinctive features, such as the mascot "Cong Cong" of the 19th Asian Games, which represents the Archaeological Ruins of Liangzhu City. Its modeling elements and color expressions all reflect the characteristics of Liangzhu culture, which is the intentional embodiment of Liangzhu culture. In the process of IP creation, distinctive Liangzhu cultural symbols, such as the face patterns of gods, people, animals and birds, can be selected to enhance their recognition and market competitiveness. Secondly, we should rely on IP images and the unique patterns and symbols of Liangzhu culture to design derivatives. In the design process, these elements are not only copied or deformed, but also their cultural connotation needs to be deeply explored. Through product design, people can appreciate the unique charm of Liangzhu culture, and the cultural connotation and attraction of products can be enhanced by telling the historical stories and legends of Liangzhu culture. Liangzhu Wenchuang products can try cross-border integration with other design fields except daily necessities to create more innovative products. In the design process, with the enhancement of environmental awareness, designers use renewable and degradable materials as much as possible in material selection to reduce the impact on the environment. This concept is also passed on to consumers through products, guiding everyone to value the Archaeological Ruins of Liangzhu City's environmental protection. Finally, in terms of product promotion, it is necessary to expand the market, open online sales channels, use the traffic and user base of the platform for sales, and carry out publicity and promotion on social platforms to improve product exposure and influence. At the same time, we should pay attention to offline promotion and sales, such as opening physical stores in museums, art galleries, cultural and creative blocks and other places, providing immersive shopping experiences, cross-border cooperation with other brands or institutions, jointly launching joint products or holding joint activities, and expanding brand influence. Through creative design, we

should create a unique IP image and apply the unique patterns of Liangzhu culture to daily necessities such as clothing, home furnishings and accessories. It can not only enrich the cultural connotation of products and enhance the added value of products, but also make more people feel the charm of Liangzhu culture in their daily lives, thus deepening their understanding and recognition of Liangzhu culture.

5. Conclusion

Based on the theoretical framework of design semiotics, this paper analyzes the signifier and signified of Liangzhu cultural pattern symbols, as well as the intuitive information carried by its external form and the deep cultural significance and aesthetic value inside. This perspective not only reveals the unique charm of the Liangzhu pattern as an intangible cultural heritage, but also opens up a new path for its protection and inheritance. From perspectives of aesthetic education, digital system construction and product design, this paper explores the protection path of Liangzhu culture. In terms of aesthetic education, it is emphasized that Liangzhu cultural patterns should be included in the school art education curriculum, so that students can experience and understand the profound heritage of Liangzhu culture in practice through curriculum design and cross-border practice, cultivating their aesthetic ability and cultural identity. In the aspect of digital system construction, we should make full use of modern scientific and technological means to digitally collect, process and store Liangzhu culture, establish a comprehensive digital database, and take this as a starting point to use modern virtual technology to build on-the-spot digital cultural experiences such as museums and heritage parks, and spread Liangzhu culture efficiently and broadly through various online media on the Internet. This can prevent the physical damage and loss of cultural relics, as well as enable more people to understand and participate in the inheritance of Liangzhu culture. In terms of product design, this paper studies the successful cases of cultural creation in the Forbidden City and the Asian Games. Focusing on the creation of characteristic IP images, we should tap the depth behind cultural symbols, combine Liangzhu cultural patterns with modern design elements, and create cultural and creative derivatives with cultural implications and market potential. Meanwhile, we need to product marketing strategies and discuss them from both online and offline. These methods have injected new vitality into the sustainable inheritance of Liangzhu culture.

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