

Study on the Inheritance and Protection of Weifang Kites with Digital Technology

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Abstract:

This paper explores the application and strategies of digital technology in the inheritance and protection of Weifang Kites. As a national intangible cultural heritage of China, Weifang Kites carry rich historical and cultural connotations as well as folk wisdom. With the rapid development of digital technology, a new approach has been provided for the protection of traditional culture. This paper analyzes the specific applications of digital technology in the data collection, storage, display, and dissemination of Weifang Kites, and proposes strategies such as establishing a digital archive database, realizing cross-border integration of the Weifang Kite digital industry, and building a digital exhibition platform, so as to promote the inheritance and innovative development of Weifang Kite culture. Research shows that digital technology not only injects new vitality into the inheritance of traditional craftsmanship, but also provides broad space for the integration of Weifang Kite culture with modern technology and creative industries, thereby offering a valuable reference for the protection of intangible cultural heritage in China.

Keywords:

Weifang Kites, Intangible Cultural Heritage, Digital Technology, Cross-border Integration

1. Introduction

As a national intangible cultural heritage of China, Weifang Kites carry rich historical and cultural connotations as well as folk wisdom. Since ancient times, Weifang Kites have become an important part of Chinese culture due to their exquisite craftsmanship, unique designs, and profound cultural implications. However, in modern society, faced with the rapid development of digital technology, how to inherit and protect this outstanding traditional culture has become a pressing issue to be addressed.

The increasing maturity of digital technology offers a brand-new pathway for the protection of traditional culture. Through digital means, it is not only possible to effectively inherit the craftsmanship of making Weifang Kites, but also to enable more people to understand and disseminate this excellent national culture. This paper aims to explore the role of digital technology in the inheritance and protection of

Weifang Kites, analyze its advantages in aspects such as cultural inheritance, innovative development, and communication, and provide a valuable reference for the protection of intangible cultural heritage in China.

2. Overview of Weifang Kites

2.1. Historical Origin of Weifang Kites

Weifang has a profound connection with kites that spans thousands of years. Legend has it that the world's first "wooden kite" (mù yuān, an ancient Chinese term referring to kites) was handcrafted and flown by Lu Ban—a renowned carpenter and inventor in ancient China—in Weifang. During the Ming and Qing dynasties, kites grew prevalent among the people of Weifang, evolving into a key carrier of local folk customs, seasonal culture, and aesthetic tastes, thus boasting high cultural, artistic, and historical value [1].

Through historical evolution and cross-regional dissemination, Weifang Kites gradually developed distinct stylistic and artistic features, characterized by meticulous material selection, elegant designs, exquisite framing and pasting, vivid imagery, vibrant paintings, and flexible flying performance. They shine in tandem with Beijing Kites, Tianjin Kites, and Nantong Kites, standing on an equal footing to form the four major kite schools in China.

As recorded in Wei County Gazetteer (edited by Chen Hebei and Liu Donghou): "Every Cold Food Festival, outside the East Gate, on the sandy beach... The Baihe River flows gently beneath Banqiao Bridge; peach and plum blossoms burst into bloom, willows are shrouded in mist, and paper kites soar high into the clouds." The sheer number of kite-flying spots mentioned here attests to the immense popularity of kites in Wei County at that time [2].

After thousands of years of inheritance and development, Weifang Kites have become a unique form of folk art, embodying the essence of countless master craftsmen's ingenuity. With their rich historical and cultural connotations, lifelike designs, and superb flying techniques, Weifang Kites have served as a window for Shandong Province to showcase the charm of traditional culture to the world, allowing more people to perceive the profoundness and breadth of China's outstanding traditional culture.

At the summary and commendation conference of the 4th Kite Invitational Tournament, the then Vice Mayor of Weifang stated: "In recent years, while implementing the CPC Central Committee's policies of opening up to the outside world and developing the domestic economy in line with local realities, the Municipal Party Committee and Municipal Government have repeatedly deliberated on this question: the prosperity and development of a city depend on its level of openness, and the key to openness lies in its reputation and attractiveness. Inspired and supported by relevant departments and international friends, we have focused on leveraging kites—a folk art with local characteristics and traditional advantages—to advance related initiatives [3]."

Endowed with unique designs, rich colors, and exquisite craftsmanship, Weifang Kites have been designated as a national intangible cultural heritage and passed down for millennia. To this day, they remain equally charming: not only do they preserve ancient cultural traditions, but they also act as a bridge for cultural exchange, inspiring more people to explore and inherit this precious cultural heritage.

2.2. Production Techniques and Preservation Methods of Weifang Kites

Weifang Kites are mainly categorized into two types: hard-winged kites and soft-winged kites. Soft-winged kites can be freely disassembled and carried in dedicated kite boxes, offering convenience and flexibility; in contrast, hard-winged kites cannot be disassembled once assembled, enabling them to withstand strong winds [4].

The production techniques of Weifang Kites have a long-standing history. The production process includes material selection, frame making, kite paper production, coloring, assembly, and adjustment, with its core technical features summarized as the “four crafts of framing, pasting, painting, and flying.”

(1) Material selection: Common materials include bamboo, plastic, and paper, among which bamboo is the traditional primary material for kite making.

(2) Frame making: Frame structures such as the “rice” shape and “cross” shape are adopted to support the kite’s form.

(3) Kite paper production: According to the designed pattern, the outline of the kite is drawn on paper with a pencil or charcoal; a thin layer of paint is then applied, and after drying, more detailed lines and patterns are outlined.

(4) Assembly: The finished frame and kite paper are assembled together, fixed with twine or glue, and decorations are added to parts like the kite’s tail and wings.

For preservation, Weifang Kites should be protected from direct sunlight, moisture, and extrusion, and must not be placed in high-temperature environments. Regular inspections of the kite’s condition are also required: if issues such as damage or fading occur, timely repairs or replacements should be carried out. As a new technology and method for recording audio-visual historical materials in the new era, digital technology plays an irreplaceable role in the protection of intangible cultural heritage.

3. Application and Dissemination of Digital Technology in Intangible Cultural Heritage Data Collection

Digital technology plays a vital role in the data collection and dissemination of intangible cultural heritage (ICH). First, it enhances collection efficiency. With digital technology, ICH-related data can be collected quickly and in large quantities—compared with the traditional manual collection method, digital technology significantly improves the efficiency of data gathering. Second, it enriches the scope of collected content and enables the diversified collection of ICH, covering multi-dimensional data such as text, images, audio, and videos. This multi-faceted approach goes beyond the limitations of traditional single-format collection, capturing the integrity and richness of ICH more comprehensively. Finally, digital technology makes ICH data more convenient to preserve and organize. It further promotes the dissemination and popularization of ICH, facilitates cross-regional cooperation and resource sharing, innovates inheritance methods, and taps into the inherent value of ICH. Through digital processing, ICH regains vitality in the new era. This not only contributes to the protection, inheritance, and promotion of traditional culture but also provides abundant cultural resources for modern society, ultimately realizing the innovative development of ICH in the contemporary context.

3.1. Digital Collection and Documentation of Intangible Cultural Heritage

ICH historical materials can be roughly divided into three categories: oral historical materials, material historical materials, and documentary historical materials. ICH historical materials can be roughly divided into three categories: oral historical materials, material historical materials, and documentary historical materials. Among these, oral historical materials are generally obtained through oral accounts by ICH inheritors and interviewers (non-inheritors). To preserve such materials, audio and video recordings can be used to document the oral accounts of inheritors and interviewers. Material historical materials cover a wide range of items, including costumes, props, handicrafts, musical instruments, and tools. For these, visual preservation methods such as photography and video recording can be adopted; for large-sized items or those with complex details, 3D scanning can be conducted to obtain accurate dimensional data. Documentary historical materials form the most extensive category. Record keepers should systematically organize these materials, store them in categories, and identify the documents with historical value. A portion of these materials can be preserved through digital scanning (using scanners to digitize text and images), while the rest can be documented via photography [5].

3.2. Digital Storage and Restoration of Intangible Cultural Heritage

Most ICH materials collected through digital means require digital post-processing before storage. Leveraging digital technology, ICH can be recorded and preserved in high definition in formats such as text, images, audio, and video. This not only expands the scope of dissemination and extends the preservation period but also facilitates public access and research. Building on digital storage, advanced restoration technologies can be applied to restore and recreate damaged or deteriorated ICH, allowing it to regain vitality. Furthermore, digital technology provides broad space for the inheritance and innovation of ICH, integrating traditional culture with modern life and further promoting the prosperity and development of China's outstanding national culture.

3.3. Digital Exhibition and Dissemination of Intangible Cultural Heritage

When showcasing ICH programs, the application of virtual reality (VR) technology and holographic imaging can achieve an ideal effect that is hard to match by other expressive means. The combination of text, images, and three-dimensional visuals creates a realistic, three-dimensional, immersive, and engaging experience for ICH during promotion and exhibition, delivering an exceptional display effect. Through multiple means—including high-definition videos, VR, and online platforms—the public can access and understand ICH up close, experiencing its unique charm. Digital dissemination breaks geographical and temporal barriers, enabling more people to learn about and inherit China's outstanding national culture, thereby strengthening national cultural confidence.

4. Strategies for the Application of Digital Technology in the Inheritance of Weifang Kites

Digital technology provides brand-new collection and documentation methods for the protection of intangible cultural heritage (ICH), including graphic scanning, 3D scanning, holographic shooting, digital photography, motion capture, and more [6]. In the Opinions of the General Office of the State Council on Strengthening the

Protection of China's Intangible Cultural Heritage issued by the General Office of the State Council, it is explicitly proposed that "various methods such as text, audio recording, video recording, and digital multimedia should be used to conduct authentic, systematic, and comprehensive documentation of ICH, and archives and databases should be established." Since then, various regions across the country have successively established national-level ICH research centers, provincial-level ICH protection centers, prefecture-level ICH protection centers, and county-level ICH protection centers. These institutions have conducted systematic and proactive research on methods and approaches for ICH protection, explored the feasibility and operability of digital imaging in ICH protection, and put forward relatively detailed response plans [7].

4.1. Establishment of a Digital Archive Database

To prevent the distortion or loss of digital materials in forms such as traditional graphic materials, audio-visual recordings, and physical exhibitions over time, a combination of traditional and new technologies should be adopted during the collection process. On the one hand, digital conversion and storage of static physical materials should be conducted for steps including the framework making, painting, mounting, whistle carving, and assembly of kites. This also involves audio-visual recordings of interviews with intangible cultural heritage (ICH) inheritors and the kite-making process, followed by classified storage. On the other hand, digital technologies such as 3D modeling, 3D scanning, and dynamic video production should be utilized to construct 3D models of kites and realize animated reproduction of the kite-making techniques, thereby improving the efficiency and quality of digital content collection [8].

In the inheritance of Weifang kites, the establishment of a digital archive database is a key link. Through digital technologies, information such as traditional production techniques, design drawings, and historical stories is recorded and stored, which helps protect the core value of inheritance. This digital archive database will provide convenient access and learning channels for kite makers, researchers, and enthusiasts, and promote the in-depth dissemination of the traditional culture of Weifang kites.

4.2. Realization of Cross-Border Integration in the Weifang Kite Digital Industry

To realize the cross-border integration of the Weifang kite digital industry, first of all, traditional kites can be integrated with contemporary culture and art to develop designs with a sense of the times and expand the cultural connotation of kites. By combining advanced technologies such as virtual reality (VR) and artificial intelligence (AI) with traditional manual craftsmanship, more technologically advanced and artistically appealing kite products can be created. In addition, digital platforms can be provided to enable personalized customization, stimulating consumers' creativity.

For instance, the cross-border cooperation between Weifang kites and Wangzhe Rongyao (Honor of Kings) is a new attempt for Weifang kites in the era of digital economy, and it also opens up a new path for the innovative development of the Weifang kite cultural industry [9]. In the process of realizing the cross-border integration of the Weifang kite digital industry, integrating traditional kite art with modern technology, culture, art, and other fields can not only enrich the cultural connotation of Weifang kites but also inject new vitality into the traditional industry. Such digital transformation not only enhances the product competitiveness in the

market but also expands the channels for cultural inheritance, enabling Weifang kites to better integrate into modern society.

4.3. Construction of a Digital Exhibition Platform to Provide Interactive Experiences

The construction of a digital exhibition platform to provide interactive experiences for Weifang kite culture is an important measure to promote the inheritance and innovative development of traditional culture. Through digital technologies, we can create a virtual exhibition space to present elements of Weifang kites, such as their history, production techniques, and artistic designs, to the audience. Additionally, the use of digital images and 3D animation technologies can vividly demonstrate the craftsmanship of folk art [10]. The digital exhibition platform can also offer online workshops, allowing the audience to participate remotely in the kite-making process, thereby deepening their understanding and appreciation of traditional craftsmanship. Through interactive experiences, the audience can gain a deeper understanding of the cultural connotation of Weifang kites and stimulate their interest in traditional handicrafts.

The construction of a digital exhibition platform to provide interactive experiences can not only promote the inheritance of Weifang kite culture but also attract a wider audience to participate, giving more people the opportunity to learn about Weifang kites and increasing the participation in cultural inheritance. By constructing a digital exhibition platform to provide interactive experiences, the traditional culture of Weifang kites can radiate new vitality in contemporary society and provide strong support for the integration of traditional and modern cultures.

5. Conclusions

Under the guidance of digital technology, a brand-new era of development has arrived for the inheritance and protection of Weifang kites, and such inheritance and protection work is thriving. The application of digital technology has not only injected new vitality into the inheritance of traditional handicrafts but also provided broad space for the innovation of Weifang kite culture.

It is essential to establish a diversified talent inheritance model, develop kite-centered brand cultural tourism by leveraging the intangible cultural heritage (ICH) characteristics of Weifang kites, expand promotion channels through digital media, and promote the integration of Weifang kite culture with modern technology and creative industries—all of which will advance the ICH inheritance of Weifang kites [11]. Driven by digital technology, means such as virtual reality, online education, and digital design have injected new vitality into traditional techniques, while intelligent sensors have enhanced the performance of kites. However, we need to carefully balance innovation and tradition to ensure that digital development does not deviate from the core of traditional culture.

Conflicts of Interest

The author declares that there is no conflict of interest regarding the publication of this article.

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