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Value, Challenge and Strategy: Research on the Digital Revitalization of Intangible Cultural Heritage Traditional Dance

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ABSTRACT
Technologies such as large models, AR, VR, and AI tools for the creative generation of intangible cultural heritage (ICH) traditional dance offer new paths for the digital revitalization of traditional dance and the inheritance of cultural heritage. The digital activation of intangible cultural heritage traditional dance can break through the limitations of physical carriers, allowing for precise preservation. By creating realistic scenarios to reproduce the stories behind the dances, digital technologies overcome the constraints of time and space, expanding their dissemination and enhancing their value. However, this process also faces challenges such as the maturity of technology and standards, concerns about the authenticity of the dance, ethical issues, and overall acceptance by audiences. To address these challenges, it is essential to strengthen cooperation with technology companies to build a "dynamic gene pool," and to prioritize the experience and insights of intangible cultural heritage inheritors to ensure the authenticity of traditional dance. Immersive experience effects should be created to enhance audience engagement, while a multi-scenario communication matrix can increase the dissemination power of traditional dance. By implementing these strategies, the digital activation of intangible cultural heritage dance can be successfully achieved, promoting the healthy development of traditional ICH dance.

KEYWORDS
Traditional dance of intangible cultural heritage; Digital activation; Transformation strategy

1 Introduction

Intangible cultural heritage (ICH) traditional dance, characterized by individualized storylines, movement techniques, costumes, and props, has undergone a unique evolutionary process throughout its long historical inheritance. This process has accumulated a wealth of stories in terms of innovation, dissemination, and protection, all of which together constitute the rich cultural forms and profound connotations of ICH traditional dance [1]. However, due to the limitations of creative techniques and dissemination channels, much of the culture behind intangible cultural heritage traditional dance has long remained in a "silent" state. It is now facing challenges such as cultural loss and performance alienation in the current ecological environment of folk communication. The rapid development of digital technology has reshaped both the external form and internal culture of intangible cultural heritage traditional dance, creating digital projects that are vivid, highly immersive, and interactive. These technologies open up new avenues for the inheritance of intangible cultural heritage traditional dance.

2 The Digital Activation Value of Intangible Cultural Heritage Traditional Dance

2.1 Breaking Through Carrier Limitations to Achieve Precise Preservation

Intangible cultural heritage traditional dance is highly dependent on oral transmission. In the current context, where inheritors are aging and young people show little interest in learning, the dance faces challenges such as a lack of successors and transmission gaps. These issues are particularly evident in the loss of skills and distortion of movements. Digital technology can overcome these challenges by breaking down dance movements into millimeter-scale bone movement data through optical motion capture, inertial motion capture, and even recording details such as breathing rhythm and force application. This forms a "digital movement library" that preserves the essence of the art far more comprehensively than text or video can. Digital methods such as cloud storage and blockchain can be used to preserve, replicate, and promote digital dance resources over the long term, ensuring that traditional dances of intangible cultural heritage do not suffer from cognitive biases, movement alienation, or a shrinking inheritance range over time [2]. Moreover, the digital projects and databases established for intangible cultural heritage traditional dance can continuously collect, transfer, and present new dance movement techniques, postures, themes, and related inheritance stories as "living archives." This approach helps avoid information loss or even discontinuity in the process of dance inheritance.

2.2 Creating Realistic Scenarios and Reproducing the Stories Behind Them

The stories behind intangible cultural heritage traditional dances are often passed down through word of mouth or through books and documents, which can easily lead to information loss, misinterpretation, or silence. This hampers the inheritance of dance culture and contributes to the alienation of traditional dances that lack cultural roots, making them difficult to inherit and innovate. Digital technology, through "technical restoration + cultural decoding," creates realistic scenarios to reproduce the culture and stories behind traditional dance. This process transforms abstract evolutionary experiences, story content, and emotional expressions into perceivable, immersive, and interactive digital experiences. For example, in Taijiang, Guizhou Province, the "Reverse Wooden Drum Dance" creates a virtual Miao village scene that reconstructs stilt houses built along the mountainside, the sacrificial square of the Drum Festival, and the surrounding terraced fields and forests. Viewers can "stand" at the Drum Festival site with the help of VR devices, watch people in traditional costumes dance around the wooden drum, and listen to the long and resonant music. In the Nanfeng Nuo Dance performance stage in Jiangxi Province, viewers can scan a QR code with their mobile phones, and the "stage" superimposes virtual "ancient villagers" dressed in Ming Dynasty costumes, holding ritual implements. They then perform the "inviting the deity—driving away evil—sending off the deity" ritual together with real Nuo dance performers. Viewers can clearly see the correspondence between the Nuo dance movements and ritual steps.

2.3 Breaking Through the Limitations of Time and Space to Expand Reach

Intangible cultural heritage (ICH) traditional dance is mainly performed through the body in festive and theatrical settings and uses language to disseminate its skills, experiences, and cultural connotations. This creates distinct embodied and spatio-temporal characteristics, which contribute to the unique national style of ICH traditional dance. However, this also limits the range of its dissemination and weakens its inheritance power. Digital technology has overcome the limitations of the carriers and scenes of intangible cultural heritage traditional dance by creating "virtual theaters" through VR/AR technology. Viewers no longer need to be physically present at the performance and can be "immersed" in the dance scene through online platforms, smartphones, or wearable devices. For example, they can "watch" Qing Dynasty court dance in the digital exhibition hall of the Forbidden City, or experience the "Golden Rooster Dance" in the virtual scene of Miao villages. They can also enjoy the delicate, elegant, and graceful Kunqu dance on online platforms, with real-time interaction to learn about the history and culture behind the dance [3]. Classic segments of intangible cultural heritage traditional dance can also be processed into digital content of 15 to 60 seconds, complete with captions and special effects packaging, and placed on short video platforms. Dance digital resources can be stored on web pages and databases for permanent preservation and wide dissemination, greatly enhancing the ability to pass on dance.

2.4 Engage in Cross-Border Integration to Expand the Value of Dance

Uncovering the application value is the key to revitalizing intangible cultural heritage traditional dance and achieving healthy inheritance. Digital activation transforms intangible cultural heritage (ICH) traditional dance from "heritage" to "resource", deeply integrating with modern business forms to generate both economic and cultural value and thereby promoting the dissemination and inheritance of ICH traditional dance.

After digital technology completes the resource aggregation and extraction, content organization and reconstruction, and image narrative and presentation of intangible cultural heritage traditional dances, the relevant data can be authorized to the game, film and television, and animation fields, innovating the usage methods and strategies of dance elements, and expanding the scope and value of their application. The character "Yunjin" in the game "Genshin Impact" was digitally disassembled to create Peking Opera dance moves with a strong traditional cultural flavor, and the little monster "Xia Tian" in the animation "Chinese Fables" absorbed the steps and movements of the folk Nuo dance to form a movement posture that is both interesting and mysterious. 3D modeling of traditional dance characters can be transformed into digital collectibles, virtual idols, or made into physical cultural and creative products such as blind boxes and figurines, creating a new business model of "intangible cultural heritage + digital economy" and promoting the inheritance of intangible cultural heritage and traditional dance.

3 Challenges of Digital Revitalization of Traditional Dance Intangible Cultural Heritage

3.1 Challenges of Mature Techniques and Standards

Digital technology is becoming increasingly mature and widely applied across various fields, but "digital + dance" remains a new area of exploration. The digital activation of traditional intangible cultural heritage dances, which are

characterized by distinct techniques, unique postures, prominent rhythms, and profound meanings, faces the challenge of technical precision [4]. For example, the "rebound pipa" pose, representative of Dunhuang dance, involves multi-joint linkage and changes in muscle tension across several body parts. However, the current motion capture error rate for digital devices is as high as 18%. The "Qilin Dance Digital Activation" project in Pingshan, Shenzhen, found that the subtle movements of the hands, legs, and face needed to be repeatedly corrected to achieve a realistic effect. Furthermore, the inconsistent data formats and rendering standards of technologies such as VR, AR, and 3D have created obstacles in content migration for the complex and diverse digital resources of intangible cultural heritage traditional dance. This is especially true for the data resources generated after the primary digitization of dance, which often require complex secondary processing when applied to virtual dance performances and dynamic scene construction. To improve the quality and efficiency of the work, technicians must resume the digital extraction, transfer, and application of traditional dance information. As a result, digital revitalization projects of intangible cultural heritage traditional dance have become isolated "information islands," solidifying the forms and dissemination scope of dance carriers and losing their inherent fluidity. This leads to new predicaments in the inheritance of intangible cultural heritage traditional dance.

3.2 Challenges to the Authenticity and Ethics of Dance

Every intangible cultural heritage traditional dance is formed, developed, and passed down in a specific regional environment, cultural context, and folk life. It carries the conventional performance style, implied ideological connotations, and aesthetic appeal of a particular value orientation. Intangible cultural heritage traditional dance itself is a self-contained cultural system. The digital activation of intangible cultural heritage involves the digital collection, storage, and presentation of traditional dance using digital technology and intelligent devices. While this can vividly display dance art, profoundly express dance culture, and systematically present dance information at the theoretical level, it faces ethical controversies in practice. These controversies arise from the fragmented expression of symbolic meanings and secondary creation. The digitization of dance is typically planned and executed by professional technicians, and there is a high risk of losing dance information, distorting forms, and dissolving connotations due to inadequate communication and cognitive biases between the technicians and the dance inheritors. For instance, the "drumming" performance of Xiangxi Miao drum dance, which is an essential component of local traditional sacrificial activities and has strong ritualistic characteristics, becomes a purely dance-oriented performance after digitization. In some cases, entertainment elements are added to appeal to a wider audience, resulting in the dissolution of its religious metaphor in an entertaining context. The digital activation of intangible cultural heritage traditional dance is therefore prone to issues such as "emphasizing form over substance" and "emphasizing senses over meaning." These issues not only hinder the inheritance of the dance but also cause a disconnection and alienation between the form and substance of the dance.

3.3 Challenges to Overall Dissemination and Acceptance

Intangible cultural heritage traditional dance consists of three main elements: dance form, cultural connotation, and performance setting. Together, these elements constitute a complete dance system. The goal of digital activation is to use digital technology to systematically and comprehensively preserve and reproduce this traditional dance system, ensuring the integrated dissemination and long-term preservation of intangible cultural heritage dance culture. This process helps avoid the loss of traditional dance due to the destruction of physical carriers, environmental changes, or the lack of successors. However, digital technology is a "double-edged sword," and it brings challenges such as "media conversion loss" and "generational acceptance bias." First, excessive rendering of the performance style, cultural connotation, and scene environment of traditional intangible cultural heritage dance—particularly the sensory processing of dance elements to meet commercial needs, such as intuitive, stimulating, and entertaining presentations—has led to a situation where, although digitized traditional dances can attract the audience's attention and spark interest, they often lose their true audio-visual effect, cultural depth, and aesthetic experience. This results in serious deviations or even errors in audience perception. While digital activation of intangible cultural heritage traditional dance offers audiences more freedom and convenience in terms of viewing choices and experiences, it also makes it easy for individuals to select and appreciate fragmented dance information based on personal preferences. This leads to the breakdown of the complete narrative of traditional dance and causes one-sided, imbalanced, and fragmented communication effects, which hinders the proper inheritance of intangible cultural heritage traditional dance.

4 Digital Activation Strategies for Traditional Dance Intangible Cultural Heritage

4.1 Strengthen Cooperation with Technology Companies to Build a "Dynamic Gene Bank" Digital

technology and smart devices are the core forces for the high-quality

Digital technology and smart devices are at the core of high-quality digital activation for traditional dances in intangible cultural heritage. While the level of digital revitalization in the field of intangible cultural heritage traditional dance is still relatively low, projects such as the Dunhuang Digital Revitalization Project, the Beijing Memory Project, and the Gaoqian Ancient Village Digital Project are flourishing, providing technical and equipment references for the digital revitalization of intangible cultural heritage traditional dance [5]. To address the challenges of current mature technologies and standards, it is essential for intangible cultural heritage traditional dance to strengthen cooperation with related technology companies specializing in digital activation, digital memory, and digital twins. By leveraging their mature technologies and equipment—especially their valuable ideas and experiences—it will be possible to build a dynamic gene bank.First, optical motion capture technology should be used to precisely record details such as the dancer's joint movement trajectory, force application, breathing rhythm, etc., while combining 3D modeling to restore the texture and dynamics of costumes and props, ultimately creating a "digital twin dancer.[6]" Second, the historical background, regional customs, and inheritance stories of the dance should be collected synchronously and associated with motion data in the form of text, audio, field investigation images, and more. This will form a three-dimensional "motion + culture" database, allowing for the digital transfer and activation of the stories and cultural context behind intangible cultural heritage traditional dance.

4.2 Prioritize the Experience of Intangible Cultural Heritage Inheritors to Ensure the Authenticity of Traditional Dance

The digital activation of intangible cultural heritage traditional dance is not simply about "technical replication" of the dance, nor should it be an over-processed or altered version based on audience interests. Instead, technology should serve the authenticity and ethics of the dance, enabling a systematic, intuitive, and vivid transfer and reproduction of the dance's form and core content. Technology experts hold mature techniques and advanced concepts, while intangible cultural heritage inheritors are the performers of the dance movement system, expressers of emotions and thoughts, and bearers of cultural history. The two groups must work closely together to avoid turning the digital activation of traditional dance into a technical specimen that merely replicates the external movements or, worse, alienates the essence of the dance. Older inheritors can use "one-click recording + voice annotation" devices to record basic movements through a camera, input the names and meanings of these movements, and automatically generate a "movement video + voice notes" draft [7]. Younger and middle-aged inheritors can participate in training activities using portable motion capture sensors and 3D modeling software. This allows them to independently record "impromptu movements" during daily teaching and rehearsals, as well as their understanding of the techniques, emotions, and connotations behind the movements. Technology experts can then further carry out the digital aggregation, transfer, and reproduction of this information.

4.3 Create Immersive Experience Effects to Enhance the Overall Acceptance of the Audience

The digital activation of intangible cultural heritage traditional dance has overcome the limitations of conventional dance performances, which are typically bound by fixed locations and times. It offers audiences significant flexibility and freedom in terms of where, when, and how they experience the dance. However, this shift also runs the risk of causing fragmentation and one-sidedness in both the form and content of the audience's cognitive experience. To address this, it is essential for intangible cultural heritage traditional dance to leverage digital technology to create immersive experiences that enhance its appeal and increase overall audience acceptance. One approach is to create VR dance experience halls where audiences can "immerse themselves" in the original scene of traditional dance by wearing VR equipment. This allows them to enjoy the performance style and gain insights into the cultural history of the dance. Additionally, an AR mobile app could be introduced, allowing users to scan specific patterns to trigger virtual dance performances. With this technology, viewers can adjust the perspective, zoom in or out on the screen, and fully immerse themselves in the dance performance process [8]. Audiences could even create "virtual digital avatars" that match their personal image, temperament, interests, and hobbies. These avatars could participate in exploratory and game-like dance training and performance activities in realistic, virtual scenarios, while recording participation behavior and earning corresponding rewards. This greatly enhances the audience's enjoyment of appreciating, training, and performing the dance, thereby facilitating their full acquisition of dance skills and knowledge.

4.4 Build a Multi-Context Communication Matrix to Enhance the Dissemination Power of Traditional Dance

The digital revitalization of intangible cultural heritage traditional dance should move beyond the traditional approach

of merely aggregating, transferring, and reproducing dance materials. It must transcend the limitations of preserving and inheriting "pure art" and shift toward "development and application." This involves recognizing the resource value of digital dance, exploring the ecological and industrial chains of "digital dance +," and promoting the wider dissemination of intangible cultural heritage traditional dance. By doing so, it will also provide economic support for protection and inheritance efforts, ultimately fostering the healthy development of intangible cultural heritage traditional dance in the contemporary context. One approach is to integrate digital dance resources into anime and video games, empowering characters with personalized movements and skills. For example, the "Dunhuang Dance" themed skin in Honor of Kings triggers classic dance poses when characters perform skills, vividly showcasing the diverse dance forms and visual beauty of Dunhuang dance. Another strategy is to collaborate with virtual idols like Luo Tianyi and Ling Ling to perform traditional dances in virtual settings, attracting younger audiences and sparking their interest in learning and performing intangible cultural heritage traditional dances. Lastly, cultural and creative products such as emoticons, blind box figurines, and clothing patterns based on dance movements can be developed, creating a closed-loop system of "dissemination - consumption - feedback and inheritance."

5 Conclusion

In conclusion, the digital activation of intangible cultural heritage traditional dance breaks through the limitations of time and space using digital technology. It activates cultural values, ensuring the inheritance, dissemination, and innovative application of traditional dance in a contemporary context. At its core, this process uses technology as a bridge to connect the diverse elements of intangible cultural heritage traditional dance with the demands of modern audiences, preserving its historical legacy while breathing new life into it. Digital activation enables the dual, living inheritance of traditional dance—existing both in the body of the inheritor and in the digital world. This will become an essential force for the high-quality protection, long-lasting inheritance, and widespread dissemination of intangible cultural heritage traditional dance, and it deserves in-depth research and exploration.

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