

Digital Presentation of Intangible Cultural Heritage: A Case Study of Beijing Jade Carving

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Abstract: *Beijing jade carving, as a national intangible cultural heritage of China, carries profound historical and cultural significance. However, in modern society it faces serious challenges in both inheritance and development. This paper takes Beijing jade carving as a case study to explore the application of digital technologies in its presentation and transmission. By comprehensively analyzing the origins, development, artistic characteristics, cultural connotations, and production techniques of Beijing jade carving, the paper elucidates the practical significance of digital presentation. It further investigates digital presentation approaches—from design principles to specific forms—aiming to provide comprehensive and innovative strategies for the inheritance and modernization of intangible cultural heritage worldwide.*

Keywords: *Digital Presentation; Intangible Cultural Heritage; Beijing Jade Carving*

1. Introduction

As a national intangible cultural heritage of China, Beijing jade carving embodies profound historical connotations and exceptional craftsmanship. However, with the rapid transformation of social and economic structures, coupled with shifting consumer preferences, this traditional art form is encountering severe challenges in material sourcing, craftsmanship inheritance, and market dissemination. Particularly, the conventional exhibition methods of Beijing jade carving — predominantly relying on offline showcases and physical displays — are significantly constrained by temporal and spatial limitations, thereby diminishing its visibility and accessibility to a broader global audience. Consequently, how to leverage advanced digital technologies to transcend these limitations, facilitate broader cultural dissemination, and revitalize Beijing jade carving in contemporary contexts has emerged as a critical issue that warrants immediate scholarly attention.

The advent of digital presentation technologies offers unprecedented possibilities for the preservation, promotion, and sustainable development of Beijing jade carving. By employing advanced technologies such as 3D modeling, Virtual Reality (VR), and Augmented Reality (AR), it becomes possible to comprehensively reconstruct the intricate forms, delicate textures, and sophisticated craftsmanship of jade carvings, while simultaneously contextualizing their cultural significance, production techniques, and historical narratives. Such multi-dimensional digital engagement not only enriches the public's immersive experience but also fosters a deeper cultural understanding and emotional resonance with the art form. This study, therefore, seeks to explore the practical application of digital technologies in enhancing the presentation, communication, and inheritance of Beijing jade carving. By systematically analyzing its historical trajectory, artistic features, and production processes, the paper aims to propose innovative strategies for utilizing digital tools to amplify the cultural influence, commercial value, and sustainable development of Beijing jade carving, thereby contributing to the broader discourse on the digital preservation and innovation of intangible cultural heritage.

2. Challenges in the Development of Beijing Jade Carving and the Significance of Digital Research

2.1 Development Challenges of Beijing Jade Carving

Beijing jade carving boasts a long history that can be traced back to the Yuan Dynasty. During that period, Dadu (the capital of the Yuan) served as a political and cultural center, attracting skilled

craftsmen from across the country. The convergence and exchange of diverse jade carving techniques laid a solid foundation for the development of Beijing jade carving. During the flourishing era of the Ming and Qing dynasties, emperors ardently supported Beijing jade carving, bringing it to the zenith of enchantment. Therein lay every work of jade, because of the artisans' wisdom and heartfelt dedication: not only did it come into being as a beloved gem of the imperial family, but it also engraved an everlasting footprint on the opulent heritage of Chinese traditional handicraft. In contemporary times, the Beijing jade carving craft is having a handful of problems. The most glaring one is the declining number of good jade available. As other sources of jade continue to be mined or otherwise depleted, securing high-quality material becomes costlier, more difficult, and subject to unpredictable availability. The shortage drives up the prices for the artisan but also kills creativity. Thus many craftsmen are not able to continue their work any further and have to postpone or even cancel their projects, which drags them away from their imaginations[1].

Another big challenge is the diminishing number of willing successors to continue with the work. Jade carving is an age-old tradition with a long and steep learning curve: From the basics of learning how to handle the tools, right from acquisition of carving techniques, up to reaching that stage where one can independently produce works with some artistic value, this whole process may take some years and decades. Little wonder; in this fast-moving society with numerous career options for the youth, providing faster returns and shorter training periods, very few have the patience to get into jade carving that is laborious. Consequently, one can see the obvious gap when it comes to the inflow of new and young artists, hence the generational gap widening.

Traditional ways of showing off the jade carvings of Beijing have become a real burden for their development. In the past, these wonderful pieces were mostly exhibited in museums and craft fairs offline, which, because of the limitation of time and space, allowed reaching only a limited audience. In addition, these traditional displays mostly allow only for distant appreciation of this art, not digging deeper into the cultural connotations and production techniques behind each piece. Such a display mode monotonously fulfills the diversity of and immersive cultural experiences demanded by today's audience, thus choking the inheritance of Beijing jade carving.

2.2 Significance of Digital Research

From a theoretical perspective, digital presentation of jade carving from Beijing has important research value. It is a vivid example of digitalization of intangible cultural heritage and furthers the global intellectual framework in this area. The research shows how digital technology can go a way further in preserving, presenting, putting back in the context traditional crafts, thus making a sort of contribution toward delving into the subject of heritage digitalization and providing general patterns toward the digital reshaping of other types of intangible heritage.

In practical terms, digital technology is opening up new avenues for the preservation and growth of jade carving in Beijing. It overcomes the constraints of time and space, enabling digital tools to bring the beauty of this form of traditional art to a more global and vivid audience. With a mere click or swipe, eyes from every corner of the world can behold the fine jade carvings and explore the delicate work and cultural insights they embody. More than that, such enhanced access toward jade carving receives a new life in augmenting its heritage. Besides all those, the confluence of traditional craft with modern digital technology allows good entry into knowledge and innovation in the aspect of cultural industries, promising further development opportunities for itself.

3. Cultural Connotations, Current Status, and Digital Empowerment of Beijing Jade Carving

3.1 Cultural Connotations and Production Techniques

The history of Beijing jade carving dates back to the Yuan Dynasty. The capital was a hub of activity in those days, attracting many skilled jade artisans from around different regions, each with his own techniques and style. Through mutual exchange and sharing of experiences, this style began to evolve into a distinct one. From the Ming Dynasty to the Qing Dynasty, as jade became increasingly popular in the imperial court, it made it possible for the art to flourish and gain even greater acceptance and prestige. The stringent court standards and substantial resource investment drove Beijing jade carving to continually refine its techniques and artistic style, reaching unprecedented heights. Following the establishment of New China, the government's strong support for traditional handicrafts has ensured the continuous inheritance and innovation of Beijing jade carving.

Beijing jade carving is marked by distinctive artistic features and a rich variety of themes, including figures, flora and fauna, landscapes, and mythical creatures—each exuding its own artistic charm. In figure carving, artisans emphasize the portrayal of expressions and temperament. Through delicate lines and superb craftsmanship, they vividly capture the emotions and character traits of their subjects. For example, when depicting ancient scholars, craftsmen painstakingly refine facial expressions, postures, and clothing details to reflect the refined demeanor and transcendent spirit of the literati. Each detail is precisely crafted in floral and bird-themed jade carvings; from the delicate texture on the petals to the incredible detail on the layering of feathers, the artwork come alive with astonishing realism and vitality. Technically, the carving of jade in Beijing represents a variety of mediums and styles such as relief, round, and hollow carving. Relief carving applies a sense of three-dimensionality and depth and more vividness in its design by sculpting into the jade rock raised patterns[2]. The round carving allows for a fully realized three-dimensional form such that the piece can be viewed from virtually every direction. Hollow carving, however, provides a sense of transparency and frailty to this type of artistry, showing the rare capability of the sculptor. For example, relief carving may be used to outline the flowers and give their surface texture in a flower-and-bird-themed jade carving, round carving to shape the bird with natural, living presence, and hollow carving to suggest, among the branches and leaves, an airiness full of space and liveliness in the whole composition.(as shown in Figure 1,2)



Figure 1. The jade carving piece: Six-Armed Buddha Locking the Flood Dragon.



Figure 2. The jade carving artwork of flowers and birds - Emerald Three Autumn Vase

Beyond its artistic allure, jade carving in Beijing carries deeper cultural significance and acts as an important vessel for traditional Chinese heritage. In ancient times, jade served, aside from ornamentation, as an emblem of status and moral integrity. Hence the reason behind this common adage: "A gentleman never parts with his jade," which underpins the respect that has, for some time now, been associated with jade and its idea with such virtues as benevolence, righteousness, wisdom, courage, and purity. Many motifs in jade carving in Beijing carry auspicious meanings: dragons and phoenixes symbolize nobility and good fortune, accordingly representing imperial authority and blessings; bats, because their pronunciation is similar to "fu" (blessing), signify luck and happiness; abundance and prosperity symbolize people's wishes for a fulfilled and auspicious life.

The technique employed while making Beijing jade carvings is so highly sophisticated that it requires one to be cautious and interiorized at its every step; all this goes to show the mastery and

dedication of these extraordinary artisans. It begins by selecting the material; here, the artisans would closely study the jade in order to determine the most suitable color, texture, and quality. Different types of jade are selected according to different themes; for instance, the smooth and fine texture of white Hetian jade is quite appropriate for the carving of human figures, while it is very suitable for flower-and-bird themes due to the natural color variations of Xiuyan jade, thus enabling the artisans to exemplify such vivid details.

This selection phase is extremely important, for it tries the abilities of skilled artisans in identifying the internal structure and potential of each piece of jade, in order to give a suitable carving theme and design approach. The carving stage, which comes to be called the real core of the process, demands the utmost concentration and expertise from the carver; anything done here must be perfect because a single mistake can result in a piece not obtaining proper standards of artistic and technical quality.

Polishing is the last step to enhance the natural brilliance of the jade and give it a classy shining. After this stage, tools and polishing techniques depend on the specific textures and details that must be taken care of for the specific piece to have the best of visual graciousness and high craftsmanship. (as shown in Figure 3)



Figure 3. Beijing Flavor Reading and Appreciation WeChat Official Account

3.2 Digital Empowerment

The jade carving tradition in China was first immensely transformed by technology, with the digital age providing all new possibilities in design and artistic expression, blending the good with the bad. Computer-Aided Design software and 3D modeling software have set the path for jade designers to build their ideas into reality with a good degree of fine-tuning. However, rather than long hours of sketching and revision by hand, digital tools enable instant creation and alteration of work in virtual models. This saves precious time and lets them experiment and perfect their design without manpower exerted yet on the carving part. Through 3D modeling software, for instance, designers test different forms, see how they could work in the finished piece, and make adjustments—all before committing to the expensive and perilous task of its carving.

Additionally, the very presence of immersive technologies such as VR and AR breathed a new artistic life into the processes. The designers would put on VR gear and step into a virtual workshop, seeing the effects of space and light as it would have been understood in real-time. Such a hands-on experience ignited creativity, often leading to even more artistic pieces[3].

Digital tools also play a big role in education and nevertheless culture dissemination. Online platforms have tutorials, instructional videos, and virtual exhibitions providing ease in learning. These tutorials support beginners who can watch tutorials over and over again, practicing until they are good at it and mastering carving techniques. Virtual courses, in addition, provide for an improved understanding of all the art's creative steps as well as the cultural significance of each piece. With cultural outreach, in contrast, digital technology shatters the limits of distance between cultures.

Through the internet, China jade carving and its rich cultural stories can be shared everywhere in the world while social media takes it even a step further. Various high-quality images, videos, and attractive stories stimulate younger generations to show interest in the art, allowing it to reach a wider audience.

Digital tools have opened up new avenues for businesses to sell and market jade carvings from Beijing. Thanks to online exhibitions, the gigantic audience can see and admire the intricate work of jade carving wherever they are, increasing visibility. Features such as virtual try-ons help the customers to experience jade jewelry in an easier way in the digital world, increasing the likelihood of a sale transaction. Digital collectibles based on blockchain technology are also becoming more popular, thus forming an entirely new monetization avenue. More importantly, these one-of-a-kind, tamper-proof items have built their own separate collector subculture and developed new revenue streams while propagating the beauty and culture of the Beijing jade carving to the wider market.

4. Digital Presentation: Paths, Practices, Challenges, and Prospects

4.1 Paths and Practices of Digital Presentation

In recent years, the jade carving of Beijing has began new technological life with the conjunction of tradition in craftsmanship and modern technological advancement, which has opened new horizons for modern design and artistic expression. Today, jade designers use CAD applications and 3D modeling platforms to bring ideas to life and refine them more quickly than in the days of yore. Again, unlike the old method with whom it used to take a great lot of time to sketch out and redraft by hand, digital tools allow designers to whip up and adjust virtual models in no time, and this way the chances for big mistakes with the actual carving become more minimised. For instance, designers use 3D modeling software to simulate jade pieces with different shapes and, upon visualizing the end product, make changes far into the jade carving itself.

Besides, virtual reality and augmented reality have opened another field for creativity. With the help of VR equipment, designers could fully immerse themselves in a virtual workshop, experiencing spatial effects and lighting changes in real-time. The immersive approach not only inspires new ideas for the creation itself but also allows for more intriguing artistic products to be produced.

Along with the creative advantages it affords, digital presentation has also played an enormous role in education and the sharing of culture. Instructional videos and virtual courses make everything related to jade carving not only available but very accessible too. From the beginner's perspective, they could watch and rewatch them as many times as they like in order to master certain skills. Virtual courses also provide a thorough insight into the production process and cultural meanings behind each piece. In terms of cultural sharing, digital technologies have demolished the geographical boundaries. Now, thanks to the internet, Beijing jade carving and its associated stories have a global gallery to exhibit themselves among. Social media networks make this even greater audience possibilities putting jade carving in front of the younger generation with stunning images, video packs, and fascinating stories[4].

We are now at the crossroads of market conception, that digital tools have created new potential ways for sales and appreciation for jade carving in Beijing. Free exposure has been made easy as people get to view amazing works of jade from the confines of their households, thanks to online exhibitions. Features for virtual try-on allow consumers to experience jade jewelry on digital platforms, even building the intent to purchase them. Blockchain-based digital collectibles bring in new economic models. These one-of-a-kind, tamper-proof collectibles are drawing collectors in and creating another revenue stream. It does so while it is innovatively promoting the Beijing jade carving culture besides the artisans and other businesses.

4.2 Challenges and Prospects

The digital presentation of Beijing has made impressive progress in jade carving, and yet there are some hurdles. From the technology side, adopting digital tools requires quite a heavy investment and technical support. For small workshops and individual artisans, the heavy costs of professional equipment, software, and technical personnel can really box them out of the picture, limiting their ability to use any digital opportunities fully.

When it comes to virtual showcases, the biggest challenge has been how to reflect the tactile

qualities of jade. The present digital technology is very successful in presenting the visual elements of jade carvings; however, it is still a long way from actually imitating the unique luster and subtle texture that jade displays. Therefore, in the digital realm, one cannot appreciate works in the same way as they could in physical form; it makes them less effective as a presentation. Another downside of digital dissemination, though, is copyright protection. As works of Beijing jade carving are increasingly being shared on the internet, the protection of the creators' intellectual property is becoming more important. By virtue of unauthorized copying and distribution, their chances of earning a living from selling their work are thinned, hence the need to strengthen copyright protection and manage digital works better. In the future, many digitally presented Beijing jade carvings will become more varied and sophisticated; with technology, virtual reality and augmented reality are improving, as well as haptic feedback technology will step in more. Users will be able, in the very near future, not only to view jade carvings in virtual spaces, but also touch and feel their textures, feeling them in an even more true-to-life way.

Artificial intelligence is expected to become an even greater contributor to the design, creation, and display of products in jade carving. AI-assisted design is capable of generating personalized proposals for different jade carvings by different designers based on individual preferences and has the potential to offer them great creative inspiration. Interactive recommendation systems will also factor in the user's habits and interest in browsing so as to recommend appropriate jade carving works or cultural content, therefore enhancing engagement[5].

In the future, more cross-disciplinary collaborations will be essential for developing Beijing jade carving, combining jade carving with gaming, film, and animation. For example, integrating jade carving elements into games would allow players to craft, collect, and appreciate jade artworks while learning about their cultural value. Films and animations featuring jade carving would allow it to reach a wider audience. Collaborations like these help to bring this art into spotlight for its unique beauty in various fields and promote its innovative development in the digital age.

5. Conclusion

Digital technology opens up once unimaginable new opportunities for opportunities in the field of Wang Wu jade carving, helping it breathe with new life into its rich aesthetic and cultural legacy. This fusion of technology and tradition builds extensive diversity in the patience of the said art. Meanwhile, while digital tools grow rapidly, more and more ways regarding the maturation of jade carving into a modern era would come the other way; the cultural base may still be kept and expanded. The integration of these in-craft technologies along with the coming years, as a matter of fact, is crucial in exploring the innovative modes of presentation. Those separate modes would display and demonstrate not just the beauty of jade carving but also safeguard its profound cultural significance for generations to come.

The online platform rise and social media have played an important role in our modern world to promote Beijing jade carving. These not only enhance visibility but also promote direct interaction between artists and their audience. With the new perspective, people would understand better the artistry behind each jade piece-from the design to the very minute stages of final polishing. This new form of visibility has done a great deal to reinforce the relationship among the artists and the public, a shared admiration rising above borders. The younger generations and techno-affluent, in specific, are getting exposed to jade carving through different digital means and this has opened a new chapter in the quest for survival. As digital technologies will go, there will probably be more explorative vis-a-vis jade carvings by immersing in texture, technique, and cultural narrative storytelling.

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