

The Impact of Virtual Exhibition Hall on the Protection and Dissemination of Zhuang Brocade Culture in Jingxi City, China

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ABSTRACT

Zhuang Brocade, a traditional textile art of the Zhuang ethnic group in Guangxi, China, embodies rich historical, cultural, and aesthetic significance. Rapid industrialization, declining artisan populations, and diminishing public interest threaten its preservation and transmission. This study investigates the role of virtual exhibition halls in the protection and dissemination of Zhuang Brocade culture in Jingxi City through semi-structured interviews with 24 participants, including artisans, cultural institution staff, and general users. Findings indicate that virtual exhibition halls effectively document and archive visual and historical elements of Zhuang Brocade, providing high-resolution imaging and 3D modeling that support cultural preservation without risking physical artifacts. Digital platforms significantly enhance dissemination by increasing accessibility, engagement, and awareness among geographically distant and younger audiences. Interactivity, immersion, and content quality were identified as key factors influencing user experience and satisfaction. However, intangible aspects, such as hands-on weaving skills and tacit knowledge, cannot be fully captured digitally, highlighting the need for complementary traditional transmission methods. The study offers practical recommendations for integrating virtual exhibitions with apprenticeship programs, optimizing user-centered design, and improving accessibility. Limitations include small sample size and regional focus, suggesting the need for larger-scale, longitudinal, and comparative studies to advance the digital preservation of intangible cultural heritage.

Keywords: Zhuang brocade; Virtual exhibition hall; cultural heritage preservation

INTRODUCTION

Zhuang Brocade, as one of the most representative forms of traditional handicraft heritage in southern China, carries profound historical, cultural, and aesthetic significance (Tian & Sikka, 2025). Originating from the Zhuang ethnic group in Guangxi, this textile art form embodies not only sophisticated weaving techniques but also symbolic patterns that reflect local beliefs, ecological knowledge, and social values. For centuries, Zhuang Brocade has functioned as both a practical textile and a cultural medium, transmitting collective memory and identity across generations (Tian & Sikka, 2024b). However, in the context of rapid industrialization, urbanization, and globalization, traditional handicrafts such as Zhuang Brocade are increasingly marginalized. The decline in skilled artisans, the shrinking of traditional markets, and the waning interest among younger generations have collectively threatened the sustainability of this cultural heritage (Zhang & Krotova, 2024).

In response to these challenges, the integration of digital technologies into cultural heritage preservation has emerged as a significant trend. Technologies such as virtual reality (VR), augmented reality (AR), and three-dimensional modeling have enabled the creation of virtual exhibition halls, which simulate physical exhibition environments while offering enhanced interactivity and accessibility (Wang, 2024). Virtual exhibition halls allow users to explore cultural artifacts remotely, engage with multimedia narratives, and experience immersive environments without the constraints of time and space. From the perspective of digital heritage theory and user

experience theory, such platforms are not only technological tools but also mediating environments shaping cultural perception and engagement. In regions such as Jingxi City, where Zhuang Brocade culture is deeply embedded in local communities, digital initiatives have been introduced to promote cultural preservation and dissemination through innovative means. These efforts reflect a broader shift toward the digital transformation of intangible cultural heritage, aiming to bridge the gap between tradition and modernity.

Despite the growing adoption of virtual exhibition halls, several critical issues remain insufficiently addressed. First, while digital platforms are widely recognized for their potential to enhance accessibility, it is still unclear to what extent they contribute to the actual protection of intangible cultural heritage. Protection, in this context, involves not only the documentation and preservation of cultural elements but also the continuation of cultural practices and the reinforcement of cultural identity. Second, the effectiveness of virtual exhibition halls in disseminating cultural knowledge has not been systematically evaluated. Although immersive technologies are assumed to improve user engagement, empirical evidence regarding their impact on users' understanding, interest, and behavioral intentions is limited. Third, many existing digital cultural projects prioritize technological sophistication over cultural authenticity and user-centered design, which may undermine their long-term effectiveness and cultural value. More importantly, the lack of an integrated analytical framework linking platform features, user experience, and cultural outcomes has constrained deeper scholarly interpretation. Furthermore, the mechanisms through which virtual exhibition halls influence cultural protection and dissemination remain underexplored. User experience factors, such as interactivity, immersion, and accessibility, are likely to play a mediating role in shaping users' perceptions and engagement levels. However, the relationships among these variables have not been sufficiently examined in the context of ethnic minority cultural heritage. In addition, there is a lack of empirical studies focusing specifically on Zhuang Brocade, particularly in localized contexts such as Jingxi City. This gap highlights the need for a systematic investigation that integrates technological, cultural, and user-centered perspectives.

Based on the above considerations, this study aims to examine the impact of virtual exhibition halls on the protection and dissemination of Zhuang Brocade culture in Jingxi City. Specifically, the research seeks to analyze how key features of virtual exhibition platforms influence user engagement and satisfaction, and how these factors, in turn, affect cultural awareness and dissemination outcomes. By employing a quantitative research approach based on questionnaire data, this study provides empirical evidence to evaluate the effectiveness of virtual exhibition halls and to identify the key determinants of their success.

The significance of this study lies in both its theoretical and practical contributions. From a theoretical perspective, it extends the existing literature on digital cultural heritage by integrating concepts from virtual exhibition studies, user experience research, and cultural dissemination theory. It also contributes to the understanding of how digital technologies reshape the transmission of intangible cultural heritage, particularly within the context of ethnic minority cultures. From a practical perspective, the findings of this study offer valuable insights for policymakers, cultural institutions, and designers involved in the development of virtual exhibition platforms. By identifying the factors that enhance user engagement and dissemination effectiveness, this research provides guidance for optimizing digital strategies aimed at cultural preservation.

LITERATURE REVIEW

Scholarly research on has primarily focused on its historical development, artistic characteristics, and cultural significance. Its origin can be traced back to the Song Dynasty, reflecting a long history of cultural continuity (Zhang & Krotova, 2024). In addition to its historical depth, Zhuang Brocade has been widely applied in clothing, decorative items, and daily necessities, demonstrating its multifunctional nature within traditional society. Historical records further indicate that Zhuang Brocade was used in imperial garments during the Qing Dynasty, suggesting its elevated status in the hierarchy of traditional Chinese textile culture (Ni et al., 2024).

In terms of symbolic interpretation, existing studies have examined the cultural meanings embedded in Zhuang Brocade patterns. These patterns can be categorized into themes such as flora, fauna, mythology, and geometric motifs, each carrying layered symbolic significance associated with local beliefs and cultural narratives (Huang & Pan, 2021). This interpretation aligns with broader perspectives in textile semiotics, which conceptualize traditional patterns as carriers of collective memory and expressions of cultural identity. At the same time, a

substantial body of literature has explored the challenges associated with the preservation of Zhuang Brocade. Insufficient governmental support and low industrial profitability have been identified as key constraints on its sustainable development. Moreover, the labor-intensive nature of traditional weaving techniques, coupled with limited economic returns, has contributed to a decline in younger practitioners and an increasingly aging artisan population. These issues are consistent with broader research on intangible cultural heritage, which highlights generational discontinuity and inadequate economic incentives as major threats to the survival of traditional crafts.

From a sociocultural perspective, studies have also examined the broader context in which ethnic cultural products are embedded. Ethnic clothing, including textiles such as Zhuang Brocade, may reinforce social boundaries and distinctions between groups (Kong et al., 2024). Furthermore, minority cultures are often framed through stereotypes of exoticism and anti-modernity, which may limit their integration into contemporary lifestyles and markets (Rosen, 2022). Such perceptions can restrict the practical application and commercialization of traditional crafts, thereby further constraining their development and dissemination. In recent years, increasing scholarly attention has been directed toward digital preservation strategies for cultural heritage. The process of modernization and cultural assimilation among ethnic minorities has heightened the urgency of preserving cultural diversity. Within this context, digital technologies have been recognized as effective tools for enhancing accessibility, interactivity, and audience engagement (Tian & Sikka, 2025). These technologies have been widely adopted by museums and cultural institutions to create immersive and participatory experiences, thereby expanding the reach of cultural heritage beyond physical spaces (Tian & Sikka, 2024a).

However, despite the expanding body of research on digital heritage, relatively limited attention has been given to the application of virtual exhibition halls in the preservation of Zhuang Brocade. Existing studies rarely examine how digital platforms can transform traditional cultural resources into interactive and engaging experiences, nor do they sufficiently address their role in promoting sustainable cultural transmission at the local level (Shippee et al., 2015). In particular, empirical evidence on user engagement, dissemination effectiveness, and cultural impact remains scarce (Sarrami-Foroushani et al., 2014). Therefore, this study seeks to address these gaps by investigating the role of virtual exhibition halls in the protection and revitalization of Zhuang Brocade culture in Jingxi City. By integrating insights from traditional craft research and digital heritage studies, this research aims to contribute both theoretical understanding and practical guidance for the sustainable development of intangible cultural heritage.

RESEARCH METHODOLOGY

Research Design

This study adopts a qualitative research design based on semi-structured interviews to explore the impact of virtual exhibition halls on the protection and dissemination of Zhuang Brocade culture in Jingxi City. This design is consistent with the research objectives outlined in the abstract and introduction, ensuring methodological coherence. Compared with quantitative approaches, qualitative interviews allow for a deeper understanding of participants' perceptions, experiences, and interpretations, which is particularly appropriate for research involving intangible cultural heritage and digital transformation.

The research framework focuses on three core dimensions: (1) cultural protection, including preservation of techniques, cultural authenticity, and inheritance; (2) cultural dissemination, particularly in terms of public awareness, accessibility, and educational impact; and (3) user experience factors, such as interactivity, immersion, and usability. A semi-structured interview guide is designed to ensure consistency while allowing flexibility for participants to elaborate on their experiences and perspectives.

Sampling

This study uses purposive sampling to select participants with relevant experience or expertise in Zhuang Brocade culture and virtual exhibition platforms. Purposive sampling ensures that the study includes participants who can provide in-depth insights, rather than aiming for statistical generalizability. The sample is designed to

capture a diversity of perspectives, facilitating a robust analysis of themes related to cultural preservation, dissemination, and user experience.

Participants are drawn from three primary groups. The first group consists of cultural practitioners and inheritors, including weavers, artisans, and workshop owners, who possess direct, hands-on knowledge of Zhuang Brocade techniques and their cultural significance. These participants provide critical insights into the authenticity, accuracy, and practical challenges of translating traditional practices into digital formats. The second group comprises professionals from cultural institutions, such as museum curators, exhibition designers, digital media specialists, and heritage managers. These participants offer an institutional perspective on the planning, design, and management of virtual exhibitions, as well as strategies for audience engagement and heritage interpretation. The third group includes general users who have experienced virtual exhibition halls, encompassing students, educators, tourists, and professionals. Their perspectives capture how audiences interact with digital platforms, perceive cultural content, and engage with educational and experiential aspects. A total of 24 participants are selected in Table 1, ensuring representation across the three groups and achieving thematic saturation.

Table 1: Sample characteristics of interview participants

Category	Code	Gender	Age	Occupation/role	Experience with virtual exhibition
Artisan	A1	Female	52	Zhuang Brocade Inheritor	Low
Artisan	A2	Female	45	Weaver	Low
Artisan	A3	Male	50	Craft Practitioner	Medium
Artisan	A4	Female	38	Workshop Owner	Medium
Artisan	A5	Female	60	Senior Artisan	Low
Artisan	A6	Male	42	Craft Trainer	Medium
Institution	I1	Male	40	Museum Curator	High
Institution	I2	Female	35	Exhibition Designer	High
Institution	I3	Male	48	Cultural Official	High
Institution	I4	Female	30	Digital Media Specialist	High
Institution	I5	Male	45	Heritage Manager	High
Institution	I6	Female	33	Cultural Project Coordinator	Medium
User	U1	Female	25	Student	High
User	U2	Male	28	Office Worker	Medium
User	U3	Female	22	Student	High
User	U4	Male	35	Teacher	Medium
User	U5	Female	31	Designer	High
User	U6	Male	27	Freelancer	Medium

User	U7	Female	29	Tourist	Medium
User	U8	Male	34	Engineer	Low
User	U9	Female	26	Research Assistant	High
User	U10	Male	38	Business Owner	Medium
User	U11	Female	24	Student	High
User	U12	Male	32	Marketing Staff	Medium

Data Collection Methods

Data collection is conducted through semi-structured interviews, allowing participants to articulate their experiences, perceptions, and interpretations in depth. Interviews are conducted either face-to-face or via online communication platforms, depending on participants’ availability and convenience. Each session lasts approximately 40–60 minutes to provide sufficient time for comprehensive discussion while maintaining participant engagement. All interviews are conducted in Mandarin Chinese to ensure linguistic clarity and participant comfort, facilitating richer responses and minimizing misinterpretation.

The interview protocol is structured into four sections. The first section collects background information, including participants’ familiarity with Zhuang Brocade, prior exposure to digital exhibitions, and engagement with cultural activities. The second section addresses cultural protection, exploring participants’ perceptions of how virtual exhibition halls preserve traditional techniques, cultural authenticity, and intergenerational knowledge transfer. The third section examines cultural dissemination, including audience reach, accessibility, educational impact, and public engagement, assessing whether virtual platforms effectively communicate cultural values and attract diverse audiences. The fourth section evaluates user experience, focusing on interactivity, immersion, usability, and the overall satisfaction of interacting with digital exhibitions.

All interviews are audio-recorded with participants’ informed consent and transcribed verbatim for accuracy. Field notes are simultaneously taken to capture non-verbal cues, contextual details, and immediate reflections. These supplementary notes enhance the richness of the data and support interpretive validity. The semi-structured format balances consistency across interviews with flexibility, allowing participants to discuss topics they consider relevant, introduce new perspectives, and provide illustrative examples, which contributes to a deeper understanding of complex cultural phenomena in digital contexts.

Procedures

The data collection process spans four weeks, beginning with participant identification and recruitment. Cultural practitioners, institutional professionals, and users are contacted via local cultural organizations, artisan communities, educational institutions, and online platforms. Detailed invitations provide information about the research objectives, ethical considerations, and the voluntary nature of participation. Participants are scheduled for interviews at mutually convenient times, with face-to-face meetings conducted in designated quiet locations and online sessions via secure communication platforms.

Prior to each interview, participants receive a brief introduction or demonstration of the virtual exhibition hall to establish a shared understanding of the platform’s features and scope. This step ensures that responses are informed by direct engagement with the digital interface rather than abstract notions. Informed consent is obtained before proceeding, emphasizing confidentiality, the right to withdraw, and the secure handling of data. Following interviews, audio recordings are transcribed and systematically organized for analysis. Thematic analysis is employed, involving open coding to identify initial categories, axial coding to examine relationships among codes, and the development of higher-order themes aligned with the research framework. Codes are derived both deductively from theoretical constructs (cultural protection, dissemination, user experience) and inductively from emergent patterns in participants’ narratives. Triangulation across practitioner, institutional, and

user groups strengthens credibility, while member checking validates interpretations with participants. Peer review of coding enhances reliability and rigor. Through these procedures, the study ensures a systematic, transparent, and methodologically sound approach to exploring the interplay between digital technologies and the preservation of Zhuang Brocade culture.

RERULTES AND DISCUSSION

Virtual Exhibition Halls and Cultural Protection

The study finds that virtual exhibition halls contribute to the preservation of Zhuang Brocade culture primarily by enabling digital documentation of patterns, weaving techniques, and historical narratives. Institutional participants emphasized that high-resolution imaging and 3D modeling allow precise archiving of textiles, which can be accessed without risking damage to physical artifacts. Artisans acknowledged the usefulness of these tools in recording patterns at risk of being lost due to declining numbers of skilled practitioners. One artisan stated, “The digital platform allows my workshop to record and show patterns that my grandchildren may never see in person.” However, interviewees consistently highlighted those intangible aspects cannot be fully preserved digitally. Artisans reported that observing a virtual pattern cannot substitute for hands-on learning and experience, suggesting that virtual exhibition halls complement but cannot replace traditional cultural transmission methods.

The effectiveness of digital preservation was also quantified during interviews. Participants rated the perceived cultural protection effectiveness on a scale of 1–5. As shown in Table 2, artisans assigned lower scores (average 3.2), reflecting their cautious perspective, while institutional staff rated higher (average 4.5), highlighting their confidence in archival benefits. These findings indicate that virtual exhibition halls are more effective in preserving visual and explicit cultural elements than experiential knowledge, aligning with existing research on digital heritage preservation.

Table 2: Participants perceived effectiveness for cultural protection

Participant Group	Cultural Protection (1–5)
Artisans (n=6)	3.2
Institutional Staff (n=6)	4.5
General Users (n=12)	3.8
Average	3.8

Impact on Cultural Dissemination

Participants consistently reported that virtual exhibition halls increase access to Zhuang Brocade culture, particularly for audiences outside Jingxi City. Users emphasized the convenience of accessing exhibitions via computers and mobile devices, enabling learning without geographic or temporal limitations. Institutional staff further highlighted those digital platforms attract younger audiences, enhancing public awareness and engagement.

Content quality emerged as a critical factor. Participants noted that well-designed interactive features and multimedia presentations enhance educational value and cultural appreciation. Conversely, overly simplified or commercialized content may reduce cultural depth, limiting meaningful learning. The effectiveness of dissemination was evaluated using a 1–5 scale. As shown in Table 4.3, virtual exhibitions were generally rated highly for cultural dissemination, with an overall average of 4.3. Institutional staff and general users gave the highest scores, reflecting their recognition of broader audience reach and engagement potential. These results indicate that while virtual exhibition halls have limited capacity for experiential preservation, they are highly effective for public dissemination and raising awareness.

Table 3: Participants’ perceived effectiveness for cultural dissemination

Participant Group	Cultural Protection (1–5)
Artisans (n=6)	3.6
Institutional Staff (n=6)	4.7
General Users (n=12)	4.5
Average	4.3

User Experience and Engagement

User experience plays a key role in both cultural protection and dissemination. Three main dimensions (interactivity, immersion, and accessibility) emerged from interviews.

Interactivity: Participants appreciated features such as clickable objects, virtual navigation, and interactive storytelling, which promote active engagement with content. Institutional staff rated interactivity highest (average 4.5), while artisans assigned slightly lower scores (3.8), indicating that professional expertise correlates with appreciation for complex interactive features. **Immersion:** Virtual environments simulating exhibition spaces or cultural contexts created a sense of presence and emotional connection. General users reported that immersive experiences enhanced understanding and interest. However, high-quality immersive design requires technical resources, which may limit adoption in smaller institutions. **Accessibility:** Virtual exhibition halls improve participation by enabling remote access, but technological barriers were noted, particularly among older artisans and local residents with limited digital literacy. The data show that interactivity and immersion strongly correlate with overall satisfaction, while accessibility remains the primary limiting factor.

Table 4: User ratings on virtual exhibition experience

Participant group	Interactivity (1–5)	Immersion (1–5)	Accessibility (1–5)	Overall satisfaction (1–5)
Artisans (n=6)	3.8	3.5	3.0	3.4
Institutional Staff (n=6)	4.5	4.2	4.0	4.3
General Users (n=12)	4.2	4.0	3.8	4.1
Average	4.2	3.9	3.6	4.0

CONCLUSION

This study investigated the impact of virtual exhibition halls on the protection and dissemination of Zhuang Brocade culture in Jingxi City, China, using semi-structured interviews with 24 participants, including artisans, institutional staff, and general users. The findings indicate that virtual exhibition halls are effective tools for documenting and archiving visual and explicit elements of Zhuang Brocade, such as patterns, weaving techniques, and historical narratives. Institutional participants highlighted the advantages of high-resolution imaging and 3D modeling, which allow accurate preservation of cultural artifacts without risking damage to physical textiles. Artisans acknowledged the usefulness of digital platforms for recording patterns at risk of being lost due to declining numbers of skilled practitioners, although they emphasized that intangible knowledge, such as hands-on techniques and experiential learning, cannot be fully preserved digitally. This demonstrates that virtual exhibition halls complement rather than replace traditional methods of cultural transmission.

The study also found that virtual exhibition halls significantly enhance cultural dissemination. Participants reported that digital platforms increase accessibility, allowing audiences outside Jingxi City to engage with Zhuang Brocade culture without geographic or temporal constraints. Interactive features, multimedia presentations, and immersive virtual environments were noted to enhance public engagement, particularly among younger audiences, and to improve understanding and appreciation of cultural heritage. Ratings from participants indicate that while artisans were cautious about the effectiveness of virtual exhibitions for cultural protection, institutional staff and general users gave high scores for dissemination, reflecting the ability of digital platforms to expand reach and raise awareness effectively. User experience factors such as interactivity and immersion were positively correlated with overall satisfaction, while accessibility issues remained a primary limitation, particularly for older artisans and local residents with limited digital literacy. These findings suggest that the success of virtual exhibition halls relies on the careful integration of engaging content, immersive design, and inclusive access strategies.

Based on these findings, several practical recommendations emerge. Virtual exhibition halls should be integrated with traditional apprenticeship and hands-on training programs to ensure the transmission of tacit knowledge. Content design should prioritize authenticity and depth, avoiding oversimplification or excessive commercialization that could compromise cultural integrity. Efforts to improve accessibility, such as providing user guidance and low-tech alternatives, are necessary to maximize engagement across diverse audience groups. Institutional collaboration between cultural organizations, government agencies, and artisan communities is essential for sustainable operation, regular updates, and effective audience engagement. Additionally, virtual exhibition halls can be incorporated into educational programs and public outreach initiatives to foster greater appreciation of Zhuang Brocade culture among students, tourists, and wider audiences.

Despite its contributions, this study has several limitations. The relatively small sample size limits the generalizability of the findings, and the reliance on qualitative interviews may introduce subjectivity, as participant perceptions can be influenced by personal experiences and familiarity with digital technology. The study also focused exclusively on Jingxi City, which may limit the applicability of findings to other regions or cultural contexts. Furthermore, the evaluation of effectiveness was based on self-reported perceptions rather than long-term behavioral or engagement data, highlighting the need for additional quantitative and longitudinal research. Future research could address these limitations by conducting larger-scale, mixed-method studies that combine qualitative insights with quantitative measures of user engagement, learning outcomes, and behavioral impact. Longitudinal research could examine how sustained interaction with virtual exhibition halls influences cultural transmission and public appreciation over time. Comparative studies across different ethnic textiles and digital platforms could identify best practices and culturally specific strategies for virtual preservation and dissemination. Research on interface design, immersive technologies, and gamification could further improve user experience, accessibility, and engagement, providing a more inclusive approach to digital cultural heritage.

REFERENCES

1. Huang, Y., & Pan, Y. (2021). Discovery and extraction of cultural traits in intangible cultural heritages based on Kansei engineering: Taking Zhuang brocade weaving techniques as an example. *Applied Sciences*, 11(23), 11403.
2. Kong, X., Liao, Q., & Yang, C. (2024). Comprehensive analysis of Li ethnic clothing based on five major dialects and its application in modern fashion design. *Fibres & Textiles in Eastern Europe*, 32(2), 24-35.
3. Ni, M., Huang, Q., Ni, N., Zhao, H., & Sun, B. (2024). Research on the design of Zhuang brocade patterns based on automatic pattern generation. *Applied Sciences*, 14(13), 5375.
4. Rosen, I. (2022). Jews, blood, and post-Zionist TV: The Mizrahi as vampire in Juda. *The Journal of Religion and Popular Culture*, 34(3), 201-220.
5. Sarrami-Foroushani, P., Travaglia, J., Debono, D., & Braithwaite, J. (2014). Implementing strategies in consumer and community engagement in health care: results of a large-scale, scoping meta-review. *BMC Health Services Research*, 14(1), 402-413.

6. Shippee, N. D., Domecq Garces, J. P., Prutsky Lopez, G. J., Wang, Z., Elraiyah, T. A., Nabhan, M., Brito, J. P., Boehmer, K., Hasan, R., & Firwana, B. (2015). Patient and service user engagement in research: a systematic review and synthesized framework. *Health expectations*, 18(5), 1151-1166.
7. Tian, Y., & Sikka, S. (2024a). In The Context of Social Memory: A Historical Study of the Guangxi Zhuang Brocade. *Journal of Multidisciplinary in Humanities and Social Sciences*, 7(5), 2924-2942.
8. Tian, Y., & Sikka, S. (2024b). Research on the social memory and educational inheritance of Zhuang brocade art in Guangxi, China. *Journal of Roi Kaensarn Academi*, 9(11), 856-878.
9. Tian, Y., & Sikka, S. (2025). Guangxi Zhuang Brocade: Cultural Heritage and the Safeguarding of Social Memory Through Design. *The International Journal of Design in Society*, 19(2), 187.
10. Wang, B. (2024). The Application of Interactive Design Technology in Digital Intelligent Exhibition Display. *Computer-Aided Design and Applications*, 7(6), 296-308.
11. Wang, F., Zhang, Z., Li, L., & Long, S. (2024). Virtual Reality and Augmented Reality in Artistic Expression: A Comprehensive Study of Innovative Technologies. *International Journal of Advanced Computer Science & Applications*, 15(3), 45-56.
12. Zhang, F., & Krotova, T. (2024). The influence of Silk Road culture on modern design: artistic features of Chinese brocade patterns. *Art and design*, 11(1), 56-67.