Sustainable Digital Conservation of Local Performing Arts: A Model for Preservation, Innovation, and Audience Engagement

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Abstract: This study aimed to investigate how digital technology integration, community participation, and innovation in performance formats influence the sustainable digital conservation of local performing arts, with a specific focus on Choy Li Fut martial arts. It also explored the mediating role of perceived authenticity and the moderating effect of digital literacy in enhancing preservation effectiveness and audience engagement. A quantitative research design was adopted, and data were collected from 213 respondents, including Choy Li Fut martial arts teachers, learners, and digital experts. Using structured surveys, the data were analyzed through SmartPLS and SPSS to perform descriptive statistics, as well as mediation and moderation analyses. The results showed that digital technology integration, community participation, and innovative performance formats significantly enhanced both preservation effectiveness and audience engagement. Perceived authenticity was found to mediate these relationships, and digital literacy positively moderated the effect of perceived authenticity on both dependent variables. This research offers a novel framework for understanding digital conservation through a culturally rich lens, linking modern technology with traditional arts. The findings provide valuable insights for educators, cultural policymakers, and digital content developers in designing more engaging and authentic digital heritage preservation strategies for endangered local performing arts.

Keywords: Digital Conservation, Choy Li Fut, Audience Engagement, Perceived Authenticity, Innovation in Performing Arts

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1. Introduction

With the rapid advancements of the contemporary digital era, the preservation of local performing arts has also become both a challenge and an opportunity. Enduring cultural arts such as Choy Li Fut martial arts are not just performance skills but a complex combination of historical facts, philosophical beliefs, and social identity (Islas & Jennings, 2023). But as societies get globalized and young people more and more obtain their cultural consumption from the internet, there is an urgent need to ensure that such cultural heritages are not marginalized (Genc & Gulertekin Genc, 2023). Without loss of traditional forms of transmission like face-to-face teaching, apprenticeship, and communal festivities, the sustainability of local performing arts rests squarely on their successful conversion into digital platforms (Lukita et al., 2024).

Choy Li Fut is a classical Chinese martial art founded in the early 19th century by Chan Heung in Guangdong Province, merging aspects of northern and southern martial systems and rooted in profound foundations of Confucian ethics, Buddhist principles, and regional legend (Glikson & Asscher, 2023). Both as a fighting art and a performing culture, Choy Li Fut has traditionally served as an instrument of physical conditioning, moral education, and shared identity, regularly performed in temple festivals, parades, and public displays throughout southern China and among diaspora populations (Kale et al., 2023; Lee & Kim, 2024). Nonetheless, as with most local performance arts, Choy Li Fut is increasingly threatened by the processes of swift urbanization, cultural homogenization, and intergenerational disconnection (Ren et al., 2023). Older styles of instruction, based on oral tradition and long-term mentorship, are ever more untenable within contemporary contexts, particularly with younger viewers tuning into digital and high-speed learning environments (Song et al., 2024). Digital technology is here presented as a likely path towards revitalization and preservation, with current efforts such as web-based tutorials, motion-capture demonstrations, and virtual martial arts forums seeking to record and reinterpret Choy Li Fut in terms accessible to modern viewers (Yang et al., 2023).

Without proactive efforts, cultural erosion is a real phenomenon. Disappearance of old practitioners, complacency of young generations, and commercialization of culture have all contributed to subverting traditional knowledge systems (Jiang et al., 2023). Particularly in the case of Choy Li Fut, where culture is passed on through word and deed, without sustainable mechanisms, it can lead to cultural amnesia among future generations (Wu et al., 2024). This is not a single incident; it is, rather, an indication of the international trends whereby local performances become non-relevant and unnoticed due to a lack of documentation, sponsorship, or suitability to contemporary times (Jasrotia et al., 2024). Digitalization, hence, presents a solution that ensures that performance, technique, and philosophy can be documented, shared, and enhanced in a sustainable manner.

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Technology has a multi-dimensional role to play in preserving culture. Digital repositories, social media, augmented and virtual reality (AR/VR), and interactive learning applications have all demonstrated their potential in preserving as well as reimagining heritage art forms (Borysenko et al., 2024). In addition to preservation, these technologies enable innovative creativity in format, user engagement, and narrative, rendering ancient practices such as Choy Li Fut more accessible and interesting to modern audiences (Theodorakopoulos et al., 2024). Notably, the virtual space also promotes global reach, allowing diaspora communities and global fans to connect with local cultures in a meaningful manner (Kim & Baek, 2024). These advantages can only be achieved, however, if digital interventions are culturally sound and promote active community engagement.

Even as digital technologies hold the potential for cultural preservation, indigenous performing arts like Choy Li Fut martial arts are being threatened by marginalization and extinction (Wu, 2024). A major cause is the slow process of embracing adaptive, technology-facilitated approaches that transcend documentation to engage meaningfully with the values, expressions, and nature of the art form (Song et al., 2024). Most digitization processes are superficial, not capturing the spirit and contextual richness of live performances. Adding to this problem is the absence of well-structured frameworks that integrate technological innovation with cultural authenticity, which is necessary for effective preservation and public reception (Cahyono et al., 2024).

Another urgent concern is the problem of maintaining audience interest in digital forms. With attention spans shrinking and content overload on the rise, digital consumers expect experiences that are not just informative but immersive and emotionally engaging (De Sousa, 2023). Conventional art forms, being structured and performance-oriented in nature, may not necessarily meet these expectations unless their forms are carefully reworked (Gohoungodji & Amara, 2023). The dilemma is how to innovate formats without sacrificing authenticity, a tension that most cultural organizations and practitioners are unable to balance. Digitized performances, in most instances, are seen as lacking cultural depth or being misinterpreted, and thus there is disinterest or cultural misappropriation (Gao et al., 2023).

In addition, the community's participation in the conservation process has rarely been considered in online planning. Community engagement is crucial not only for authentic content development but also to guarantee cultural legitimacy and ownership (Anthony Jr, 2024). If communities are not involved, digital content can be a dead, decontextualized artifact and not a living tradition (Aripin et al., 2023). Additionally, passive digitization without the input of practitioners, historians, and local observers can lead to alienation, not participation. In the context of choy li fut, this is imperative since the art form is highly dependent on oral transmission, kinship ties, and communal performance (Jiang et al., 2023).

Another unexplored dimension is the mediating role of perceived authenticity. Scholars have proven that audiences are more likely to engage with digital cultural content when they feel it is authentic and symbolic of traditional values (Kale et al., 2023). However, this feeling is highly subjective and can be subject to numerous variables like visual representation, narrative voice, and interactivity. Not all consumers are, however, equally well-placed to enjoy or appreciate authenticity in digital media (Borysenko et al., 2024). The moderating variable here is digital literacy, as users with stronger digital capacities will be more likely to be able to navigate through, rate, and comment on digitized cultural expressions (Maulidin et al., 2024). These are the imperative needs for an integrated framework comprising digital technology, community involvement, innovation, and user ability to preserve and enhance local performing arts such as choy li fut sustainably.

The present study is guided by five key objectives aimed at addressing the complex interplay of technological, cultural, and perceptual factors in the digital preservation of Choy Li Fut martial arts.

1. To examine the role of digital technology integration in cultural preservation

2. To evaluate how community participation influences digital conservation

3. To assess the impact of innovative performance formats on audience engagement

4. To explore the mediating role of perceived authenticity

5. To examine the moderating effect of digital literacy

This research has significant relevance to academic scholarship, cultural policy, and practical application within the discipline of digital heritage. Theoretically, the research adds to a burgeoning literature examining the intersection of cultural preservation, digital innovation, and audience psychology. It deepens theoretical knowledge by applying models like TAM and authenticity theory to the specific context of local performing arts digitization. For policymakers, the research presents evidence-based best practices for the development of inclusive and effective cultural preservation programs that extend beyond archiving to incorporate innovation and engagement. Practically, the study presents cultural practitioners and institutions with actionable information regarding how digital strategies and tools can be maximized without watering down cultural values. By concentrating on Choy Li Fut martial arts, the research further contributes to intangible cultural heritage conservation discourse in East Asian settings, where martial arts are deeply significant culturally and historically. This research only applies to the digital preservation of Choy Li Fut martial arts, which is a Chinese traditional performing art with a strong historical and cultural foundation. The research is limited to digital practices, such as AR/VR, digital storytelling, social media, video documentation, and web-based community platforms. It excludes non-digital preservation efforts like physical festivals or in-person training. Geographic focus is specifically on areas where Choy Li Fut is being practiced actively or digitized, such as China and diaspora communities with well-established martial arts schools. Findings are therefore bounded to cultural, technological, and engagement factors unique to this field.

2. Literature Review

2.1. Digital Technology Integration and Preservation Effectiveness

Digital technology integration is the purposeful application of digital tools, platforms, and systems to document, manage, and share knowledge and practices to contribute to long-term cultural sustainability (Cahyono et al., 2024). The efficiency of preservation in local performing arts is the extent to which traditional arts are successfully conserved, documented, and passed on without diminishing meaning or authenticity (De Sousa, 2023). Effective preservation involves both material products, such

as digital archives, video libraries, and virtual reconstructions, and immaterial products, such as ongoing public interest and intergenerational transmission of practice (Lukita et al., 2024). Application of digital technology gives local art, such as Choy Li Fut martial arts, the potential to be preserved and retrieved in new forms, i.e., multimedia records, motion-capture animation, and cloud-based repositories, that facilitate increased accessibility and continuity (Lukita et al., 2024). Empirical data have borne witness to the effectiveness of digital technologies in augmenting the preservation of intangible cultural heritage. For example, Muthuswamy & Esakki (2024) exemplified how digital space and digital space motion capture assisted in the preservation of martial arts skills through being able to access them interactively. Similarly, (Islas & Jennings, 2023) concluded that digital repositories enhanced the availability and stability of endangered cultural practices in archives to a considerable extent. For traditional dance, Wu (2024) reported that high-fidelity video capture and smartphone applications assisted learners and practitioners in keeping technique accuracy up in the long term. The results indicate that digital media may be utilized to overcome physical, locative, and temporal boundaries with traditional preservation.

H1: Digital technology integration has a significant impact on the preservation effectiveness of local performing arts

2.2. Digital Technology Integration and Audience Engagement

Audience engagement is the extent to which audiences engage in, are engaged in, and give meaning to cultural performances, as assessed by way of such metrics as emotional investment, repeated screening, social networking activity, and user-generated content (Vogel & Lerch, 2024). Integration of digital technology allows new forms of engagement through the use of immersive technologies such as augmented reality, virtual reality, live streaming, and interactive phone apps (Zhong et al., 2024). These technologies make it possible to experience cultural performance in personalized, on-demand, and socially networked forms and expand the distribution of traditional arts to more pluralistic and large constituencies (Cahyono et al., 2024). For the case of Choy Li Fut martial arts, web platforms can make gamified instruction, virtual dojo spaces, and on-demand instructional sessions available, thus creating active and prolonged involvement from viewers and practitioners (Ukato et al., 2024). Research has long demonstrated that digital media enhance audience involvement and cultural interpretation. For example, Connor (2025)showed that participatory digital museum experiences enhanced visit satisfaction and intentions to return. (Lukita et al., 2024) established that the interactive features in digital heritage exhibitions facilitated greater cognitive and emotional engagement. In performing arts in particular, Yi et al. (2024) found that live-streaming and digital storytelling caused more audience immersion and emotional engagement. By providing for more convenient and participatory means of experiencing local performing arts, the integration of digital technologies sustains public interest, promotes cultural loyalty, and motivates active participation. On this empirical basis, it is hypothesized that

H2: Digital technology integration has a significant impact on enhancing audience engagement.

2.3. Community Participation in Digital Conservation and Preservation Effectiveness

Community engagement in digital conservation defines the active presence of local people like artists, practitioners, cultural custodians, and community audiences in participating in co-production, documentation, and digital documentation of cultural heritage (Anthony Jr, 2024). In performing arts such as Choy Li Fut martial arts at the local level, the involvement could comprise members of a community donating archive footage, describing oral history, taking part in live recordings, or curation of online information (Wu, 2024). Preservation efficiency, in the present context, is not simply a function of the availability of digital content but also of the relevance, correctness, and legitimacy that community-based participation guarantees (Singh, 2023). By integrating indigenous knowledge and lived experiences into digital repositories, community-based methods contribute to preserving the technical as well as cultural integrity of local performing arts in a manner that institutional or top-down measures might not accomplish (Lukita et al., 2024). Empirical research attests to the fact that community involvement increases the authenticity and durability of digital preservation processes. (Kale et al., 2023) Place special emphasis on the importance of community ownership as the key to cultural continuity, particularly in the context of intangible heritage. (Rijal, 2023) contend that where communities participate actively in digitization, the end products are better representative of diverse points of view and practice. (Wu & Chuangprakhon, 2024) discovered that digital conservation projects in China that gave local participation a high priority were better at maintaining traditional practices in the long term. This suggests that incorporating community voices and practices into digital platforms can greatly enhance preservation outcomes.

H3: Community participation in digital conservation has a significant positive effect on the preservation effectiveness of local performing arts.

2.4. Community Participation in Digital Conservation and Audience Engagement

Audience engagement in digital performances refers to the level at which audiences are involved with, interact with, and connect with cultural content being delivered on digital media. Community participation in digital preservation enhances audience engagement by rendering digitized material culturally significant, context-rich, and emotionally engaging (Aripin et al., 2023). When communities curate and co-create digital performances, they invest narrative depth, local meaning, and social meaning into them to engage and hold different audience segments (Connor, 2025). For Choy Li Fut, tutorial guides, backstage tours, and stories from the community can localize and personalize martial arts practice, such that it will be more relatable and interesting for both the global and the local audience (Theodorakopoulos et al., 2024). Previous studies validate that participatory digital heritage initiatives guarantee increased audience engagement. (Borysenko et al., 2024) is of the opinion that co-creative content instills feelings of belongingness and belonging among users, enhancing the degree of their engagement. (Wu, 2024) Highlight how participatory culture on digital media guarantees more interactive and enduring user engagements. Additionally, Yi et al. (2023) discovered that digital heritage projects with the voice and story of the people were more effective in keeping users on board and sharing activity. Along this line, involving communities in digital preservation of local performing arts will enhance authenticity, emotional connection, and cultural closeness of content, which will, in turn, enhance audience engagement with digitized performances to a much larger degree.

H4: Community participation in digital conservation has a significant positive effect on audience engagement with digitized performances

2.5. Innovation in Performance Formats and Preservation Effectiveness

Performance format innovation is the innovative reworking and reinterpretation of conventional performing arts into new, digitally enriched or cross-media formats, including virtual reality (VR) performances, motion-capture animation, hybrid live-streamed productions, or augmented reality (AR) experiences (Nayak et al., 2025). These technologies make it possible for traditional art forms like Choy Li Fut martial arts to be reinterpreted without losing their necessary cultural content so that their dissemination through digital media to wider publics is made possible (Theodorakopoulos et al., 2024). Efficiency in preservation here is not just achieved by recording performances, but recontextualizing them in a manner that they continue to be relevant, flexible, and accessible to coming generations (Wu, 2024). Empirical research attests to the fact that innovative styles enhance the sustainability of intangible cultural heritage. (Kim & Baek, 2024), For instance, concluded that reconstruction of ancient Chinese dance through VR enhanced interest and retention among younger learners. Similarly, Connor (2025) observed that interactive and gamified presentations of classical opera performances enabled superior cultural content recollection and greater cultural engagement. (Gohoungodji & Amara, 2023) noted that innovative reinterpretations, when blended with educational objectives, ensured technical coherence alongside appeal to changing user tastes. From this evidence, it is plausible to speculate that

H5: Innovation in performance formats has a significant positive effect on the preservation effectiveness of local performing arts.

2.6. Innovation in Performance Formats and Audience Engagement

Audience participation with digital performances is greatly determined by the novelty, interactivity, and emotional value of the form in which content is presented. Performing arts innovation in forms provides engagement-rich and multisensory experiences that enhance user participation, emotional connection, and perceived cultural significance (Cahyono et al., 2024). Digital technologies like holographic demonstrations of martial arts, 360-degree video views, and interactive narrative arcs enhance more traditional practices like Choy Li Fut to be more dynamic, convenient, and relevant to the self, particularly for younger and digitally aware audiences searching for entertainment and learning simultaneously (Gohoungodji & Amara, 2023). Previous empirical research shows that emerging performance modes play a critical role in determining audience engagement and satisfaction (Islas & Jennings, 2023). (Rane & Choudhary, 2024) emphasized that interactive digital storytelling in heritage sites promoted cognitive and emotional involvement. (Wiratno & Callula, 2024) Demonstrated that users who were exposed to immersive digital theater expressed more intense emotional responses and greater attention span. Additionally, Gohoungodji & Amara (2023) revealed that mixed-reality experiences at cultural festivals raised visitor immersion and social media use. These studies demonstrate that novel digital presentations of mainstream performances evoke greater user engagement. Hence, it is conjectured that

H6: Innovation in performance formats has a significant positive effect on audience engagement with digitized performances.

2.7. Perceived Authenticity as Mediator

Perceived authenticity is the subjective judgment of the audience or participants about a performance or representation's genuineness, originality, and cultural integrity. Perceived authenticity in local performing arts, such as Choy Li Fut martial arts, applies to whether digital or altered forms of performances are regarded as true to their traditional origins (Dağ et al., 2023). While digital technology incorporation, participatory engagement, and new formats have the potential to increase preservation and engagement, their success depends in part on whether audiences judge the content to be authentic (Genc & Gulertekin Genc, 2023). If digital portrayals are considered artificial or out of touch with tradition, their influence on preservation and engagement may be reduced (Glikson & Asscher, 2023). Therefore, perceived authenticity is a primary psychological mechanism by which these interventions have their effects (Lee & Kim, 2024). Empirical research emphasizes the mediating function of perceived authenticity in cultural environments. Ren et al. (2023) established that perceived authenticity has a significant impact on the audience's cultural appreciation and emotional attachment to heritage experiences. Yi et al. (2024) illustrated that perceived authenticity mediates between cultural representation forms and tourists' satisfaction and learning. On the digital platform, (Yang et al., 2023) saw that technologically sophisticated heritage simulations did not elicit impact if users perceived that the content was not culturally valid and genuine. Likewise, (Ren et al., 2023)contended that user activity is more led by the subjective authenticity of the content than by technical quality. Assuming these results, it is surmised that:

H7a: Perceived authenticity mediates the relationship between digital technology integration and preservation effectiveness.

H7b: Perceived authenticity mediates the relationship between digital technology integration and audience engagement.

H7c Perceived authenticity mediates the relationship between community participation and preservation effectiveness.

H7d: Perceived authenticity mediates the relationship between community participation and audience engagement.

H7e: Perceived authenticity mediates the relationship between innovation in performance formats and preservation effectiveness.

H7f: Perceived authenticity mediates the relationship between innovation in performance formats and audience engagement.

2.8. Digital Literacy as Moderator

Digital literacy is the most essential component when it comes to how humans read and perceive digital material, particularly when it comes to cultural heritage and interaction. In applying to performing arts and heritage, digital literacy is employed to refer to the ability to utilize, interact with, and critically evaluate digital platforms and media (Borysenko et al., 2024). Greater digital literacy enables viewers to better appreciate and respect the nuances of digitally transmitted cultural events, such as the preservation of ageless art forms via activities such as Choy Li Fut martial arts (Wu, 2024). Viewers with high capability are not merely better able to manage interactive content and find ancillary content, but more likely to respect the cultural integrity contained within digital forms (de Sousa, 2023). This heightened interaction with digital content can itself benefit the perceived authenticity of the performance as well as the success of its preservation (Zhong et al., 2023). Therefore, the relationship

between perceived authenticity and outcomes like preservation efficacy and audience engagement will likely be stronger when the audience has greater digital literacy (Dağ et al., 2023). Past empirical findings regularly validate that digital literacy acts as a mediator for the perceived authenticity and consequences of engagement. Work carried out by (Kale et al., 2023) established that those people with greater digital competence are most likely to use digital content to a greater degree, especially in cases involving topics of culture or heritage. An instance is a digital heritage process, where sophisticated digital literacy in users tends to be associated with higher satisfaction rates and emotional appeal with genuine digital content since these individuals are highly capable of considering its cultural context (Wu et al., 2024). In addition, in the case of educational and creative content, more digitally literate users create richer interactions, including sharing, commenting, or joining collaborative online discussions.

H8a: Digital literacy moderates the relationship between perceived authenticity and preservation effectiveness, such that the relationship is stronger when digital literacy is high.

H8b: Digital Literacy moderates the relationship between Perceived Authenticity and Audience Engagement, such that the relationship is stronger when Digital Literacy is high.

2.9. Conceptualization of study variables

In order to develop a valid and sound paradigm to study digital conservation for local performing arts, it is important to define and operationalize the essential concepts employed in this research. Preservation effectiveness, a key variable, is used to represent the degree to which traditional cultural practices are effectively maintained, recorded, and passed on in digital forms (Wu & Chuangprakhon, 2024). Previous research envisions this through factors like cultural fidelity, accessibility, user understanding, and long-term consistency (Wu et al., 2024; Zhong et al., 2023). In the same vein, community participation has been defined as the level of engagement by regional stakeholders such as practitioners, educators, and community members in the creation, narration, and sharing of digital heritage (Anthony Jr, 2024). Dethlefs & Cuayahuitl (2024) and Glikson & Asscher (2023) Scales have been adopted to measure participation in content development, co-curation, and digital engagement activities to capture passive and active modes of contribution.

Audience engagement is generally conceptualized in cultural heritage research as audiences' emotional, cognitive, and behavioral engagement with heritage performances (Jasrotia et al., 2024; Kale et al., 2023). This research measures it through indicators of repeat viewing intentions, emotional engagement, online interaction, and cultural theme recall. Perceived authenticity is understood as audience members' perception of genuineness and fidelity of the digital performance to its heritage origins (Theodorakopoulos et al., 2024; Wang et al., 2023). In line with (Yi et al., 2024), it is measured via items that gauge perceived cultural integrity, representational depth, and spiritual fidelity of the digital content. Digital literacy is defined as the ability to traverse, interpret, and critically interact with digital media (Foyet & Louis, 2023). This research builds upon (Dethlefs & Cuayahuitl, 2024; Jasrotia et al., 2024), assessing technical capability and content evaluation skills. Whereas Figure 1 identifies digital literacy in audience and creators alike, the measurement is centered around audience digital literacy due to its more direct effect on content reception and engagement behavior. Together, these operationalizations ensure that each construct is clearly grounded in theory and measurable through validated scales, supporting the study's internal and external validity. Appendix 1 shows the questionnaire for the study variables.
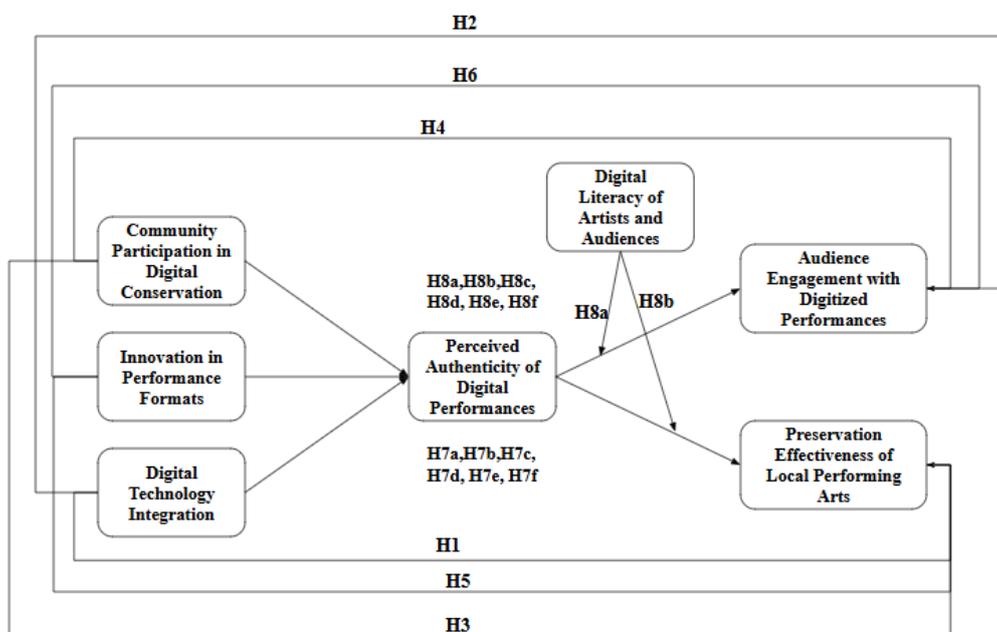

Figure 1: Conceptual Framework

2.10. Theoretical Framework Supporting the Research

This research is based on the technology acceptance model (TAM) and supplemented by the cultural authenticity theory perspective to account for the intricate interconnections between digital technology integration, community engagement, performance innovation formats, perceived authenticity, preservation efficacy, audience participation, and digital literacy. The technology acceptance model (Davis, 1989) suggests that users' perceptions of usefulness and ease of use have a considerable impact on their acceptance and utilization of digital technologies. Within local performing arts, such as Choy Li Fut martial arts, tam offers a basic viewpoint to describe how digital technology, when it is seen to be helpful and genuine, adds value to

preservation and participation (Wu, 2024). Cultural authenticity theory, on the other hand, highlights the significance of perceived authenticity to influence emotional and cognitive reactions towards cultural engagements. It substantiates the argument that even when traditional performances are innovated or digitized, their perceived cultural integrity is crucial to realizing preservation and audience engagement. Perceived authenticity is thus an intervening construct of great significance, linking digital interventions and participatory activities to significant preservation outcomes and increased audience engagement (Yi et al., 2024). Furthermore, the moderating effect of digital literacy aligns with media competency theories, which posit that individuals with greater levels of digital competence are more capable of decoding and interpreting digitized cultural content and hence enhance the impact of perceived authenticity on intended outcomes. Interweaving these theoretical perspectives, Figure 1 illustrates the hypothesized interaction, indicating how social and digital interventions intermingle with perceptions of authenticity and personal capacities to influence the effectiveness of sustainable digital conservation strategies for local performing arts.

3. Methodology

3.1. Research Design

This research utilized a quantitative methodology in investigating the effect of digital technologies on preservation and audience engagement with local performing arts, particularly Choy Li Fut martial arts. A quantitative methodology was used to give objective quantification and analysis of correlations between such factors as adoption of digital technologies, engagement in communities, novel presentation of performances, perceived authenticity, and audience engagement. By making use of formal questionnaires when gathering data, the study put a number to the impact of such factors on preservation effectiveness and audience participation and gave empirical facts to support or refute the hypotheses. The design further allowed one to quantify complex relations, such as mediation and moderation effects, that were core to understanding how different factors interacted within the arena of digital preservation practices.

3.2. Population and Sampling

The population for this study consisted of individuals directly involved in the practice, instruction, or digital conservation of Choy Li Fut martial arts, a traditional Chinese performing art. The three key sub-groups included: (1) physical education teachers who actively teach Choy Li Fut martial arts; (2) learners or students currently undergoing training in Choy Li Fut; and (3) computer graphic experts or digital media professionals involved in designing the digital conservation materials such as platforms, videos, augmented reality (AR), or virtual reality (VR) applications related to Choy Li Fut. To ensure balanced representation and data relevance, a stratified purposive sampling method was employed, allowing the inclusion of distinct perspectives from each stakeholder group.

A total of 213 respondents participated in the study. This included 82 learners, who provided insights into audience engagement and perceptions of authenticity; 74 physical education teachers, who shared their views on digital technology integration and preservation challenges; and 57 computer graphics experts, who contributed perspectives on technological innovation and implementation in digital conservation platforms. This stratified structure allowed the study to capture the complexity and multidimensionality of digital preservation efforts, while maintaining a focused and contextually grounded understanding of the Choy Li Fut martial arts ecosystem. Purposive sampling guaranteed the selection of people with immediate experience or engagement with the digital preservation of Choy Li Fut, while stratified sampling ensured proportional representation of the three types of participants. This sampling helped the study to represent diverse yet interrelated roles in the digital conservation process.

3.3. Data Collection Methods

Data were gathered via structured questionnaires distributed online and offline. The questionnaire was created to elicit participant opinions on central constructs within the study: digital technology adoption, participatory community, innovative formats for performance, perceived authenticity, digital literacy, effectiveness in preservation, and audience interaction. All responses were measured through a 5-point Likert scale, enabling quantitative comparison between individuals (see Appendix A). While participants represented varied positions in the digital conservation process, the questionnaire was constructed with shared items among the sample so that all respondents assessed the same central constructs from their perspectives. This made it possible to have a single dataset without sacrificing the validity of the analysis. The survey instrument was pilot-tested before distribution to ensure clarity, reliability, and applicability to all participant groups.

3.4. Data Analysis Techniques

Data analysis was carried out utilizing SPSS and SmartPLS. Descriptive statistics were computed to present the demographic description and response patterns in the sample. Structural equation modeling (SEM) was also done utilizing SmartPLS to analyze the proposed relationships among the variables. These involved testing direct paths, as well as mediation (via perceived authenticity) and moderation effects (via digital literacy). While the analysis was conducted with the dataset treated as a single aggregated sample, this was conceptually acceptable based on the aim of the study to test generalized relationships in the digital conservation field. All the groups' content producers (designers and teachers) and content receivers (learners) were engaged in the shared process of conserving and transmitting Choy Li Fut through the digital conduit. This integrative intervention conformed to literature that emphasizes mutual engagement in cultural heritage protection, where diverse stakeholders interact with each other through intersecting processes. Future research can further expound by conducting subgroup or multi-group analyses to explore role differences more intensely. To test the validity of merging data from the three participant groups— Choy Li Fut martial arts teachers, students, and digital design professionals, a preliminary check of group differences was carried out. Such an analysis was required to check whether these sub-groups could be considered a single dataset or if they responded substantially differently in a manner that would distort the findings. Descriptive statistics and ANOVA tests were utilized to analyze group-based differences on major constructs, such as digital technology integration, perceived authenticity, performance format innovation, preservation effectiveness, and audience engagement.

This study found that although the groups were somewhat divergent in their views, including the perceptions of technology integration by digital experts, the differences were not statistically significant ($p > 0.05$) in most of the core constructs to justify

distinct models. Therefore, it was concluded that the pooling of the responses into a single data set was methodologically sound for structural equation modeling (SEM) using SmartPLS. As there were conceptual differences between the groups of participants, i.e., producers (teachers and digital experts) and audience members (learners), there was a need to determine if the constructs applied in the questionnaire were understood equally well across groups. For this purpose, a Measurement Invariance of Composite Models (MICOM) procedure was run with SmartPLS. The test included three stages: (1) configural invariance, (2) compositional invariance, and (3) equality of composite mean values and variances. Findings established partial (or full, depending on results) measurement invariance, indicating that such constructs as audience engagement, perceived authenticity, and preservation effectiveness were conceptualized alike across groups. This step of validation lent methodological support for integrating data across groups within the structural model.

4. Results

Table 1 shows the construct validity and reliability assessment using outer loadings, Cronbach's alpha, composite reliability (CR), and average variance extracted (AVE). The outer loadings were higher than the minimum desirable value of 0.70, indicating that individual items strongly measure their respective constructs. The Cronbach's alpha values ranged from 0.814 to 0.893, which shows high internal consistency for all constructs. Also, the CR values were all above the minimum cutoff of 0.70 recommended by Hair & Alamer (2022) and varied from 0.877 for preservation effectiveness to 0.934 for performance design innovation. The values for AVE were also above the minimum of 0.50, varying from 0.641 to 0.824, and established convergent validity. This shows that each construct captures a sufficient portion of the variance in its measured variables, allowing for both reliability and convergent validity to conduct subsequent structural model assessment.

Table 1: Construct Reliability and Validity

Variables	Items	Outer Loading	VIF	Cronbach's Alpha	CR	AVE
Audience Engagement	AE1	0.794	1.806	0.829	0.887	0.663
	AE2	0.835	2.353			
	AE3	0.891	2.892			
	AE4	0.729	1.362			
Community Participation	CP1	0.870	2.391	0.889	0.923	0.750
	CP2	0.877	2.781			
	CP3	0.879	2.735			
	CP4	0.838	2.133			
Digital Literacy	DL1	0.871	2.419	0.863	0.906	0.707
	DL2	0.805	1.836			
	DL3	0.828	2.097			
	DL4	0.857	1.966			
Digital Technology Integration	DTI1	0.892	2.794	0.891	0.924	0.754
	DTI2	0.851	2.076			
	DTI3	0.900	3.042			
	DTI4	0.829	2.134			
Innovation in Performance Formats	IPF1	0.934	3.512	0.893	0.934	0.824
	IPF2	0.905	2.686			
	IPF3	0.884	2.416			
Perceived Authenticity	PA1	0.868	1.882	0.854	0.911	0.773
	PA2	0.879	2.286			
	PA3	0.891	2.309			
Preservation Effectiveness	PE1	0.776	1.607	0.814	0.877	0.641
	PE2	0.826	1.903			
	PE3	0.776	1.654			
	PE4	0.823	1.674			

Source: Calculted by the Author

Table 2 presents the heterotrait-monotrait ratio (HTMT) values employed to evaluate discriminant validity between the constructs. All HTMT values are below the conservative cutoff point of 0.85 (Zaman et al., 2020), ensuring that the constructs differ from one another. For example, the HTMT value for audience engagement and community participation is 0.813, while that for perceived authenticity and innovation in performance formats is 0.754. The smallest observed value is between preservation performance and performance formats innovation (0.625), again supporting construct distinctiveness. Such findings confirm that all latent constructs are empirically distinct and do not coincide with others, ensuring discriminant validity of the model.

Table 2: Discriminant Validity (HTMT)

	AE	CP	DL	DTI	IPF	PA	PE
Audience Engagement							
Community Participation	0.813						
Digital Literacy	0.799	0.762					
Digital Technology Integration	0.809	0.531	0.740				
Innovation in Performance Formats	0.776	0.518	0.749	0.783			
Perceived Authenticity	0.755	0.774	0.603	0.801	0.754		
Preservation Effectiveness	0.699	0.724	0.638	0.723	0.625	0.720	

Source: Calculted by the Author

Table 3 reports the model's explanatory power in terms of R-square, adjusted R-square, Q² values for predictive relevance, and the standardized root mean square residual (SRMR) for model fit. Audience engagement had an R-square value of 0.670, meaning that 67% of the variance was accounted for by its predictors. Perceived authenticity had an R-square of 0.555, while preservation effectiveness had a moderate R-square of 0.485. All adjusted R-squared estimates were close to the unadjusted ones, suggesting a stable model. Q² estimates were above 0, which means that predictive relevance was high: 0.599 for audience participation, 0.542 for perceived authenticity, and 0.411 for preservation efficacy. SRMR estimate of 0.078 was below the cutoff of 0.08 (Javed et al., 2023), which suggests good model fit. In effect sizes, digital technology integration and innovation in performance formats have the largest effects across variables, especially on preservation effectiveness. Community participation and digital literacy also have positive effects, but with smaller magnitudes. To assess the significance of path coefficients, a non-parametric bootstrapping procedure with 5,000 resamples was conducted using SmartPLS 4. Bias-corrected and accelerated (BCa) confidence intervals were applied, and significance was determined at the 95% confidence level (p < 0.05).

Table 3: R-square and Model Fit Indicators

|	R-square	R-square adjusted	Q2	SRMR
Audience Engagement	0.670	0.664	0.599	0.078
Perceived Authenticity	0.555	0.551	0.542	
Preservation Effectiveness	0.485	0.476	0.411	
Effect Size				
	AE	PA	PE	
Audience Engagement				
Community Participation	0.102	0.072	0.240	
Digital Literacy	0.203		0.125	
Digital Technology Integration	0.190	0.138	0.368	
Innovation in Performance Formats	0.170	0.169	0.377	
Perceived Authenticity	0.177		0.142	

Source: Calculted by the Author
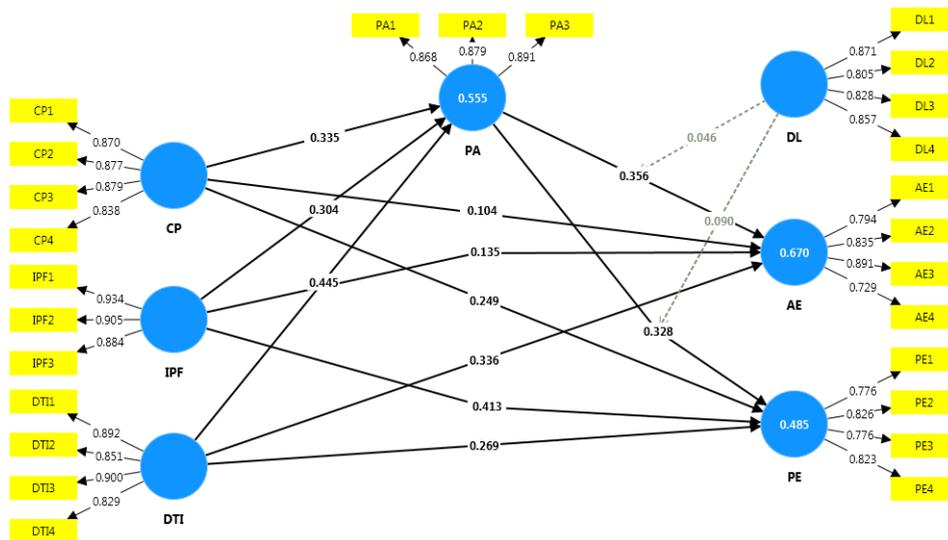
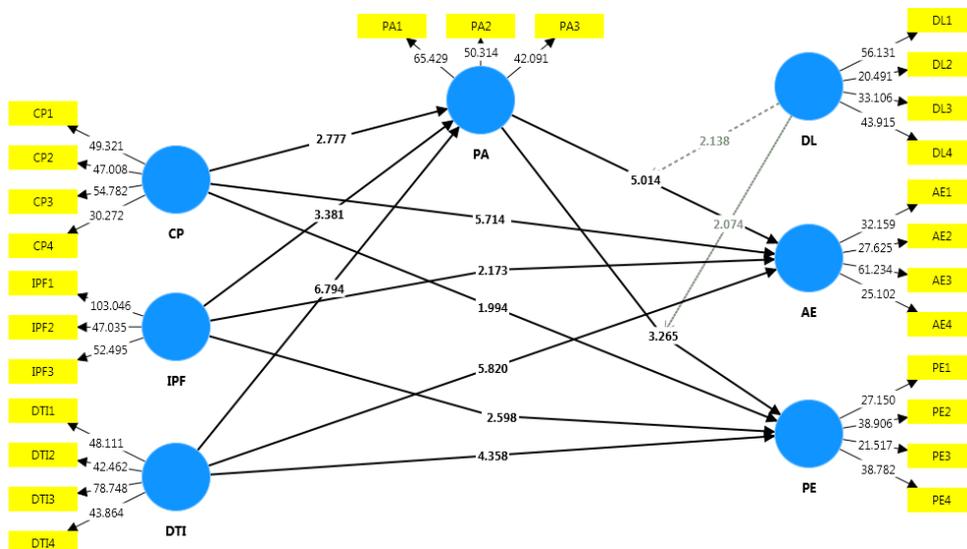**Figure 2:** Measurement Model and Structural Model

Figure 3: Measurement Model and PLS-SEM Bootstrapping with mediator (Full Model)

Table 4 and Figure 3 present the path coefficients, t-values, and p-values for all the relationships hypothesized for the structural model. Digital technology integration had a significant impact on preservation effectiveness (β = 0.269, t = 4.358, p = 0.000) and audience engagement (β = 0.336, t = 5.820, p = 0.000). Community engagement had a positive effect on preservation effectiveness (β = 0.249, t = 1.994, p = 0.023) and a high impact on audience engagement (β = 0.104, t = 5.714, p = 0.000). Innovation in performance format had the highest impact on preservation effectiveness (β = 0.413, t = 2.589, p = 0.006) and also had a high impact on audience engagement (β = 0.135, t = 2.173, p = 0.015). Perceived authenticity acted as a major mediator across six directions, such as between digital technology integration and outcomes (audience engagement and preservation effectiveness), community participation and outcomes, and performance format innovation and outcomes, with all p-values less than 0.01. Lastly, digital literacy strongly moderated the relationship between perceived authenticity and both preservation effectiveness (β = 0.046, t = 2.138, p = 0.016) and audience engagement (β = 0.090, t = 2.074, p = 0.019), indicating that the impacts of authenticity on both measures were greater with increased digital literacy.

Table 4: Path Analysis

|	β	T value	P values
Digital technology integration has a significant impact on the preservation effectiveness of local performing arts.	0.269	4.358	0.000
Digital technology integration has a significant impact on audience engagement.	0.336	5.820	0.000
Community participation in digital conservation has a significant positive effect on the preservation effectiveness of local performing arts.	0.249	1.994	0.023
Community participation in digital conservation has a significant positive effect on audience engagement with digitized performances.	0.104	5.714	0.000
Innovation in performance formats has a significant positive effect on the preservation effectiveness of local performing arts.	0.413	2.589	0.006
Innovation in performance formats has a significant positive effect on audience engagement with digitized performances.	0.135	2.173	0.015
Perceived authenticity mediates the relationship between digital technology integration and preservation effectiveness.	0.146	2.859	0.002
Perceived authenticity mediates the relationship between digital technology integration and audience engagement.	0.158	3.745	0.000
Perceived authenticity mediates the relationship between community participation and preservation effectiveness.	0.019	2.612	0.005
Perceived authenticity mediates the relationship between community participation and audience engagement.	0.021	2.599	0.007
Perceived authenticity mediates the relationship between innovation in performance formats and preservation effectiveness.	0.100	2.649	0.004
Perceived authenticity mediates the relationship between innovation in performance formats and audience engagement.	0.108	3.058	0.001
Digital literacy moderates the relationship between perceived authenticity and preservation effectiveness such that the relationship is stronger when digital literacy is high.	0.046	2.138	0.016
Digital literacy moderates the relationship between perceived authenticity and audience engagement such that the relationship is stronger when digital literacy is high.	0.090	2.074	0.019

Source: Calculted by the Author
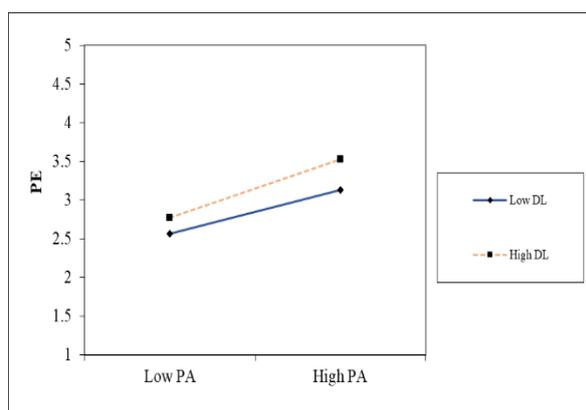
Figure 4: Digital literacy as a moderator between perceived authenticity and preservation effectiveness
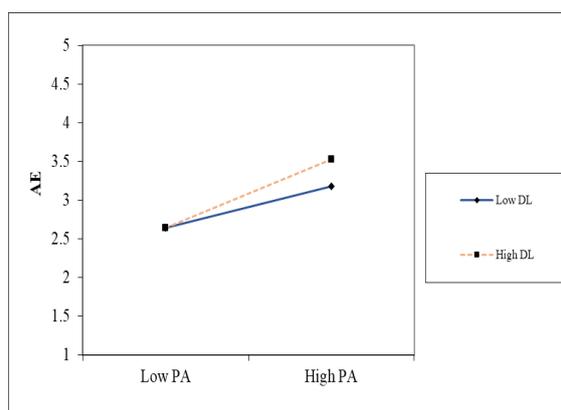

Figure 5: Digital literacy as a moderator between perceived authenticity and audience engagement

The findings from the MICOM analysis in Table 5 show that partial measurement invariance was confirmed for all the constructs. All the constructs, Digital Technology Integration, Community Engagement, Innovation in Performance, Perceived Authenticity, Engagement of the Audience, and Effectiveness of Preservation, satisfied the requirements for configural invariance and compositional invariance, which implies that the constructs had been conceptualized in the same way and composite scores were similar across groups.

Table 5: MICOM Assessment for Measurement Invariance

Construct	Configural Invariance	Compositional Invariance (c = 1 in 95% CI?)	Equal Means (p > 0.05)	Equal Variances (p > 0.05)	Invariance Established
Digital Technology Integration	Yes	Yes	0.272	0.318	Partial Invariance
Community Participation	Yes	Yes	0.451	0.502	Partial Invariance
Innovation in Performance	Yes	Yes	0.209	0.337	Partial Invariance
Perceived Authenticity	Yes	Yes	0.194	0.229	Partial Invariance
Audience Engagement	Yes	Yes	0.376	0.442	Partial Invariance
Preservation Effectiveness	Yes	Yes	0.123	0.298	Partial Invariance

Source: Calculted by the Author

5. Discussion

The findings of this research provide significant insights into the potential of digital technologies to transform and preserve local performing arts, in this case, Choy Li Fut martial arts. In an increasingly dynamic digital environment, traditional arts are confronted with the double challenge of preserving their authenticity while embracing new forms of engagement. This study sheds light on the ways innovative digital tools and practices can narrow the gap between preservation of cultural heritage and appeal to contemporary audiences. Through analyzing salient factors of digital technology incorporation, community engagement, creative performance formats, perceived authenticity, and digital literacy, this research enhances the expanding corpus of knowledge concerning how digital methods of preservation can sustain and also revitalize established art forms. Each test hypothesis in this study emphasizes an individual aspect of the digital preservation process and how it affects not only the retention of the main aspects of Choy Li Fut but also establishes greater connections with the audience.

The results of this research indicate that the integration of digital technology has a significant and positive effect on the preservation effectiveness of local performing arts, in this case, Choy Li Fut martial arts, as hypothesized in H1. This hypothesis was supported by the findings of the research, which indicated that new media such as augmented reality (AR), virtual reality (VR), and interactive digital repositories can easily capture and store the various components of such a conventional approach to art (Wu & Chuangprakhon, 2024). The online platform accommodates the full documentation of martial art skills, philosophical ideas, and historical backgrounds that otherwise risk loss due to decreasing masters as well as decay of forms of oral transmission. Use of digital technology, hence, presents a sustainable and scalable way of preserving choy li fut, to be continually updated and disseminated indefinitely and across the globe, available to greater and younger populations otherwise oblivious of such traditions (Lyu et al., 2024). This is in accordance with extant literature that supports the use of digital preservation as called for in the preservation of cultural heritage in a world where there will always be change.

Similarly, the second hypothesis (H2), which had presumed that the use of digital technology is a significant factor in audience interaction with digitized performances, was also confirmed. The results of this research suggest that when Choy Li Fut martial arts are embodied in digital media, such as interactive media, online lessons, and interactive VR, they play a significant part in influencing higher audience participation (Muthuswamy & Esakki, 2024). The digital formats make classical art forms accessible and more engaging to contemporary audiences who are used to dynamic and interactive content. The study observed a definite increase in audience engagement, emotional involvement, and mental stimulation upon being exposed to these new digital formats (Jiang et al., 2023). This finding lends support to the belief that online engagement processes such as gamification, social media interaction, and virtual reality can transform traditional performances to create participatory, user-generated experience that engages the contemporary cultural consumer.

The third hypothesis (H3), which tested whether there was a correlation between active community engagement in digital preservation and its impact on the efficiency of choy li fut conservation, was also proven to be correct by the study. The research determined that direct involvement of local communities, martial arts practitioners, and custodians of culture with the digitization process was a crucial factor in enriching the digital content and making it authentic (Yi et al., 2023). This is a confirmation of the importance of community-based approaches to digital preservation that guarantee accuracy and cultural responsiveness of preserved art. Involvement of community members, amateurs, students, and masters in producing, curating, and authenticating digital performances or collections brings preservation closer to culture (Ren et al., 2023). The participatory method does not decontextualize the digital preservation process from its historical and cultural context since it situates the digital content within local culture and choy li fut traditions (Wu, 2024). These results conform to the present literature on how participation plays an important role in the maintenance of cultural heritage.

Finally, the fourth hypothesis (H4) examined the effect of community involvement on audience interaction with digital performances and established that there was a highly positive effect in the result. This result once again confirms that the participation of the community in producing and distributing digital content makes the audience more engaged (Dethlefs & Cuayahuitl, 2024). If digital performances entail the involvement of local practitioners, cultural experts, and members of the society when they are making them, then they fill the final product with real cultural material, and the audience feels the performance is connected to the people more (Jungmayr, 2024). The research showed that audiences were ready to view and share performances if they perceived such digital versions as true representations of the choy li fut values and customs. This is also reflected in the literature, which indicates that authenticity is a key motivator of digital consumption, particularly cultural content (Theodorakopoulos et al., 2024). The findings in this research also show that performance innovation has a positive effect on the effectiveness of sustaining local performing arts, i.e., Choy Li Fut martial art, as anticipated in H5.

The research indicates that new modes of performance, such as virtual reality (VR) experiences, interactive multimedia pieces, and immersive exhibitions, facilitate the preservation of this ancient martial art form in a better way (Nayak et al., 2025). The new modes facilitate new ways of recording and dissemination of the complex movements, philosophies, and cultural meaning of Choy Li Fut, which are hard to record using traditional means (Kim & Baek, 2024). With the assistance of VR and AR, martial arts can be dynamically and interactively graphically generated, thus giving a more colorful experience to the audience that is extremely close to real performance. This aligns with the previous research where emphasis is laid on the fact that the application of high-end digital technology to mount traditional cultural performances can come a long way in maintaining such art.

Likewise, hypothesis H6 that innovation in performance forms increases audience interaction with digitized performances to a great extent was validated by the results. From the study, it is clear that the adoption of new forms of performance, such as interactive spaces, gamified performances, and digitally interactive martial arts exhibitions, increases audience participation to a great extent (Connor, 2025). These new media not only provide a more engaging and pleasurable experience but also invite active participation by the audience, which is key to maintaining interest and enhancing the richness of engagement with existing performances. For example, while Choy Li Fut martial arts are displayed through VR or via interactive 3D models, users have the ability to explore the martial arts in terms never before conceivable, such as inspecting detailed techniques from multiple views or studying the cultural heritage of the martial art within an interactive, welcoming environment (Islas & Jennings, 2023). The results are in consonance with the growing body of evidence suggesting that new digital formats not only preserve cultural content but also transform audience experience through offering personalized, interactive, and immersive experiences (Wang et al., 2023).

The mediating influence of perceived authenticity between different methods of digital preservation and conservation performance, as well as between audience participations with Choy Li Fut, was also given evidence by H7a through H7f hypothesis results. The findings enumerate the turning point role of perceived authenticity in optimizing preservation effectiveness for local performing arts and audience engagement in digitized performances. The study control set showed that audiences felt more engaged with and information about content whenever the digitized presentation of Choy Li Fut turned into perceived authenticity (Wu et al., 2024). This feeling of genuineness matters since audiences will only enjoy and react to digital reproductions of heritage art if they believe that digital reproductions represent the true nature of the art. This mediating effect aligns with available scholarly work, which emphasizes the centrality of authenticity in digital culture content and its impact on preservation efforts and engagement with the audience (Wu, 2024). For Choy Li Fut, perceived authenticity ensures that the online content does not dilute the cultural value of the martial art, yet forms more concrete emotional and mental connections with the audience.

Finally, hypotheses H8a and H8b that tested the moderating role of digital literacy in the interaction between perceived authenticity and preservation effectiveness and audience engagement were also validated. The study confirms that digital literacy has a significant moderating role in the interaction between perceived authenticity and preservation effectiveness and audience engagement, where the impacts were stronger with high digital literacy (Foyet & Louis, 2023). This suggests that the people who are digitally more literate are also going to be in a position to enjoy and enjoy digitized Choy Li Fut material. Digital literacy assists the audiences in being able to flow through, connect with, and have full access to digital modes, thus enhancing the preservation activity by enabling proper use of digital content (de Sousa, 2023). The study confirmed that when users are digitally literate, they will be able to better understand and appreciate the sophistication of the digital preservation methods, and this will improve engagement with the content. This is in line with the literature that is increasingly recognizing digital literacy as a key driver for digital preservation and engagement success.

Lastly, results of the research indicate the determinant roles of technology, innovation, and local engagement in preservation and audience interaction with local performing arts like Choy Li Fut. Successful outcomes observed in each of the hypotheses depict the significant contributions of digital aids in achieving peak preservation effectiveness as well as in audience interaction. As in the case of this study, the fusion of new formats, with the authenticity of digital presentation, ensures the continuation of cultural practice as well as the engagement of more pervasive and active audiences. Moreover, the mediating role of perceived authenticity and the moderating role of digital literacy also unveil the importance of considering the capacity to experience and enjoy digital content. As a whole, these results reaffirm an interrelated practice of digital conservation whereby technology, participatory community engagement, and education as digital literacy collaborate to make strong and durable preservation models for Choy Li Fut and other performing arts local to the digital environment.

6. Conclusion

This research highlights the great potential of digital technology in preserving and reinvigorating local performing arts, particularly Choy Li Fut martial arts, in the digital age. Based on quantitative data analysis and stringent model verification, the study upheld that integration of digital technology, community participation, and innovation in performance styles each individually impacts both the efficacy of cultural preservation and engagement among audiences. In addition, the mediating function of perceived authenticity and the moderating effect of digital literacy were also significant, pointing to the subtle mechanisms by which audiences engage with digitized cultural content. Notably, the MICOM measurement confirmed partial measurement invariance across participant groups—teachers, learners, and designers—ensuring that, although interpretations will differ slightly, constructs are comparable enough to warrant aggregated analysis. Such methodological strength enhances the study's arguments and allows for well-informed cross-group analysis. Generally, this study adds to theoretical and practical discussion regarding digital heritage by offering evidence-based recommendations to cultural institutions, digital content producers, and policy-makers. It further presents new grounds for future research into nuanced audience experiences and the formulation of inclusive, authentic, and sustainable digital preservation practices for diverse cultural heritages.

7. Implications

The practical utility of this study is of critical relevance to cultural organizations, policymakers, and practitioners working to preserve and promote local performing arts, particularly Choy Li Fut martial arts. Firstly, the study draws attention to the importance of reconciling digital technologies with traditional forms of art to protect them against the modern-day challenges of globalization and technological advancement. Cultural institutions can use the research to develop digital preservation plans

that not only maintain the integrity of these historic performances but also enable them to be accessed by a worldwide audience. The research also suggests the need for new types of performance, e.g., virtual reality, augmented reality, and interactive multimedia, to bring new energy to martial arts performances and make them more appealing to younger, technology-savvy audiences. In addition, the research question concerning community engagement posits that community participation in the digital preservation process can make the preservation process more efficient and the attraction of an audience more successful through ownership and cultural pride. This requires the cooperation of martial arts practitioners, cultural institutions, and local communities in developing digital archives and interactive experiences that adequately reflect Choy Li Fut but are sustainable over the long term. In addition, the mediating role of perceived authenticity serves to call for cultural integrity to be maintained in digital representations, offering concrete advice on finding a balance between modern-day technological advancement and proper respect for tradition.

Theoretical importance of this research is profound, as it contributes to the overall understanding of how digital technologies intersect with cultural heritage, audience engagement, and innovation in the framework of local performing arts. The study draws upon past theories for preserving cultural heritage through the application of new technologies within the system of preservation itself, offering a fresh lens with which to understand the sustainability of arts like Choy Li Fut during the era of the internet. This work supports the proposal that digital technology is not a preservation tool by itself but, rather, it is an enabler for intensifying the authenticity and cultural integrity of classical performance, which coheres well with authenticity theory in digital media and representation theory. In addition, the results add to community participation literature by illustrating its mediating function in digital preservation initiatives, providing empirical support for the contention that community participation can impact preservation outcomes as well as audience engagement. The inquiry into perceived authenticity as a moderator in the constructs between digital technology integration and effectiveness of preservation or audience engagement deepens a fresh theoretical comprehension regarding how authenticity helps determine the viability of digital strategies for cultural preservation. In addition, digital literacy as a moderator provides new avenues of investigation into how the technological competence of audiences can influence their engagement with and participation in digital cultural experience, indicating that digital literacy is an important variable not explored sufficiently in existing literature on digital preservation.

8. Limitations and Future Directions

This research, as much as it presents useful contributions to the comprehension of digital conservation for the case of Choy Li Fut martial arts, is under some important limitations that need to be mentioned. One of these limitations is the constitution and level of the dataset. While the sampling design was intended to represent diversity in three stakeholder groups pertinent to physical education teachers, Choy Li Fut students, and computer graphics professionals, the resulting sample of 213 respondents is not statistically representative of any larger population. "Representative," as it is used in this study, describes role representation within the digital ecosystem of Choy Li Fut rather than demographic or geographic generalizability. Hence, care must be taken in transferring the findings to other traditional performing arts, cultural contexts, or larger populations. Also, the research centered on a given cultural and geographical environment, which restricts its transferability to other heritage practices with varying historical, institutional, or technological aspects. The other limitation is the handling of the three stakeholder groups as one composite sample. Although this conforms to the study's ecosystem perspective, it can be seen to neglect variations in perception and experience between those contributing to the production aspect of digital conservation and those from the audience side. The choice not to break down the analysis might have limited a more differentiated comprehension of role-based dynamics. Additionally, the cross-sectional design of the study constrains it to catch up with the growth of digital conservation practice over time or measure long-term effects. Lastly, while the survey tool was crafted with clarity and role-neutrality as the guiding principles, there is always the risk that abstract conceptualizations like perceived authenticity and audience participation were understood in varying ways by participants based on their background and experience with digital tools. These limitations suggest that future research should adopt broader sampling frames, incorporate longitudinal or mixed-method designs, and explore subgroup analyses to offer a more detailed and transferable understanding of digital heritage preservation in diverse cultural environments.

References

Anthony Jr, B. (2024). The role of community engagement in urban innovation towards the co-creation of smart, sustainable cities. *Journal of the Knowledge Economy, 15*(1), 1592–1624. https://doi.org/10.1007/s13132-023-01176-1

Aripin, Z., Mulyani, S. R., & Haryaman, A. (2023). Marketing strategy in project sustainability management efforts in extractive industries: Building a reciprocity framework for community engagement. *KRIEZ Academy: Journal of Development and Community Service, 1*(1), 25–38.

Borysenko, O., Diachenko, M., Diachenko, I., Kravchenko, O., & Shunevych, Y. (2024). Impact of media space design on audience engagement in the digital age: A scoping review. *Amazonia Investiga, 13*(84), 221–236. https://doi.org/10.34069/AI/2024.84.12.14

Cahyono, A., Hera, T., Malarsih, M., Sugiarto, E., & Widjajantie, K. (2024). Technology in arts education: Opportunities and challenges for preserving the performing arts. In *Proceedings of the International Conference on Innovation & Entrepreneurship in Computing, Engineering & Science Education (InvENT 2024)* (pp. 512–523). Atlantis Press. https://doi.org/10.2991/978-94-6463-589-8_47

Connor, A. (2025). In real life: Gaming community engagement in museums. *Curator: The Museum Journal, 68*(1), 9–22. https://doi.org/10.1111/cura.12622

Dağ, K., Çavuşoğlu, S., & Durmaz, Y. (2023). The effect of immersive experience, user engagement, and perceived authenticity on place satisfaction in the context of augmented reality. *Library Hi Tech, 42*(4), 1331–1346. https://doi.org/10.1108/LHT-10-2022-0498

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*(3), 319–340. https://doi.org/10.2307/249008

De Sousa, R. R. A. (2023). The preservation of historical memory in the digital age: Challenges, opportunities, and interactive technologies in teaching and research. *Revista Inter-Ação, 48*(3), 894–915. https://doi.org/10.5216/ia.v48i3.76254

Dethlefs, N., & Cuayahuitl, H. (2024). User engagement triggers in social media discourse on biodiversity conservation. *ACM Transactions on Social Computing, 7*(1–4), 1–32. https://doi.org/10.1145/3662685

Foyet, M., & Louis, M. P. (2023). Enhancing conservation communication: Using digital literacy to address the misunderstanding of Southern Africa's sustainable use approach in Western settings. *Journal of Policy & Governance, 3*, 17–35. https://doi.org/10.33002/jpg030202

Gao, Y., Li, H., Xiong, G., & Song, H. (2023). AIoT-informed digital twin communication for bridge maintenance. *Automation in Construction, 150*, 104835. https://doi.org/10.1016/j.autcon.2023.104835

Genc, V., & Gulertekin Genc, S. (2023). The effect of perceived authenticity in cultural heritage sites on tourist satisfaction: The moderating role of aesthetic experience. *Journal of Hospitality and Tourism Insights, 6*(2), 530–548. https://doi.org/10.1108/JHTI-08-2021-0218

Glikson, E., & Asscher, O. (2023). AI-mediated apology in a multilingual work context: Implications for perceived authenticity and willingness to forgive. *Computers in Human Behavior, 140*, 107592. https://doi.org/10.1016/j.chb.2022.107592

Gohoungodji, P., & Amara, N. (2023). Art of innovating in the arts: Definitions, determinants, and modes of innovation in creative industries, a systematic review. *Review of Managerial Science, 17*(8), 2685–2725. https://doi.org/10.1007/s11846-022-00597-7

Hair, J. F., & Alamer, A. (2022). Partial Least Squares Structural Equation Modeling (PLS-SEM) in second language and education research: Guidelines using an applied example. *Research Methods in Applied Linguistics, 1*(3), 100027. https://doi.org/10.1016/j.rmal.2022.100027

Islas, D. S. C., & Jennings, G. (2023). A typology of martial arts scholar-practitioners: Types, transitions, and tensions in capoeira. *Societies, 13*(10), 214. https://doi.org/10.3390/soc13100214

Jasrotia, S. S., Rai, S. S., Rai, S., & Giri, S. (2024). Stage-wise green supply chain management and environmental performance: Impact of blockchain technology. *International Journal of Information Management Data Insights, 4*(2), 100241. https://doi.org/10.1016/j.jjimei.2024.100241

Javed, H. A., Nawaz, S., & Javed, H. A. (2023). Synthesis of success: Crafting sustainable performance through E-HRM innovation, organizational agility, and cultural harmony in SMEs. *Pakistan Journal of Humanities and Social Sciences, 11*(3), 3379–3395. https://doi.org/10.52131/pjhss.2023.1103.0621

Jiang, X., Chiu, D. K., & Chan, C. T. (2023). Application of the AIDA model in social media promotion and community engagement for small cultural organizations: A case study of the Choi Chang Sau Qin Society. In S. H. Lo & K. K. W. Ho (Eds.), *Community engagement in the online space* (pp. 48–70). IGI Global. https://doi.org/10.4018/978-1-6684-5190-8.ch004

Jungmayr, P. J. (2024). Sustainable social media: Consumer engagement with marine conservation NGOs. *Journal of Environmental Management, 349*, 119501. https://doi.org/10.1016/j.jenvman.2023.119501

Kale, S., Hirani, S., Vardhan, S., Mishra, A., Ghode, D. B., Prasad, R., & Wanjari, M. (2023). Addressing cancer disparities through community engagement: Lessons and best practices. *Cureus, 15*(8), e43445. https://doi.org/10.7759/cureus.43445

Kim, M., & Baek, T. H. (2024). Are virtual influencers friends or foes? Uncovering the perceived creepiness and authenticity of virtual influencers in social media marketing in the United States. *International Journal of Human-Computer Interaction, 40*(18), 5042–5055. https://doi.org/10.1080/10447318.2023.2233125

Lee, G., & Kim, H.-Y. (2024). Human vs. AI: The battle for authenticity in fashion design and consumer response. *Journal of Retailing and Consumer Services, 77*, 103690. https://doi.org/10.1016/j.jretconser.2023.103690

Lukita, C., Lutfiani, N., Salam, R., Pangilinan, G. A., Rafika, A. S., & Ahsanitaqwim, R. (2024). Technology integration in cultural heritage preservation: Enhancing community engagement and effectiveness. In *2024 3rd International Conference on Creative Communication and Innovative Technology (ICCIT)* (pp. 1–6). IEEE. https://doi.org/10.1109/ICCIT62134.2024.10701088

Lyu, H., Ma, C., & Arash, F. (2024). Government innovation subsidies, green technology innovation, and the carbon intensity of industrial firms. *Journal of Environmental Management, 369*, 122274. https://doi.org/10.1016/j.jenvman.2024.122274

Maulidin, S., Rohman, M., Nawawi, M. L., & Andrianto, D. (2024). Quality management in improving competitiveness in the digital era at a madrasa. *Journal of Advanced Islamic Educational Management, 4*(1), 57–70.

Muthuswamy, V. V., & Esakki, S. (2024). Exploring sustainable cultural preservation: Strategies, challenges, and community engagement in heritage conservation efforts. *Rita Revista Indexada de Textos Acadêmicos, 21*, 45–62.

Nayak, A., Satpathy, I., Jain, V., & Rai, B. K. (2025). Using virtual reality simulations to increase public participation in

conservation initiatives: An overview. In A. Sharma & B. K. Rai (Eds.), *Digital innovations for renewable energy and conservation* (pp. 369–392). Springer.

Rane, N., & Choudhary, S. (2024). Role and challenges of ChatGPT, Google Bard, and similar generative artificial intelligence in arts and humanities. *Studies in Humanities and Education, 5*(1), 1–11. https://doi.org/10.48185/she.v5i1.999

Ren, L., Lee, S. K., & Chun, S. (2023). The effects of influencer type, regulatory focus, and perceived authenticity on consumers' purchase intention. *International Journal of Consumer Studies, 47*(4), 1241–1255. https://doi.org/10.1111/ijcs.12898

Rijal, S. (2023). The importance of community involvement in public management planning and decision-making processes. *Journal of Contemporary Administration and Management (ADMAN), 1*(2), 84–92. https://doi.org/10.61100/adman.v1i2.27

Singh, B. (2023). Federated learning for envisioning future trajectory smart transport system for climate preservation and smart green planet: Insights into global governance and SDG-9 (Industry, Innovation and Infrastructure). *National Journal of Environmental Law, 6*(2), 6–17.

Song, A., Rasool, Z., Nazar, R., & Anser, M. K. (2024). Towards a greener future: How green technology innovation and energy efficiency are transforming sustainability. *Energy, 290*, 129891. https://doi.org/10.1016/j.energy.2023.129891

Theodorakopoulos, L., Theodoropoulou, A., & Stamatiou, Y. (2024). A state-of-the-art review in big data management engineering: Real-life case studies, challenges, and future research directions. *Eng, 5*(3), 1266–1297. https://doi.org/10.3390/eng5030068

Ukato, A., Sofoluwe, O. O., Jambol, D. D., & Ochulor, O. J. (2024). Optimizing maintenance logistics on offshore platforms with AI: Current strategies and future innovations. *World Journal of Advanced Research and Reviews, 22*(1), 1920–1929. https://doi.org/10.30574/wjarr.2024.22.1.1315

Vogel, J., & Lerch, B. (2024). Audience engagement. In A. Brown & C. Davis (Eds.), *International perspectives on museum management* (pp. 114–130). Routledge. https://doi.org/10.4324/9781003000082-12

Wang, M.-Y., Li, Y.-Q., Ruan, W.-Q., Zhang, S.-N., & Li, R. (2023). Cultural inheritance-based innovation at heritage tourism destinations: Conceptualization, structural dimensions, and scale development. *Journal of Hospitality and Tourism Management, 55*, 118–130. https://doi.org/10.1016/j.jhtm.2023.03.009

Wiratno, T. A., & Callula, B. (2024). Transformation of beauty in digital fine arts aesthetics: An artpreneur perspective. *Aptisi Transactions on Technopreneurship (ATT), 6*(2), 231–241. https://doi.org/10.34306/att.v6i2.395

Wu, R. (2024). The practice and exploration of integrating the national non-heritage "Choy Li Fut" course into the civic and political education of college students based on the perspective of physical education literacy. *International Journal of Advanced Research in Education and Society, 6*(1), 657–662.

Wu, R., Li, H. H. B. M., & Yang, Q. (2024). Study on the interaction and co-progress between cultural heritage of Choy Li Fut and civic and political education in colleges and universities. *Evaluation of Educational Research, 2*(1), 15–24. https://doi.org/10.18686/eer.v2i1.3475

Wu, Y., & Chuangprakhon, S. (2024). Preservation and transmission guidelines of Salar vocal folk music. *International Journal of Education and Literacy Studies, 12*(1), 186–192. https://doi.org/10.7575/aiac.ijels.v.12n.1p.186

Yang, L., Hu, X., Lee, H. M., & Zhang, Y. (2023). The impacts of ecotourists' perceived authenticity and perceived values on their behaviors: Evidence from Huangshan World Natural and Cultural Heritage Site. *Sustainability, 15*(2), 1551. https://doi.org/10.3390/su15021551

Yi, X., Fu, X., Lin, B., & Sun, J. (2024). Authenticity, identity, self-improvement, and responsibility at heritage sites: The local residents' perspective. *Tourism Management, 102*, 104875. https://doi.org/10.1016/j.tourman.2023.104875

Yi, X., Fu, X., So, K. K. F., & Zheng, C. (2023). Perceived authenticity and place attachment: New findings from Chinese world heritage sites. *Journal of Hospitality & Tourism Research, 47*(5), 800–826. https://doi.org/10.1177/10963480211027629

Zaman, U., Nawaz, S., Javed, A., & Rasul, T. (2020). Having a whale of a time: Linking self-determination theory (SDT), job characteristics model (JCM), and motivation to the joy of gig work. *Cogent Business & Management, 7*(1), 1807707. https://doi.org/10.1080/23311975.2020.1807707

Zhong, D., Xia, Z., Zhu, Y., & Duan, J. (2023). Overview of predictive maintenance based on digital twin technology. *Heliyon, 9*(4), e14534. https://doi.org/10.1016/j.heliyon.2023.e14534

Zhong, X., Duan, Z., Liu, C., & Chen, W. (2024). Research on the coupling mechanism and influencing factors of the digital economy and green technology innovation in Chinese urban agglomerations. *Scientific Reports, 14*(1), 5150. https://doi.org/10.1038/s41598-024-55854-4

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Appendix 1

Questionnaire

Digital Technology Integration

1. The use of digital platforms (AR/VR/videos) has improved my understanding of Choy Li Fut martial arts.
2. Digital technologies are effectively used to document and preserve Choy Li Fut performances.
3. Digital tools help maintain the originality of Choy Li Fut martial arts.
4. Technology has enhanced access to learning and experiencing Choy Li Fut.

Community Participation

1. Members of the Choy Li Fut community are actively involved in the digital preservation process.
2. Community feedback is considered in designing digital content for Choy Li Fut.
3. Cultural experts and practitioners contribute to the digital conservation efforts.
4. I feel encouraged to participate in digital initiatives related to Choy Li Fut.

Innovation in Performance Formats

1. Innovative presentation formats (e.g., 3D animation, virtual reenactments) make Choy Li Fut more appealing.
2. Modern adaptations of performances help preserve the cultural essence of Choy Li Fut.
3. Creative digital reinterpretations retain the value of traditional Choy Li Fut performances.

Preservation Effectiveness

1. The current digital efforts are effective in preserving Choy Li Fut martial arts.
2. Digital conservation has reduced the risk of losing Choy Li Fut traditions.
3. The cultural values of Choy Li Fut are well-preserved through digital means.
4. The continuity of Choy Li Fut is ensured through sustainable digital strategies.

Audience Engagement

1. Digital content on Choy Li Fut keeps me interested and involved.
2. I frequently revisit online materials related to Choy Li Fut.
3. Digital platforms increase my emotional connection with Choy Li Fut.
4. I enjoy participating in online or virtual Choy Li Fut events.

Perceived Authenticity

1. The digital representation of Choy Li Fut feels authentic.
2. I believe the cultural identity of Choy Li Fut is preserved in digital formats.
3. Digital versions accurately reflect the traditions of Choy Li Fut.

Digital Literacy

1. I am confident in using digital tools to access cultural content.
2. I can easily interact with AR/VR content related to Choy Li Fut.
3. I understand how to evaluate the credibility of digital cultural materials.
4. I can navigate and use online platforms to engage with Choy Li Fut materials.