

# Living Inheritance or Digital Alienation ? The Ethical Dilemma and Path Selection of the Inheritance of Intangible Cultural Heritage Digital People

Zixuan Huang <sup>1</sup>, Ruimin Wang <sup>1,\*</sup>, Wenxuan Jing <sup>1</sup>

<sup>1</sup> Beijing City University, Beijing 101300, China

**\* Correspondence Author:**

Ruimin Wang

wrmbd123@163.com

*Received: 14 September 2026 / Accepted: 26 October 2026 / Published online: 31 October 2026*

## Abstract

Digital technologies are increasingly used to document, interpret, and disseminate intangible cultural heritage (ICH), and AI-enabled digital humans have emerged as a new medium for its communication and transmission. This study classifies ICH digital humans into three functional types: performance and dissemination, craft-skill replication, and educational assistance. It examines the ethical tensions that arise when the logic of technological reproduction intersects with the people-centred and practice-based character of living heritage transmission. Based on a questionnaire survey conducted between May 10 and June 10, 2026, the study obtained 521 valid responses from participants with different ages, educational backgrounds, and occupations. The questionnaire covered five dimensions: respondent characteristics, perceptions of ICH transmission, awareness and use of ICH digital humans, digital-ethics concerns, and preferences for future governance. The findings point to three interrelated dimensions of potential digital alienation: distortion of cultural content and authenticity through standardised reproduction; structural imbalance in transmission arising from the interaction of technological and commercial pressures; and divergent public evaluations associated with demographic and cognitive differences. In response, the study proposes three pathways: differentiated standards and meaningful participation by ICH bearers; a human-centred human-machine model supported by transparent content review and commercial oversight; and targeted public education that addresses differences in age and educational background. These findings offer empirical insights into the responsible use of digital humans in ICH safeguarding and transmission.

**Keywords:** Intangible Cultural Heritage; Digital Humans; Digital Ethics; Public Perceptions; Living Transmission

## 1. Introduction

UNESCO's Convention for the Safeguarding of the Intangible Cultural Heritage defines ICH as practices, representations, expressions, knowledge, and skills that communities, groups, and individuals recognise as part of their cultural heritage and continually recreate in response to their environment, interaction with nature, and history (UNESCO, 2003). This definition places communities and practitioners at the centre of safeguarding and emphasises transmission and revitalisation rather than the static preservation of cultural products. Accordingly, living transmission depends on interpersonal teaching, embodied practice, performance, and the integration of heritage into everyday life (Alivizatou, 2012; Kirshenblatt-Gimblett, 2004; Smith, 2006). The Convention also calls for the active participation of communities, groups, and individuals in safeguarding activities, a principle further articulated in UNESCO's ethical principles for safeguarding ICH (UNESCO, 2015).

Digital technologies have created new opportunities to document, present, and communicate ICH across geographical and generational boundaries. Recent studies have examined the use of augmented reality, social media, digital reading, and AI-generated narratives to improve access to cultural heritage and support audience engagement (Galani & Vosinakis, 2024; Hua et al., 2024; Liu et al., 2025; Zhang & Xu, 2024). Research has also explored public participation in digital heritage management and the factors associated with the adoption of digital ICH experiences (Ye et al., 2025; Zhang et al., 2024). These developments demonstrate the potential of digital technologies to broaden access and create new forms of cultural experience. However, increased visibility and technical reproducibility do not necessarily ensure the continuity of the social relationships, embodied knowledge, and local contexts through which living heritage is transmitted.

Research on the digital safeguarding of ICH has developed along several related lines. One strand examines the technical possibilities of digital documentation, three-dimensional reconstruction, augmented reality, and interactive presentation. For example, Galani and Vosinakis (2024) investigated the use of augmented reality and digital characters to communicate traditional craft practices, while Zhang and Xu (2024) developed a grounded-theory model of cultural heritage communication on social media. More recent studies have examined the adoption of digital ICH experiences and the use of AR/VR storytelling, social media, and AI-generated narratives in the Chinese context (Hua et al., 2024; Liu et al., 2025; Ye et al., 2025). Scoping and comparative reviews have further mapped the growing range of digital methods used for ICH documentation, preservation, education, and cultural innovation (Ren & Lam, 2026; Wei et al., 2026).

A second strand addresses the ethical and social implications of technological intervention. AI systems may reproduce or amplify representational biases embedded in cultural collections and training data, while the use of AI in cultural heritage raises questions about transparency, accountability, human oversight, and the protection of cultural values (Foka & Griffin, 2024; Tiribelli et al., 2024; UNESCO, 2022). Research specifically focused on ICH has also discussed the need to balance AI-enabled documentation and innovation with cultural authenticity, community participation, and the protection of practitioners' rights (Fu et al., 2025; Tan et al., 2026). Despite these advances, there remains a need for empirical research into how members of the public with different demographic backgrounds perceive the functions, risks, and appropriate boundaries

of ICH digital humans. In particular, it is important to distinguish between concerns derived from theoretical discussion and perceptions reported by actual audiences. This study addresses this gap through a questionnaire survey and a comparative analysis of public perceptions.

Against this background, this study examines whether ICH digital humans can support living transmission or whether their application may generate forms of digital alienation. It focuses on three dimensions of potential alienation: the cultural content and authenticity of inheritance, the structure and organisation of transmission, and public understanding and value judgements. Using questionnaire data, the study explores differences in perceptions across age, educational, and occupational groups and considers how these findings can inform the responsible development of ICH digital humans.

## **2. Three Forms and Technical Logics of ICH Digital Humans**

The safeguarding and transmission of ICH continue to face practical challenges, including the ageing of some heritage bearers, limited opportunities for succession, unequal access to training, and the difficulty of documenting tacit knowledge. These challenges are particularly significant for practices that depend on oral instruction, bodily movement, and repeated hands-on learning. Digital technologies can help record and organise knowledge, preserve audiovisual materials, and make heritage content accessible to wider audiences. However, documentation and digital presentation cannot, by themselves, replace the social relationships and embodied practice involved in living transmission (Tan et al., 2026; Wei et al., 2026). Digital preservation therefore needs to be considered alongside community participation and the continued practice of heritage bearers (UNESCO, 2003, 2015).

Against this background, ICH projects have increasingly adopted technologies such as motion capture, three-dimensional reconstruction, AI-generated content (AIGC), and large language models. These tools can support the recording, presentation, and interpretation of heritage knowledge and may provide additional channels for public engagement. Recent reviews identify applications across documentation, classification, restoration, exhibition, education, and cultural innovation (Ren & Lam, 2026; Wei et al., 2026). Nevertheless, the contribution of these technologies depends on how they are designed and governed, particularly whether they remain aligned with the needs and values of the communities concerned (Tan et al., 2026).

According to their principal functions and application objectives, ICH digital humans can be grouped into three types: performance and dissemination, craft-skill replication, and educational assistance.

### **2.1. Performance and Dissemination**

Performance-and-dissemination digital humans are designed to extend ICH presentation beyond physical venues. They may deliver online explanations, perform digitally adapted versions of traditional arts, participate in livestreams, or appear in short videos and virtual exhibitions. These applications can broaden audience access and reduce some of the practical constraints associated with offline performances, including venue capacity, travel, scheduling, and production costs.

Digital characters and augmented-reality installations have, for example, been used to communicate traditional craft processes and connect heritage narratives with physical places (Galani & Vosinakis, 2024). Recent research has also examined the combination of AR/VR storytelling, social media participation, and AI-generated narratives in the communication of Chinese ICH (Liu et al., 2025).

However, performance-and-dissemination applications also raise questions about authenticity and representation. A digital human that merely reproduces a performer's appearance or movements may present a stylised representation without conveying the social relationships, contextual knowledge, and practical judgement involved in transmission. Entertainment-oriented adaptations may also simplify cultural content to attract attention or platform traffic. In addition, the use of a person's likeness, voice, performance data, and other personal or cultural materials requires clear rules concerning consent, rights, and data use (Tiribelli et al., 2024; UNESCO, 2022). Digital performance can therefore support visibility and documentation, but it should not be treated as equivalent to the full process of living transmission.

## **2.2. Craft-Skill Replication**

Craft-skill replication digital humans are intended to record and reproduce techniques, movements, and procedural knowledge, particularly where the number of practitioners is small or a practice is considered vulnerable. Three-dimensional reconstruction and motion-capture technologies can record the movements and sequences involved in traditional crafts, martial arts, and performing arts. These records may serve as digital documentation, learning resources, or reference materials for future practitioners. Recent research reviews identify digital documentation and restoration as important stages in the safeguarding of ICH (Fu et al., 2025; Wei et al., 2026).

Nevertheless, the ability to reproduce visible movements does not necessarily mean that a digital system can transmit the knowledge and judgement acquired through long-term practice. A recording may capture the external form of a technique without fully representing the tactile experience, situational adaptation, aesthetic judgement, or cultural meanings communicated through interaction between practitioners and learners. If digital instruction were to replace rather than complement face-to-face teaching, learners could become proficient at imitating visible actions while remaining unfamiliar with the knowledge and values that inform them. Digital replication should therefore be understood as a supplementary documentation and learning resource, not as a substitute for the embodied transmission of skills (Alivizatou, 2012; Tan et al., 2026).

## **2.3. Educational Assistance**

Educational-assistance digital humans are designed to answer questions and introduce basic knowledge about ICH. They may provide explanations of historical background, terminology, tools, techniques, and related cultural practices. By drawing on curated knowledge bases and large language models, they can support online learning, virtual exhibitions, and introductory educational activities. Research on social-media-based cultural heritage communication suggests that functional, sensory, interactive, and contextual experiences can shape how audiences understand and engage with heritage content (Zhang & Xu, 2024). Studies of digital ICH adoption also indicate that perceived usefulness and the quality of the digital experience are relevant to users' acceptance (Ye et al., 2025).

Educational-assistance digital humans should not, however, be treated as replacements for practical training or direct interaction with heritage bearers. Inaccurate source material, algorithmic bias, or generated responses that lack reliable grounding may distort the interpretation of ICH knowledge. Online explanations can also encourage fragmented learning if they are not connected to practical activities and contextual understanding (Figure 1). The key issue is therefore how to define the appropriate role of digital tools while preserving opportunities for hands-on practice and interpersonal transmission (Foka & Griffin, 2024; Fu et al., 2025; UNESCO, 2022).

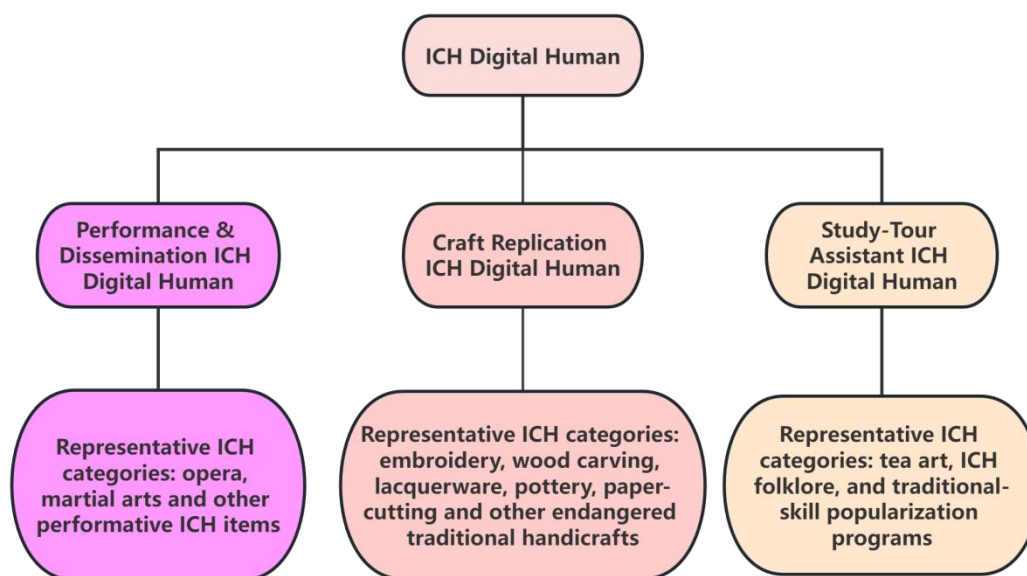


**Figure 1. Overview of the Three Types of ICH Digital Humans**

### 3. From Living Inheritance to Digital Alienation: Multiple Areas of Tension

Living transmission refers to the ongoing process through which ICH knowledge, skills, and cultural meanings are passed on and recreated through practice, interaction, and participation. It is rooted in the social and geographical contexts where heritage is practised and is connected to everyday life rather than being confined to museums or exhibition spaces. UNESCO's definition emphasises that ICH is continually recreated by communities in response to their environment and history (UNESCO, 2003). Heritage scholarship similarly treats heritage as a cultural process through which meanings are produced and negotiated, rather than as a fixed object that can simply be preserved (Kirshenblatt-Gimblett, 2004; Smith, 2006). The use of digital humans may support this process, but it may also create tensions when technological reproduction is treated as equivalent to living transmission.

The first tension concerns the difficulty of reproducing the tacit and individualised dimensions of traditional practice. In apprenticeship-based transmission, a practitioner does not merely demonstrate a sequence of actions; the learner also observes, asks questions, receives feedback, and gradually develops personal judgement through repeated practice. The style and expertise of individual bearers are shaped by experience and local traditions and cannot always be captured through standardised data collection. A rigid digital reproduction process may therefore freeze a

particular version of a practice and limit the scope for adaptation and innovation. This risk is especially relevant to crafts and performing arts in which individual interpretation and embodied experience are central (Alivizatou, 2012; Smith, 2006; Tan et al., 2026).

The second tension concerns the relationship between heritage practices and the places in which they are embedded. ICH is often closely connected to local environments, customs, materials, and community relationships. Digital exhibitions and virtual environments can make heritage more accessible, but standardised presentation formats may flatten regional differences and detach practices from the settings that give them meaning. Participatory approaches to heritage media emphasise the importance of place, community interpretation, and everyday practices in shaping cultural meaning (Giaccardi, 2012; Kirshenblatt-Gimblett, 2004). Digital presentation should therefore retain contextual information and make the relationship between a practice and its place visible.

The third tension concerns the unequal visibility that may arise from platform algorithms and commercial incentives. Recommendation systems and market-oriented production may concentrate attention on highly visible heritage items that are easy to package and present, while less familiar, locally specific, or commercially unattractive practices receive less exposure. This possibility is related to broader concerns about representational bias in AI systems and the influence of user-generated content and platform-mediated visibility on heritage communication (Foka & Griffin, 2024; Hua et al., 2024; Tiribelli et al., 2024). If digital promotion consistently favours a narrow set of highly marketable examples, it may reproduce rather than reduce inequalities in the visibility of different ICH practices.

#### **4. Empirical Analysis of Ethical Dilemmas in the Use of ICH Digital Humans**

The growing use of digital technologies in ICH safeguarding creates opportunities for documentation, communication, and education. At the same time, the implications of these applications for cultural authenticity, the role of heritage bearers, public understanding, and digital ethics require empirical examination. This section reports the results of a questionnaire survey designed to explore public perceptions of ICH digital humans and the ethical issues associated with their use.

The questionnaire covered five dimensions. The first collected respondents' demographic characteristics, including age, educational background, and occupation. The second examined perceptions of the current state of ICH transmission, including perceived challenges and the need for revitalisation. The third assessed awareness of and experience with ICH digital humans, including information channels and perceived advantages and suitable application scenarios. The fourth examined digital-ethics concerns, including cultural distortion, data privacy, copyright ownership, human substitution, and commercial imbalance. The fifth addressed development and governance preferences, including content supervision, copyright protection, and the provision of public-interest platforms.

The questionnaire was developed with reference to the study's objectives and the relevant literature. It included single-choice, multiple-choice, and open-ended questions. For the purposes

of this study, an ICH digital human refers to a virtual human representation developed or operated using technologies such as motion capture, AIGC, and large language models, with functions that may include performance and dissemination, skill replication, and educational assistance. Digital alienation refers to the risk that algorithms, commercial interests, or cognitive biases may distort the authenticity and transmission priorities of ICH, weaken the role of heritage bearers, or produce divergent public value judgements. Participation was voluntary, and the questionnaire was open to respondents of different ages, including those under 18. Responses with unusually short completion times, identical answers across all items, or internal inconsistencies were excluded. Data were collected from May 10 to June 10, 2026, through an online questionnaire platform and social communities, as well as offline at cultural centres, campuses, and cultural-tourism venues. A total of 552 questionnaires were distributed and 540 were returned. After the exclusion of invalid responses, 521 valid questionnaires remained. Descriptive statistics were produced using SPSS. Three key questionnaire items were selected for cross-tabulation and visualisation. Because the response options represented nominal categories rather than ordered levels, cross-tabulation was used to describe the distributions rather than to infer causal relationships.

**Table 1. Demographic Characteristics of Respondents (N = 521)**

| Variable   | Category                     | Frequency | Percentage (%) |
|------------|------------------------------|-----------|----------------|
| Age        | Under 18                     | 97        | 18.62          |
|            | 18–25                        | 124       | 23.80          |
|            | 26–40                        | 129       | 24.76          |
|            | 41–60                        | 93        | 17.85          |
|            | Over 60                      | 78        | 14.97          |
| Education  | Below bachelor's degree      | 188       | 36.08          |
|            | Bachelor's degree            | 282       | 54.13          |
|            | Postgraduate degree or above | 51        | 9.79           |
| Occupation | Student                      | 193       | 37.04          |
|            | Public-institution employee  | 55        | 10.56          |
|            | Private-sector employee      | 96        | 18.43          |
|            | Freelancer                   | 43        | 8.25           |
|            | Educator                     | 27        | 5.18           |
|            | Unemployed                   | 28        | 5.37           |
|            | Other                        | 79        | 15.16          |

The sample included respondents from several age, educational, and occupational groups. As shown in Table 1, respondents with a bachelor's degree accounted for 54.13% of the sample, while students represented 37.04% of respondents. The age distribution covered five groups, from under 18 to over 60. These characteristics allow the study to compare descriptive patterns across demographic categories. The questionnaire was distributed through a combination of online and offline channels to reach respondents with different backgrounds and levels of contact with ICH. The resulting responses provide primary evidence for describing public perceptions and identifying issues that may inform further research and governance discussions.

#### 4.1. Public Awareness of ICH Digital Humans

Figure 2 presents respondents' familiarity with ICH across age groups. The distribution indicates differences in reported familiarity and engagement. Respondents in the under-18 and 18–25 groups were more likely to report limited familiarity, such as having heard of ICH without actively learning about or practising it. The 26–40 group showed a relatively higher level of deeper engagement, while respondents over 60 reported comparatively limited exposure to digital ICH content.

Age Group × Digital Human Exposure — 3D Bar Chart (ascending, occlusion-free)

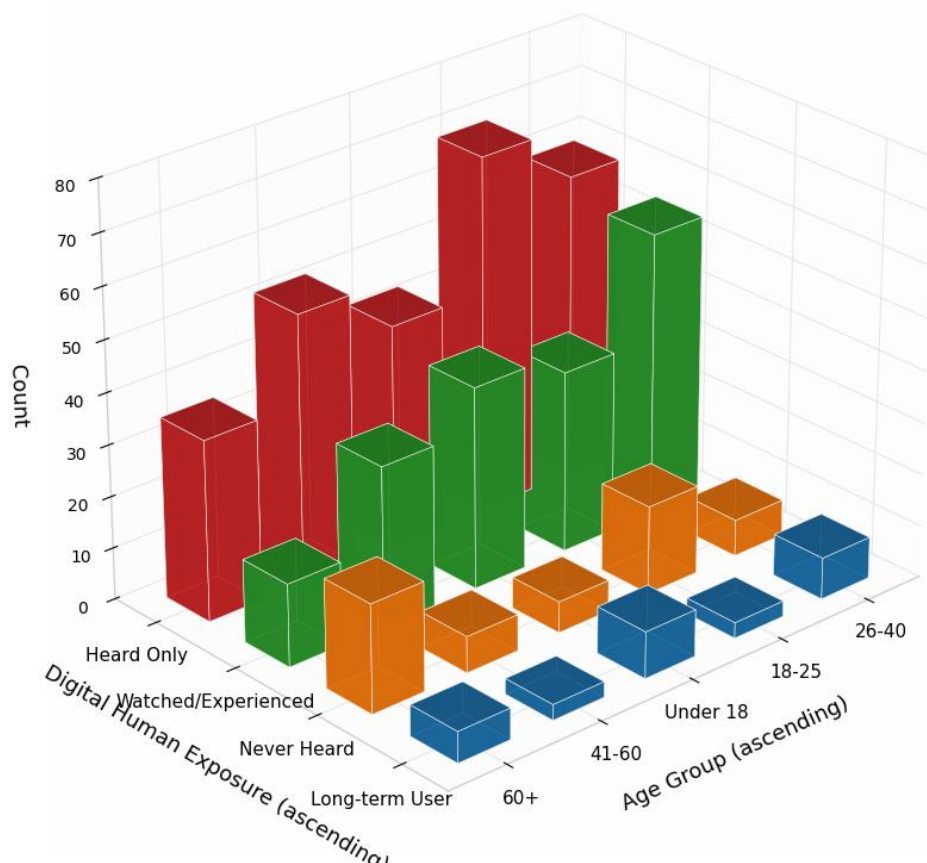


Figure 2. Age Group and Familiarity with ICH Digital Humans

Overall, many respondents remained at a relatively superficial level of familiarity, while the proportion reporting active learning or participation was smaller. The descriptive patterns suggest that younger respondents may encounter ICH more often through online media, whereas middle-

aged and older respondents may have fewer opportunities to access digital information about it. These patterns should be interpreted as differences in reported exposure rather than as evidence of fixed generational characteristics.

These age-related patterns may reflect differences in media habits, access to information, and opportunities for participation. Short-form digital content can introduce younger audiences to heritage practices, but exposure does not necessarily lead to an understanding of their historical, social, and regional contexts. Research on social-media-based heritage communication highlights the importance of combining accessible presentation with contextual, sensory, and interactive experiences (Liu et al., 2025; Zhang & Xu, 2024). Digital communication should therefore seek not only to attract attention but also to provide pathways from initial exposure to sustained learning and participation.

Occupation × Digital Human Exposure — 3D Bar Chart (ascending, occlusion-free)

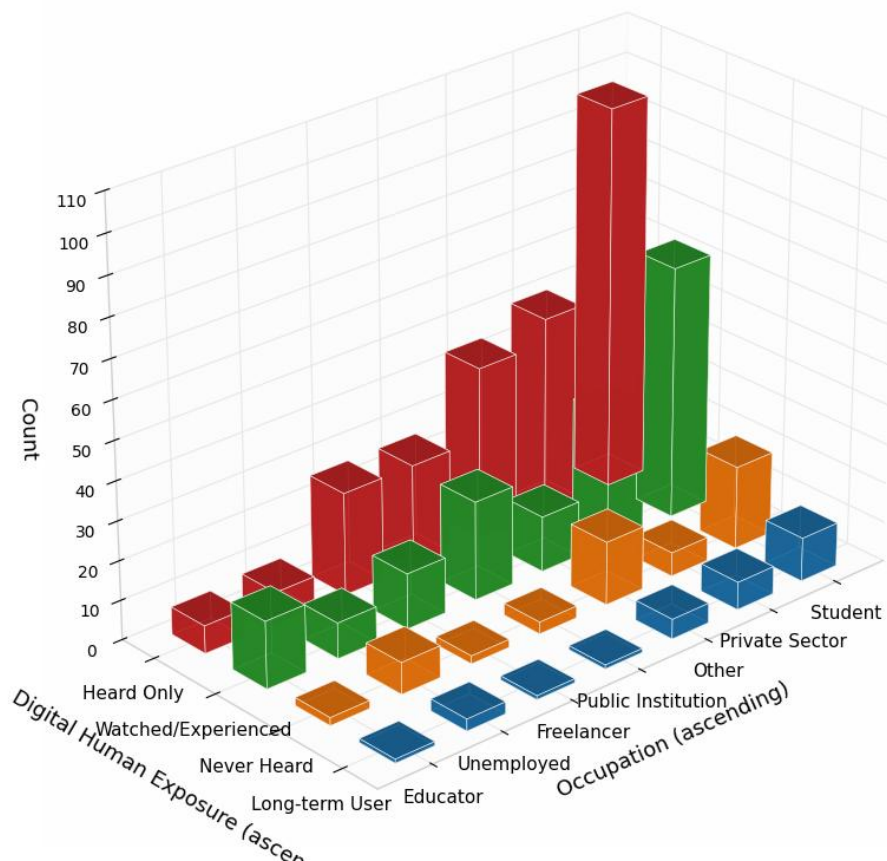


**Figure 3. Occupational Group and Familiarity with ICH Digital Humans**

Figure 3 compares familiarity with ICH digital humans across occupational groups. The descriptive distribution suggests that students rely relatively heavily on online platforms for information about ICH, while public-institution employees and educators show a comparatively higher level of deeper engagement. Private-sector employees, freelancers, and some other occupational groups report lower levels of sustained engagement. These differences may reflect variations in information access and opportunities for participation, although the cross-tabulation does not establish the reasons for those differences. Research on digital participation in heritage

management similarly emphasises the importance of access, digital literacy, and opportunities for meaningful engagement (Zhang et al., 2024; Ye et al., 2025).

Figure 4 examines how respondents with different levels of ICH familiarity evaluate the advantages of digital humans. Respondents with lower levels of familiarity place relatively greater emphasis on convenience and the potential to attract younger audiences. Respondents who are more familiar with ICH or actively engaged in its practice place greater emphasis on functions such as the detailed recording of techniques and the preservation of heritage-related resources. The overall pattern suggests that respondents recognise the communication value of digital technologies, while those with greater experience of ICH may pay closer attention to their documentation and safeguarding functions.

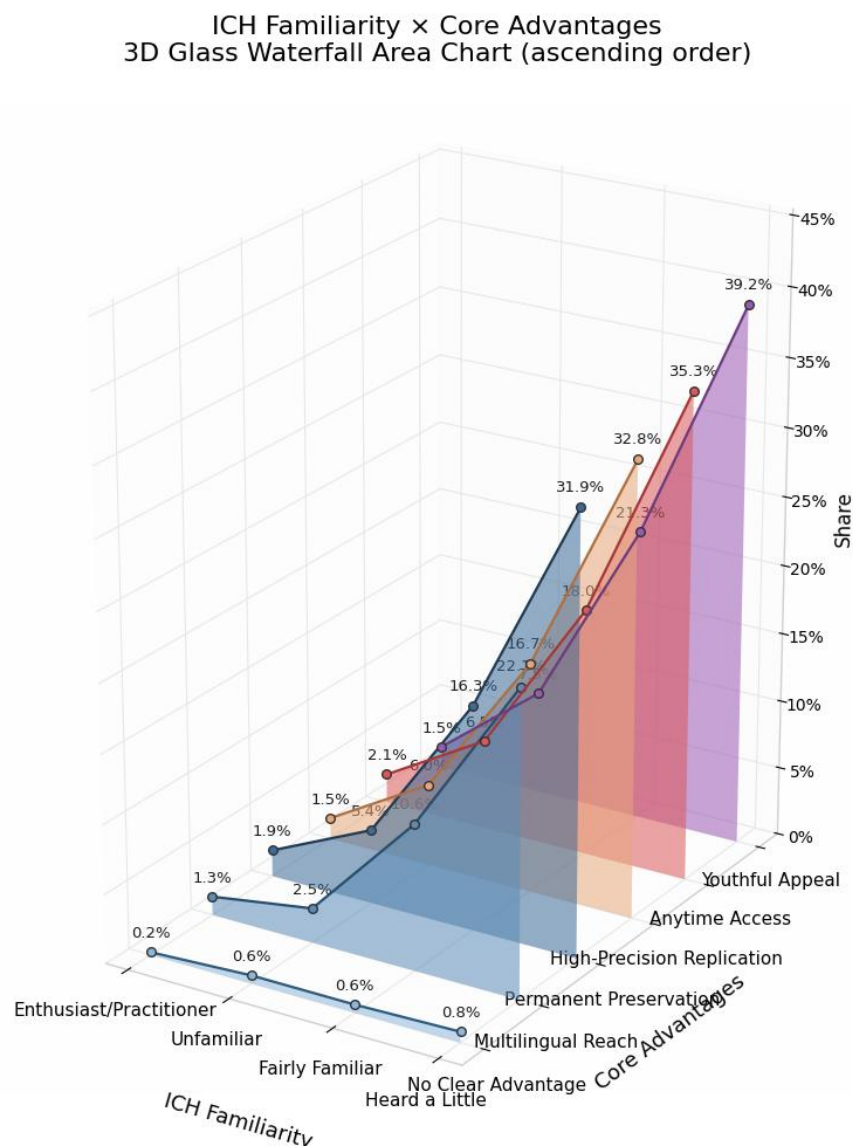


**Figure 4. ICH Familiarity and Perceived Advantages of Digital Humans**

This pattern points to a potential tension between accessibility and authenticity. Digital communication can reduce barriers to initial exposure, but convenient access and visually convincing reproduction do not necessarily provide the contextual knowledge or practical

experience required for deeper understanding. The design of ICH digital humans should therefore consider both communication effectiveness and the needs of heritage bearers and practitioners.

#### 4.2. Perceived Conflicts Between Living Inheritance and Digital Alienation

Figure 5 compares respondents' recognition of the relationship between digital humans and living transmission with their perceptions of related ethical risks. The distribution indicates that respondents who were partially supportive or neutral often expressed concerns about issues such as cultural distortion. Those who were less supportive reported fewer concerns in absolute terms, which may partly reflect differences in their level of engagement with the topic. The pattern suggests that acceptance of digital technologies and awareness of their potential risks are not necessarily opposites. Public attitudes should therefore not be reduced to a simple division between support and opposition. Some respondents appear willing to accept the convenience of new technologies while remaining alert to risks involving cultural misrepresentation, commercial intervention, and the weakening of heritage bearers' roles. Such concerns are consistent with wider discussions of AI ethics in cultural heritage, particularly the need to address bias, transparency, and human oversight (Foka & Griffin, 2024; Tiribelli et al., 2024).

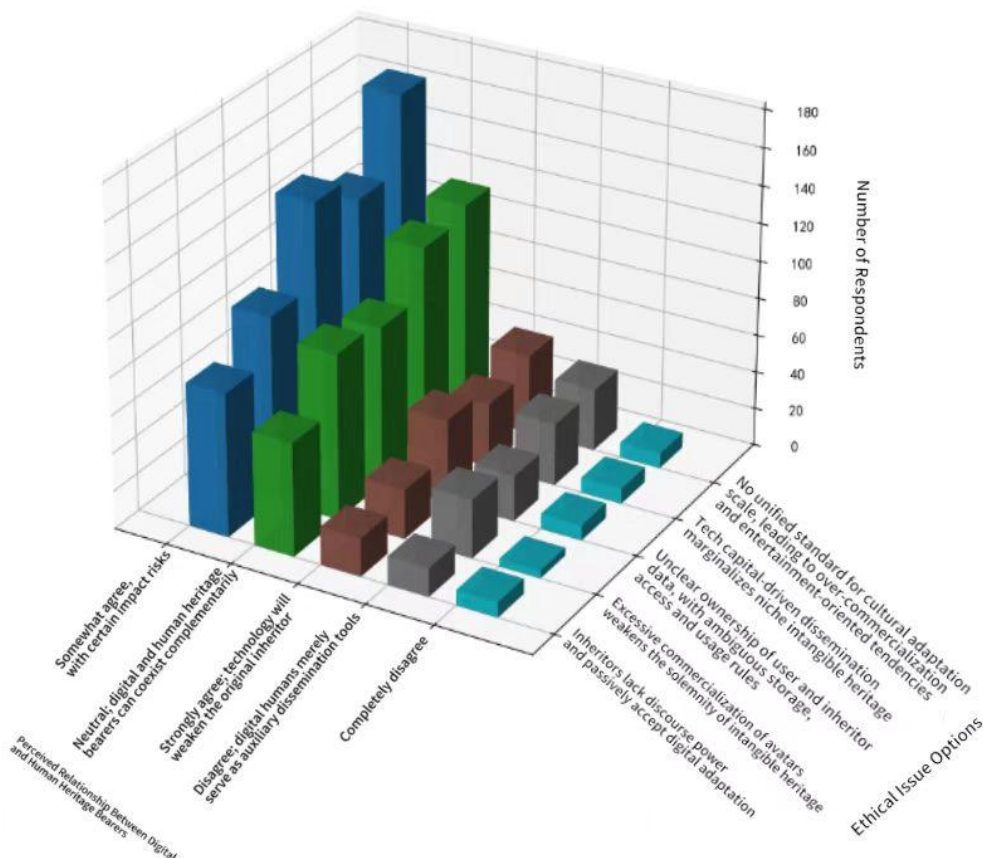


**Figure 5. Perceived Ethical Risks by Attitudes Toward ICH Digital Humans**

Figure 6 examines occupational differences in concerns about entertainment-oriented adaptations of ICH digital humans. Among the occupational categories in the questionnaire, student respondents showed the strongest concern, followed by freelancers. Private-sector employees and

public-institution employees expressed comparatively lower levels of concern, while educators' responses were more mixed. Respondents in the 'other' category were more likely to select neutral or less-concerned options. These are descriptive differences in the survey sample and should not be interpreted as evidence that occupation itself causes particular attitudes.

The results highlight a possible tension between market-oriented communication and the practice-based logic of living transmission. When digital content is designed primarily to maximise traffic, highly visible and easily packaged forms of heritage may receive more attention than practices that require longer explanations or sustained participation. Research on user-generated content and AI-mediated heritage representation has also raised questions about how platform visibility, authenticity, and representational bias shape public engagement (Foka & Griffin, 2024; Hua et al., 2024).

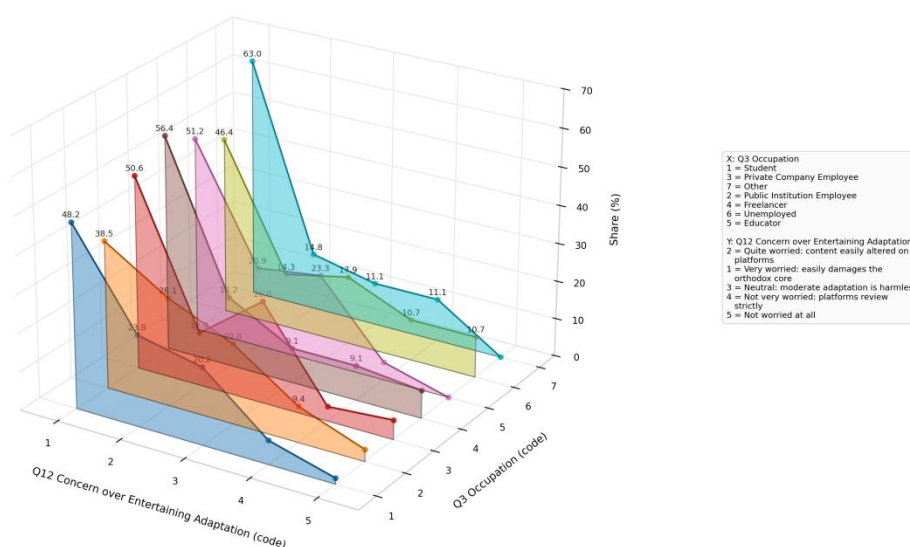


**Figure 6. Concerns About Entertainment-Oriented Adaptation by Occupational Group**

Figure 7 presents differences across educational groups in perceptions of whether digital humans may weaken the value of living transmission. Respondents at all educational levels recognised that digital technologies could affect existing transmission practices. Responses among those with higher educational attainment were more varied, while respondents with lower educational attainment appeared more likely to select options indicating concern about technological impact. The distribution suggests differences in how respondents evaluate the relationship between digital tools and traditional transmission.

Educational background may be associated with differences in how respondents interpret the opportunities and risks of digital inheritance. However, the cross-tabulation is descriptive and does not demonstrate that educational attainment causes a particular attitude. Nor does it establish that one group has a more accurate understanding than another. Research on youth participation and digital ICH adoption highlights the relevance of digital literacy, prior experience, and opportunities for participation when interpreting public responses (Ye et al., 2025; Zhang et al., 2024).

The findings do not support a simple conclusion that digital technology inevitably causes cultural alienation. Rather, they point to concerns about how technology is selected, designed, and applied.

Standardised reproduction, insufficient community participation, and the displacement of offline practice may create risks when digital tools are used without appropriate safeguards. A complementary relationship between digital media and face-to-face transmission is therefore important for preserving the conditions under which ICH remains a living practice.

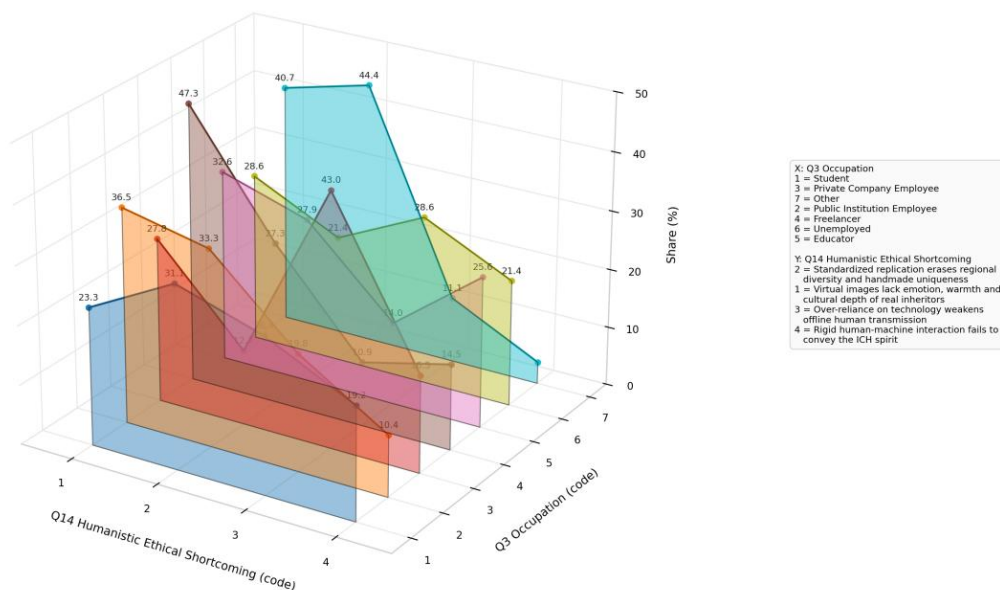


**Figure 7. Perceived Impact of Digital Humans on Living Transmission by Educational Group**

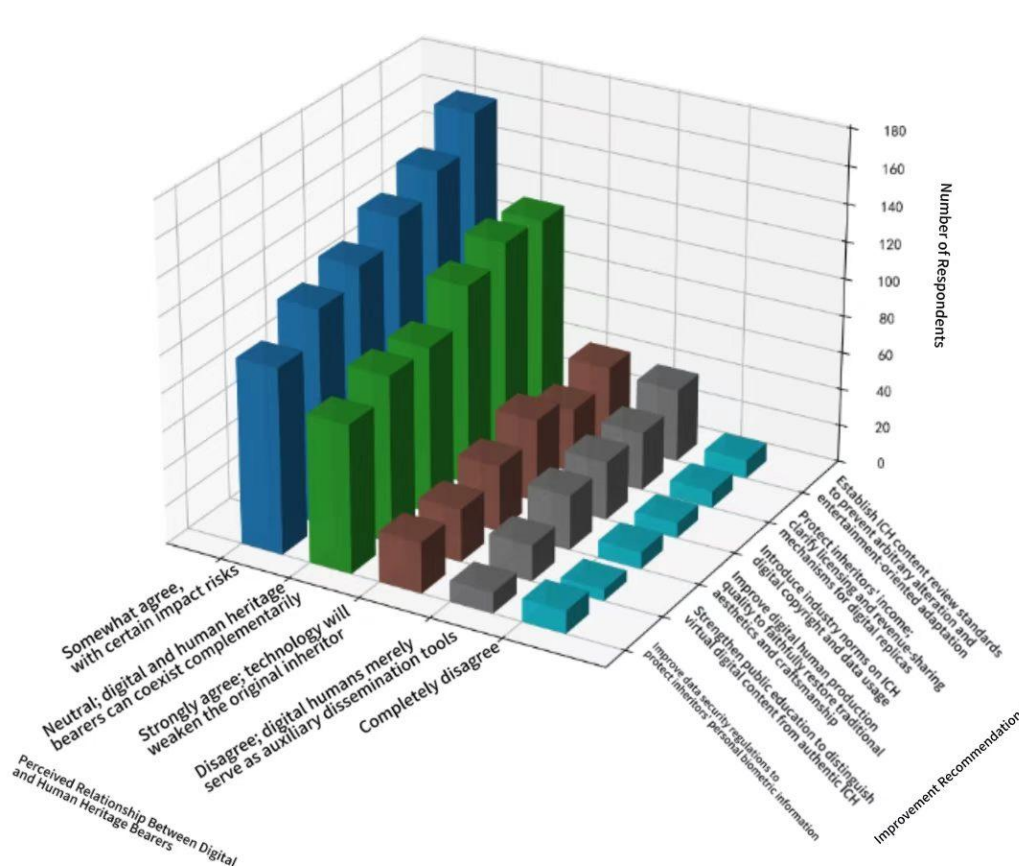


**Figure 8. Attitudes Toward Digital-Human Inheritance and Preferred Improvement Measures**

Figure 8 examines respondents' preferences for improving the governance of ICH digital humans. Across the attitude groups, respondents showed interest in measures such as content-review standards, protection of heritage bearers' rights and income, and clearer rules for digital copyright and data use. Support for these measures was particularly visible among respondents who were partially supportive or neutral. Complete opposition to the use of digital humans was less common in the sample.

These responses suggest that public concerns are not limited to whether digital humans should be used; they also concern the conditions under which such systems should operate. Governance measures involving consent, transparency, rights protection, and human oversight are consistent with UNESCO's ethical principles for ICH safeguarding and its Recommendation on the Ethics of Artificial Intelligence (UNESCO, 2015, 2022). Recent research on AI and ICH likewise emphasises the importance of community participation and responsible data governance (Fu et al., 2025; Tan et al., 2026).

### 4.3. Public Expectations for the Development of ICH Digital Humans

Figure 9 compares expectations about the future development of ICH digital humans across age groups. Overall, respondents tended to expect some further development while favouring an assistive role for digital humans rather than complete replacement of face-to-face transmission. Respondents under 18 expressed the most optimistic expectations. Those aged 18–25 were also generally positive but appeared more supportive of an auxiliary role. More than 30% of respondents in the 26–40 and 41–60 groups were optimistic about further development, while respondents over 60 expressed more cautious expectations.

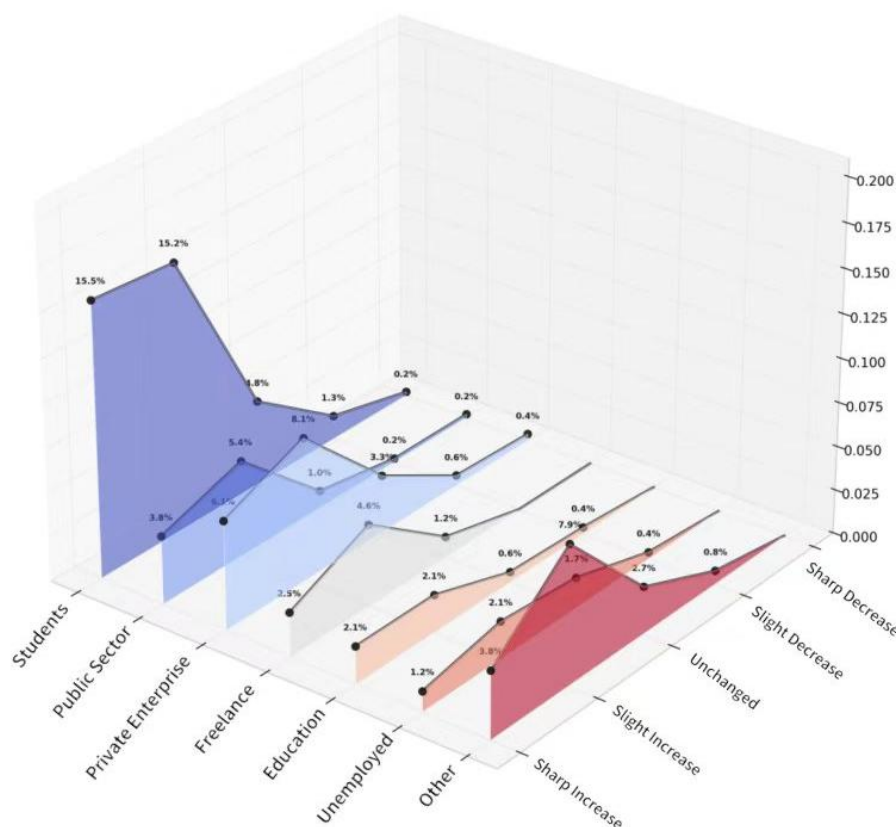


Figure 9. Expectations About the Development of ICH Digital Humans by Age Group

The results indicate differences in expectations across age groups, but they also point to a shared concern about the relationship between technological assistance and human-led transmission. Respondents generally recognised the potential of digital tools while expressing reservations about replacing heritage bearers and practical learning. This position accords with recent research showing that the adoption of digital ICH experiences depends on users' perceptions of usefulness and experience, while safeguarding requires continued attention to authenticity and community involvement (Ye et al., 2025; Tan et al., 2026).

## **5. Key Challenges: Digital Alienation and the Preservation of Living Heritage**

### **5.1. Stratified Value Perceptions and the Social Differentiation of Digital Inheritance**

The survey indicates that respondents' age, educational background, and occupation are associated with differences in how they evaluate ICH digital humans. These differences may contribute to divergent public judgements about the value and risks of digital inheritance. They should, however, be understood as patterns in the surveyed sample rather than as evidence that demographic characteristics directly cause particular perceptions. Research on digital ICH adoption and youth participation similarly identifies prior experience, digital literacy, and opportunities for engagement as relevant factors in shaping responses (Ye et al., 2025; Zhang et al., 2024).

Across age groups, younger respondents expressed relatively strong concern about risks such as cultural distortion and entertainment-oriented adaptation. Older respondents reported lower levels of familiarity with digital ICH content and may have had fewer opportunities to encounter or evaluate these applications. These findings suggest that public education should address both the opportunities and limitations of digital technologies, rather than assuming that greater concern necessarily indicates opposition or that lower concern indicates acceptance.

Educational differences were also visible in the response distributions. Respondents with lower educational attainment appeared more likely to express concerns in a less differentiated way, whereas respondents with higher educational attainment displayed a wider range of views. These patterns should not be interpreted as a ranking of groups' cognitive abilities. Instead, they indicate that information access, prior knowledge, and familiarity with digital technologies may shape how people evaluate the risks and benefits of ICH digital humans.

Age and educational background may overlap, but the present cross-tabulations do not isolate their independent effects. Further research using multivariate analysis would be needed to examine these relationships more rigorously. More broadly, limited public understanding of ICH and digital technologies may make it difficult to distinguish between appropriate digital support and forms of intervention that undermine cultural context, authenticity, or the role of heritage bearers.

### **5.2. Cognitive Bias: Fragmented Communication and Shallow Understanding of ICH**

ICH is rooted in local environments, practitioners' skills and personal styles, and forms of transmission such as apprenticeship and oral instruction. These characteristics make ICH a dynamic cultural process rather than a fixed body of information. Digital media can extend its reach and create opportunities for participation, but the communication format may also favour short, visually

engaging, and easily shareable content. Research on participatory heritage media and digital reading highlights the importance of connecting online content with social practice, embodied experience, and contextual understanding (Giaccardi, 2012; Zhang & Xu, 2024).

Online presentation may separate heritage practices from the places, materials, relationships, and routines through which they acquire meaning. When digital content provides only a simplified account of a practice, audiences may recognise its name or appearance without understanding its history or cultural context. Digital communication can therefore increase the breadth of exposure without necessarily increasing the depth of understanding. This concern reinforces the need to connect digital presentation with local knowledge and community participation (Kirshenblatt-Gimblett, 2004; Liu et al., 2025; Smith, 2006).

### **5.3. Instrumental Value and the Boundaries of Digital Intervention**

Standardised reproduction and template-based content generation may make ICH digital humans easier to develop and deploy, but they can also reduce the visibility of regional differences and individual practitioners' styles. Digital systems may struggle to represent tacit knowledge, context-dependent judgement, and the cultural meanings embedded in practice. These risks are not inevitable consequences of digitisation; they depend on data selection, system design, governance, and the extent to which heritage bearers participate in the process (Foka & Griffin, 2024; Fu et al., 2025; Wei et al., 2026).

One major concern identified in the survey is over-reliance on technology at the expense of face-to-face transmission. Respondents generally regarded digital humans as tools that can assist communication and learning, rather than as substitutes for human practitioners. The appropriate role of digital humans is therefore instrumental: they may support documentation, explanation, and access, but should not displace apprenticeship, practical training, or the authority of the communities that sustain ICH. This distinction is consistent with the people-centred principles of ICH safeguarding (UNESCO, 2003, 2015, 2024).

The survey suggests that many respondents accept the convenience of digital communication while remaining concerned about whether standardised reproduction can capture the experience and style of heritage bearers. Respondents also expressed concern about entertainment-oriented adaptations and the potential weakening of cultural content. The group with relatively high risk awareness was not necessarily the group most opposed to digital humans; some respondents who were partly supportive or neutral also expressed strong concerns about copyright, commercial intervention, and content review. These findings are consistent with broader discussions of AI ethics and digital ICH adoption (Tiribelli et al., 2024; Ye et al., 2025).

Taken together, the findings suggest that the central issue is not the existence of digital-human technology itself, but the boundaries and conditions governing its application. Without clear standards, community involvement, and appropriate oversight, digital tools may reproduce cultural biases or encourage forms of presentation that prioritise visibility over meaningful transmission.

## **6. Pathways to Mitigation: Toward Human–Machine Collaboration**

### **6.1. Safeguarding Authenticity and the Cultural Core**

Respondents' concerns focused on the possible homogenisation of content, the loss of regional characteristics, and the weakening of interpersonal transmission. They also recognised that current digital systems may provide limited interaction and may not fully reproduce the practical details or contextual knowledge involved in ICH. Recent reviews emphasise that digital safeguarding is most effective when technical methods are aligned with community participation and the needs of heritage bearers (Ren & Lam, 2026; Tan et al., 2026).

A first step is to establish differentiated documentation and reproduction standards for different ICH categories. Rather than relying on a single template, project teams should identify the specific skills, materials, regional characteristics, and cultural meanings associated with each practice. Digital models should be designed around the requirements of the relevant heritage domain and should make clear which aspects have been recorded, interpreted, or reconstructed. Such an approach can help preserve diversity and reduce the risk that standardised formats will obscure the distinctive features of individual practices (Ren & Lam, 2026; Wei et al., 2026).

Heritage bearers and relevant communities should participate throughout the process of data collection, content design, model development, review, and subsequent use. Their involvement is important for identifying technically accurate representations, explaining tacit knowledge and cultural protocols, and determining which materials may be shared publicly. Collaboration with researchers, educators, and technical specialists can further improve the quality of digital representations. This approach is consistent with the participatory principles of the 2003 Convention and UNESCO's ethical guidance for ICH safeguarding (UNESCO, 2003, 2015; Tan et al., 2026).

### **6.2. Reconstructing a Symbiotic System and Defining Application Boundaries**

The respective roles of digital humans and heritage bearers should be clearly defined. Heritage bearers and communities should remain the primary agents of living transmission, while digital humans should serve as supplementary tools for documentation, communication, and learning. This human-centred model can combine the accessibility of digital technologies with the practical and social dimensions of face-to-face transmission. Digital systems should not be presented as autonomous or equivalent replacements for practitioners, particularly in contexts where knowledge depends on embodied skill, judgement, and community recognition (UNESCO, 2003, 2015; Tan et al., 2026).

Governments, cultural institutions, and platforms should establish transparent procedures for reviewing ICH-related digital content and supervising commercial applications. These procedures should address the provenance and permitted use of training data, informed consent, the use of likenesses and voices, copyright and related rights, attribution, revenue sharing where appropriate, and mechanisms for correcting inaccurate or culturally inappropriate content. AI governance frameworks emphasise transparency, accountability, human oversight, and the protection of human rights (UNESCO, 2022, 2024). Research on AI in cultural heritage also stresses the need to integrate ethical review into the design and deployment process (Fu et al., 2025; Tiribelli et al., 2024).

Public institutions, technology providers, and cultural enterprises should balance cultural safeguarding with the development of sustainable digital services. Commercial applications may contribute resources and expand public access, but commercial objectives should not override the cultural priorities identified by heritage bearers and communities. Platforms should provide channels for feedback and correction, while project operators should explain how digital content is produced and used. These measures can help reduce the risk that traffic-oriented production and commercial imbalance will distort the cultural meanings of ICH.

### **6.3. Providing Targeted Guidance to Address Cognitive Gaps**

The survey indicates that familiarity with ICH digital humans and perceptions of their ethical implications vary across respondents. Public education should therefore be differentiated rather than delivered through a single communication approach. The aim should be to improve understanding of both ICH safeguarding and the capabilities and limitations of digital technologies, while avoiding the assumption that greater acceptance is always preferable.

For audiences with limited prior knowledge, introductory materials can explain what ICH is, why living transmission matters, and how digital tools can support documentation and access. These materials should use clear language and concrete examples while distinguishing between recorded information, expert interpretation, and AI-generated content. For audiences with greater prior knowledge, discussion forums and educational resources can support more detailed consideration of authenticity, data governance, copyright, and the role of heritage bearers. UNESCO's AI ethics recommendation highlights the importance of education, transparency, and human oversight in the responsible use of AI (UNESCO, 2022; Zhang et al., 2024).

Communication strategies should also take account of differences in age and media use. Younger audiences can be encouraged to move from short-form exposure to sustained learning and practical participation. Older audiences may benefit from accessible explanations of digital platforms, AI-generated content, and the ethical issues associated with digital reproduction. The aim is not to eliminate all differences in perception, but to improve the public's capacity to evaluate both the benefits and risks of digital transmission (Hua et al., 2024; Ye et al., 2025).

At the societal level, inclusive ICH education should be supported through schools, cultural institutions, community organisations, and public-interest digital platforms. Such initiatives should strengthen public understanding of ICH and provide opportunities for communities and practitioners to explain their own traditions. Public education should also communicate the principles of consent, attribution, cultural respect, and responsible data use. These priorities are consistent with UNESCO's ethical principles for safeguarding ICH and with recent research on community-engaged digital safeguarding (Tan et al., 2026; UNESCO, 2015).

## **7. Conclusion**

Digital technologies provide new channels for documenting, presenting, and communicating ICH. ICH digital humans may help address practical challenges such as limited access to heritage content, constrained performance settings, and the difficulty of preserving records of endangered

skills. They can therefore make a useful contribution to the communication and documentation of living heritage. However, the logic of digital reproduction does not fully correspond to the people-centred, practice-based logic of living transmission. The use of digital humans consequently raises questions about cultural authenticity, the role of heritage bearers, and the conditions under which digital tools should be deployed.

Drawing on questionnaire responses from 521 participants, this study identifies three interrelated dimensions of potential digital alienation: the distortion of cultural content and authenticity through standardised reproduction; structural imbalance in transmission associated with technological and commercial pressures; and differences in public value judgements across demographic and cognitive groups. The findings also suggest that many respondents recognise the usefulness of digital humans while preferring an auxiliary rather than substitutive role for these systems. Concerns about cultural distortion and governance are therefore not confined to respondents who reject digital technologies outright. Digital alienation should not be understood as an inevitable outcome of technological development. It is better understood as a risk that may emerge when technology is applied without sufficient attention to cultural context, community participation, and appropriate governance. The central role of people in living transmission remains essential. The embodied knowledge, practical judgement, and human relationships developed through oral instruction and interpersonal practice cannot be fully replaced by digital reproduction.

To support the responsible development of ICH digital humans, this study proposes three pathways: establishing differentiated documentation and reproduction standards; ensuring the meaningful participation of heritage bearers and communities throughout the development and use of digital content; and clarifying the supplementary role of digital humans through content review and oversight of commercial applications. Targeted public education can also help address differences in familiarity and risk perception. Together, these measures can support a more balanced relationship between technological innovation and living transmission. Digitising ICH is not simply a matter of storing cultural materials in digital form, and the use of digital humans does not necessarily entail cultural distortion. Digital humans can support documentation, communication, and introductory education, but they should not replace the practitioners and communities that sustain ICH. By balancing the practical benefits of digital technologies with cultural authenticity, community participation, and responsible governance, digital innovation can contribute to the continued vitality of ICH.

### **Author Contributions:**

Conceptualization, Ruimin Wang; methodology, Zixuan Huang, Ruimin Wang, and Wenxuan Jing; investigation, Zixuan Huang; resources, Ruimin Wang; data curation, Zixuan Huang, Ruimin Wang, and Wenxuan Jing; writing—original draft preparation, Zixuan Huang, Ruimin Wang, and Wenxuan Jing; writing—review and editing, Zixuan Huang, Ruimin Wang, and Wenxuan Jing; visualization, Zixuan Huang, Ruimin Wang, and Wenxuan Jing; supervision, Ruimin Wang; funding acquisition, Ruimin Wang. All authors have read and agreed to the published version of the manuscript.

### **Funding:**

This research was funded by the Beijing Education Science 14th Five-Year Plan Project, entitled "Research on Digital Ethical Dilemmas and Optimization Paths for Beijing University Students in the Context of AI-Generated Content-Enabled Education" (Grant No. CDIB25599), and the Beijing City University College Students' Innovation and Entrepreneurship Project (Grant No. S202611418085X).

### **Institutional Review Board Statement:**

The study was reviewed and approved by the Ethics Committee of Beijing City University. All research procedures involving human participants, including questionnaire design, participant recruitment, data collection, and the management of research data, were conducted in accordance with the ethical principles for research involving human participants and the relevant institutional guidelines. Particular attention was paid to protecting participants' rights, privacy, and confidentiality throughout the research process. Participation in the study was entirely voluntary, and appropriate measures were taken to ensure that participants could make informed decisions about their involvement in the research.

### **Informed Consent Statement:**

Informed consent was obtained from all participants prior to their participation in the study. Before completing the questionnaire, participants were informed of the purpose and nature of the research, the voluntary nature of their participation, and the intended use of the collected information. They were also informed of their right to decline participation or withdraw from the study without any adverse consequences. All information collected was used exclusively for academic research purposes and was handled in accordance with the applicable principles of confidentiality and data protection. For participants under the age of 18, informed consent was obtained from their parents or legal guardians, together with the minors' assent, in accordance with the approved research protocol.

### **Data Availability Statement:**

The original contributions presented in this study are included in the article and its supplementary materials. Further inquiries can be directed to the corresponding author.

### **Conflict of Interest:**

The authors declare no conflict of interest.

### **References**

- Alivizatou, M. (2012). *Intangible heritage and the museum: New perspectives on cultural preservation*. Left Coast Press.
- Foka, A., & Griffin, G. (2024). AI, cultural heritage, and bias: Some key queries that arise from the use of GenAI. *Heritage*, 7(11), 6125–6136. <https://doi.org/10.3390/heritage7110287>

- Fu, Y., Shi, K., & Xi, L. (2025). Artificial intelligence and machine learning in the preservation and innovation of intangible cultural heritage: Ethical considerations and design frameworks. *Digital Scholarship in the Humanities*, 40(2), 487–508. <https://doi.org/10.1093/llc/fqaf034>
- Galani, S., & Vosinakis, S. (2024). An augmented reality approach for communicating intangible and architectural heritage through digital characters and scale models. *Personal and Ubiquitous Computing*, 28, 471–490. <https://doi.org/10.1007/s00779-024-01792-x>
- Giaccardi, E. (Ed.). (2012). *Heritage and social media: Understanding heritage in a participatory culture*. Routledge.
- Hua, Y., Ding, L., Dong, H., & Lin, Z. (2024). Influence of user-generated content (UGC) in social media on the intangible cultural heritage preservation of Gen Z tourists in the digital economy era. *International Journal of Tourism Research*, 26(5), Article e2743. <https://doi.org/10.1002/jtr.2743>
- Kirshenblatt-Gimblett, B. (2004). Intangible heritage as metacultural production. *Museum International*, 56(1–2), 52–65. <https://doi.org/10.1111/j.1350-0775.2004.00458.x>
- Liu, J., Chen, C., Zou, H., Zheng, J., & Gao, D. (2025). Preserving China's intangible cultural heritage through AR/VR storytelling, social media, and AI narratives. *npj Heritage Science*, 13, Article 685. <https://doi.org/10.1038/s40494-025-02265-x>
- Ren, K., & Lam, J. F. I. (2026). Knowledge graph-driven digital preservation of intangible cultural heritage: A cross-cultural comparative study of Chinese and Western implementation paradigms. *Humanities and Social Sciences Communications*, 13, Article 147. <https://doi.org/10.1057/s41599-025-06186-9>
- Smith, L. (2006). *Uses of heritage*. Routledge.
- Tan, Y.-C., Yang, L.-H., & Wang, B. (2026). Community-engaged digital safeguarding of intangible cultural heritage: A review of methods and challenges. *npj Heritage Science*, 14, Article 184. <https://doi.org/10.1038/s40494-026-02458-y>
- Tiribelli, S., Pansoni, S., Frontoni, E., & Giovanola, B. (2024). Ethics of artificial intelligence for cultural heritage: Opportunities and challenges. *IEEE Transactions on Technology and Society*, 5(3), 293–305. <https://doi.org/10.1109/TTS.2024.3432407>
- UNESCO. (2003). *Convention for the safeguarding of the intangible cultural heritage*. <https://ich.unesco.org/en/convention>
- UNESCO. (2015). *Ethical principles for safeguarding intangible cultural heritage*. <https://ich.unesco.org/en/ethics-and-ich-00866>
- UNESCO. (2022). *Recommendation on the ethics of artificial intelligence*. <https://unesdoc.unesco.org/ark:/48223/pf0000381137>
- UNESCO. (2024). *Basic texts of the 2003 Convention for the Safeguarding of the Intangible Cultural Heritage* (2024 ed.). <https://ich.unesco.org/en/basic-texts-00503>
- Wei, S., Wang, L., Xu, S., Xu, J., Wang, M., Shi, J., Fan, H., & Gan, F. (2026). How digital technologies empower the safeguarding of intangible cultural heritage: A scoping review of research from 2020 to 2025. *npj Heritage Science*, 14, Article 557. <https://doi.org/10.1038/s40494-026-02774-3>

- Ye, X., Ruan, Y., Xia, S., & Gu, L. (2025). Adoption of digital intangible cultural heritage: A configurational study integrating UTAUT2 and immersion theory. *Humanities and Social Sciences Communications*, 12, Article 23. <https://doi.org/10.1057/s41599-024-04222-8>
- Zhang, J., & Xu, C. (2024). A grounded theory-based model of information communication in cultural heritage digital reading on the social media from the perspective of the embodied theory. *Heritage Science*, 12, Article 208. <https://doi.org/10.1186/s40494-024-01313-2>
- Zhang, Y., Ikiz Kaya, D., & van Wesemael, P. J. V. (2024). An assessment framework for digital participatory practices engaging youth in cultural heritage management. *Journal of Cultural Heritage*, 70, 408–421. <https://doi.org/10.1016/j.culher.2024.10.014>

**License:** Copyright (c) 2026 Author.

All articles published in this journal are licensed under the Creative Commons Attribution 4.0 International License (CC BY 4.0). This license permits unrestricted use, distribution, and reproduction in any medium, provided the original author(s) and source are properly credited. Authors retain copyright of their work, and readers are free to copy, share, adapt, and build upon the material for any purpose, including commercial use, as long as appropriate attribution is given.