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Driving the Dissemination of Chinese Intangible Cultural Heritage in the Digital Age: An Exploratory Study of Key Factors

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Abstract

The rapid development of digital technology has profoundly transformed the landscape for the safeguarding and dissemination of Intangible Cultural Heritage (ICH), especially in the Chinese context. This exploratory study seeks to systematically identify the key factors driving the digital dissemination of Chinese ICH. Using a mixed-methods approach, the research integrates a quantitative survey of 403 university students (as digital-native audiences) with in-depth interviews of six ICH experts and administrators. Eight dimensions are identified as having significant effects on dissemination effectiveness, including digital platform interface design, user participation, content presentation, user interaction, technological empowerment, ICH-genre suitability, evaluation system completeness, and sustainable support mechanisms. The findings lead to targeted recommendations for platform design, content and technology strategies, and support systems, offering both theoretical grounding and practical pathways for the successful transmission and broader dissemination of ICH in the digital era.

Keywords: social transformation, safeguarding and dissemination, ICH, digital platform

1. Introduction

In recent years, the integration of digital technologies such as the Internet, big data, artificial intelligence, and blockchain has accelerated innovation across economic and social domains, reshaping productivity and everyday life (Li, 2023).This digital shift represents a cognitive and managerial revolution, marking a qualitative leap in societal informatization (Zhou, 2018).UNESCO emphasizes how these technologies enhance global ICH safeguarding through immersive tools such as VR, AR, and AI-driven platforms, enabling broader access and preservation amid rapid cultural erosion worldwide (UNESCO, 2003; UNESCO, 2024). Internationally, scholars highlight how these technologies address ICH's vulnerability amid globalization, with digital platforms enabling immersive experiences that overcome geographical barriers and foster cross-cultural engagement (Alivizatou, 2016; Lenzerini, 2011). This trend echoes the broader wave of "digital heritage" research, where scholars explore how digital technologies serve not merely as recording tools but as core drivers that reshape heritage meanings, promote community participation, and enable sustainable management (Li & Stouffs, 2021; Parry, 2010).

Intangible Cultural Heritage (ICH), as a concentrated embodiment of human creativity and communal vitality, is rooted in community practices and continuously evolves through intergenerational transmission (Kirshenblatt-Gimblett, 2004).In the context of China, as an integral component of outstanding traditional Chinese culture, ICH crystallizes the wisdom of all ethnic groups and bears witness to the continuous development of Chinese civilization (Jin, 2019). According to the China ICH Network (2024), the country now lists 1,557 national ICH representative items covering ten major categories—folk literature, traditional music, traditional dance, and others—with a total of 3,610 sub-items, demonstrating the remarkable diversity and richness of Chinese culture. Safeguarding ICH is therefore essential for strengthening cultural confidence, fostering cultural prosperity, and promoting Chinese culture on the global stage (Jin, 2019), while also aligning with international frameworks such as the UNESCO Convention that stress ICH's role in sustainable development and identity preservation (Blake, 2006; Smith, 2006). However, the protection of heritage has

never been isolated from social transformations. With the comprehensive penetration of digital technologies, there have been profound changes in the ways of information acquisition, cultural consumption, and social participation, and the survival and dissemination of ICH have also entered a new historical stage. Social changes and technological innovation in the digital age have promoted the innovative inheritance and development of intangible cultural heritage skills in the new era (Luo & Xiao, 2024).

In the era of comprehensive digitalization, the integration of traditional culture and modern technology poses unprecedented challenges and opportunities for the inheritance and innovation of intangible cultural heritage (Luo & Xiao, 2024). Its inherent characteristics—strong local embeddedness, living variability, and dependence on oral and embodied teaching—create significant barriers to reaching broader audiences, especially digital-native youth (Han, 2025; Ye et al., 2025). Fortunately, rapid advances in digital technologies such as virtual reality (VR), augmented reality (AR), big data, and mobile applications now offer unprecedented solutions for the digital survival and revitalization of ICH (Wang et al., 2025). These technologies inject new vitality into preservation efforts and open promising pathways for integrating ICH with contemporary technological progress (Wang, 2024). Digital channels demonstrate significant potential for more effectively integrating ICH into contemporary cultural life and practices through innovative narrative approaches and interactive design. Globally recognized cases, such as the Europeana digital library and ICH dissemination initiatives on Chinese social media platforms such as Douyin, illustrate this transformative impact (Paquienseguy, 2025). Digital media technologies are conducive to promoting the digitalization of traditional intangible cultural heritage, thereby facilitating both theoretical and practical research on digitalization of ICH projects (Wang, 2022; Liu, 2025).

Current research largely focuses on the application or case-based practice of single technologies, while lacking a systematic analysis of the driving mechanisms for the protection and dissemination of ICH in the digital age from the perspective of broader social change, particularly in terms of user-based empirical studies (Park et al., 2024). University students, as digital natives and key transmitters, offer critical insights through their perceptions of ICH platforms (Zhou et al., 2025). However, user-centered research in this area remains insufficient, this study adopts a mixed-methods approach combining questionnaire surveys and in-depth interviews to systematically explore the key factors influencing ICH protection and dissemination in the digital age, thereby providing solid theoretical support and practical references for building an efficient and sustainable digital ICH dissemination model.

2. Research Design and Methods

2.1 Quantitative Survey

This study adopted an explanatory sequential mixed-methods design (Creswell & Plano Clark, 2011) to conduct quantitative analysis among 403 college students through a questionnaire survey, identifying key factors and their interrelationships that affect the digital dissemination of ICH. Data analysis was performed using descriptive statistics, mean comparisons, correlation analysis, and exploratory factor analysis (EFA). A self-designed questionnaire was used to measure user experience on digital ICH platforms, covering six dimensions: content presentation method, interface design, content type and quality, user interaction, user participation, and learning effect, with a total of 30 items. A five-point Likert scale was used (1 = strongly disagree, 5 = strongly agree). The overall Cronbach's alpha coefficient of the questionnaire was 0.938, and the KMO value was 0.940, indicating good reliability and validity.

Table 1. Overall validity analysis by KMO and Bartlett's test

	Statistics	Value
KMO sampling suitability measure.		0.940
Bartlett's test of sphericity	Approximate Chi-Square	6776.48
	degrees of freedom	406
	Significance	.000

2.2 Qualitative Interview the Experts

2.2.1 Interviewee

On this basis, further in-depth interviews were conducted with six experts and managers in the field of ICH to qualitatively examine the social and cultural motivations, technological adaptation logic, and practical implementation challenges underlying the quantitative results from both practical and theoretical perspectives. Three senior experts in the field of ICH (specializing in ICH research and digital media design) and three ICH project managers from ICH protection centers in Tianjin, Hebei, Anhui, and other regions were selected for semi-structured in-depth interviews. These experts and managers possess extensive theoretical research or practical management experience in ICH and are therefore able to reveal the core issues and influencing factors shaping ICH dissemination in the digital age from both macro- and micro-level perspectives, ensuring the professionalism and relevance of the interview content. The research design is grounded in the real context of digital social change, focusing on the interactive relationships among technology, platforms, and

people in the contemporary cultural environment, aiming to systematically reveal the dissemination mechanisms and adaptation pathways of ICH within the digital ecosystem, and provide empirical evidence for building an ICH inheritance system aligned with the characteristics of the current era.

2.2.2 Data Analysis

Based on the core issues of ICH protection and dissemination in the digital age, a semi-structured interview guide was designed, mainly covering four modules: First, the technical application level, such as the value and challenges of digital technologies in ICH dissemination; Second, the platform design level, including requirements related to content, interface, and interaction design for digital ICH platforms; Third, the user demand level, focusing on young people's preferences and willingness to engage with digital ICH content; Fourth, the sustainable development dimension, addressing issues such as policy support for digital ICH dissemination, talent cultivation, and operational models. Each interview lasted approximately 60–90 minutes. The interview recordings were transcribed verbatim, and Braun and Clarke's (2006) thematic analysis method was applied for coding, theme extraction, and analysis.

3. Results

Based on the data collected through the aforementioned mixed-methods approach, this study systematically identified the key factors influencing the protection and dissemination of ICH in the digital age. The core findings are presented from both quantitative and qualitative perspectives. The quantitative analysis reveals intrinsic correlations between variables such as platform design and learning outcomes, while the qualitative analysis further dissects the underlying drivers of technological adaptation, evaluation systems, and sustainable mechanisms. The two sets of findings mutually confirm and complement each other, jointly outlining a comprehensive framework of influencing factors for the digital dissemination of ICH.

3.1 Key Factors Explore by Quantitative Factors

3.1.1 Research Subjects and Sampling

A random sampling method was used to select 403 college students aged 19–24 as the research participants, covering different genders, grades, and major categories, thereby ensuring good representativeness. A total of 410 questionnaires were distributed, of which 403 were valid, resulting in an effective response rate of 98.3%. The sample structure is shown in Table 1, with balanced distribution across gender, grade, and major. Participants' exposure to ICH spanned all levels, ranging from "completely unknown" to "very familiar", further supporting the representativeness of the sample.

Table 2. Basic information of the sample population

Variables	Options	Number	Percentage (%)
Gender	Male	181	45.0
	Female	222	55.0
Grade of study	Freshman	105	26.0
	Sophomore	105	26.0
	Junior year	100	25.0
	Senior year	93	23.0
Professional Category	Arts (fine arts, design, drama, music, etc.)	71	18.0
	Humanities and social sciences (history, culture, journalism, philosophy, etc.)	150	37.0
	Science and Engineering (Computer Science, Engineering, Natural Sciences, etc.)	151	39.0
	Others	31	8.0
ICH undertanding	Very familiar	31	8.0
	Somewhat familiar	83	21.0
	Heard but not very familiar	169	42.0
	Completely unfamiliar	120	3.0

3.1.2 Analysis of the Influencing Factors of ICH Communication in the Digital Era by Sample Demographics

1) Gender and performance of influencing factors

Table 3. Gender differences in various dimensions

Dimensions	Gender	Number	Mean	SD.	t	Sig(2-tailed)
Content presentation method	Male	181	16.69	4.774	0.434	0.665
	Female	222	16.48	4.829		
Interface Design	Male	181	16.67	4.882	0.294	0.769
	Female	222	16.53	4.795		
Content type and quality	Male	181	17.14	5.006	0.525	0.600
	Female	222	16.88	4.723		
User Interaction	Male	181	16.48	4.824	-0.488	0.626
	Female	222	16.71	4.652		
User engagement	Male	181	15.98	5.044	-1.705	0.089
	Female	222	6.85	5.171		
Learning effect	Male	181	13.52	4.165	0.936	0.350
	Female	222	13.14	3.953		

According to the results of the independent-samples t-test, no significant gender differences were found across the six dimensions of content presentation style ($t = 0.434$, $p = 0.665$), interface design ($t = 0.294$, $p = 0.769$), content type and quality ($t = 0.525$, $p = 0.600$), user interaction ($t = -0.488$, $p = 0.626$), user engagement ($t = -1.705$, $p = 0.089$), and learning effectiveness ($t = 0.936$, $p = 0.350$) between male and female college students. Although female students exhibited slightly higher user engagement (mean = 16.85) than male students (mean = 15.98) and male students demonstrated marginally higher learning effectiveness (mean = 13.52) than female students (mean = 13.14), these differences did not reach statistical significance, indicating that gender is not a key factor influencing the effectiveness of digital ICH dissemination. This finding suggests that gender differences in information acquisition and platform usage habits are narrowing in digital society, and that digital platforms exhibit increasingly gender-neutral characteristics, thereby providing favorable conditions for the widespread promotion of digital ICH.

2) Grade of study and performance of influencing factors

Table 4. Grade of study differences in various dimensions

Dimensions	Grade	Number	Mean	SD.	F	Sig (2-tailed)	Multiple Comparision
Content presentation method	Freshman	105	17.14	4.60	0.884	0.449	-
	Sophomore	105	16.38	4.72			
	Junior year	100	16.10	4.69			
	Senior year	93	16.67	5.22			
Interface Design	Freshman	105	16.50	4.74	1.952	0.121	-
	Sophomore	105	16.14	4.81			
	Junior year	100	16.21	4.76			
	Senior year	93	17.62	4.95			
Content type and quality	Freshman	105	17.40	4.97	1.338	0.261	-
	Sophomore	105	16.33	4.67			
	Junior year	100	16.78	4.81			
	Senior year	93	17.53	4.93			
User Interaction	Freshman	105	16.12	4.58	5.616**	0.001	1<4, 2<4, 3<4
	Sophomore	105	15.61	4.68			
	Junior year	100	16.69	4.74			
	Senior year	93	18.19	4.58			
User engagement	Freshman	105	16.29	4.76	0.646	0.586	-
	Sophomore	105	16.39	5.13			
	Junior year	100	16.13	4.95			
	Senior year	93	17.09	5.70			
Learning effect	Freshman	105	13.07	4.22	1.759	0.154	-
	Sophomore	105	13.00	3.86			
	Junior year	100	13.11	3.97			
	Senior year	93	14.15	4.10			

Note: 1 represents Freshman, 2 represents Sophomore, 3 represents Junior, and 4 represents Senior.

Table 5. Robust test of equality of means for Grade difference

Variables	Statistics	Number	Percentage (%)
Content presentation method	Welch	0.939	0.423
	Brown-Forsyth	0.879	0.452
Interface Design	Welch	1.867	0.136
	Brown-Forsyth	1.948	0.121
Content type and quality	Welch	1.353	0.258
	Brown-Forsyth	1.337	0.262
User Interaction	Welch	5.67	0.001
	Brown-Forsyth	5.619	0.001
User engagement	Welch	0.564	0.64
	Brown-Forsyth	0.641	0.589
Learning effect	Welch	1.721	0.164
	Brown-Forsyth	1.758	0.155

a Asymptotic F distribution.

According to the results of the one-way ANOVA, a significant grade difference was observed in the user interaction dimension ($F = 5.616$, $p = 0.001$). The mean score for senior students ($M = 18.19$, $SD = 4.58$) was significantly higher than those for freshmen ($M = 16.12$), sophomores ($M = 15.61$), and juniors ($M = 16.69$); Further verification using the Welch test and Brown-Forsythe test showed consistent results (Welch's $F = 5.670$, $p = 0.001$; Brown–Forsythe $F = 5.619$, $p = 0.001$), with all values below 0.01, confirming significant differences in user interaction across grades. No significant grade differences were found in the other dimensions (e.g., content presentation and interface design; $p > 0.05$). This result indicates that students in higher academic years tend to have more experience with digital technologies, stronger demands for self-directed learning, and higher requirements regarding the interactivity of digital ICH platforms. User interaction has thus emerged as a differentiated factor influencing the effectiveness of ICH dissemination across grade groups. As individuals become immersed in the digital environment for longer periods, their requirements for interaction depth and participation also increase. This suggests that, in the process of social digitization, communication strategies should account for the developmental trajectories of users' digital behaviors.

3) Differences in professional categories

Table 6. Analysis of differences in professional categories across various dimensions

Dimensions	Professional Category	Number	Mean	SD.	F	Sig (2-tailed)
Content presentation method	Arts	71	16.70	4.84	0.039	0.990
	Humanities and social sciences	150	16.53	4.89		
	Science and Engineering	151	16.60	4.64		
	Others	31	16.39	5.26		
Interface Design	Arts	71	16.69	5.10	0.706	0.549
	Humanities and social sciences	150	16.87	4.94		
	Science and Engineering	151	16.17	4.61		
	Others	31	17.16	4.76		
Content type and quality	Arts	71	16.63	4.91	0.662	0.576
	Humanities and social sciences	150	17.05	4.97		
	Science and Engineering	151	16.89	4.78		
	Others	31	18.06	4.52		
User Interaction	Arts	71	16.32	4.72	0.604	0.613
	Humanities and social sciences	150	16.63	4.96		
	Science and Engineering	151	16.51	4.61		
	Others	31	17.65	4.18		
User engagement	Arts	71	16.35	4.85	0.198	0.898
	Humanities and social sciences	150	16.67	5.24		
	Science and Engineering	151	16.25	5.30		
	Others	31	16.71	4.47		
Learning effect	Arts	71	12.65	4.25	0.857	0.463
	Humanities and social sciences	150	13.57	3.83		
	Science and Engineering	151	13.33	4.05		
	Others	31	13.45	4.63		

According to the results of the one-way ANOVA, no significant differences were found across the six dimensions of content presentation style ($F = 0.039$, $p = 0.990$), interface design ($F = 0.706$, $p = 0.549$), content type and quality ($F =$

0.662, p = 0.576), user interaction (F = 0.604, p = 0.613), user engagement (F = 0.198, p = 0.898), and learning effectiveness (F=0.857, p=0.463) among college students across different disciplinary categories (arts, humanities and social sciences, science and engineering, and other). This result indicates that disciplinary background does not significantly affect students' experience or learning effectiveness when using digital ICH platforms. Digital ICH platforms demonstrate strong interdisciplinary adaptability and can effectively engage young people from diverse disciplinary backgrounds. Such platforms can overcome cognitive barriers associated with traditional disciplinary knowledge structures and resonate with young people from different academic backgrounds. This finding is conducive to building an interdisciplinary and inclusive cultural heritage community within the context of the digital society.

4) Exposure for ICH understanding

Table 7. Analysis of differences in ICH understanding across various dimensions

Dimensions	ICH understanding	Number	Mean	SD.	F	Sig (2-tailed)
Content presentation method	Very familiar	120	16.68	5.03	1.041	0.374
	Somewhat familiar	169	16.63	4.89		
	Heard but not very familiar	83	15.93	4.53		
	Completely unfamiliar	31	17.65	4.00		
Interface Design	Very familiar	120	17.48	4.79	2.308	0.076
	Somewhat familiar	169	16.04	4.86		
	Heard but not very familiar	83	16.30	4.53		
	Completely unfamiliar	31	17.00	5.25		
Content type and quality	Very familiar	120	17.54	4.66	1.235	0.297
	Somewhat familiar	169	16.78	5.00		
	Heard but not very familiar	83	16.41	4.74		
	Completely unfamiliar	31	17.68	4.96		
User Interaction	Very familiar	120	17.23	4.69	1.04	0.375
	Somewhat familiar	169	16.36	4.81		
	Heard but not very familiar	83	16.41	4.72		
	Completely unfamiliar	31	16.06	4.38		
User engagement	Very familiar	120	16.38	5.40	0.187	0.905
	Somewhat familiar	169	16.60	5.07		
	Heard but not very familiar	83	16.17	5.00		
	Completely unfamiliar	31	16.81	4.88		
Learning effect	Very familiar	120	13.86	4.09	2.343	0.073
	Somewhat familiar	169	12.90	4.10		
	Heard but not very familiar	83	12.94	3.84		
	Completely unfamiliar	31	14.42	3.89		

According to the results of the one-way analysis of variance, students with different levels of exposure to ICH (completely unfamiliar, heard of but not very familiar, somewhat familiar, and very familiar) showed no significant differences across four dimensions of content presentation style (F=1.041, p=0.374), content type and quality (F = 1.235, p = 0.297), user interaction (F = 1.040, p = 0.375), and user engagement (F = 0.187, p = 0.905); The dimensions of interface design (F = 2.308, p = 0.076) and learning effectiveness (F = 2.343, p = 0.073) approached statistical significant levels but did not meet the conventional threshold ($p < 0.05$). This finding indicates that the users' initial level of awareness of ICH is not a key factor influencing the effectiveness of digital ICH dissemination. Digital platforms can effectively reach groups with varying levels of ICH awareness, thereby providing relatively equal opportunities for the popularization of ICH knowledge. To some extent, digital platforms function as a "cultural leveling mechanism", offering relatively equal opportunities for individuals with different levels of ICH knowledge to access and learn cultural content. This mechanism helps bridge the knowledge gaps in digital society and promotes the more inclusive dissemination of culture.

3.1.3 Correlation Analysis

Table 8. Correlation analysis between various dimensions

Dimensions	(1)	(2)	(3)	(4)	(5)	(6)
(1) User engagement	1					
(2) Learning effect	.472**	1				
(3) Content presentation method	.475**	.427**	1			
(4) Interface Design	.416**	.456**	.423**	1		
(5) Content type and quality	.475**	.393**	.399**	.422**	1	
(6) User Interaction	.470**	.411**	.370**	.440**	.436**	1

** Pearson correlation is significant at the 0.01 level (two-tailed).

According to the above analysis results, user engagement, content presentation style, interface design, content type and quality, user interaction, and learning effectiveness were all significantly positively correlated ($p < 0.01$). Among these variables, the correlation coefficient between user participation and learning effectiveness was the highest ($r = 0.472$), indicating that the higher levels of user participation on the digital ICH platform are associated with more substantial learning outcomes related to ICH knowledge; The correlation between content presentation method and user engagement was also strong ($r = 0.475$), suggesting that vivid and diverse modes of content presentation can effectively stimulate users' willingness to participate; The correlation between interface design and learning effect ($r = 0.456$), as well as between user interaction and learning effectiveness ($r = 0.411$), were also notable, further verifying the synergistic effects of multiple platform design dimensions in enhancing the effectiveness of ICH dissemination. Within the information environment of the digital society, user engagement has emerged as the factor most strongly associated with learning outcomes, confirming a broader shift in contemporary social and cultural communication models from one-way transmission to two-way participation. Digital platforms are no longer passive channels for information delivery but have increasingly become social spaces that encourage users to actively construct personal cultural cognition.

3.1.4 Factors Influence the ICH Communication via Learning Effort of Audiences

Table 9. Factors Model summary

Model	R	R-square	Adjusted R-squared	Error in standard estimates	Durbin Watson
1	.590a	0.348	0.34	3.29	1.953

a Predictors: (constant), user engagement, interface design, content type and quality, content presentation, user interaction

b Dependent variable: learning effect

Table 10. Model coefficients

Model		Unstandardized coefficients		Standardized coefficient	t	Sig.
		B	Standard error	Beta		
1	(constant)	2.443	0.783		3.119**	0.002
	Content presentation method	0.133	0.041	0.157	3.221**	0.001
	Interface Design	0.177	0.041	0.211	4.306**	0.000
	Content type and quality	0.074	0.041	0.089	1.791	0.074
	User Interaction	0.105	0.042	0.123	2.487*	0.013
	User engagement	0.166	0.041	0.210	4.068**	0.000

a Dependent variable: learning effect

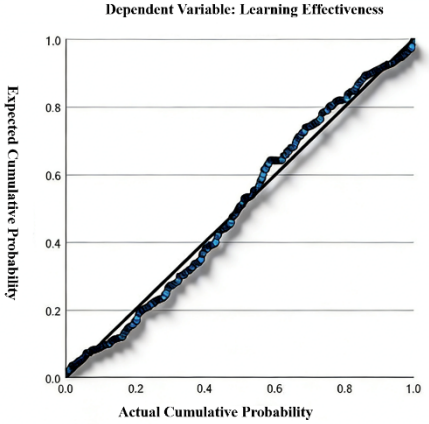


Figure 1. Normal P-P Plot of Regression Standardized Residuals

Figure 1 compares the diagonal reference line (representing expected cumulative probability) with the actual distribution of standardized residuals (representing actual cumulative probability). This visual assessment determines if the residuals satisfy the normality assumption required for regression diagnostics. As shown, the data points align closely with the diagonal, indicating that the residuals substantially conform to a normal distribution.

A multiple linear regression analysis was conducted with learning effectiveness as the dependent variable, content presentation style, interface design, content type and quality, user interaction, and user engagement as independent variables (Table 10). The results indicated that the overall model fit was good ($R = 0.590$, $R^2 = 0.348$, adjusted $R^2 = 0.340$), explaining 34.0% of the variance in learning effectiveness. The Durbin-Watson statistic was 1.953, which is close to 2, indicating no significant autocorrelation among the residuals and suggesting that the model is robust and reliable.

Based on the regression coefficients, interface design ($\beta = 0.211$, $p < 0.001$) and user engagement ($\beta = 0.210$, $p < 0.001$) exert the strongest influence on learning outcomes and represent the core factors driving the improvements of ICH knowledge learning acquisition. A user-friendly interface design can lower operational barriers and enhance users' willingness to engage with the platform. Well-designed participation mechanisms, such as interactive tasks and incentive systems, can stimulate users'motivation to actively explore ICH knowledge, thereby enhancing learning outcomes. Content presentation ($\beta = 0.157$, $p = 0.001$) and user interaction ($\beta = 0.123$, $p = 0.013$) also show significant positive effecys on learning outcomes. Multimodal content presentation (such as videos, animations, VR scenes) can concretize abstract intangible cultural heritage knowledge and enhance its comprehensibility and acceptability; High quality interaction design, such as AR-based trial experiences and situational interactions, can enhance user immersion and strengthen knowledge retention. Content type and quality ($\beta = 0.089$, $p = 0.074$) showed a positive impact, but did not reach statistical significance. This finding does not negate the importance of content quality, rather, it suggests that for college students, the experiential design of digital platforms—such as interface usability, interaction design, and participation mechanisms—exerts a stronger influence on learning outcomes than variations in content types. Therefore, prioritizing the optimization of platform design while ensuring content quality is necessary. This pattern reflects the behavioral preferences of users in the digital society, who are more inclined to accept and understand traditional culture through intuitive, seamless, and engaging attractive interactive experiences.

3.2 Qualitative Analysis of Influencing Factors Based on Interview Data

Through the coding of interview transcripts from six intangible cultural heritage experts and managers, four core qualitative factors influencing the protection and dissemination of ICH in the digital age were identified,. These qualitative findings mutually corroborate the quantitative results and further elucidate the underlying mechanisms.

3.2.1 Technological Empowerment and Adaptability

Respondents generally believe that digital technology is a key empowering factor in promoting the dissemination of ICH, and also a social integration process; however, they emphasize that "technology applications must be deeply adapted to the types of ICH." For example, artistic ICH (e.g., carving and embroidery) are well suited to step-by-step decomposition through high-definition videos and 3D modeling. Performing ICH (e.g., Jingxing La Hua) requires multi camera filming and virtual stage technology to balance a sense of presence with a sense of mediated viewing; Folk ICH , by contrast, requires panoramic and multimodal digital documentation to preserve its cultural space and contextual integrity. This requirement for adaptability reflects the need for the co-evolution of technological and cultural subsystems in the digital transformation of society, otherwise, digital migration may result in the erosion of cultural meanings.

3.2.2 Platform Matrix and User Experience

Respondents described a multi-level platform configuration in which short-video platforms and mini programs serve functions of user attraction and interest stimulation, while apps, digital museums, and online exhibition halls support systematic and in-depth knowledge dissemination and cultural experiences. This configuration reflects the stratification of information dissemination and the increasing precision of audience demand in the digital society. User experience functions as the core lever determining the effectiveness of platform communication and is reflected in two main aspects. First, content presentation should move beyond traditional "manual-style" knowledge transmission and adopt narrative storytelling approaches to enhance content attractiveness. Second, interactive design should shift from static viewing to dynamic participation by incorporating features such as AR-based virtual fitting of traditional clothing and simulated production of ICH handicrafts, enabling users to comprehend cultural meanings through experiential engagement. This transformation marks a shift in ICH dissemination from a traditional "propaganda and education" paradigm toward a user-centered public service paradigm that emphasizes emotional connection and immersive experience. The strong demand for active user involvement reflects the prevalence of participatory culture in the digital society, in which the public is no longer satisfied with being an audience but increasingly seeks to become co-builders of cultural experiences.

3.2.3 Evaluation System Completeness

Respondents pointed out that the current evaluation overly relies on surface-level data such as "views, likes, and shares," while ignoring deeper indicators such as "learning effectiveness," "cultural identity," and "behavioral transformation." This excessive reliance on surface-level traffic reflects the extensive "traffic-first" development model prevalent in the early stages of the digital society. Experts suggest that a "quantitative-qualitative" evaluation system should be established. In addition to basic traffic data, quantitative indicators such as "user retention rate", "deep reading duration", and "completion rate of interactive tasks" should be incorporated. Qualitative indicators may include user cultural identity interviews, inheritor satisfaction surveys, and tracking of offline participation behaviors, thereby ensuring the quality and direction of ICH dissemination through multidimensional evaluation. This approach aligns with the trend of increasingly refined and scientific digital social governance, which requires that the evaluation of public cultural services focus on long-term social benefits, including individuals' cognitive changes, emotional identification, and behavioral transformation.

3.2.4 Sustainable Guarantee Mechanism

The digital dissemination of ICH is not simply a technical issue but a long-term endeavor that requires the coordinated support of multiple social systems. At present, the lack of sustainable support mechanisms constitutes a major bottleneck in the digitalization of ICH. Interview findings indicate that policies, funding, talent, operations mechanisms, and subject guarantees jointly constitute a social support network sustaining digital cultural inheritance. First, policy and funding support. The digitization of ICH should be incorporated into national or local cultural digitalization strategies, with stable earmarked funding secured (Huang & Tan, 2012), in order to avoid short-term, project-based implementation. Second, talent support is required, particularly the cultivation of interdisciplinary professionals who possess expertise in technology, culture, and design. ICH protection institutions should collaborate with digital enterprises to implement systematic talent training programs. Third, operational support should be strengthened by exploring a model in which public welfare is primary and commercial activity is supplementary (Qin, 2014). Moderate development of digital ICH derivatives, such as virtual figurines and digital collectibles, can enable mild commercialization while reinvesting returns into heritage protection. Fourth, subject guarantees is required to ensure the central role of inheritors and communities, which is critical to avoiding a new form of cultural dispossession by technological elites in the digital age. This issue is closely to the fairness and inclusiveness of digital society development (Zhong & Mo, 2022).

4. Conclusion and Discussion

This study systematically identified and validated the key factors influencing the protection and dissemination of ICH in the digital age through a mixed-methods approach integrating questionnaire surveys and in-depth interviews. The research findings can be summarized across three levels—platform design, content technology, and support mechanisms—comprising eight key factors: interface design, user engagement, content presentation, user interaction, content type and quality, technological empowerment, evaluation system completeness, and sustainable guarantee mechanism. Based on empirical findings, the study proposes the following conclusions and recommendations to inform both the theoretical development and practical advancement of digital ICH dissemination.

4.1 Research Conclusion

(1) Platform design and user engagement constitute the core determinants of the effectiveness of digital social communication. Quantitative analysis confirms that within the information environment of the digital society, platform usability (interface design) and attractiveness (user engagement) are strong predictors for improving the learning effectiveness of ICH among young people. The presentation of content and user interaction also play significant supporting roles, while the direct impact of content type and quality is relatively limited. This indicates that adapting to the dissemination of digital society requires prioritizing user experience and social interaction mechanisms.

(2) Digital platforms demonstrate strong social potential to promote the universal dissemination of culture. The findings indicate that, except for the significantly higher levels of user interaction among senior students, no significant differences were observed across gender, major category, or prior ICH knowledge. This indicates that digital platforms have good universality across genders, professions, and knowledge backgrounds, providing technological possibilities for promoting cultural equity on a large scale and at low cost in the digital society. Meanwhile, the higher demand for interactivity among senior students highlights the need to consider intragenerational variations in digital behavior and to provide differentiated platform services.

(3) The essence of technological application lies in a process of social and cultural adaptation. Interview findings indicate that there are fundamental differences in digital strategies for ICH categories, including skills, performances, oral traditions, and folk customs. The effectiveness of technological empowerment depends on its respect and adaptation to the essence of ICH. Technological applications that deviates from cultural logic may result only in superficial digital spectacle, and fail to achieve deep cultural inheritance and social recognition.

(4) Evaluation systems and sustainable mechanisms serve as institutional guarantees for high-quality development. Current evaluation practices rely heavily on surface indicators such as page views and likes, lacking in-depth examination of cognitive gain, cultural identity, and behavioral transformation. Establishing a scientific evaluation framework alongside a stable social support network is therefore essential to ensuring the long-term vitality of ICH in the digital society and preventing cultural marginalization.

4.2 Discussion

This study verifies the critical role of platform-related factors such as interface design, user engagement, and content presentation in the dissemination of ICH. Building on these findings, the following discussion further explores the underlying logic and potential challenges of ICH dissemination in the digital age.

(1) The study reveals that the dissemination of ICH is undergoing a paradigm shift from technological presentation to experiential construction. Both quantitative and qualitative evidence indicate that the platform's ease of use, interactivity,

and participatory affordances have become the core drivers of user learning. This reflects a fundamental change in the cultural communication logic of the digital society: the public is no longer satisfied with passively receiving information, but expects to understand and accept traditional culture through intuitive, smooth, and meaningful interactive experiences. Therefore, future digital practices of ICH should move beyond the instrumental application of technology and shift towards deep design of user immersion, identity formation, and social interaction mechanisms.

(2) While promoting cultural inclusiveness, digital platforms also face governance challenges, particularly lagging evaluation mechanisms. This study finds that the digital platforms exhibit strong cross-group universality, thereby enabling large-scale dissemination. However, interview findings reveal that the current evaluation system remains confined to superficial quantitative metrics, failing to capture the deeper social benefits of ICH dissemination, such as enhanced public awareness and strengthened cultural identity. Establishing a multidimensional assessment framework that integrates "exposure–cognition–behavior–identity" constitutes a crucial institutional underpinning for transitioning the digital preservation of ICH from "scale expansion" to "quality enhancement."

(3) The digitalization of ICH essentially constitutes a co-evolutionary process between socio-technical systems and cultural systems. The emphasis on technological adaptability in the study suggests that successful digitization is not merely a process of content transfer, but rather one that requires a dynamic balance between widespread dissemination and faithful protection, technological efficiency and cultural authenticity. This necessitates collaborative efforts among managers, platform operators, and inheritor communities to construct a sustainable ecosystem that accommodates technological iterations while safeguarding cultural essence.

5. Suggestions

5.1 Practical Suggestions

Based on the above conclusions, this article proposes the following suggestions in three dimensions: platform design, content and technology, and support systems:

(1) Optimize platform design and user participation mechanism to enhance user experience. Platforms should focus on interface user-friendliness and ensuring seamless operation, thereby reducing users' cognitive load during their entry paths. The system should embed interactive mechanisms, such as setting task challenges, point rewards, and virtual achievement systems, to stimulate users' intrinsic exploration motivations (Zhu,2020); Research should promote the transformation of content presentation from "static display" to "dynamic participation", and strengthen users' emotional connection and cultural identity through situational interaction and immersive experience.

(2) Strengthen content strategies and technology adaptation to achieve precise dissemination. At the content planning level, develop differentiated digital strategies based on ICH types: technical ICH focuses on step -by-step decomposition and visual demonstration(Zhang,2025), performance intangible cultural heritage focuses on multi camera shooting and virtual stage construction, oral ICH emphasizes holographic recording and restoration of language context, and folk ICH requires the use of multimodal methods for panoramic reproduction to systematically preserve its cultural space. In terms of expression, we should promote the storytelling style and the life-oriented language expression, enhance the affinity and resonance within the context of digital society, and break down the barriers to cultural dissemination (Zeng, 2023).

(3) Improve the evaluation system and sustainable ecology, and build a socially collaborative governance model. We should promote the construction of a multidimensional evaluation framework of "exposure–cognition –behavior–identity", guiding practice to shift from pursuing "exposure" to focusing on "social influence". At the governance level, it is recommended to deeply integrate the digitization of ICH into national and local cultural digitization strategies. Through policy guidance, cross departmental collaboration, and the cultivation of multi-skilled talents, a social governance ecology involving multi-party collaboration among government, market, inheritors, communities, and the public can be constructed. We can explore an operational model that prioritizes public welfare with commercial support, and use lightweight approaches such as digital derivative development to inject endogenous power into the sustainable transmission of ICH.

5.2 Research Limitations and Future Directions

The sample of this study primarily consists of college students, and in the future it could be expanded to include more diverse social groups, such as adolescents, middle-aged adults, and older adults, to examine the impact of the digital divide on the digital groups' s participation in ICH. In addition, typical ICH projects such as Jingxing La Hua and Yixing Zisha can be selected for empirical research based on social design concepts. With the evolution of technologies such as AIGC and the metaverse, the future research should focus on how these technologies can reconstruct cultural narratives at a deeper level, create new social interaction rituals, and address emerging social governance issues, such as cultural authenticity and digital ethics, that may arise during this process.

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Authors contributions

Erjuan Ji and Asst. Prof. Dr. Suwich Tirakoat were responsible for the study design and data collection, and drafted the manuscript. Erjuan Ji conducted research and investigated process. Asst. Prof. Dr. Suwich Tirakoat was formal analyzing and interpreting data. Dr. Worawith Sangkatip and Asst. Prof. Dr. Suwich Tirakoat contributed to the revision of the manuscript and provided academic guidance. All authors read and approved the final manuscript. The proportion of work contributed to this article is 50:10:40, respectively, by the authors.

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