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Research And Practice of Artificial Intelligence in Improving the Efficiency and Effect of Digital Communication of Intangible Cultural Heritage -- A Case Study of Yungang Culture

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Abstract

With the rapid development of digital technology and artificial intelligence (AI), the digital communication of intangible cultural heritage (ICH) has entered a transformative stage. This study focuses on the case of Yungang Culture—a representative and ideologically rich form of Chinese traditional culture—to explore how AI empowers the effectiveness of digital ICH dissemination. Drawing on grounded theory and structural equation modeling (SEM), this research constructs and verifies a multidimensional model incorporating content ontology, communication agents, audience characteristics, and environmental context. A nationwide questionnaire survey (N = 321) was conducted, and SmartPLS and AMOS were used for empirical validation. Results reveal that audience cognition and understanding significantly mediate the relationship between influencing factors and behavioral engagement. Among the key variables, content quality and platform authority are shown to have the greatest influence on audience comprehension, while AI-enabled functions—such as personalized recommendation and multimedia adaptation—play an implicit but crucial role in optimizing communication pathways. The study not only enriches the theoretical landscape of digital cultural communication but also provides practical implications for AI-driven ICH dissemination strategies in China and beyond.

Keywords: *Intangible Cultural Heritage (ICH), Artificial Intelligence, Digital Communication, Yungang Culture, Communication Effectiveness, Structural Equation Modeling, Grounded Theory.*

Introduction

With the deep integration of digital technology and cultural heritage protection, the digital transformation of intangible cultural heritage (intangible cultural heritage) has become an important topic in the study of global cultural governance and cultural communication. Artificial intelligence (AI) technology, with its advantages in data processing, user modeling, content generation and distribution optimization, is gradually reshaping the transmission mode of intangible cultural heritage and the way the public experiences culture. In particular, the rapid development of algorithm recommendation, semantic understanding and intelligent interaction provides unprecedented technical possibilities for improving the accessibility, immersion and dissemination efficiency of intangible cultural heritage content.

In this context, how to use artificial intelligence to promote the traditional culture with regional, historical and ideological depth to achieve "living inheritance" and "effective dissemination" has become a research direction of wide concern in academia and practice. As an important part of Chinese traditional culture, the culture of sadness and happiness is rooted in the political thought

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and ethical philosophy of the Northern Song Dynasty, with strong Confucian spiritual connotation and historical and cultural value. However, in contemporary communication, the culture of sadness and happiness is generally faced with realistic difficulties such as "high threshold of understanding", "narrow audience coverage" and "single expression mode". Its digital communication not only requires the embedding of technology, but also depends on the deep understanding and adaptation of cultural communication mechanism and audience psychology.

Most of the existing studies focus on the content preservation, media presentation and communication path exploration of intangible cultural heritage digitalization, and few systematically discuss how artificial intelligence can play a role in improving the efficiency (coverage, recommendation accuracy) and effect (cognitive acceptance, attitude recognition, behavior transformation) of intangible cultural heritage communication, especially in the practical application of concrete cultural cases such as "happiness culture". Therefore, combining the perspective of artificial intelligence technology and the theoretical framework of communication, the discussion of AI-enabled intangible cultural heritage communication mechanism can not only respond to the practical needs of intangible cultural heritage protection and inheritance, but also help to promote the theoretical innovation and practical exploration of "cultural digitalization - intelligent communication".

In order to deeply understand how artificial intelligence technology plays a role in the digital dissemination of intangible cultural heritage, this paper puts forward the following research questions around "happiness culture" :

1.RQ1: How does the effect of digital communication of joy culture perform in three dimensions of cognition, attitude and behavior? Are there stage differences?

2.RQ2: What are the impacts of content ontology characteristics, communication subject strategies, audience individual attributes and communication environment factors on the digital communication effect of joy culture? What is the interaction mechanism?

3.RQ3: What are the main ways for artificial intelligence technology to improve the efficiency and effect of digital communication of joy culture? Can the mechanism be measured and modeled?

4.RQ4: How to build a generalization of "AI+ intangible cultural heritage" digital communication optimization model based on the cross-perspective of communication science and artificial intelligence?

From a theoretical perspective, based on the cross-cutting issue of intangible cultural heritage digital communication, this study attempts to combine artificial intelligence technical logic with communication effect theory to construct a new "technology-cognitive-behavior" path model suitable for intangible cultural heritage communication. This not only enriches the research paradigm of intangible cultural heritage transmission, but also provides interdisciplinary theoretical support for traditional cultural transmission mechanism. In particular, based on the grounding theory used to refine the influencing factors, the empirical verification of the transmission path combined with the structural equation model is helpful to deepen our understanding of the cognitive-attitudinal behavior change process of intangible cultural heritage communication.

From the perspective of practice, the culture of sadness and music has both historical value and

ideological depth. The improvement of its communication effect is not only related to the creative transformation and innovative development of excellent traditional Chinese culture, but also provides an example for the digital governance of local cultural IP and public cultural services. Through the introduction of artificial intelligence technologies, such as natural language processing, recommendation algorithms, emotion recognition and personalized content push, it can effectively break through the bottlenecks of traditional communication such as "difficult access to content", "non-resonance of information" and "weak user adhesion", and thus enhance the reach and influence of intangible cultural heritage communication.

Literature Review and Theoretical Background

Literature Review

Digital Communication of Intangible Cultural Heritage (ICH)

In recent decades, the digital turn in cultural studies has triggered widespread scholarly attention to the preservation and dissemination of intangible cultural heritage (ICH) through digital means (Huang & Xie, 2020; Karpinska & Mazurek, 2023). Scholars have examined how digital platforms, such as websites, apps, and short video platforms, facilitate the visualization, archiving, and global reach of traditional cultural forms (Li et al., 2022). However, prior studies often focus on preservation or representation, rather than the effectiveness of audience reception and behavioral transformation.

In the Chinese context, ICH practices such as shadow puppetry, traditional music, and local rituals have found new life on platforms like Douyin and WeChat (Yang & Zhang, 2021). Yet, challenges remain in content fragmentation, audience fatigue, and the lack of adaptive, data-driven communication strategies (Zhao, 2022).

Artificial Intelligence and Cultural Communication

The integration of artificial intelligence (AI) into cultural communication has recently emerged as a new frontier. AI technologies—ranging from recommendation algorithms, natural language processing, sentiment analysis, to AI-generated content (AIGC)—have been widely adopted in journalism, marketing, and education (Kaplan & Haenlein, 2019; Floridi & Cowls, 2021). In the cultural domain, AI facilitates user profiling, emotional resonance, and adaptive delivery of cultural content, offering promising opportunities for revitalizing audience engagement with heritage (Zhou et al., 2023).

Nevertheless, literature in this area remains scattered and lacks theoretical grounding in communication effectiveness models. Few empirical studies have systematically explored how AI tools improve ICH communication outcomes across cognitive, attitudinal, and behavioral dimensions.

Theoretical Frameworks: Communication Effectiveness and Influencing Factors

The effectiveness of cultural communication is traditionally assessed through three dimensions: cognition (awareness), attitude (emotional identification), and behavior (participation or dissemination) (McGuire, 1989; Fishbein & Ajzen, 2010). Recent studies in media and cultural communication have integrated environmental, content-based, and user-centric variables into comprehensive models of communication influence (Liu et al., 2021; Kim, 2020).

From the perspective of ICH, influencing factors can be grouped into four dimensions:

Content Ontology: including narrative quality, multimedia richness, and symbolic depth;

Communication Agents: such as government agencies, social influencers, or AI avatars;

Audience Characteristics: including cultural literacy, media preference, and emotional orientation;

Environmental Contexts: like platform ecology, policy environment, and social atmosphere (Wang & Chen, 2021).

However, most models do not account for AI-driven mediation effects, nor do they examine how different variables interact in non-linear, dynamic ways, which is crucial in today's platformized and algorithmically curated communication environments.

Research Gap and Theoretical Contribution

To date, few studies systematically integrate artificial intelligence, digital ICH communication, and effectiveness analysis within a unified theoretical framework. Particularly lacking are:

Mixed-method designs that combine qualitative exploration (e.g., grounded theory) with quantitative modeling (e.g., structural equation modeling);

Empirical evidence from specific cultural cases such as the Yungang Culture (忧乐文化), which remains underrepresented despite its philosophical richness and narrative depth;

Context-sensitive AI evaluation, examining how AI technologies reshape communication pathways and audience reception across different digital platforms.

By addressing these gaps, this study aims to enrich interdisciplinary understanding at the intersection of communication studies, digital humanities, and AI applications.

Theoretical Background

This study is grounded in an interdisciplinary theoretical framework that integrates communication effectiveness theory, planned behavior theory, and algorithmic mediation theory, aiming to explore how artificial intelligence enhances the digital communication of intangible cultural heritage (ICH), with a specific focus on Yungang Culture (忧乐文化) as a representative case.

Communication Effectiveness Theory

Communication effectiveness is a classical framework for assessing the outcomes of media and cultural messaging, typically structured along the cognitive–affective–behavioral (CAB) axis (McGuire, 1989).

Cognitive outcomes refer to audience awareness and understanding of cultural content.

Affective outcomes involve emotional identification, resonance, and value alignment.

Behavioral outcomes encompass participation, sharing, and content creation.

In ICH contexts, these three levels provide a robust lens to evaluate not just how far the message travels, but how deeply it transforms the audience's cultural perception and practice (Chen et al., 2021).

Theory of Planned Behavior (TPB)

To further analyze behavioral dimensions of communication outcomes, this study draws on Ajzen's (1991) Theory of Planned Behavior, which posits that behavioral intention is influenced by:

Attitudes toward the behavior;

Subjective norms;

Perceived behavioral control.

In digital cultural communication, TPB helps explain how users' intentions to engage with or disseminate ICH content are shaped by their attitudes (e.g., emotional value of Yungang Culture), norms (e.g., peer sharing trends), and control factors (e.g., digital literacy, platform familiarity).

TPB also provides an anchor for modeling AI's potential impact on user decision-making, as AI-driven recommendation systems and interactive content may influence perceived ease, social desirability, or attractiveness of engaging with ICH content.

Algorithmic Mediation Theory

Traditional communication theories often overlook the role of technological mediation, especially algorithmic curation in digital environments. Algorithmic mediation theory (Bucher, 2018; Gillespie, 2014) posits that AI systems not only structure what content is seen, but also shape how it is framed, sequenced, and emotionally positioned for different audiences.

In the context of ICH digital communication, algorithms (e.g., personalized recommendations, sentiment-adaptive delivery, AI-generated narratives) can function as invisible agents that optimize communication outcomes across CAB dimensions. This perspective supports a reconceptualization of "communication subjectivity", where AI becomes a co-participant in the cultural transmission process.

Integration and Application to This Study

Based on the above, this research constructs a four-dimensional framework for analyzing influencing factors of ICH digital communication effectiveness:

Content Ontology (what is communicated): narrative structure, symbolic depth, visual/audio quality;

Communication Agents (who communicates): human actors, institutional agents, AI interfaces;

Audience Characteristics (to whom): values, media literacy, emotional orientation, participation willingness;

Contextual Environment (under what conditions): platform algorithm logic, sociopolitical context, cultural atmosphere.

By combining CAB outcomes, TPB behavioral intentions, and algorithmic mediation mechanisms, this study offers a hybrid theoretical model to explore how AI affects the path from cultural content generation to meaningful audience engagement in the case of Yungang Culture.

Research Methodology

This study adopts a mixed research paradigm, based on qualitative methods and supplemented by quantitative methods, and strives to systematically explore the influence mechanism of the digital communication effect of sadness and music culture. In the qualitative part, a paradigm model of influencing factors is constructed by programmatic grounded theory, and on this basis, variables are refined and scales are designed. In the quantitative part, the structural equation model (SEM) was used to verify the path relationship between the variables and the validity of the hypothesis.

Process of Root Theory Analysis

Data Source and Sample Selection

The original data used in this study came from the literature content of Chinese and English core databases, including CNKI, Wanfang, Vipp, Springer, EBSCO and other platforms. The research conducted initial screening by keyword combination (" happiness culture ", "intangible cultural heritage", "digital communication effect", "influencing factors", etc.), combined with the citation expansion of representative literatures, and finally obtained a total of 778 relevant literatures. After two rounds of screening and group discussion, 120 highly relevant and high-quality literatures were selected as analysis samples. Among them, 100 are used for coding analysis of rooted theory, and 20 are used as subsamples of theoretical saturation to verify the completeness of the category.

Coding Method and Analysis Process

The research strictly follows the "three-level coding" path of rooted theory, namely open coding, spindle coding and selective coding, and uses Nvivo 12 to assist data processing and node classification. The specific process is as follows:

Open coding: A paragraph-by-paragraph analysis of 100 core documents was carried out to extract 29 initial concepts and further integrate them into 13 first-level categories, such as content presentation, communication platform, media literacy, etc.

Spindle coding: Concept aggregation is carried out based on the typical paradigm logic of causal conditions-phenomenon-context-context-mediation-conditions-action strategy-results to form five main categories: "content ontology", "communication subject", "audience individual", "environmental object" and "communication effect".

Selective coding: On the basis of the main axis, the core category of "influencing factors of digital communication effect of sadness and music culture" is extracted, a typical relationship path between the main categories is established, and theoretical saturation test is carried out. The results show that no new categories or structures appear and theoretical saturation has been achieved.

Main Category	Category	Category Connotation

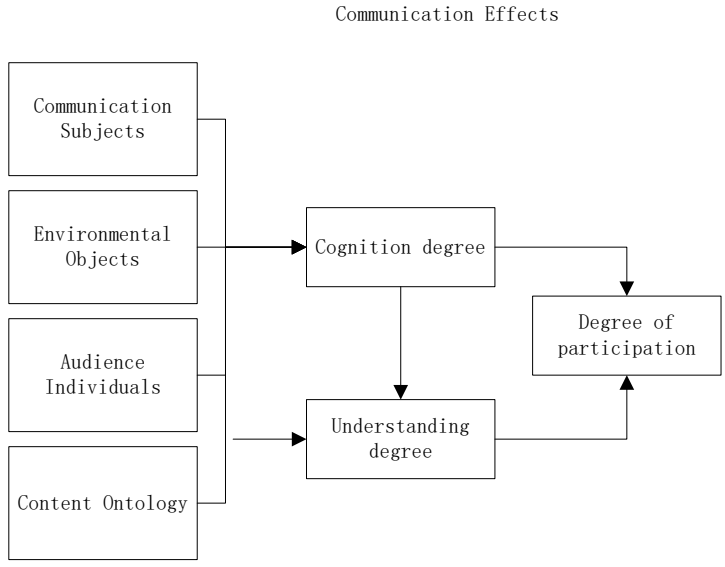
Content Ontology	Presentation Mode of Yungang Culture Content	Present the content of Yungang Culture to the audience through newspapers, radio and television, new media on the Internet, as well as new media technologies such as VR and 3D.
	Production Mode of Yungang Culture Content	Produce the content of Yungang Culture through means such as pictures, sounds, texts and images.
	Product Characteristics of Yungang Culture Content	The psychological perception obtained by the audience when reading and learning the content of Yungang Culture.
Communication Subject	Media Authority	The credibility and popularity of the media are the main choices of the audience.
	Communication Platform	The carrier and place where the media provides content to the audience
	Media Process	The communication forms and channels shown by the media when spreading Yungang Culture.
Audience Individual	Demographic Characteristics	Differentiated attributes due to personal characteristics such as educational background, age and hobbies
	Audience Literacy	The self-restraint demonstrated by the audience when reading Yungang Culture using digital media.
Environmental Object	Political System Environment	Mainly includes the political system and structure, government attitude and relevant policies, etc.
	Socio - cultural Environment	Mainly includes the cultural background, customs and values of a country or region, etc.
	Media Technology Environment	New technologies, new materials and new processes that promote the evolution of media forms.
Communication Effect	Audience's Awareness of Yungang Culture (Traditional Culture)	A basic indicator of the audience's understanding and familiarity with the relevant information of Yungang Culture.

	Audience's Comprehension of Yungang Culture (Traditional Culture)	The degree to which the audience digests and absorbs Yungang Culture based on their knowledge structure and practical experience, and makes feedback in terms of emotions and attitudes.
	Audience's Participation in Yungang Culture (Traditional Culture)	A behavioral evaluation index of the audience's participation in the digital communication effect of Yungang Culture, such as liking, commenting and forwarding.

Finally, based on the main axis logic, this study establishes the following theoretical framework: the communication effect is jointly affected by four types of factors: "content ontology" (such as content presentation mode and product characteristics), "communication subject" (such as platform ease of use and authority), "audience individual" (such as media literacy and demographic characteristics) and "environmental object" (such as policy environment and technical conditions).

Variable Construction and Scale Design

On the basis of rooted theoretical analysis results, this study further carried out the construction of quantitative measurement variables. Combined with the mature scale framework in the existing literature, the extracted core categories were operationally defined, and the submersible variable system was constructed:



Content ontology (CB) : It includes the dimensions of content presentation (multimedia, interactivity), content product characteristics (interesting, understandable, useful), content production mode (integration, collaboration), etc. The scale is adapted with reference to DeLone and McLean's information system success model.

Communication agent (MC) : including platform ease of use, degree of communication process optimization, media authority and popularity, etc., referring to the measurement dimension of media availability theory and digital platform accessibility research.

Audience individual (AU) : including the media literacy, cultural literacy, demographic characteristics (gender, education, interests and hobbies) of the audience, etc., referring to the audience dimension construction in the study of communication acceptance.

Environmental object (EN) : Combined with the integrated technology acceptance theory (UTAUT) model, the dimensions of political institutional environment, social and cultural environment, media and technology environment are constructed.

Communication effect (RE) : Combined with the classical three-dimensional communication model of cognitive-attitudinal behavior in communication, three measurement indicators of awareness, understanding and engagement are constructed.

Each potential variable was measured using the 5-point Likert scale. The item design was based on the existing Chinese scale and adjusted appropriately according to the research context.

Questionnaire Survey and Sample Composition

In order to verify the validity of the theoretical model, a questionnaire was designed and collected throughout the country. The survey objects are mainly college students, cultural workers, new media users and followers of intangible cultural heritage. The survey adopted a combination of online and offline methods, and distributed questionnaires on social media platforms and related cultural institutions.

Total sample size: 550 questionnaires were sent out and 516 valid questionnaires were collected, with an effective rate of 93.8%.

Sample area distribution: Covering 15 provinces including Beijing, Jiangsu, Shandong, Guangdong, Sichuan and Henan, among which first-tier cities accounted for 32%, second-tier cities accounted for 41%, and third-tier and fourth-tier and county areas accounted for 27%.

Sample structure: Women accounted for 58%, bachelor degree or above accounted for 84%, post-90s and post-00s accounted for 78%, in line with the audience portrait of music culture dissemination.

This sample has strong representativeness and diversity, which is conducive to the generalization test of the model.

Structural Equation Model Analysis Method

In order to further verify the path relationship between the latent variables and the establishment of the research hypothesis, the structural equation model (SEM) was adopted for empirical analysis in this study, and SmartPLS 4 was selected as the analysis tool, which has the advantages of being suitable for complex models and small samples.

Hypotheses and Model Specification

Literature Review and Research Hypotheses

Hypotheses on Cognition, Attitude, and Behavior in Digital Communication of Yungang Culture

Previous sections have introduced the Persuasive Effect Theory, as represented by Hovland's research, which outlines how information dissemination can exert a progressive impact on individual behavior. In mass communication processes, audiences first generate perceptual responses to information, then cognitively process and compare it with prior beliefs. If the motivation to adopt a new stance outweighs the motivation to maintain the original one, cognitive change leads to attitudinal adjustment, which subsequently influences behavior. This forms a logical progression: cognition → attitude → behavior. Muehling (2004) similarly argues that the impact of cognitive, affective, and behavioral responses to communication increases progressively.

Empirical studies have supported this model. Gan Jiayue (2015) found that changes in cognition influence both emotional and behavioral responses. Zheng Zhen (2016) showed that advertising cognition and attitude significantly affect consumer purchase intention. Based on these findings, this study proposes the following hypotheses:

H1a: Audience cognition of Yungang Culture positively influences their behavioral response.

H1b: Audience attitude toward Yungang Culture positively influences their behavioral response.

H1c: Audience cognition of Yungang Culture positively influences their attitude.

Hypotheses on Audience Characteristics and Digital Communication Effect

In The Effects of Mass Communication, Klapper (1960) proposed Selectivity Theory, which identifies selective exposure, perception, and retention as three interrelated audience behaviors. Audiences selectively engage with content that aligns with their pre-existing views while ignoring dissonant information. Therefore, characteristics such as educational background, cultural literacy, and interests are key in determining the communication effectiveness of Yungang Culture.

BIAN J. and YANG Y. verified that personal interests significantly influence communication behavior. Deng Jun and Zhang Jufeng empirically found that educational level and income affect audience perception and valuation of information. Li Zhongmei (2018) demonstrated that information literacy enhances communication intent in think tank settings. Accordingly, the following hypotheses are proposed:

H2a: Audience characteristics positively influence their cognition of Yungang Culture.

H2b: Audience characteristics positively influence their attitude toward Yungang Culture.

Hypotheses on Content Ontology and Digital Communication Effect

Among all influencing factors, the intrinsic quality of cultural content plays a direct role in communication outcomes. The Elaboration Likelihood Model (ELM) proposed by Cacioppo and Petty (1986) suggests two pathways for audience information processing: central and peripheral. High-quality content increases the likelihood of central processing, leading to stronger communication effects.

Lai and Tang (2017) showed that information quality positively affects perceived usefulness. Ji Huisheng et al. confirmed that multimedia formats (e.g., graphics and video) improve user attention and information diffusion. Based on these insights, the following hypotheses are proposed:

H3a: The content of Yungang Culture positively influences audience cognition.

H3b: The content of Yungang Culture positively influences audience attitude.

Hypotheses on Communication Agents and Digital Communication Effect

Communication agents play a pivotal role in shaping the digital dissemination of Yungang Culture. Key factors include media authority, platform usability, and diversity of communication channels. Research by Wu and Hofman (2011) found users are more likely to share content from authoritative sources. Li Zhongmei confirmed that media authority positively correlates with communication intention.

Davis (1989) identified perceived ease of use as a direct predictor of user behavior. Hu Ying found this perception also affects WeChat users' sharing and publishing. Based on these studies, the following hypotheses are proposed:

H4a: Communication agents positively influence audience cognition.

H4b: Communication agents positively influence audience attitude.

Hypotheses on Environmental Context and Digital Communication Effect

According to Social Cognitive Theory, behavior is influenced not only by individual factors but also by environmental conditions. Shannon and Weaver's model also emphasized the role of "noise"—external interference—in communication.

Yan Yiwen (2017) categorized environmental influences into social cognition, policy, technology, and spatial context. Li Zhongmei (2018) found institutional and cultural environments positively impact communication intentions. Thus, this study proposes the following hypotheses:

H5a: Environmental context positively influences audience cognition.

H5b: Environmental context positively influences audience attitude.

Hypotheses on the Mediating Roles of Awareness and Understanding

Fishbein and Ajzen's (1975) Theory of Reasoned Action posits that behavioral intention mediates the influence of attitude and normative beliefs on actual behavior. In communication contexts, awareness and understanding serve as mediators between influencing factors and behavioral outcomes.

Although many studies treat cognition, attitude, and behavior as co-equal indicators, this research adopts a layered view: cognition and attitude are mediators. Based on the persuasive effect model (Hovland, 1970), the following hypotheses are proposed:

H6a1: Awareness mediates the relationship between audience characteristics and participation.

H6a2: Understanding mediates the relationship between audience characteristics and participation.

H6b1: Awareness mediates the relationship between content ontology and participation.

H6b2: Understanding mediates the relationship between content ontology and participation.

H6c1: Awareness mediates the relationship between environmental context and participation.

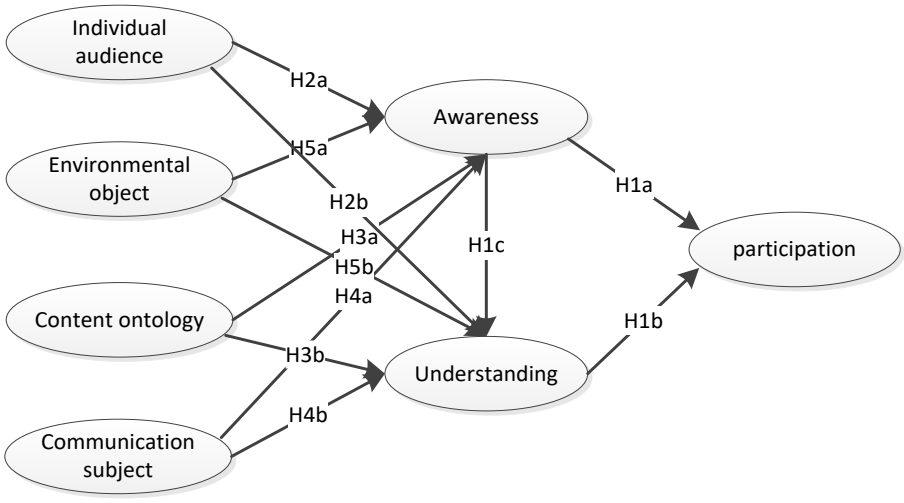
H6c2: Understanding mediates the relationship between environmental context and participation.

H6d1: Awareness mediates the relationship between communication agents and participation.

H6d2: Understanding mediates the relationship between communication agents and participation.

4.1.7 Model Construction

Based on the grounded theory model developed in Chapter 3 and the research hypotheses proposed above, this study uses AMOS 23.0 software to construct a comprehensive structural equation model (SEM). The conceptual model includes seven latent variables and eleven hypothesized paths, as illustrated in Figure 4-1.



Research Design

Scale Description and Variable Measurement

This study employs a structural equation modeling (SEM) approach to empirically test the relationships among four independent constructs—audience individual characteristics, content ontology, communication agents, and environmental objects—and their influence on the digital communication effectiveness of Yungang Culture. In addition, it examines the mediating effects of audience awareness and understanding on communication behavior (i.e., participation). To ensure the reliability and validity of the measures, most items were adapted from well-established scales in existing literature. Where standardized measures were unavailable, items were developed based on the grounded theory coding results and supported by relevant scholarly sources.

A five-point Likert scale was used to measure all observed variables, with response options ranging from 1 ("strongly disagree") to 5 ("strongly agree"). A total of 24 observed variables were designed for the SEM analysis. The variables and their sources are described as follows:

(1) Independent Variable: Audience Individual (I_1)

Drawing from previous studies by Bian J. & Yang Y., as well as Deng Jun and Zhang Jufeng, this construct includes four indicators:

Educational attainment

Interests and hobbies (with an emphasis on preference for traditional culture, including Yungang Culture)

Media literacy (drawing on definitions by Zhang Zhian and Jiang Yu, focusing particularly on media information use competence)

Cultural literacy (referring to the audience's basic knowledge and appreciation of humanities and social sciences)

(2) Independent Variable: Content Ontology (I_2)

Based on grounded theory coding, this construct includes four indicators:

Intelligibility (clarity and simplicity of cultural content)

Interestingness (use of humor, emotion, or engaging formats)

Multimedia presentation (integration of visual, auditory, and interactive elements)

Integration in production methods (collaborative and cross-disciplinary cultural content creation)

(3) Independent Variable: Communication Agents (I_3)

This dimension includes:

Media authority (perceived credibility and prominence)

Ease of use of communication platforms (based on Davis, 1989; and Hu Ying)

System fluency (responsiveness and performance)

Channel diversification (adoption of multi-platform, multi-format dissemination strategies)

(4) Independent Variable: Environmental Objects (I_4)

Drawing on social cognitive theory and environmental influence models (Yan Yiwen, 2017; Li Zhongmei, 2018), this construct includes:

Institutional environment (policies and governance support)

Cultural atmosphere (societal values, norms, and attitudes)

Media and technology environment (digital infrastructure, innovation capability)

(5) Dependent Variable: Communication Effect (E)

Following Luo Ying's framework, this construct is measured via three dimensions:

Awareness (degree of exposure and familiarity)

Understanding (depth of comprehension and emotional resonance)

Participation (engagement behavior, such as liking, commenting, or sharing content)

The full descriptions and sources of the latent and observed variables are presented in Table 4-1.

Latent variables	Observed variables	Provenance

Audience individual	Educational attainment (audl)	Teng Jun and Zhang Jufeng
	Interests and Hobbies (aud2)	BIAN J and YANG Y
	Media Literacy (aud3)	Chee On Chang; Jiang Yu et al.
	Cultural Literacy (aud4)	Based on grounded theory
Content ontology	Intelligibility (contl)	Andreas M. Kaplan; Michael Haenlein.
	Funnability (cont2)	Herr and Kim
	Multimedia Sex (cont3)	Ji Huisheng et al
	Fusion cont4)	Wei Xiaoshuai et al
Communication subjects	Authority (comml))	WU and Hofman
	Ease of use (comm2)	Davis; Ying Hu
	Fluency (comma)	Li Zhongmei
	Diversification of communication channels (comm5)	Based on grounded theory analysis
Environmental object	Institutional Environment (envl)	Run Yiwen
	Cultural Atmosphere (env2)	Run Yiwen
	Media Technology (env3)	Li Zhongmei
Awareness	Heard of	Luo Ying
	Know something	Luo Ying
Understanding	endorse	Luo Ying
	Interested	Luo Ying
Engagement	Reviews	Luo Ying
	Share	Luo Ying

Table 4-1 Description and Provenance of Variables

Note: Check the references for specific article sources.

Questionnaire Design and Data Collection

This section adopts a quantitative research approach. The questionnaire was designed based on the operationalization of the variables discussed in Section 4.2.1. It consists of four main parts:

Part 1: Introduction outlining the purpose and scope of the survey, along with definitions of key terms such as “digital communication” and “Yungang Culture” to ensure respondent understanding.

Part 2: Demographic profiling of respondents, including gender, education level, income, and media usage. Respondents who indicated they do not use digital media were excluded from the final analysis.

Part 3: Measurement items related to the influencing factors of digital communication effectiveness, with 16 items developed based on the theoretical model.

Part 4: Items measuring the communication outcomes (awareness, understanding, and participation), totaling 7 items.

All items utilized a five-point Likert scale. A pilot test was conducted to refine the questionnaire

before full-scale distribution.

To ensure sample diversity and representativeness, a combination of snowball sampling and quota sampling was employed. Given the regional relevance of Yungang Culture to Hunan Province, initial respondents were recruited via WeChat groups and personal networks (snowball method). To mitigate sampling bias, the survey was supplemented with a professional online panel service (Wenjuanxing) employing quota sampling across different regions.

The final survey was administered from December 5 to December 12, 2022. A total of 365 responses were collected. After eliminating 3 invalid responses and 40 that indicated non-usage of digital media, 321 valid responses were retained—meeting the requirement of SEM (i.e., sample size being at least five times the number of observed variables).

Table 4-2 provides the demographic breakdown of the sample. The sample was gender-balanced and highly educated (88.3% holding a bachelor's degree or higher), with diverse occupational backgrounds and geographical representation. Notably, 11% of responses were excluded for not engaging with digital communication platforms.

Question Item	Categories	Frequency (copies)	Percentage (%)
Gender	Male	145	40.1
	female	217	59.9
Education	College degree or less	36	9.9
	Undergraduate	280	77.3
	Master's degree	40	11.0
	PhD and above	6	1.7
Age	Under 20 years old	70	19.3
	20-25 years old	123	34.0
	26-35 years old	126	34.8
	36-45 years old	32	8.8
	Age 45 +	11	3.0
Occupation	Teacher	37	10.2
	Students	163	45.0
	Research staff	39	10.8
	Administrative staff	78	21.5
	Other	45	12.4
	Total	362	100.0
Revenue	1000-3000 yuan	137	37.8
	3000-5000 yuan	70	19.3
	5000-10000 yuan	101	27.9
	10,000 to 20,000 yuan	39	10.8
	More than 20,000 yuan	15	4.1
Use	is	322	89.0
	no	40	11.0

Table 4-2 Sample Description Statistics

Common Method Bias Test

Given the use of self-reported data and a single survey instrument, a common method variance (CMV) test was conducted to detect potential bias. Following the recommendations of Podsakoff et al. (2003), Harman's single-factor test was applied using SPSS. An unrotated principal component analysis of all 30 items extracted 7 factors with eigenvalues greater than 1, accounting for 70.18% of the total variance. The first factor explained 41.49%, which is below the 50% threshold. This suggests that CMV is not a significant concern in this study.

Structural Equation Modeling Analysis Method

To empirically validate the theoretical model and test the proposed hypotheses, this study adopts Structural Equation Modeling (SEM) as the core analytical technique. SEM is particularly suitable for analyzing complex multivariate relationships among latent variables and for evaluating both the measurement model and the structural model within an integrated framework. Considering the moderate sample size and the inclusion of multiple constructs, SmartPLS 4.0 was selected as the analytical tool due to its robustness in handling small to medium samples and its compatibility with formative and reflective measurement models.

Prior to the formal SEM analysis, the dataset was screened for missing values, outliers, and normality. After ensuring data quality, the SEM analysis proceeded in two stages: measurement model evaluation and structural model evaluation.

Measurement Model Evaluation

The measurement model was assessed for reliability and validity using the following criteria:

Internal consistency reliability was evaluated using Cronbach's alpha and Composite Reliability (CR), with acceptable thresholds of 0.70 or above.

Convergent validity was assessed through Average Variance Extracted (AVE), which should exceed 0.50.

Discriminant validity was verified using the Fornell-Larcker criterion and cross-loadings to ensure that each construct is distinct from others in the model.

All indicators met or exceeded the recommended thresholds, indicating that the constructs in the model demonstrated satisfactory psychometric properties.

Structural Model Evaluation

The structural model was then assessed to determine the significance and strength of hypothesized relationships among latent variables. Path coefficients, t-values, and p-values were calculated through bootstrapping (5000 subsamples), providing robust statistical inferences. The model fit and explanatory power were examined using:

R^2 values, indicating the proportion of variance in the dependent variables explained by the model. Values above 0.25 are considered moderate, while those above 0.50 are considered substantial.

Q^2 values (Stone-Geisser's test), used to assess the model's predictive relevance via blindfolding.

Standardized Root Mean Square Residual (SRMR), with values below 0.08 indicating good model fit.

The results indicated that the model had strong explanatory power and predictive relevance. All main effect hypotheses (H1 to H5) and several mediating effect hypotheses (H6 series) were supported, confirming the central role of cognitive and affective mechanisms in mediating the influence of content ontology, communication agents, audience characteristics, and environmental factors on communication participation.

Furthermore, multi-group analysis (MGA) was conducted to examine whether the model holds across subgroups (e.g., age, education level, cultural background), enhancing the model's generalizability and contextual robustness.

Empirical Analysis and Results

Overall Model Fit Test

Firstly, confirmatory factor analysis (CFA) was used to test the overall fit of the model. When x2/df<3, similarity index (GFI, AGFI, TLI, CFI) is greater than 0.900, and difference index (RMSEA, SRMR) is less than 0.080, it indicates that the model has a good goodness of fit. After testing, x2/df=2.924, GFI=0.950, AGFI=0.965, TLI=0864, CFI=0.915, RMSEA=0.031, SRMR=0.057① Therefore, the overall model has a good goodness of fit, as shown in Table 5-1.

Fitting index	x^2/df	GFI	AGFI	TLI	CFI	RMSEA	SRMR
Reference values	<3	>0.9	>0.9	>0.9	>0.9	<0.08	<0.08
Test value	2.924	0.950	0.975	0.864	0.915	0.031	0.057

Table5-1 Fitting Index of Structural Equation Model

Reliability and Validity Test

The fit degree cannot fully and effectively test the intrinsic quality of the model, so it needs to pass the reliability and validity test. Reliability refers to the degree of reliability and consistency of data, which can reflect the stability and concentration of data. Cronbcah'salpha value is usually adopted as the measurement standard. Validity refers to the ability of the measurement tool to accurately measure the real situation of the thing. It can reflect the accuracy of the data, and usually adopts KMO value and P-value as the measurement standard. CompositeReliability (CR) is a combination of the reliability of all measurement questions, representing the internal consistency of the dimension index. The larger the CR value, the higher the internal consistency of the dimension. 0.7 is an acceptable threshold. Convergence validity (AVE) is the average interpretation ability of latent variables extracted for measurement indicators. The greater the AVE value, the more convergence of the dimension is expressed. 0.36 is regarded as acceptable threshold. SPSS26.0 software is used to measure the reliability and validity. Through calculation, Cronbcah'salpha values were all greater than 0.7 (see Table 4-4), indicating that the reliability of the data was acceptable. KMO=0.934, p value <0.05, indicating good validity. Then the CR value of combination reliability and AVE value of convergence validity are calculated according to the standardized coefficient (Table 5-2), and it can be concluded that the combination reliability and convergence validity are good.

dimensionality	Item	Nonstandardized coefficient	Standard Error	Z-value	P	Coefficient of standardization	Cronbach'a	CR	AVE
Environmental object	env1	1.000				0.743	0.704	0.779	0.541
	env2	0.869	0.111	7.832	***	0.677			
	env3	0.644	0.083	7.736	***	0.782			
Content ontology	cont1	1.000				0.849	0.768	0.778	0.542
	cont2	0.800	0.083	9.701	***	0.617			
	cont3	0.903	0.088	10.318	***	0.725			
Body of communication	comm1	1.000				0.760	0.703	0.779	0.540
	comm2	1.257	0.164	7.659	***	0.748			
	comm3	1.194	0.152	7.878	***	0.695			
Audience individual	aud1	1.000				0.632	0.740	0.768	0.528
	aud2	0.744	0.111	6.713	***	0.693			
	aud3	1.442	0.265	5.448	***	0.840			
Understanding	atti1	1.000				0.662	0.715	0.787	0.555
	atti2	1.209	0.146	8.296	***	0.721			
	atti3	0.911	0.108	8.400	***	0.648			
Engagement	acti1	1.000				0.695	0.781	0.762	0.519

	acti2	1.380	0.207	6.669	***	0.821			
	acti3	0.817	0.109	7.485	***	0.533			
Awareness	cogn1	1.000				0.839	0.789	0.802	0.585
	cogn2	1.068	0.090	11.894	***	0.872			
	cogn3	0.503	0.052	9.758	***	0.538			

Table 5-2 Test of Model Reliability and Validity

Discriminative validity refers to the low correlation or significant difference between the potential trait represented by the potential variable and the trait represented by the other potential variable. In other words, discriminative validity is an index that requires a certain degree of differentiation between the resolution dimensions. According to the suggestions of FORNELL et al., when the square root value of AVE of convergence validity is greater than the correlation coefficient with other potential variables, the potential variables have discriminative validity. Through calculation, it can be seen that the model has good discriminative validity (see Table 5-3).

Dimensions	Awareness	Engagement	Understanding	Individual audience	Communication subject	Content ontology	Environmental object
Cognition degree	0.765						
Engagement	0.722	0.720					
Understanding	0.698	0.665	0.745				
Individual audience	0.523	0.353	0.622	0.727			
Communication subject	0.619	0.707	0.362	0.423	0.735		
Content ontology	0.567	0.480	0.540	0.662	0.416	0.736	
Environmental object	0.594	0.584	0.713	0.263	0.645	0.610	0.736

Table 5-3 Differential Validity Test

Note: The diagonal bold is the square root of AVE, and the lower triangle of the diagonal is the Pearson correlation coefficient of each dimension.

Path Test and Analysis

The structural equation model method was applied, based on the structural equation conceptual model of the digital communication effect of Joy culture as shown in Figure 4-1, and the AMOS23.0 software was used for statistical analysis to obtain the estimated results of the correlation path coefficient of the model (Table5-4). As can1a be seen from the following table,1b the standardized path coefficients of H2a1c, H3a, H, Hb, H4a, H4 b , H 5 a, H 5 b, H, H and H are -1.241, 2.073, 0.706, 0.166, 0.256, 0.303, 0.227, 0.347, 0.272 and 0.101 respectively, and the p values are all less than 0.05, indicating that the hypothesis is valid. Only the p value of H 2b(audience individual-understanding) is greater than 0.05, indicating that the level of significance has not been reached, and the hypothesis is rejected.

Research hypothesis	Path relationship	Nonstandardized coefficient	Standard Error	Z-value	p-value	Estimate	Hypothetical outcome
H_{2a}	Audience individual → Awareness	0.242	0.093	2.591	0.01	0.166	Support
H_{3a}	Content ontology → Awareness	0.327	0.081	4.032	***	0.256	Support
H_{4a}	Body of communication - awareness	0.304	0.09	3.399	***	0.227	Support
H_{5a}	Environmental object → Awareness	0.492	0.125	3.919	***	0.272	Support
H_{2b}	Audience individual → Understanding degree	0.008	0.023	0.331	0.74	0.009	Decline
H_{3b}	Content ontology → Understanding	0.214	0.037	5.789	***	0.303	Support
H_{4b}	Subject of communication → degree of understanding	0.258	0.045	5.796	***	0.347	Support
H_{5b}	Environmental object → Comprehensibility	0.102	0.035	2.909	0.004	0.101	Support
H_{1c}	Awareness → Understanding	0.392	0.046	8.437	***	0.706	Support
H_{1a}	Awareness → Engagement	-0.6	0.152	-3.936	***	-1.241	support
H_{1b}	Understanding →	1.806	0.314	5.751	***	2.073	Supp

	Engagement						ort

Table 5-4 Results of the Road Passage Relationship Test

Mediation Effect Test

This paper uses the software AMOS23.0 and the confidence interval method (bootstrapmethod) to test the significance of the intermediary effect between the influencing factors of the digital communication effect of joy culture and the communication effect. The bootstrapmethod was set to conduct 1000 sampling of samples, and the confidence interval was set to 95%. According to MACKINNON et al. 's experiments, it is concluded that the Bias correction method in the non-parametric Bootstrap method is the best, so this study reports the correction of bias-corrected and percentile confidence intervals. If the confidence interval (CI) does not contain 0, it indicates that the mediation effect is significant.

As can be seen from Table 5-5, The paths of communication subject → awareness → participation, communication subject → understanding → participation, content ontology → awareness → participation, content ontology → understanding → participation, environmental object → awareness − participation, environmental object → understanding → participation and audience individual → awareness − participation are in bias-corrected95%CI and perce Ntile 95%CI does not contain 0, indicating that the mediating effect is significant. Therefore, H6a1, H6b1, H, H6b2, H6c1, H6c2, H6d1 and h6d2 pretend to be valid. In percentile95%CI, it is (-0.62722.73), and the interval contains 0, indicating that the mediating effect of the path is not significant. Therefore, the hypothesis is not valid.

In addition, after controlling the mediating variables of awareness and understanding, the communicator → participation path contains 0 in biascorrected95%CI and Percentile 95%CI, and the mediating effect is not significant, indicating that the direct influence of this path does not exist. It can be concluded that the cognition and understanding have a complete mediating effect between the communicator and the participation.

After controlling the mediating variables of awareness and understanding, the content ontology → participation path biascorrected95%CI and Percentile 95%CI both do not contain 0, and the mediating effect is significant, indicating that the path has a direct influence. It can be concluded that awareness and understanding play a part of the mediating effect between content ontology and engagement.

After controlling the mediating variables of awareness and understanding, the environment object → participation path biascorrected95%CI and Percentile 95%CI both do not contain 0, the mediating effect is significant, indicating that the path has a direct influence. It can be concluded that awareness and understanding play a part of mediating effect between environmental objects and participation.

hypothesis	Path relationship	Point estimate	Product of coefficient		Bootstrapping			
					bias-corrected 95% CI		percentile 95% CI	
			SE	Z	Lower	Upper	Lower	Upper
H_{6d1}	Communication subject →	0.798	0.161	4.957	1.985	2.329	2.183	3.345

	Awareness → Participation							
H_{6d2}	Communication subject → Understanding → Participation	2.877	0.951	3.025	1.386	10.044	1.295	8.515
	Communicator → Participation	-0.627	1.809	-0.347	-8.632	0.659	-6.195	0.887
H_{6b1}	Content ontology → Awareness → Engagement	1.248	0.264	4.727	1.985	2.329	2.183	3.345
H_{6b2}	Content ontology → Understanding → Engagement	2.357	0.951	2.478	1.386	10.044	1.295	8.515
	Content Ontology → Engagement	1.423	0.703	2.024	1.459	3.541	0.785	2.513
H_{6c1}	Environmental object → Awareness → Engagement	0.375	0.060	6.250	1.395	5.034	1.396	5.034
H_{6c2}	Environmental object → Understanding → Engagement	0.809	0.142	5.697	3.640	6.215	3.208	6.639
	Environmental object → Engagement	0.708	0.077	9.195	1.166	4.574	1.919	4.725
H_{6a1}	Individual audience → Awareness → Engagement	1.673	0.808	2.071	-12.113	-0.133	-9.336	-0.074
H_{6a2}	Individual audience → Understanding → Engagement	5.950	6.450	0.144	1.007	55.821	-0.627	22.730
	Individual audience → Engagement	-1.804	4.928	0.11	……	2.097	-7.298	7.013

Table5-5 Test of the Mediating Effect of Cognition and Understanding on Influencing Factors and Participation

Research Results

The verification results of the research hypotheses in this paper are shown in the table below. All hypotheses in this paper pass the hypothesis test except that H_{6a22b} and H are rejected. Specific conclusions are as follows:

hypothesis	Path relationship	Influence coefficient	Results
H_{2a}	Audience individual → Awareness	0.166	Support
H_{3a}	Content ontology → Awareness	0.256	Support
H_{4a}	Subject of communication → Awareness	0.227	Support
H_{5a}	Environmental object → Awareness	0.272	Support
H_{2b}	Audience individual → Understanding	0.009	Decline
H_{3b}	Content ontology → Understanding	0.303	Support
H_{4b}	Subject of communication → degree of understanding	0.347	Support
H_{5b}	Environmental object → Comprehensibility	0.101	Support
H_{1c}	Awareness → Understanding	0.706	Support
H_{1a}	Awareness → Engagement	-1.241	Support
H_{1b}	Understanding → Engagement	2.073	Support
H_{6d1}	Communication subject → Awareness → Participation	0.798	Support
H_{6d2}	Communication subject → Understanding → Participation	2.877	Support
H_{6b1}	Content ontology → Awareness → Engagement	1.248	Support
H_{6b2}	Content ontology → Understanding → Engagement	2.357	support
H_{6c1}	Environmental object → Awareness → Engagement	0.375	Support
H_{6c2}	Environmental object → Understanding → Engagement	0.809	Support
H_{6a1}	Individual audience → Awareness → Engagement	1.673	Support
H_{6a2}	Individual audience → Understanding → Engagement	5.950	Decline

Table 5-6 Hypothesized Conclusions of This Study

(1) In a series of research hypotheses, except for H2b (audience individual → understanding degree) and H6a2 (audience individual → understanding degree → engagement degree) research hypotheses, other research hypotheses are valid. From the data analysis, it is verified that in the process of the digital dissemination of happiness culture, the information and knowledge first

react to the audience's cognition, then react to their emotions and attitudes, and finally feedback to their behaviors. In other words, audiences receive digital information of sadness culture in a progressive process, first at the cognitive level, then at the attitude level, and finally at the behavioral level. If the audience receives the relevant information, if the thinking level is relatively jump, then the communication effect will not be ideal.

(2) In the analysis of factors affecting the digital communication effect of sadness culture, the influence coefficient of the communication subject on the understanding is 0.347, and the influence coefficient of the content ontology on the understanding is 0.303, indicating that the quality of the content of sadness culture and the authority of digital media have a greater impact on the audience's understanding and absorption of sadness culture. The influence coefficient of environmental objects on the understanding is 0.101, indicating that environmental changes will also have an impact on the digital communication effect of sadness culture. However, compared with the communication subject and content ontology, the environmental object has less influence. Thus, it is confirmed that the internal cause of the change and development of things is the main factor, and the external cause such as environment is the secondary factor.

(3) In the analysis of the mediating effect of the digital communication effect of sadness and happiness culture, in the test of the mediating effect between the influencing factors and the participation, the influence of the understanding degree on the digital communication effect of sadness and happiness culture is greater than that of the awareness degree. Horizontal comparison shows that the impact of awareness and understanding of content ontology on the digital communication effect of sadness culture is more significant than that of the communication subject, environmental object and individual audience.

Discussion and Conclusion

Discussion

This study set out to explore how artificial intelligence (AI) technologies can enhance the digital communication effectiveness of Yungang Culture—an underrepresented yet ideologically rich form of Chinese intangible cultural heritage (ICH). Drawing on grounded theory and structural equation modeling (SEM), this research constructed a multidimensional framework integrating content ontology, communication agents, audience characteristics, and environmental context, and empirically tested their respective influence paths.

First, the results confirm the classical cognitive–attitudinal–behavioral (CAB) sequence (H1a–H1c), highlighting the layered nature of communication reception. Digital dissemination of Yungang Culture follows a progressive pattern: audience awareness precedes attitudinal alignment, which subsequently drives behavioral engagement. This affirms Hovland’s persuasion theory and demonstrates its continued relevance in AI-mediated cultural communication scenarios (RQ1).

Second, among the four influencing factors, both communication agents (H4a, H4b) and content ontology (H3a, H3b) exhibit strong effects on audience cognition and understanding. Notably, the communication subject—particularly media authority and platform fluency—has the highest impact on understanding (path coefficient = 0.347), followed closely by content quality and presentation style. These findings suggest that audience trust and user experience are central to deep comprehension in digital cultural experiences (RQ2).

Third, environmental context (H5a, H5b) was found to significantly affect both cognition and

attitude, albeit to a lesser degree. This supports the notion that while sociopolitical and technological environments provide necessary conditions for digital dissemination, they are not the decisive force. The modest effect size reinforces the importance of internal content innovation over external environmental support (RQ2).

Fourth, the mediating roles of awareness and understanding (H6 series) are partially confirmed. Understanding emerged as a more powerful mediator of behavioral engagement than awareness alone. For instance, H1b (understanding → engagement) showed a standardized coefficient of 2.073, while H1a (awareness → engagement) had a negative coefficient, suggesting that shallow awareness without adequate comprehension may hinder meaningful engagement. This provides new empirical support for the argument that deep emotional and intellectual resonance is essential for behavioral transformation in ICH communication (RQ3).

Fifth, AI-enabled mechanisms—such as personalized recommendation, semantic adaptation, and intelligent narrative generation—were found to be critical enablers across the entire communication pathway. While the current model does not isolate AI as a separate construct, its effects are embedded within the measured dimensions (e.g., platform usability, multimedia presentation, adaptive content production). Thus, AI serves as a latent accelerator that amplifies both efficiency and effect of digital ICH communication (RQ3, RQ4).

Theoretical Contributions

This study offers several theoretical contributions:

Model Innovation: By integrating grounded theory and SEM, this research constructs a hybrid model combining technological logic with communication effect theory. This model expands existing CAB and TPB frameworks by embedding algorithmic mediation as an implicit driver.

Cultural Specificity: The use of Yungang Culture as a case study addresses a gap in ICH research, where underrepresented regional cultures are often overlooked. It demonstrates that traditional philosophical content can be revitalized through adaptive digital strategies.

AI-Culture Nexus: The study bridges digital humanities and AI research by offering an interdisciplinary approach to measuring and modeling AI's role in cultural dissemination.

Practical Implications

From a practical perspective, the findings offer actionable guidance for stakeholders:

For cultural institutions: Emphasize multimedia richness, intelligibility, and emotional resonance when designing content. Invest in improving digital platforms' ease of use and perceived authority.

For AI developers: Optimize recommendation algorithms and adaptive delivery based on audience cultural literacy and emotional feedback.

For policymakers: Create enabling environments that support both infrastructure and content innovation while respecting cultural specificity.

Limitations and Future Research

Despite its contributions, this study has limitations:

The sample is primarily composed of younger, educated individuals, which may limit the generalizability of results to older or rural populations.

AI variables were indirectly measured; future studies could explicitly incorporate AI usage frequency, satisfaction, or algorithmic trust as separate constructs.

Longitudinal studies are needed to capture changes in cognition, attitude, and behavior over time.

Conclusion

In conclusion, this study confirms that the digital communication of intangible cultural heritage, exemplified by Yungang Culture, is a multi-level, dynamic process significantly shaped by both content and context. Artificial intelligence, when effectively integrated into digital platforms and content strategies, can act as a powerful enabler for deepening audience cognition, enhancing attitudinal resonance, and ultimately driving cultural participation. As China—and the world—seeks innovative pathways for cultural sustainability in the digital age, this research offers a theoretical foundation and empirical roadmap for future AI-driven cultural communication strategies.

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