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Article

Gamification-Oriented H5 Mini-Games for Dissemination of Intangible Cultural Heritage: A Case Study of Wuhan Paper-Cutting

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Abstract: Intangible cultural heritage (ICH) constitutes the core carrier of China's outstanding traditional culture, bearing national historical memories and regional folk cultural veins. At present, most forms of ICH communication rely on one-way content output such as graphic exhibitions and documentaries, which appear outdated and monotonous, creating bottlenecks for youth-oriented ICH promotion. As the latest mainstream web communication technology, HTML5 (H5) features lightweight interactive attributes. Combined with gamification thinking, it can break the limitations of static cultural communication, transform passive cultural appreciation into immersive interactive experiences, and guide audiences to participate autonomously, create original works, and complete secondary social sharing. Taking Wuhan paper-cutting as an empirical case, this paper disassembles the cultural elements of Wuhan paper-cut art, classifies mainstream H5 mini-game forms, and explores integrated paths for fusing ICH elements with diverse game mechanics. The research results can provide a unified practical framework for the digital social communication of paper-cutting, embroidery, folk fine arts and other varieties of ICH.

Keywords: Gamification Thinking; H5 Mini-Game; Wuhan Paper-Cutting; Intangible Cultural Heritage Dissemination

1. Introduction

China's outstanding intangible cultural heritage carries regional folk customs and the collective memory of the nation, serving as a core resource for the development of national cultural soft power. In recent years, the state has issued a series of policy documents to advance the in-depth integration of intangible cultural heritage categories such as traditional crafts and folk fine arts with digital technologies, encouraging the use of new media to expand communication channels and realize youth-oriented inheritance. Meanwhile, with the full popularization of mobile Internet, social media has become the primary platform for young people to access cultural content. Lightweight, highly interactive and shareable digital content has gradually replaced one-way communication forms including offline exhibitions and full-length documentaries. Digital transformation has become an inevitable trend for intangible cultural heritage to break through inheritance bottlenecks and expand public influence. Against this backdrop, how to narrate the stories of intangible cultural heritage via new digital media while preserving its core cultural essence has become a critical issue demanding urgent solutions for the cultural tourism and cultural communication sectors (Ministry of Industry and Information Technology et al., 2024).

Riding the wave of digital development, short videos, online graphic exhibitions and basic interactive H5 products have become mainstream carriers for disseminating intangible cultural heritage. Cultural and tourism authorities at all levels and self-media creators have devoted themselves to producing digital content related to intangible cultural heritage. Nevertheless, prevailing communication practices have exposed multiple irreconcilable practical problems. Algorithm mechanisms prioritizing online traffic dilute the profound cultural connotations of heritage, as most communication content merely pursues visual impact while ignoring the historical, folk and craft values behind intangible cultural heritage. The one-way indoctrination model fails to arouse young audiences' enthusiasm for participation, confining heritage communication within circles of traditional culture enthusiasts and obstructing outreach to broader groups. In addition, templated mass production powered by AIGC further weakens the unique artistic styles and cultural identities of geographically distinctive heritage. On the other hand, gamification design thinking, with its merits including task incentives, instant feedback and immersive experiences, has been widely adopted in non-gaming scenarios. Boasting low participation barriers, powerful social viral effects and low development costs, H5 technology stands out as an excellent communication tool compatible with the mobile social ecosystem. The combination of the two offers a brand-new viable solution to address the pain points of intangible cultural heritage communication.

In light of the above industry status and research gaps, this paper takes gamification thinking and interactive H5 technology as its core research tools, selecting Wuhan Paper-Cutting, which features distinct regional characteristics and a complete craft system, as the empirical research subject. Moving beyond superficial analysis of digital communication phenomena of intangible cultural heritage, this study thoroughly deconstructs the full cultural system of Wuhan Paper-Cutting by dividing its core cultural elements into three layers: narrative, craft and visual. It systematically sorts out the interactive types of mainstream lightweight H5 mini-games available on the market, explores the integration logic between heritage cultural elements and various gameplays, and ultimately constructs a reusable integrated gamified H5 design paradigm applicable to multiple types of intangible cultural heritage. It provides comprehensive practical references for lightweight social communication of traditional handicrafts and other categories of intangible cultural heritage.

2. Literature Review/Background

2.1 Practical Dilemmas of Digital ICH Communication

In the new media era, cultural tourism authorities at all levels and self-media creators have accelerated the digital promotion of intangible cultural heritage. A large number of vertical ICH self-media accounts have emerged on short-video platforms, with real-shot short videos, online graphic exhibitions and lightweight H5 interactive products as mainstream communication forms. Nevertheless, under the combined influence of traffic algorithms, widespread AIGC technology and social media operation rules, digital ICH communication faces a series of practical contradictions in retaining cultural core connotations, realizing in-depth audience participation and standardized content development(Yang, 2026).

Traffic-oriented platform operation logic continuously dilutes the profound cultural connotations of intangible cultural heritage. To meet the completion rate assessment standards of short-video platforms, most top ICH accounts prioritize clips of visually striking craft moments. Although such videos can quickly attract followers, they ignore the profound cultural heritage behind ICH, leading to a phenomenon where form outweighs substance. Audiences only remember visual spectacles rather than the intrinsic cultural meanings of heritage items.

One-way indoctrination communication further restricts in-depth audience participation. Most ICH self-media still follow the communication mode of documentaries and offline exhibition halls, outputting information passively through real-shot videos and graphic popular science. ICH encyclopedias on Bilibili and columns of local cultural tourism WeChat channels all take knowledge-based videos as core content. Superficial viewing only leaves fleeting cultural memories, barely generating cultural empathy among young people. Fan groups remain confined to traditional culture enthusiasts, failing to break through to broader youth demographics.

Mass standardized production powered by AIGC conflicts with the personalized inheritance of intangible cultural heritage. The rise of generative AI greatly accelerates the output of digital communication materials. Nowadays, numerous cultural tourism copywriting and online interactive materials are mass-produced by AI drawing tools with low costs and high efficiency. However, AI-generated graphics follow rigid unified templates, erasing the unique creative styles of folk artisans and weakening the distinctive regional cultural identity of local ICH.

2.2 Core Connotations of Gamification Thinking

Gamification thinking first originated in the field of game design. Richard Barthes initially put forward the player behavior classification model, and later scholar Kevin Werbach established the complete theoretical framework of gamification. Conceptually, gamification does not mean developing full-length games. Instead, it applies game mechanisms including point-based level progression, quest objectives, instant feedback and achievement collection to non-entertainment scenarios, stimulating participants' subjective initiative through fun incentive mechanisms (Xu, 2025).

Introducing gamification thinking into ICH inheritance transforms passive cultural viewing into immersive interactive experiences. Traditional ICH communication mostly relies on static knowledge popularization where audiences receive information passively. In contrast, gamified frameworks decompose folk stories, handcraft procedures and traditional patterns into progressive quests, enabling the public to actively learn ICH content through hands-on operations and level unlocking.

From a communication perspective, gamified experiences effectively boost youth engagement, extend user stay duration, and motivate secondary creation and social sharing of user-generated works. This resolves the aging audience crisis and broken communication chains of ICH, further advancing youth-oriented inheritance of intangible heritage.

2.3 Media Communication Advantages of HTML5 Technology

HTML5 (H5) is a new-generation web interactive technology that runs directly in browsers and social platforms without software downloads. Integrating graphics, animation, audio and multi-touch functions, it realizes diverse human-computer interaction effects and represents the dominant technical medium for social interactive communication on WeChat and other social platforms (Bai, 2024). Its core communication strengths fall into three categories as follows.

In terms of technical attributes, H5 eliminates the limitations of traditional client software and launches instantly via shared links on WeChat or browsers. The ultra-low participation threshold perfectly fits fragmented new media communication scenarios and minimizes barriers for young audiences to engage(Bai, 2024).

In mass communication, H5 breaks the one-way transmission constraints of short videos and static graphics by integrating multimedia elements to deliver diverse interactive content. Multiple viral H5 cases have proven its strong propagation and interactivity, matching the personalized, youth-oriented demands of ICH communication. Representative examples include

My Military Uniform Portrait launched by People's Daily Online, which generated tens of millions of views through photo synthesis interaction, and personality-test H5s produced by NetEase that trigger spontaneous sharing among friends and social media contacts to achieve viral diffusion. The success of these cases verifies H5's powerful communication and interactive performance, which meets the youth-oriented and personalized demands of ICH dissemination.

In terms of development costs, H5 boasts shorter production cycles and lower investment compared with large-scale digital projects. Widespread online H5 production platforms such as Eqixiu, Mugeda, Xiiumi and Tuzhan eliminate the need for professional design software or coding skills, allowing independent designers to complete interactive content efficiently. This shortens project timelines and cuts financial costs significantly, making H5 highly suitable for lightweight ICH interactive projects.

2.4 Thesis Statements and Questions

Against the current status of digital communication for intangible cultural heritage (ICH) and the limitations of existing relevant research, this paper puts forward three core research questions. First, how to systematically deconstruct the inherent cultural elements of Wuhan Paper-cutting ICH and establish a hierarchical content system suitable for digital interactive transformation. Second, how to restructure the interactive logic of ICH-themed H5 products based on gamification design thinking to address the fragmentation of user experience and weak cultural connotations prevalent in existing works. Third, how to extract a universal design paradigm for gamified ICH H5 works, so as to offer practical references for lightweight digital communication of various types of intangible cultural heritage.

Integrating gamification theory, the communication advantages of HTML5 media, and existing research on the digitalization of ICH, this paper advances the following research hypotheses. First, ICH culture can be divided into three progressive core layers: narrative, craftsmanship and visual elements, which serve as the fundamental foundation for constructing immersive interactive experiences. Second, integrating these three layers of cultural elements into a single linear narrative experience can effectively overcome the drawback of separation between storytelling, craft demonstration and creation modules in traditional ICH H5 products. Third, the integrated workflow of "contextual narrative setup – craftsmanship interaction at plot nodes – generation of personalized visual outputs – community communication and dissemination" can be adopted as a universal paradigm for H5 interactive design applicable to all categories of handicraft ICH.

3. Analysis of Cultural Elements in Wuhan Paper-Cutting ICH

To realize deep integration between Wuhan paper-cutting and H5 mini-game communication, this section structurally stratifies the cultural characteristics of Wuhan paper-cutting into three hierarchical layers: a narrative layer centered on historical stories and folk legends, a craft layer consisting of handcraft techniques and production workflows, and a visual layer formed by graphic patterns, colors and composition. These three layers comprehensively cover all dimensions of Wuhan paper-cut culture from the inner core to outer form, laying a foundation for subsequent digital transformation.

3.1 Narrative Layer of Wuhan Paper-Cutting Art

The narrative layer constitutes the spiritual core of humanistic history carried by Wuhan paper-cutting, consisting of historical evolution, folk customs and character legends.

Clarifying its historical evolution helps young people grasp the complete developmental lineage of Wuhan paper-cutting. Rooted in ancient Chu carving craft, this art matured during

the Ming and Qing dynasties alongside the commercial prosperity of Hankou. In the late Qing and early Republican eras, it formed a distinctive Jiangcheng school shaped by dock and marketplace culture. In modern times, thematic expansions transformed traditional window decorations and paper slips into regional folk art depicting Jiangcheng landscapes and marketplace life, forming an orderly inherited historical trajectory.

Exploring folk customs reveals the fundamental characteristics distinguishing Wuhan paper-cutting from other regional paper-cut styles. Rooted in local Hankou rural life, its themes draw heavily on Jianghan dock labor, street markets, temple fairs, wedding rituals and seasonal folk customs, capturing the ordinary lives of boatmen, vendors and townsfolk within paper-cut patterns. These images preserve the unique folk life of modern Hankou, forming folk textual records with distinct regional local features.

Understanding character legends conveys the craftsman spirit and humanistic warmth embedded within ICH. Character legends include life stories, creative experiences and inheritance journeys of successive folk paper-cut artisans, documenting real generational craft transmission. They also cover local oral folk tales and customs, with classic paper-cut patterns corresponding to unique folk narratives, mutually reinforcing images and storytelling.

3.2 Craft Layer of Wuhan Paper-Cutting Art

The craft layer contains core production techniques and supporting tools of Wuhan paper-cutting, forming the core component of this ICH that carries orally-transmitted craftsman spirit and serves as the most critical inheritance carrier.

Wuhan paper-cutting follows six standardized production procedures: sketching drafts, copying patterns via smoking, paper fixation, line carving, contour trimming, and color collage mounting. Unlike southern paper-cutting dominated by scissors, Wuhan paper-cutting centers on carving knives, emphasizing crisp cutting strokes and coherent lines with flexible integration of negative and positive carving, forming a hybrid craft style prioritizing carving supplemented by scissors.

The craft layer also includes a complete system of exclusive tools and materials: carving knives, wax boards, rice paper, kerosene lamps for pattern smoking and other specialized equipment refined by successive inheritors through repeated practice. These hands-on crafts cannot be preserved via static images alone and require repeated practice to develop muscle memory, safeguarding the handmade uniqueness and irreproducible craft foundation of Wuhan paper-cutting. Integrated workflows, tools and techniques compose the complete craft layer of this intangible heritage.

3.3 Visual Layer of Wuhan Paper-Cutting Art

The visual layer forms the core external aesthetic carrier of Wuhan paper-cutting, the most intuitive perceptual cultural dimension for mass audiences, and the primary identifier differentiating it from other regional paper-cut schools.

Wuhan paper-cutting features a complete, geographically distinctive visual system covering visual symbols, modeling composition and color palettes. For visual symbols, dock culture, East Lake ecology, Han opera art and old Hankou marketplace culture generate exclusive regional patterns including Yellow Crane Tower, Jianghan Customs House, Yangtze sailing boats, lotus roots and Han opera facial masks with strong local recognition. In modeling and composition, it abandons the rugged style of northern paper-cutting, relying on soft curved lines and delicate hollow-out techniques to create layered virtual-real contrasts, following symmetrical balance and clear primary-secondary logic to balance exquisite detailing and everyday vitality. Its color system prioritizes traditional Chinese vermilion red, paired with black ink lines, off-white paper bases and ancient brown auxiliary hues. The simple, solemn and elegant color palette inherits

folk symbolic meanings of traditional paper-cutting while adapting to modern digital visual aesthetics(Qu, 2025).

4. Gamified H5 Design Application for Wuhan Paper-Cutting

4.1.Classification of Mainstream H5 Mini-Game Forms

By sorting interactive H5 cases circulated within the WeChat ecosystem, mainstream lightweight mini-game formats include narrative branching, scene puzzle-solving, treasure-hunting level progression, jigsaw puzzles, spot-the-difference, color-filling DIY, pattern collage, gesture simulation, knowledge quizzes, fortune drawing, memory flip cards, elimination games, labyrinths, dress-up mini-games, rhythm games and freehand graffiti. Based on interactive logic, this paper categorizes these formats into five core types (Zhou, 2024).

1. Narrative Story Games: Branch plot selection, timeline roaming, scenario dialogue. These games deliver content via text, animation and audio storytelling; users advance plots by clicking dialogue boxes, featuring low interaction difficulty and strong narrative focus.

2. Logical Puzzle Games: Jigsaw, spot-the-difference, memory flip cards, elimination puzzles, treasure-hunt riddles. Players complete tasks through observation, memory and logical reasoning with simple rules and broad audience appeal; image manipulation strengthens visual memory of cultural patterns.

3. Simulated Craft Games: Gesture drawing, drag-and-drop simulation, virtual production, workflow reproduction. These replicate real-life physical motions through touchscreen presses, swipes and drags to deliver immersive experiential value.

4. Creative Creation Games: Line art coloring, pattern collage, free graffiti, element dress-up, custom poster design. Users gain independent creative authority to freely match colors and graphics and generate exclusive works, with one-click sharing built-in for strong viral social attributes.

5. Trivia & Personality Test Games: Knowledge quizzes, personality assessments, fortune drawing, stamp collection check-ins. Questions and selections output cultural knowledge, generating exclusive result posters for lightweight interaction and fast social diffusion.

4.2 Construction of Wuhan Paper-Cutting H5 Mini-Games Based on Three-Tier Cultural Elements

The three-tier division of Wuhan paper-cut culture (narrative, craft, visual layers) does not separate independent segmented game modules splitting storytelling, craft teaching and creation into disconnected gameplay segments. Instead, it sorts the internal cultural logic of Wuhan paper-cutting to integrate narrative, craft and visual elements into a cohesive immersive gaming experience along a single linear storyline(Zhou & Kong, 2023).

(1) Build immersive situational context via the narrative layer and define player identity. The game adopts a first-person perspective, framing players as young apprentices travelling to old Hankou to learn paper-cutting from folk artisans. Animated paper-cut visuals construct scenes of old Hankou residential courtyards, docks and East Lake villages, paired with dynamic illustrations, text dialogue and Wuhan dialect voiceover to establish story context. The elder craftsman assigns sequential crafting quests: designing blessing merchant ship patterns for dock rituals, Han opera facial mask window decorations, and lotus fishing cutouts. Narrative context defines subsequent crafting objectives, framing hands-on interaction as plot tasks and endowing craft operations with coherent narrative logic.

(2) Embed craft-layer interactive segments at narrative plot milestones. When storylines progress to scenes of artisans selecting red paper, drafting patterns and cutting artwork, interactive modes activate within the original scene without switching to independent workshop interfaces to preserve visual unity. Completing corresponding paper-cut craft interactions

becomes a prerequisite for advancing the narrative. Players sequentially simulate paper folding, line tracing, hollow carving and contour trimming to fully replicate authentic paper-cut workflows. Craft segments are embedded organically within story progression, integrating craft experience and narrative rhythm.

(3) Generate personalized visual-layer artworks derived from craft interaction outcomes. Player operations during craft segments—including curve tracing angles, hollow-out area selection and folding deviations—alter details of the final paper-cut artwork to produce unique personalized patterns. This visual creation integrates into story endings: cutouts are pasted onto courtyard windows, hung on dock ship bows, or displayed on opera stages, turning creative outputs into integral plot components. Custom posters combining generated paper-cut patterns, thematic text and decorative borders are automatically rendered upon completion.

(4) Export visual artworks to realize community communication. Save and one-click share functions are added on the game ending page, allowing users to distribute personalized paper-cut posters to WeChat Moments and other social platforms. ICH cultural experience extends beyond H5 game boundaries, expanding the communication reach of Wuhan paper-cutting through user-generated visual works(Wu, 2020).

4.3 Construction of a Gamified ICH H5 Communication Paradigm

Through the complete design and practice of Wuhan paper-cutting ICH H5 mini-games, this paper summarizes integrated fusion logic for the narrative, craft and visual cultural layers of ICH, embedding all three tiers within a single immersive experience storyline to build a universal design paradigm applicable to lightweight H5 mini-games for all varieties of ICH. This paradigm resolves the fragmented design flaws of traditional ICH H5 products that isolate storytelling, gameplay and creation, forming a closed loop of situational experience, craft interaction and visual output with strong cross-category adaptability for handcrafts, folk customs, traditional opera and cultural artifact H5 design(Tang & Zhao, 2020).

Within this universal paradigm, the narrative, craft and visual layers perform distinct, progressive design functions:

First, the narrative layer delivers immersive cultural context. Drawing on ICH origin history, regional folk culture and legends to construct scenario environments, it establishes player identities and quest objectives, eliminating empty, mechanical interactive experiences by grounding gameplay within authentic cultural context.

Second, the craft layer forms the core interactive experience. Traditional ICH production workflows, technical rules and craft logic are transformed into lightweight touchscreen interactive mechanics embedded within key narrative milestones. Players must complete craft interaction tasks to continue story progression, achieving immersive cultural learning through in-story craft practice and hands-on operation.

Third, the visual layer enables personalized creative output and new media communication. Individualized player operations during craft segments directly shape the visual style and details of final ICH artworks. The system generates unique heritage visuals integrated into story endings to produce shareable cultural creative posters, enabling secondary social propagation of ICH culture.

Based on the integrated logic of three cultural layers, this paper extracts a universal design workflow for ICH H5 mini-games: Situational Narrative Setup → Craft Interaction at Plot Milestones → Personalized Visual Artwork Generation → Social Communication Output. Abandoning fragmented, segmented design of traditional ICH H5 products, this workflow fully integrates cultural storytelling, craft experience and visual creation within a single linear gameplay experience. The paradigm features flexible adaptability: designers adjust narrative length, craft interaction difficulty and creative freedom to derive light popular science, aesthetic

education, cultural creative communication, and fully immersive ICH H5 mini-game types, greatly improving the reusability and diversity of digital ICH design.

5. Conclusions

Against the backdrop of prevailing dilemmas in the digital communication of intangible cultural heritage (ICH), including diluted cultural connotations, low audience engagement, and weakened regional characteristics caused by mass AI-generated content, this paper takes gamification thinking and lightweight interactive HTML5 technology as its research entry points and selects Wuhan Paper-Cutting as an empirical case. It systematically deconstructs the three-tier cultural elements of Wuhan Paper-Cutting, namely the narrative layer, craft layer and visual layer, sorts out mainstream lightweight H5 mini-games available on the market, explores the integration paths between ICH cultural elements and various gameplay mechanisms, and finally proposes a transferable and reusable integrated design paradigm for gamified ICH-themed H5 works. This research attempts to deliver a complete practical framework for youth-oriented social communication of traditional handicrafts and various categories of intangible cultural heritage.

The core argument of this paper holds that simply relying on visual presentation or one-way knowledge output cannot break the communication bottleneck of ICH. Instead, gamification incentive mechanisms should be integrated with the strengths of H5 media, embedding the complete cultural system of ICH into immersive interactive processes. Digital design for ICH must abandon the fragmented model that separates storytelling, operational experience and user creation. The narrative layer constructs cultural contexts, the craft layer serves as the core of interaction, and the visual layer undertakes personalized output and social communication. The progressive integration of these three tiers of cultural elements forms a closed-loop experience. On this basis, the participation threshold for young audiences can be lowered, users' willingness to experience independently, create original works and share content on social platforms can be stimulated, thereby realizing sustainable youth-oriented communication of ICH while fully preserving its intrinsic cultural essence.

This research has yielded four major core achievements. First, it sorts out three prominent practical shortcomings in the current digital communication of ICH, and clarifies the internal logic and media advantages of applying gamification thinking and H5 technology to ICH dissemination. Second, it deconstructs the cultural system of Wuhan Paper-Cutting and establishes a complete three-tier framework of narrative, craft and visual cultural elements, offering a standardized cultural decomposition framework for the digital transformation of ICH. Third, it categorizes mainstream lightweight H5 mini-games into five types, demonstrates the integrated design of three-tier cultural elements and gameplay with the case of Wuhan Paper-Cutting, and forms a fully implementable design roadmap. Fourth, it extracts a universal integrated design paradigm following the workflow of "contextual narrative setup – craft interaction embedded in plot nodes – generation of personalized visual works – output for social communication". This paradigm addresses the defects of conventional ICH H5 products, such as prioritizing superficial forms over cultural connotations and lacking regional uniqueness due to templated production. Applicable to traditional handicrafts including paper-cutting and embroidery, it effectively lowers the design and development barriers of digital interactive ICH products.

This study has certain limitations. Its empirical case only focuses on handicraft-type ICH, and the adaptive details of the proposed paradigm for other distinct ICH categories such as folk operas, folk customs and traditional Chinese medicine have not been fully verified. Future research can be further deepened in three directions. Firstly, expand the sample of ICH cases, adjust modular settings of the paradigm for diverse ICH types, and refine targeted adaptation

rules. Secondly, combine emerging technologies including AIGC and virtual reality to optimize H5 interactive forms and enrich gamification incentive mechanisms for a stronger immersive experience. Thirdly, conduct empirical user surveys to collect feedback from young audiences for iterative optimization of design workflows, so as to improve the operability and communication effects of the paradigm. In addition, researchers may cooperate with cultural tourism institutions and ICH inheritors to launch practical projects, testing and refining this gamified H5 communication framework with real communication data, and continuously advancing the long-term digital inheritance of China' s outstanding intangible cultural heritage.

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