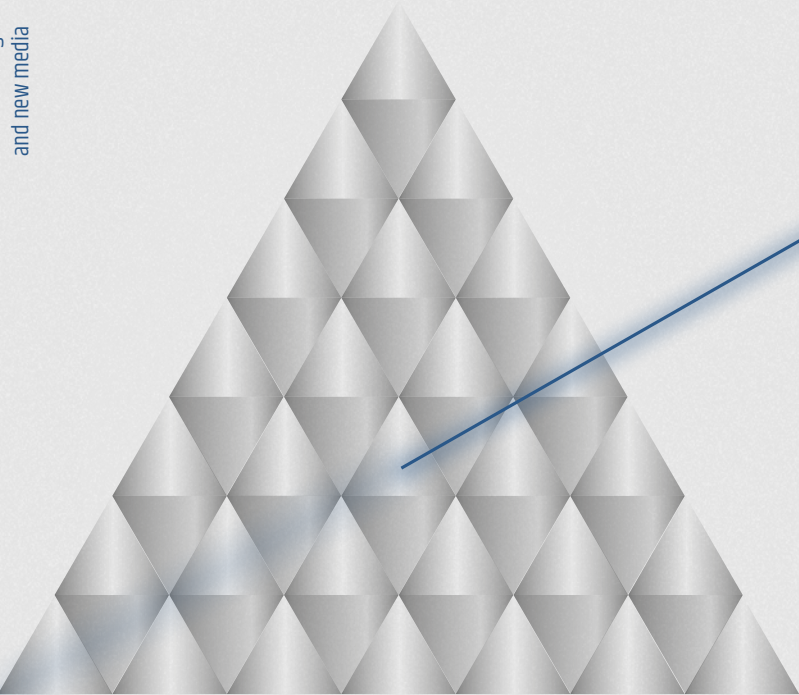


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scientific magazine on graphic design
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Dear Readers!

We are pleased to present the 10th issue of the academic magazine *dsignn*, devoted to papers presented at the international C-IDEA PhD Forum 2025, an event bringing together academic and design communities from around the world. The articles published in this issue reflect a wide range of contemporary research in design, visual communication, new media art, and the relationships between technology, culture, and society. The authors explore, among other topics, the influence of Pop Art on contemporary graphic design, the use of artificial intelligence in art education and cultural heritage preservation, new technologies in street art, the digital reconstruction of cultural heritage, information visualization, and co-design as a tool for supporting the development of local communities.

A common thread running through these studies is the search for new ways of interpreting, preserving, and communicating culture through contemporary design tools. Particular attention is given to the development of digital technologies and artificial intelligence, as well as to the preservation of local identity, the responsibility of the designer, and the social dimension of the design process.

This issue also marks a special milestone for our editorial team — it is already the 10th issue of *dsignn*! We would like to take this opportunity to thank the authors, reviewers, and everyone involved in preparing this and previous issues. We also extend our sincere thanks to you, our Readers, for your interest in the magazine, your continued presence, and for accompanying us through each successive issue.

Enjoy reading!

Dsignn Editorial Team

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C-IDEA PhD Forum (3/3)

The first International PhD Forum organized by the C-IDEA Association was successfully held from 22 to 24 October 2025 in a hybrid format, with simultaneous sessions hosted at Miami Ad School Berlin, Germany, and Shih Chien University (Kaohsiung Campus) in Taiwan, China. The event was co-organized by the C-IDEA Association, the Australian Research Centre for Virtual and Interactive Environment (IVE), and the Polish academic journal *dsign*, attracting active participation from scholars and researchers across the globe.

The forum was co-chaired by **David Blaiklock**, **Li Xu**, and **Chang Fangpang**. An esteemed international review panel, comprising eight experts, provided academic evaluation and guidance. The panel included **Prof. Ning Gu** (Adelaide University), **Prof. Robert Jundo** (Strzeminski Academy of Fine Arts in Łódź, Poland), **Prof. Hyungjoo A. Kim** (Purdue University, USA), **Prof. Andreas Ken Lanig** (Head of Design and Media Department, Nordhessen University of Applied Sciences, Germany), **Prof. Lisa Winstanley** (Nanyang Technological University, Singapore), **Prof. Jiang Jie** (Nanjing University of the Arts, China), **Prof. Anna Rita Emili** (School of Architecture and Design “E. Vittoria”, University of Camerino, Italy), and **Dr. Anna Klos** (Director, WIT & Retroavanguardia Gallery, Poland).

Prof. Ning Gu of the Adelaide University served as the Forum Chair. Distinguished guests, including C-IDEA Association President David Blaiklock and University of South Australia’s Dan Mclean, contributed as commentators, providing valuable feedback on the presentations.

The forum brought together doctoral candidates and early-career researchers from 15 institutions across seven countries, including China, Slovenia,

Georgia, and Serbia, who presented their research findings either online or on-site. The presented papers centered around three cutting-edge areas:

- **Technology and Tradition:** Research demonstrated the application of digital tools like AI image generation and cellular automata algorithms to analyze historical elements such as Ming dynasty clothing symbols and street art, establishing methodological frameworks for the visual reconstruction of cultural semantics.
- **Social Innovation:** Studies focused on design empowerment, exploring co-design approaches to foster rural revitalization by strengthening farmer agency and developing ethical UX frameworks tailored for early-career craft practitioners.
- **Cultural Identity:** Explorations in this domain were multifaceted, ranging from constructing urban imagery for the Hangzhou Asian Games to comparative analyses of Eastern and Western narrative paradigms, thereby deepening the philosophical discourse on local design identity within a globalized context.

Since its establishment in 2018, the C-IDEA International Alliance of Art and Design Universities & Educators has grown into a significant international association, now comprising 147 member institutions from over 35 countries, including many of the world’s leading art and design colleges. Operating as a non-profit organization, C-IDEA is dedicated to fostering exchange and collaboration in teaching, research, and practice among international design institutions, actively contributing to the advancement of global design education. ■



Keywords: #pop art #graphic design #semiotics #cultural communication #localized development

The Integration and Development of **Pop Art Elements** in **Modern** **Graphic Design**



Zhang Meng, PhD

This article is based on the presentation delivered at the C-IDEA Design Conference, held on 23-26 October 2025 at Shih Chien University, Kaohsiung Campus, Taiwan, China.



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← Fig. 1 Andy Warhol, Campbell's Soup Cans

Source: Guangming Daily, "Campbell's Soup Cans", Guangming Online. Retrieved October 22, 2025, from https://epaper.gmw.cn/gmrb/html/2016-08/08/nw.D110000gmrb_20160808_2-15.htm

Abstract

As a significant art movement that emerged in the mid-20th century, Pop Art, with its mass-oriented, reproducible, and ironic visual characteristics, has profoundly influenced the aesthetic logic and communicative strategies of modern graphic design. This paper focuses on the integration and development of Pop Art elements in contemporary graphic design, aiming to explore how Pop Art visual symbols are reconstructed, reinterpreted, and applied in cross-cultural design contexts. The study addresses three primary research questions: (1) how the visual symbol system of Pop Art is transformed into the language of modern graphic design; (2) what localized development features emerge from this transformation within the Chinese context; and (3) how Pop Art achieves the dual integration of aesthetic and commercial value within the global visual communication system. The research scope covers the dissemination and evolution of Pop Art in the United Kingdom, the United States, and China. By combining semiotic and cultural studies frameworks, the study analyzes representative artists' works and graphic design cases. The findings indicate that Pop Art, through the reproduction of image symbols and the transposition of cultural contexts, has facilitated a shift in graphic design from "artistic expression" to "cultural communication". Its visual language not only enriches the aesthetic dimensions of contemporary design but also provides new analytical perspectives on the interaction between design and social ideology. The academic contribution of this paper lies in constructing a semiotic model linking Pop Art and graphic design, revealing the cross-cultural generation mechanisms of Pop Art visual symbols and their re-semantization in contemporary design contexts.

1. Introduction

1.1. "Pop Art"

"Pop Art" was first proposed in 1954 by the British art critic Lawrence Alloway, who used the term to refer to popular cultural art produced and disseminated by mass media [1]. In the 1960s, Pop Art ignited a spark in the United Kingdom, and with the promotion of artists such as Andy Warhol, it rapidly spread and flourished in the United States. Pop Art emphasized everyday life and consumer culture, employing artistic techniques such as deconstruction and recomposition, mass reproduction, cutting, and collage. Through these methods, it reflected the worldview, life perspective, and values of the postwar younger generation, particularly their advocacy of individual subjectivity (Fig. 1).

The most representative summary of Pop Art was provided by the British painter Richard Hamilton, who described it as "popular (designed for the masses), transient (short-term), forgettable, inexpensive, mass-produced, youthful (targeted at young people), glamorous, sexy, gimmicky, attractive, and industrial in scale" [2]. Pop style is characterized by diversity, mass appeal, replication, and popular taste. It presents both the surface and essence of consumer culture from the perspective of the general public, thereby mitigating the exclusion of popular culture by elite culture.

1.2. Semiotics of Pop Art

This flowchart (Fig. 2) articulates a semiotic analytical framework for Pop Art visual symbols, disentangling the dialectics of symbolic production, signification, and cultural circulation through a two-tiered structure rooted in structuralist and post-structuralist semiotic theories.

In the "Symbol Source & Initial Transformation" phase, Pop Art appropriates raw signifiers from three domains: "daily objects" (e.g., Warhol's Campbell's soup cans, emblematic of consumerist ubiquity), "political icons" (e.g., revolutionary portraits, indexing ideological symbolism), and "pop culture signs" (e.g., Coca-Cola logos, signifying capitalist commodification). These sources undergo artistic manipulation via techniques like "exaggeration" (amplifying

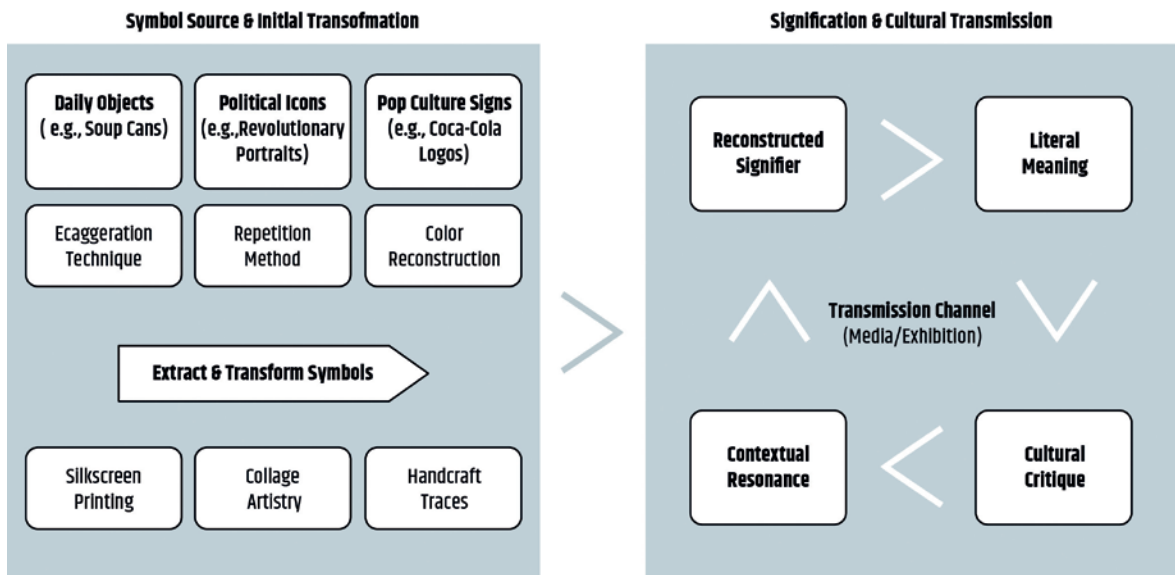


Fig. 2 Flowchart for Semiotic Analysis of Pop Art Visual Symbols. Source: Own study.

visual salience to rupture habitual perception), “repetition” (mimicking mass production’s logic to critique industrial hegemony), and “color reconstruction” (reconfiguring hues to subvert conventional symbolic associations). Material and technical interventions – such as “silkscreen printing” (blurring artisanal uniqueness to mirror mechanical reproduction), “collage artistry” (fragmenting and reassembling signs to destabilize unified meaning), and “handcraft traces” (preserving tactile specificity amid industrial mimicry) – further mediate the transition from “raw cultural symbols” to “artistically reconstructed signifiers”.

The “Signification & Cultural Transmission” phase unfolds the polysemic layers of these reconstructed signifiers. Initially, they generate “literal meaning” (e.g., a soup can signifying a consumer good), but their semiotic work extends to “cultural critique” – Warhol’s repetitive soup cans, for instance, denaturalize consumerism’s ideological interpellation. This dual signification circulates via “transmission channels” (exhibitions, mass media) and acquires “contextual resonance”, as symbols interface with specific historical – political milieus (e.g., Chinese Political Pop’s engagement with socialist – era visuality). Critically, this resonance

retroactively shapes how reconstructed signifiers are interpreted, creating a feedback loop between symbolic form and cultural context that underpins Pop Art’s ideological efficacy.

2. The Development of Pop Art in Chinese Graphic Design

In China, Pop Art is generally mentioned within the context of design history, yet its coverage remains relatively limited. For example, in works such as *Design Art History* by Zhou Rui, Fan Shengxi, and Wu Duan, and *History of Modern World Design* by Wang Shouzhi, Pop Art is discussed primarily as an artistic movement. As a result, these studies tend to focus more on its origins and development, while offering relatively limited analysis of specific works [3].

2.1. “Calendar Posters”

The Early Stage of Pop Art in China: With the continuous advancement of printing technology, traditional Chinese New Year paintings gradually integrated Western painting techniques, giving rise to a form of commercial art. The subject matter primarily focused on urban life and fashionable women, aligning with the interests and tastes of the urban public (Fig. 3).



Fig. 3 Calendar of Zhaojun by Ding Peng

Source: People's Daily Online. (n.d.). Calendar Posters: Soft Pop Art Beyond Exaggeration and Gaudiness. Art Collection. Retrieved October 22, 2025, from <http://art.people.com.cn/n/2014/0326/c206244-24737155-2.html>

2.2. Chinese Pop Art in the 1960s-1970s

During the era of rampant far-left ideology in China, artworks emphasizing exemplary or heroic figures emerged, known as the “Red, Bright, and Glorious” works. These included portraits of the Chairman, as well as New Year prints and propaganda posters depicting heroic figures, revolutionary themes, and celebrations of the revolutionary activities of ordinary people.

This flowchart (Fig. 4) delineates the production, transformation, and circulation of Political Pop Art within post-socialist contexts, situating the genre as a mediating apparatus between socialist heritage, marketization, and digital culture – an analytical framework informed by cultural studies and theories of post-socialist transition.

Phase 1: Symbol Extraction – anchors the genre in dual genealogies: “socialist visuals” (red/yellow tonalities, revolutionary icons) emblematic of planned-economy ideological apparatus, and “commercial/pop culture signs” indexing market-era commodification. This “material collection” stage enacts a dialectical appropriation of historical symbols and emergent consumerist image-

ry, laying the groundwork for critical intervention.

Phase 2: Artistic Transformation – operationalizes this appropriation via “fusion strategies” (e.g., juxtaposing Cultural Revolution portraits with Coca-Cola logos, as in Wang Guangyi’s “Great Criticism” series) and “visual reconstruction” (reframing socialist aesthetics through Pop Art’s flatness, repetition, and high-saturation palettes). The resultant “transformed artworks” collapse the ideological distance between socialist heritage and capitalist modernity, rendering their contradiction visible as aesthetic form.

Phase 3: Context & Evolution – unpacks the socio-cultural conditions shaping Political Pop’s meaning. “Post-socialist context” is defined by the tension between “planned economy legacy” (enduring socialist symbolic regimes) and “market culture impact”. This tension precipitates a “cultural meaning shift” Political Pop evolves from a critical apparatus (deconstructing ideological/political narratives) into “an identity symbol” while navigating “commercialization trends”.

Phase 4: Contemporary Application – illustrates the genre’s afterlife in digital media, “brand collaborations” and as a “cultural identity symbol”. Here, Political Pop transcends avant-garde critique, functioning as a flexible symbolic repertoire for negotiating post-socialist subjectivities.

2.3. New Wave Art and the Pre-Pop Phase

Pop Art in China began with the “85 New Wave Art” movement. However, at that time, it prima-

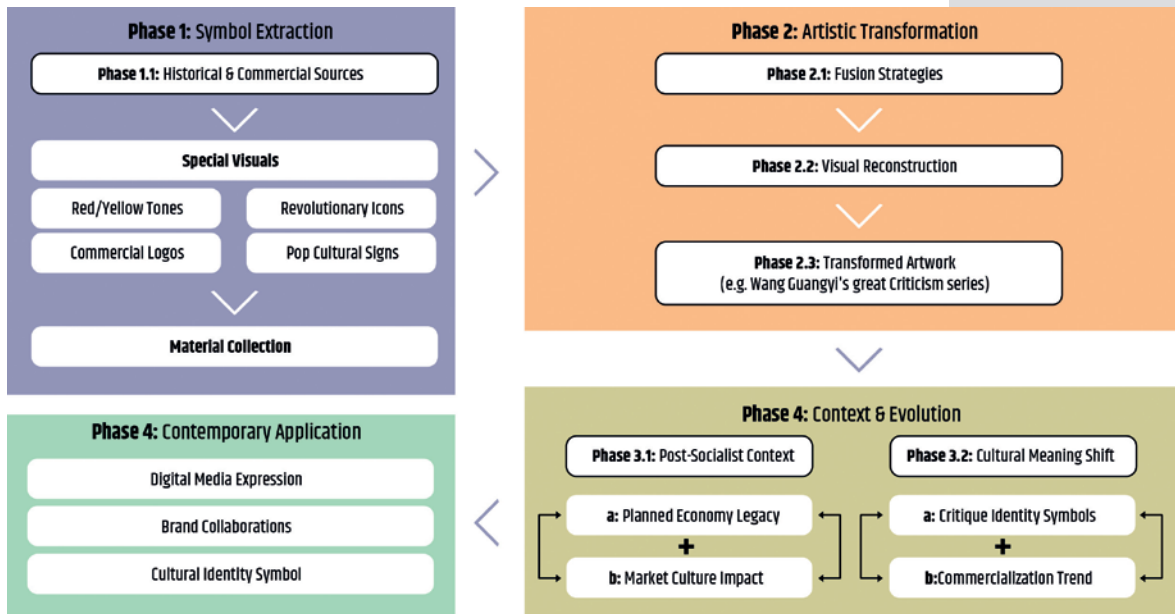


Fig. 4 Flowchart for Political Pop Art in Post-Socialist Context. Source: Own study.

rily served as a means of borrowing from Western practices. Due to the absence of a fully developed mass culture as its foundation, this period is often referred to as the “pre-Pop stage” [4]. It continued the values established since the 1919 May Fourth New Culture Movement, with a core emphasis on the consistency between practical rationality and humanism. This was mainly reflected in the rejection of traditional culture and its conventions, coupled with the incorporation of Western modern art. By using individual consciousness to critique collective consciousness, it transformed limited social criticism into universal and radical cultural critique, seeking elite cultural themes centered on heroism.

Ren Jian’s Stamp Collection series transforms the patterns of national flags into postage stamps. As flags conventionally represent nations to the public, this approach resonates with the visual practices of artists such as Kandinsky, Malevich, and Reinhardt (Fig. 5). Wang Guangyi’s Great Criticism – Coca-Cola employs the standard poses of the Cultural Revolution and a red, yellow, and blue primary color scheme, reflecting a distinctly Pop-oriented political aesthetic (Fig. 6).

In 1985, Robert Rauschenberg’s visit to Mainland China ushered in a new chapter for Pop Art in the country, with representative figures including Wu Shanzhuan, Gu Wenda, and Xu Bing. Wu Shanzhuan’s Red Humor series features rooms

covered with big-character posters, employing repeated red, black, and white motifs to emphasize the overwhelming force of red. Disconnected textual elements create a symbolic illusion, focusing on the intrinsic meaning of the “Cultural Revolution”, namely the deeper reality of a “cultural deficit” (Fig. 7). Gu Wenda’s text-based series similarly exposes the destruction of traditional cultural systems during the Cultural Revolution, demonstrating a heightened level of perceptiveness and composure. Works such as Positive and Negative Characters and Dislocation integrate Chinese ink painting with Western surrealist styles, producing a chaotic and disjointed interplay of text and semantics, thereby enriching the multiplicity of meaning within the written characters (Fig. 8). Xu Bing’s Book from the Sky (Xishi Jian) created thousands of invented “Chinese characters”, using movable type printing to produce scrolls hundreds of meters long and several thread-bound “Heavenly Books”. Inspired by the traditional Chinese movable type printing technique, this conceptual installation caused a sensation in the art world upon its debut (Fig. 9).

2.4. The Emergence of the Pop Fever

After the “85 New Wave” movement, Pop Art in China entered a new phase of development.

Hubei Pop – characterized as accessible and widely comprehensible popular art – emerged as



Fig. 5 Philately by Ren Jian.

Source: Sina Collection. (n.d.). Poly Spring Auction: Early Chinese Avant-Garde Art – Metaphysical Visual Allegory | Yan Li | Marco Lu | Ma Shuqing. Retrieved October 22, 2025, from <https://collection.sina.com.cn/auction/pmgg/2019-05-15/doc-ihvhw1995252.shtml>

a product of the interplay among contemporary culture, global visual information, and market mechanisms.

Political Pop – Political Pop became one of the most significant phenomena in Chinese avant-garde art of the 1990s [5]. Chinese political imagery and symbols drew widespread attention and, under the influence of the market, gave rise to numerous derivative forms. Oil painters reconstructed fragments of Chinese history and politics to create images imbued with the characteristics of the era, which came to visually define Political Pop.

Kitsch Art (Post-Pop) – Kitsch art attenuates political content, emphasizes national style, and straightforwardly applies and reorganizes Sinitized visual symbols. This distinguishes it from traditional Pop Art.



Fig. 6 Mass Criticism by Wang Guangyi.

Source: Hunan Tan Guobin Contemporary Art Museum. (n.d.). News & Information. Retrieved October 22, 2025, from https://tcam.artron.net/index.php/articles_models/index_a/1606

3. Development of Pop Art in Foreign Graphic Design

3.1. Collage

The first Pop collage by the founder of Pop Art, the British artist Richard Hamilton, *Just what is it that makes today's homes so different, so appealing?* (Fig. 10), presents material life in an accessible and straightforward manner. The muscular male figure symbolizes the consumer in a commercial society, holding a giant lollipop inscribed with the word "POP". Surrounding him are images of a voluptuous nude woman, an avant-garde jazz singer, and modern household appliances such as a vacuum cleaner, record player, tape recorder, and refrigerator – all emblematic of the quality of life in contemporary urban culture. The ceiling depicts the lunar landscape, while through the window one glimpses a bustling street scene. Altogether, the work encapsulates the essence of popular culture and consumer civilization. By appropriating popular symbols of everyday life, Hamilton critiques the dominance of traditional modernism. Although the image appears vibrant and alluring, it simultaneously evokes a sense of frustration and disillusionment [6].



Fig. 7 Red Humor by Wu Shanzhuan.
Source: Artron Art Network. (n.d.).
Wu Shanzhuan (But Still Red), International Red Humor and Inga Svala Thorsdottir — Thor's Daughter Pinkification Service — Exhibition. Retrieved October 22, 2025, from <https://contemporary.artron.net/exhibitDetail.php?ShowCode=5325>



Fig. 8 Character of Zheng Fan by Gu Wenda.
Source: Sina Shangpin. (n.d.). Putting Art History into the Washing Machine (2). Retrieved October 22, 2025, from <https://style.sina.com.cn/news/2009-02-04/122933105.shtml>



Fig. 9 Xishi Jian by Xu Bing.
Source: Sina News. (n.d.). Xu Bing, born in 1955 in Chongqing, Contemporary Artist, Representative Work: "Book from the Sky" | Book from the Sky | Artist | Birth. Retrieved October 22, 2025, from https://k.sina.com.cn/article_2146892831_7ff6fc1f0400169ta.html





Fig. 10 Just what is it that makes today's homes so different, so appealing? by Richard Hamilton.
Source: Sina Collection. (n.d.). Richard Hamilton: The Father of Pop Art Who Transcended Pop. Retrieved October 22, 2025, from <https://collection.sina.com.cn/jczs/2018-10-11/doc-ihmhafiq8753286.shtml>

→
Fig. 11 Untitled. China by Rauschenberg.
Source: China Graphic Design Online. (n.d.). Life Is Art – Exploring Robert Rauschenberg's "Mixed Media Art". Retrieved October 22, 2025, from https://www.dolcn.com/data/cns_1/article_31/paper_311/pgra_3112/2011-04/1301906122.html



←
Fig. 12 Pear Road by David Hockney.
Source: HiArt – Contemporary Art Information Expert. (n.d.). David Hockney: Ways of Seeing. Retrieved October 22, 2025, from <http://www.hiart.cn/feature/detail/d21fquo.html>



↑
Fig. 13 Andy Warhol, Marilyn Monroe, Screen Print, each 91.4 × 91.4 cm, 1967. Source: Sina Collection. "Andy Warhol Reproduced Marilyn Monroe — Who Made Whom Famous?" Retrieved October 22, 2025, from <https://m.allhistory.com/ah/article/5eb3a0b1d47fa200011513db>



↑ **Fig. 14** Hollow Figures by Keith Haring. Source: Art Archives. (n.d.). Keith Haring — International Artist Database · Biography. Retrieved October 22, 2025, from <https://www.artda.cn/yishujiakuguowai-c-312.html>



→ **Fig. 15** Masterpiece by Roy Lichtenstein, 1962, glazed color offset print, 137 × 137 cm, private collection. Source: <https://www.roylichtenstein.com/masterpiece.jsp>



Fig. 16 Jeff Koons, Balloon Dog.

Source: Design Zhiyou. (n.d.). Jeff Koons: The Intersection of Art and Commerce. Retrieved October 22, 2025, from <https://www.ucppt.com/culture/6306>

Cubist collage art originated with Picasso, who was inspired by the layers of posters pasted on the streets of Paris. He began attaching real objects to the surface of his paintings, thereby constructing a three-dimensional spatial effect that broke away from the conventions of traditional easel painting.

The American Pop artist Robert Rauschenberg, in one of his installation works, symmetrically arranged two yellow oilcloth umbrellas with an upright American flag. This composition evoked the solemn and austere atmosphere of cultural constraint, while simultaneously hinting at the voyeuristic curiosity of the public. It further expressed the supreme authority of imperial power in China, as well as the reverence and anxiety it instilled in the people (Fig. 11).

Collage artist Eugenia Loli employs original photographic techniques in combination with scanned newspapers and magazines to create a form of Pop Art infused with Dadaist and Surrealist qualities. David Hockney's photographic collages, on the other hand, generate striking visual effects through

the use of overlapping, displacement, and shifting perspectives, merging singular and multiple viewpoints within the same composition (Fig. 12).

3.2. Illustration, Posters, and Placards

Marcel Duchamp's "readymade" art was the first to introduce the concept of "appropriation". Building on this, Andy Warhol employed strategies of "reproduction" with various symbols of contemporary popular culture, most notably through the medium of silkscreen printing. His 1962 poster Campbell's Soup Cans replicated red-and-white soup cans in serial fashion, creating a strong sense of compositional order through uniformity of tone, texture, and arrangement, generating a rhythmic visual impact. In Marilyn Monroe (1967), the repetition of a single motif in varying colors produced the effect of a multicolored filmstrip, expressing a state of helplessness and disorientation within a society dominated by commercial interests (Fig. 13). Unlike other Pop artists, Warhol eliminated manual craftsmanship in his



Fig. 17 Pumpkin by Yayoi Kusama, 1998–2000, various materials, dimensions variable. Source: Exhibition Review | Yayoi Kusama: I Saw a Bouquet of Love in the Universe. (n.d.). Retrieved October 22, 2025, from <https://m.thepaper.cn/uc.jsp?contid=12856144>

work almost entirely, relying instead on printmaking techniques that directly transferred photographic images onto canvas [7].

American Neo-Pop artist Keith Haring employed abstract human figures in his work, characterized by bold, simplified lines, vibrant colors, and childlike abstractions of movement that strike directly at the depths of the viewer's psyche (Fig. 14). Similarly, American Pop artist Roy Lichtenstein pursued a democratized sense of self-



Fig. 18 Sunflower by Takashi Murakami. Source: Fanshu Dang, The Paper. (n.d.). Takashi Murakami & Yayoi Kusama: Two Japanese Contemporary Artists Engaging with Commerce. Retrieved October 22, 2025, from https://www.thepaper.cn/newsDetail_forward_3294305

f-expression, making extensive use of Ben-Day dots. By altering content, restructuring compositions, and expanding textual captions into the imagery itself, he transformed his works into a form reminiscent of comic strips (Fig. 15).

Source: Sina Collection. (n.d.). Even if You've Never Heard of Him, You Can Still Recognize His Paintings — The Comic-Style Works of Roy Lichtenstein. Retrieved October 22, 2025, from https://roll.sohu.com/a/659835414_347478

3.3. Packaging and Installation

Product packaging design encompasses three core elements: logos, typography, and graphics. A well-balanced integration of these components not only establishes a strong product identity but also stimulates consumer curiosity and interest. Pop-style packaging design is most prominently reflected in cigarette packaging, cosmetics, apparel, and, in its earlier stages, a limited range of electronic products [8].

The packaging design of Coca-Cola bottles features bold colors and highly decorative graphics, producing a sense of visual pleasure. Other examples, such as CottonPop Pop socks and the ZATA series packaging, illustrate the practical application of Pop Art symbols. Neo-Pop artist Jeff Koons enlarged everyday objects to create monumental sculptures, most notably Balloon Dog, a mirror-polished stainless steel work measuring three meters in height and weighing one ton (Fig. 16). Inspired by balloon toy dogs, its smooth surface, massive scale, and dazzling colors symbolize childhood innocence and hope. The work exists in five versions: orange, blue, magenta, gold, and red. Koons's broader oeuvre features imaginative popular imagery characterized by the extreme spectacle of consumer aesthetics, the deployment of kitsch as a critical tool, the allure of technological reproduction, the collusion of

Fig. 19 Silhouette, TBWA\Chiat\Day
(TBWA\C\D).

Source: MBA Knowledge Base. (n.d.). Case Study: Apple iPod Silhouette Campaign. Retrieved October 22, 2025, from <https://www.huxiu.com/article/552599.html>



capital and art, and postmodern allegories of desire. Similarly, Yayoi Kusama's thousands of repeated polka dots reflect a personal process of self-redemption and a means of communicating with the world (Fig. 17). Japanese contemporary artist Takashi Murakami transformed his "Superflat" theory into a signature style of anime-inspired art, collaborating with designers such as Issey Miyake and Louis Vuitton. In his work *Sunflower*, the anthropomorphized flowers smile playfully and mysteriously, depicting a reality without a central focus – a weightless environment. The densely clustered smiling flowers symbolize the highly collective nature of Japanese society, while their bright colors and joyful expressions convey a sweet longing detached from reality (Fig. 18). From Andy Warhol's *Campbell's Soup Cans* to Takashi Murakami's *Sunflower*, screen printing has not only witnessed the course of art history but has also served as an ultimate medium through which leading artists express their conceptual visions.

4. Application of Pop Art in Contemporary Flat Design

4.1. Contrast and Integration between Pop Art and Minimalism

4.1.1. Harmony of Color

The high-saturation primary colors commonly used in Pop Art – such as red, yellow, and blue – can be combined with the monochromatic or subdued grayscale backgrounds of Minimalism to create strong visual contrast. This approach preserves visual tension while avoiding excessive complexity. For example, Apple Inc. has employed simple white or black backgrounds in certain advertisements and product promotional posters to highlight core products, while simultaneously adding bright Pop Art-style color accents to create focal points. This strategy effectively merges Minimalism's "negative space" with Pop Art's "co-

lor explosion", enabling products to retain visual vitality within a minimalist framework.

The Silhouette campaign not only won TBWA\Chiat\Day the Global Effie Award from the American Marketing Association and the Kelly Award from the Magazine Publishers of America, but the agency was also nominated by Adweek as the 2004 U.S. Agency of the Year. Although early analyst predictions for iPod sales estimated \$400 million, product enhancements and the Silhouette campaign helped Apple achieve an astonishing \$1.2 billion in net sales in the first quarter of 2005 alone. While the iPod's market share declined from 92% in October 2004 to 87% in March 2005, demand still exceeded supply (Fig. 19).

4.1.2. Simplification of Information Transmission

In information delivery, Minimalism helps reduce distractions, allowing core messages to be presented intuitively, while Pop Art can create memorable visual points within limited space. For example, in the early global advertisements of Japan's UNIQLO, the overall layout was extremely simple, featuring geometric negative space and concise typography. However, the visuals often included high-saturation color blocks or Pop-style graphic symbols to reinforce the brand's youthful and energetic image. This approach ensured efficient information transmission while generating strong visual memory cues through Pop Art elements.

In China, Alibaba's Tmall has also combined the two styles in its large-scale "Double Eleven" promotional campaigns. The background and

textual components followed Minimalism's straightforward layout and logical clarity, whereas the promotional themes employed Pop Art—style explosive colors and dynamic symbols to enhance the festive atmosphere. This combination of “simplicity and exaggeration” successfully achieved the dual goals of clear information delivery and immersive visual experience.

4.2. Integration of Pop Art and Flat Design

4.2.1. Comparative Table of Pop Art and Flat Design Characteristics

Table 1 systematically compares the core characteristics of Pop Art and Flat Design across five dimensions, elucidating their differences in aesthetic logic, technical foundations, and cultural orientation.

Visual Elements

Pop Art absorbs mass culture through exaggerated everyday symbols, collage, and repetition, deconstructing the visual imagery of consumer society to critique its pervasive commercial logic. In contrast, Flat Design employs minimalist icons and geometric shapes, prioritizing visual clarity and immediate recognizability in digital interfaces.

Color Usage

Pop Art utilizes highly saturated primary colors and strong contrasts, reflecting the visual impact of industrial production while metaphorically alluding to the sensory dominance of consumerism. Flat Design, on the other hand, relies on bright, bold color blocks and simplified palettes to optimize readability and ensure cross-platform consistency in digital media.

Technical Characteristics

The differences are further highlighted by technical features. Pop Art's silkscreen printing, mass reproduction, and traces of handcraft embody Walter Benjamin's theory of “mechanical reproduction”, balancing industrial imitation with artistic authenticity. Flat Design is based on vector graphics, clean lines, and flat layers, relying entirely on digital production logic to achieve efficient, streamlined visual output in screen-based media.

Information Communication

Pop Art emphasizes narrativity, as exemplified by Andy Warhol's repeated depictions of soup cans, offering commentary on the commodification under capitalism. Flat Design emphasizes

directness and efficiency, facilitating rapid information capture in alignment with users' demand for immediacy in digital interface interactions.

Cultural Association

Pop Art is rooted in consumer culture and political contexts, reflecting postwar American consumerism or China's “Political Pop” responding to socialist-era symbols. Flat Design, by contrast, aligns with digital usability requirements, serving brand rejuvenation and user experience, and in digital product ecosystems, it embodies the integration of functional practicality and symbolic recognition.

4.2.2. Interface Design and Symbolic Graphics

One of the key characteristics of Pop Art is its transformation of everyday objects, popular culture symbols, and contemporary elements into simplified and exaggerated visual representations. This symbolic treatment emphasizes immediacy and recognizability, allowing viewers to grasp information and emotions at a glance. The “iconification” concept in modern Flat Design aligns closely with the symbolic approach of Pop Art: both pursue simplicity and recognizability while enhancing visual impact through color, form, and layout.

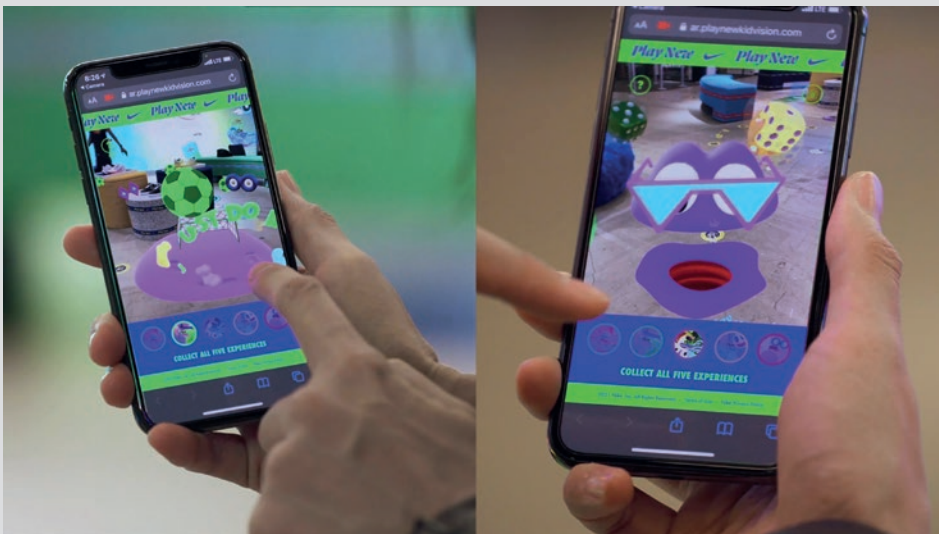
In mobile application interfaces (App UI) and web design, designers often employ cartoonish or geometric symbolic graphics to increase both engagement and recognizability. For instance, Google frequently incorporates hand-drawn Pop Art symbols and vibrant geometric patterns in its holiday Doodles, event logos, and web illustrations. Such designs combine flat icons with cultural and playful elements, making interfaces not only intuitive and operable but also capable of eliciting emotional resonance. For example, interactive web illustrations released for Halloween or the Olympics use exaggerated colors and symbolic characters, transforming conventional icons into visually engaging carriers of cultural content.

In China, Alipay extensively applies Pop Art-inspired symbolic elements, particularly in festival-themed interfaces. For instance, during the Lunar New Year, the interface design cartoonizes traditional cultural symbols such as red envelopes, fireworks, and the character “福” (fortune), integrating them into a flat operational interface. This approach maintains simplicity and usability while enhancing the festive atmosphere and interactive fun, thereby increasing user engagement and satisfaction. Additionally, Alipay has



→ **Fig. 20** HEYTEA Collaborates with International Artist Yayoi Kusama to Launch Seven New Products. Source: Adquan, HEYTEA x Yayoi Kusama Collaboration: "Add Some Bubbles to the World". Retrieved October 22, 2025, from <https://www.adquan.com/article/355408>

↓ **Fig. 21** Nike Launches WebAR In-store Campaign, Inviting Customers to Experience a New Way of Sports. Source: Kivcube Blog — Official Blog of Mizhi Technology. "Nike Launches WebAR In-store Campaign, Inviting Customers to Experience a New Way of Sports". Retrieved October 22, 2025, from <https://www.kivcube.com/blog/news/5286/>



Feature Dimension	Pop Art	Flat Design
Visual Elements	Exaggerated daily symbols, collage repetition	Minimalist icons, geometric shapes, no gradients/shadows
Color Usage	High-saturation primary colors (red/yellow/blue), strong contrast	Bright, clear color blocks, high contrast, simple color schemes
Technical Characteristics	Silkscreen printing, mass reproduction, handcraft traces	Vector graphics, clean lines, flat layers, digital production
Information Transmission	Narrative (e.g. critiquing consumer culture)	Direct, efficient (prioritizing quick information capture)
Cultural Connection	Tied to consumer culture, political contexts	Aligned with digital interface usability, brand (youthfulness)

Tab. 1 Comparison of Features of Pop Art and Flat design. Source: own study.

incorporated Pop Art-style iconography in certain brand co-branded campaigns, effectively merging brand symbols with flat interface design and creating an organic integration of cultural symbols and modern UI design.

These examples demonstrate that Pop Art’s symbolic graphics offer multiple values in interface design: they not only strengthen visual recognition and information delivery but also enhance emotional identification and interactive experience. The integration of Pop Art-style symbols with Flat Design in mobile applications, web design, and digital marketing interfaces is increasingly becoming a significant trend in contemporary interface design.

4.2.3. Modern Trends in Color Application

One of the most distinctive visual characteristics of Pop Art is its bold use of highly saturated primary colors, a strategy that instantly captures viewers’ attention. In contrast, the popular Flat Design in contemporary graphic design favors bright, high-contrast color blocks, emphasizing interface simplicity and rapid information delivery. From a color philosophy perspective, Pop Art and Flat Design share a natural compatibility: both value the direct visual impact of color and emphasize clear boundaries between shapes and hues.

In practice, modern designers often combi-

ne the high-saturation contrasting colors of Pop Art with the clean color blocks of Flat Design. This fusion ensures clarity while endowing visual works with strong tension and expressiveness. Such a strategy not only enhances the visual appeal of the design but also improves user interaction and engagement on digital media and social platforms. For example, the Chinese brand HEYTEA, in some of its co-branded packaging and promotional posters, employs flat geometric compositions complemented by Pop Art-inspired colors such as bright yellow, cyan, and magenta. This approach not only conveys a youthful brand image but also strengthens the visual impact of products in social media dissemination (Fig. 20).

Meanwhile, other brands have also explored innovative approaches in the modernization of color application:

Florasis Limited-Edition Makeup Packaging

The Chinese cosmetics brand Florasis incorporated Pop Art elements into its limited-edition packaging, employing bright color contrasts and exaggerated graphics to create a visually impactful design. Such an approach not only enhances brand visual recognition but also attracts the attention of younger consumers, boosting market competitiveness.

MINISO × Chiikawa Collaboration



Fig. 22 Claes Oldenburg, *The Store* (1961). Source: Zhihu. "Notes on 150 Years of Modern Art – Pop Art: Retail Therapy (1956–1970) (Part II)". Retrieved October 22, 2025, from https://zhuanlan.zhihu.com/p/392274790?utm_id=0

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The collaboration between MINISO and the popular Japanese character brand Chiikawa showcased the application of Pop Art elements within a brand's visual identity (VI) system. The co-branded series combined cute cartoon characters with minimalist brand aesthetics, launching global pop-up stores and limited products. This successfully attracted young consumers' attention and participation, demonstrating the modern application of Pop Art colors in brand youthification strategies.

In summary, contemporary designers are increasingly adopting a "Pop Art + Flat Design" trend in color application. By using highly saturated contrasting colors, they not only ensure visual clarity and effective information transmission but also enhance brand personality, playfulness, and communicative power. This color strategy has found wide application in graphic design, packaging, and advertising, becoming an important approach to modernizing brand visual identity.

4.3. Visual Extension of Pop Art in Digital Media Design

A key feature of digital media is its dynamic and interactive nature, which provides opportunities for the reinvention of Pop Art elements. When Pop Art's symbolic graphics and color blocks are applied in motion, they can produce effects with heightened rhythm and visual impact. For example, Spotify's dynamic advertising videos often

employ high-contrast colors and repeated Pop-style geometric shapes, creating a strong visual beat that aligns with the music rhythm, thereby capturing users' attention within a short time. In interactive design, Pop Art elements are used to create immersive experiences. In Nike's online interactive advertisement "Play New", dynamic Pop illustrations and interactive animations guide users to explore different visual elements on the page, fostering emotional resonance with the brand through clicks and swipes (Fig. 21).

Each of us carries an inner child, and this is the energy that Nike conveys through the Play New in-store AR experience. To elevate this concept to a new level, Bridge Studios (Philadelphia, PA) created a set of interactive and entertaining WebAR games embedded within the colorful and whimsical store architecture. Activated via a QR code at the store entrance, children of all ages can enter and explore the Play New AR web application, locating and scanning five triggers distributed throughout the store. Each trigger launches a mini AR game, ranging from putting challenges to virtual soccer kicks. Upon completion, each experience is recorded in the web application, mapping overall progress and indicating which mini games have yet to be discovered. Once all five are triggered and completed, users receive a congratulatory reward from the store concierge. Dream Syndicate and

BRDG developed Nike's Play New AR as a WebAR experience, allowing easy access and rapid transitions without requiring the download or installation of a dedicated mobile application.

China's Tmall "Double Eleven" interactive pages incorporate explosive Pop Art-style graphics, comic-style speech bubbles, and dynamic color blocks, combined with interactive lottery mechanisms that engage users in the act of "playing" while participating in consumption. This approach not only extends the entertainment value of Pop Art but also enables digital media design to achieve both communicative and commercial functions.

4.4. Integration of Pop Art and Installation Art

In the 1960s, Claes Oldenburg's Pop Art works offered a sharp critique of American consumer culture, often through sculptural media. His early works primarily consisted of plaster reliefs depicting food and clothing. Oldenburg would first create basic forms on galvanized wire mesh covered with cotton and plaster, then paint them using inexpensive commercial enamel. In his later works, while the thematic focus remained consistent, his primary medium shifted to large stuffed plastics sewn from vinyl or canvas. Many of these works were exhibited in Oldenburg's solo exhibitions titled *The Store*, which stands as his most representative showcase of consumer product sculpture, expressing a critical perspective on the commodification of art in consumer society (Fig. 22).

The Store, created by Claes Oldenburg in 1961, is part of the Pop Art movement. This work is characterized by its colorful and eclectic presentation, simulating a storefront filled with various items one might encounter in the commercial marketplace, all reimagined through Oldenburg's artistic lens. The objects are displayed in a somewhat chaotic yet carefully arranged manner, reflecting the consumer culture of the time. Each item appears meticulously

crafted with exaggerated and lively details, transforming everyday objects into remarkable artistic expressions. The bold use of color and rough textures creates a sense of realism intertwined with cartoonish elements, inviting viewers to contemplate the mundane nature of commercial goods through humor and critique. The overall installation establishes an immersive environment, surrounding the audience with a playful yet thought-provoking backdrop shaped by Oldenburg's vision.

5. Conclusion

In today's economy-driven era, Chinese pop art visual elements require designers to reinterpret and deconstruct them using new concepts and forms. Employing these local visual symbols, which emerged under specific historical conditions and periods, allows design to more distinctly reflect Chinese cultural characteristics [9]. As an important bridge connecting art and popular culture, Pop Art primarily operates through the re-semanticization of visual symbols, transforming everyday scenes of consumer society into an artistic language imbued with aesthetic tension. This study examines the visual characteristics and cultural semantics of Pop Art, and, by integrating typical contemporary graphic design practices, reveals the mechanisms through which Pop Art continues and transforms within the context of modern visual design.

Firstly, in terms of formal language, Pop Art promotes diversification and symbolization of visual expression through techniques such as exaggeration, repetition, and collage, features that are reactivated in contemporary graphic design practices, including advertising, packaging, and brand communication. Secondly, at the cultural level, the consumer metaphors and participatory nature of Pop Art provide contemporary designers with new narrative perspectives, enabling visual symbols to simultaneously convey commercial value and cultural meaning. Thirdly, from



a design thinking perspective, Pop Art encourages designers to reconsider the relationships between art and the market, creation and dissemination, thereby facilitating the re-socialization of artistic practice.

Through theoretical analysis and comparative case studies, the primary contribution of this research lies in constructing a framework for the integration of contemporary graphic design from a Pop Art semiotic perspective, which elucidates the interactive logic among artistic symbols, cultural semantics, and commercial communication. This framework not only deepens the understanding of Pop Art's contemporary expressive mechanisms but also provides new methodological insights for graphic design education and creative practice. Future research may further explore the potential applications of Pop Art's visual language in digital media and AI-generated design, aiming to achieve an innovative fusion of artistry and technology.

Zhang Meng

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Intelligent Art Education:

A Preliminary Analysis of AI-Driven Heritage Transmission for Ethnic Cultural Legacies

Keywords: #Artificial Intelligence (AI) #Transmission of Ethnic Cultural Heritage #Art Education
#Educational Models #Interdisciplinary Collaboration

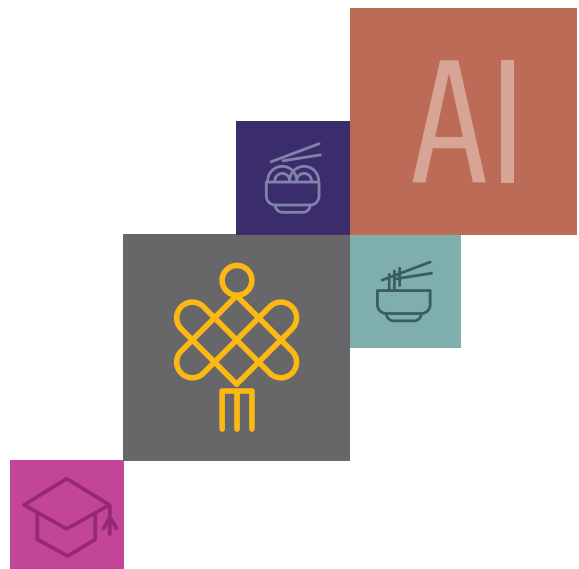


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Abstract

This study investigates the empowering role of artificial intelligence (AI) in the transmission of ethnic cultural heritage within the context of the integration of art and science and technology. By constructing digital databases, developing AI-assisted tools, and establishing intelligent educational platforms, the study advances the preservation and innovative transformation of cultural resources. It critically examines the current application of AI in art and design education, identifying key challenges such as an outdated curriculum framework and insufficient interdisciplinary collaboration. In response, the research advocates a project-driven pedagogical approach as the core of instructional design and proposes an integrated teaching model that synergistically combines technology, art, and culture to enhance students' practical competencies and cultural literacy. Emphasizing the cultivation of critical thinking, the dissertation further offers recommendations for educational reform, including curriculum optimization and faculty development. It contends that intelligent education constitutes a vital pathway for cultural heritage transmission and provides both theoretical grounding and practical guidance for the reform of higher art education.



1. Introduction

1.1. Research Background

Chinese civilization, with its profound historical continuity and uninterrupted cultural lineage, stands as one of the world's oldest and most resilient cultural traditions. Throughout millennia of historical evolution, it has radiated enduring vitality, vividly embodying the core characteristics of Chinese culture — its continuity, innovativeness, unity, inclusiveness, and commitment to peace.

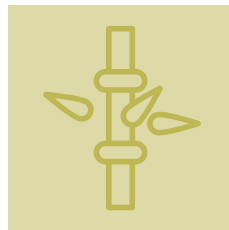
In recent years, emerging technologies such as artificial intelligence (AI) and big data have catalyzed transformative shifts in intelligent art education and the digital transmission of ethnic cultural heritage. The Chinese government has accorded high priority to leveraging technological innovation to empower cultural and artistic practices. For instance, China Education Modernization 2035 (2019) explicitly calls for

advancing the innovative development of smart education and deepening the integration of information technology with art education. Similarly, the Guidelines on Strengthening Aesthetic Education in Higher Education Institutions in the New Era (2020) emphasizes the need to harness modern information technologies to innovate pedagogical models in aesthetic education. In the domain of cultural heritage preservation, both the 14th Five-Year Plan for Culture and Tourism Development (2021) and the Opinions on Further Strengthening the Protection of Intangible Cultural Heritage (2021) advocate the application of digital technologies in the documentation, exhibition, and dissemination of intangible cultural heritage (ICH).

Domestic scholars have conducted extensive research on the application of AI in art education and cultural herita-

ge transmission. Yu Zhicheng and Liu Pan (2025) propose that digital transformation in aesthetic education should be realized through three dimensions: curriculum literacy, human-AI collaborative teaching, and dynamic assessment, stressing the necessity of balancing technological empowerment with humanistic stewardship to ensure AI serves as an enabler — not a substitute — for the spirit of aesthetic education [1]. Xu Rengang (2024) underscores the critical importance of AI literacy for art educators [2]. Yao Guozhang explores the potential of next-generation digital technologies — including AI, big data, and blockchain — in ICH protection, offering policy recommendations for sustainable digital heritage practices grounded in technical principles and case studies [3]. Li Qingchang (2023) investigates design principles and methodologies for applying virtual reality (VR) in ICH transmission, arguing that immersive and interactive experiences can overcome traditional barriers to intergenerational knowledge transfer, provided that user experience and acceptance remain central to design [4]. Zhang Yilong and Cai Zongmo (2025) caution that the integration of generative AI into education should not be a unidirectional technological imposition, but rather a value-oriented recalibration of technological logic by the essence of education itself [5].

Internationally, UNESCO has promoted the application of digital technologies in cultural heritage since 2015 [6], and its 2021 report highlights AI as a promising avenue for preserving endangered cultural expressions [7]. The European Union's Digital Education Action Plan (2023-2027) likewise affirms the pedagogical value of AI in



art education [8]. Bown and Candy [9] proposed an AI-assisted model for creative learning in art education, while research teams at institutions such as the Massachusetts Institute of Technology have developed AI platforms like AIVA for artistic creation [10]. The French National Centre for Scientific Research (CNRS) [11] employs deep learning for artwork recognition; the University of Tokyo utilizes augmented reality (AR) [12] to reconstruct traditional architecture; and UNESCO actively promotes global digital sharing of cultural heritage [13].

While both domestic and international scholarship converges on the potential of AI to empower art education and cultural transmission, international research demonstrates greater systematicity and foresight in technological implementation, alongside heightened attention to ethical and diversity-related concerns — offering valuable insights for China's evolving practices.

Currently, despite nationwide efforts to promote the transmission of ethnic cultural heritage, society remains polarized by two opposing attitudes. On the one hand, certain groups place excessive emphasis on tradition while demonstrating insufficient innovative awareness, thereby impeding the dynamic evolution of cultural practices. On the other hand, segments of the population, heavily influenced by foreign cultures, exhibit a diminished sense of identification with their own cultural heritage, often failing to accord it due respect or prioritize its transmission. This dual contradiction underscores the urgent need — within the context of the intelligent technology era — to critically re-examine the role, methodological



approaches, and value orientations of cultural heritage transmission.

1.2. Research Significance

With the advancement of the market economy, the brand value of ethnic culture has increasingly garnered recognition. A proper understanding of ethnic cultural heritage is therefore imperative, as its transmission plays a pivotal role both spiritually and materially. It constitutes not only the foundational bedrock for the survival and development of a nation but also a critical driver of social progress and prosperity. The inheritance of ethnic culture exerts profound and far-reaching influence on a nation's spiritual identity and material advancement.

From a spiritual perspective, ethnic culture embodies the collective historical memory and shared value systems of a community, serving as a cornerstone for constructing national identity and sustaining social cohesion. Contemporary creative practices that neglect a deep understanding of the internal logic of traditional culture risk degenerating into superficial imitation. Only through a thorough comprehension of its symbolic systems and meaning structures can genuinely rooted, culturally informed creative transformation be achieved. The spirit of innovation championed in the new era itself originates from the rich soil of traditional ethnic culture. Standing on the shoulders of history and drawing nourishment from this cultural foundation, creativity can flourish and evolve dynamically.

Effective transmission of ethnic culture entails more than the mere acquisition of intellectual enrichment; it also provides normative frameworks that guide human conduct. Strengthening

education in ethnic cultural heritage plants the seeds of national spirit within students, thereby cultivating an enduring source of inspiration for their future creative endeavors. Integrating ethnic cultural content into teaching and learning processes further establishes an internalized moral compass that shapes students' ethical sensibilities and aesthetic judgments.

Ethnic culture functions as a distinctive, regionally grounded brand. When developed thoughtfully and sustainably, it can catalyze the growth of cultural industries and tourism, thereby stimulating local economic development. The uniqueness of ethnic culture serves as a vital calling card in intercultural exchange. By strategically cultivating and promoting ethnic cultural brands, their influence can be amplified both nationally and globally, fostering mutual understanding, goodwill, and mutually beneficial cooperation among diverse nations and peoples.

1.3. Research Innovations

This study centers on how artificial intelligence (AI) can profoundly empower educational practices for the transmission of ethnic cultural heritage within the framework of Art-Science Integration. Moving beyond the instrumentalization of AI as a mere technical tool, the research is guided by three core conceptual pillars — human-AI collaboration, cultural subjectivity, and interdisciplinary integration — and advances the following theoretical and pedagogical innovations:

1.3.1. Theoretical Synthesis and Innovation

The study transcends the longstanding binary dichotomy between “technology” and “culture” in traditional art education by organically integrating AI with the transmission of ethnic cultural





heritage. It constructs a triadic theoretical framework of “Technology + Art + Culture” under the paradigm of Art-Science Integration. This framework not only expands the scholarly boundaries of aesthetic education and intangible cultural heritage (ICH) pedagogy in the intelligent era but also offers a novel theoretical model that harmonizes technological rationality with humanistic sensibility.

1.3.2. Reconstruction of Pedagogical Models

The research proposes an innovative teaching approach centered on project-based learning, interdisciplinary collaboration, and reflective practice. By situating learning within authentic cultural contexts, this model actively cultivates students’ higher-order thinking and cultural innovation capacities. It facilitates a paradigm shift in art education — from the transmission of technical skills toward the co-construction of meaning and the exercise of value judgment — thereby providing a replicable and scalable model for the practical implementation of ICH education.

1.3.3. Exploration of a Human-AI Collaborative Paradigm

The study pioneers a new paradigm of cultural transmission grounded in human-AI collaboration. In this model, AI functions as an intelligent assistant, handling foundational and repetitive tasks such as data processing, pattern recognition, content generation, and prototype simulation. Meanwhile, human learners and educators serve as “meaning-makers”, retaining authoritative roles in cultural interpretation, ethical deliberation, original expression, and contextual responsiveness. This division of labor — “humans lead meaning-making; machines assist generation” — safeguards cultural subjectivity while unlocking the genera-

tive potential of technology, offering a forward-looking and ecologically sustainable pathway for ethnic cultural education in the age of AI.

1.3.4. Ethical Reflection and Cultivation of Subjective Agency

Through dedicated “AI + Traditional Art” workshops, the research engages students in collaborative creation with AI, prompting critical inquiry into pivotal issues such as authorship, the boundaries of originality, and cultural appropriation. Furthermore, it systematically embeds topics including AI ethics, cultural sovereignty, and digital heritage preservation into the curriculum. This intentional integration strengthens students’ sense of ethical responsibility and critical consciousness when engaging with traditional culture through technological mediation, thereby upholding both the subjectivity and ethical integrity of cultural transmission.

1.4. Research Question

Although ethnic culture possesses dual value — as a cornerstone of spiritual identity and as a driver of industrial development — its transmission is currently confronted with three profound and interrelated challenges:

Cultural Distortion: The reduction of cultural expressions to superficial symbols and fragmented pastiches has led to a progressive erosion of their intrinsic meaning and core values.

Pedagogical Fragmentation: Outdated curricular frameworks and the persistent disjunction between technology and cultural content — often described in China as “two separate skins” — have impeded the formation of a coherent, integrative educational ecosystem capable of nurturing holistic competencies.

Transmission Inertia: Students exhibit low levels of engagement and lack the capacity to transform traditional cultural elements into meaningful, contemporary creative expressions.

Within this context, a critical re-examination of the value and purpose of ethnic cultural transmission has become urgently necessary.

Ethnic culture constitutes not only the spiritual foundation for a nation's survival and development but also a vital impetus for social progress and intercivilizational dialogue. Its significance manifests across both spiritual and material dimensions; however, this dual potential is jeopardized by tendencies toward formalism and instrumentalization, which threaten the authenticity and integrity of cultural heritage.

At the spiritual level, ethnic culture serves as the core source of national identity and social cohesion. It embodies shared values, historical memory, and ethical norms, forming the bedrock upon which cultural self-confidence and consciousness are built. Authentic transmission does not entail the mechanical replication of surface-level symbols; rather, it requires guiding younger generations to grasp the underlying logic of cultural systems so as to activate their intrinsic creative potential. Only innovation rooted in deep cultural understanding can truly “stand on the shoulders of history” and generate expressions imbued with contemporary relevance and vitality. Consequently, education in ethnic culture must transcend rote knowledge transmission and instead function as an internal nourishment for students' value judgment, aesthetic sensibility, and creative

motivation — enabling them to uphold cultural subjectivity in the digital age and avoid degenerating into rootless pastiche or hollow performance.

At the material level, while ethnic culture holds significant regional branding value and can catalyze the cultural tourism and creative industries, its reduction to consumable symbolic labels risks hollowing out its semantic depth. Genuine cultural influence

arises not from exoticized packaging or commodified spectacle, but from respectful engagement with cultural essence and its creative transformation.

Only through a systemic educational approach that cultivates a new generation of inheritors — equipped with cultural literacy, technological fluency, and

ethical discernment — can ethnic culture evolve from a passive “resource” into a dynamic “asset”, and from static “display” into active “dialogue”. In doing so, it may fulfill its broader role as a bridge for cross-civilizational understanding and the construction of a shared human future.

Therefore, the transmission of ethnic culture is neither a matter of mere preservation nor instrumental exploitation; it demands a comprehensive reconceptualization that integrates cultural subjectivity, educational modernization, and technological ethics. Only by addressing the intertwined crises of distortion, fragmentation, and inertia can we realize the dual imperatives of living transmission — understood not as mere digital archiving or performative display, but as the sustained capacity of younger generations, through educational mechanisms, to internalize



cultural logic and creatively re-embed it into contemporary life — and innovative transformation in the intelligent era.

1.5. Research Objectives

Confronted with the tripartite challenges currently afflicting ethnic cultural heritage education in the intelligent era — namely, cultural distortion (characterized by symbolic reductionism and pastiche that erode cultural essence), pedagogical fragmentation (manifested in the persistent disjunction between technology and culture — and an outdated curriculum framework), and transmission inertia (evidenced by low student engagement and insufficient capacity for innovative transformation) — this study is grounded in the practical demands of educational reform. It proposes three interdependent and progressively articulated core objectives, aiming to construct a coherent, actionable, and scalable reform framework with clear goals and well-defined pathways.

1.5.1. Objective One: To Investigate the Application Value and Ethical Boundaries of AI in the Educational Transmission of Ethnic Cultural Heritage

Artificial intelligence has become deeply embedded in national development strategies, and its role in education is evolving from that of a supplementary tool to a pivotal variable shaping the educational ecosystem. However, the integration of AI into traditional cultural education presents a double-edged sword: while it holds the potential to revitalize dormant cultural memory and expand modes of dissemination and experiential engagement, it also risks cultural semantic loss through oversimplification or misinterpretation. Therefore, the primary task of this study is to clarify the appropriate positioning of AI within ethnic cultural education — namely, as an auxiliary instrument that serves to amplify cultural subjectivity, rather than as a substitute for human interpretation and meaning-making. The research will critically examine the scope of applicability and ethical limits of AI in key processes such as data collection, visual representation, and interactive design, firmly advocating the principle that “technology serves culture”, not the reverse. This inquiry aims to provide normative guidance for cultivating educational practices that are ethically responsible, culturally self-aware, and humanistically grounded.

1.5.2. Objective Two: To Construct an Interdisciplinary Teaching Support System Integrating “Technology + Art + Culture”

Contemporary higher education in ethnic arts and culture is often hindered by rigid disciplinary silos and fragmented curricular content, resulting in a persistent disconnect between technological, artistic, and cultural domains that undermines holistic talent development. In response, this study advocates for the dismantling of institutional and epistemic barriers to establish a triadic, interdisciplinary teaching support system centered on the integration of technology, art, and culture. This system will synthesize knowledge resources from diverse fields — including artificial intelligence, digital media, art and design, ethnology, and intangible cultural heritage (ICH) studies — and operationalize them through modular course clusters, project-based learning units, and collaborative teaching-research mechanisms. Within this framework, ethnic culture ceases to be an isolated body of “cultural knowledge” and instead becomes a dynamic, interdisciplinary object of inquiry situated within authentic problem contexts. This approach significantly enhances the integrative quality, practical relevance, and contemporary adaptability of cultural heritage education.

1.5.3. Objective Three: To Design a Human-AI Collaborative Pathway for Cultivating Students’ Cultural Innovation Competence

To address the challenges of low student engagement and weak capacity for creative transformation, this study proposes a competence-building pathway oriented around human-AI collaboration. Moving beyond the misconception of AI as a replacement for human creativity, this pathway is grounded in the principle that “humans lead meaning-making, while machines assist generation”. Specifically, AI assumes foundational tasks such as data processing, stylistic simulation, and prototype generation, whereas students focus on higher-order cognitive activities — including cultural interpretation, value judgment, ethical reflection, and original transformation.

Through pedagogical vehicles such as “AI + Traditional Art” workshops and cross-media creative projects, students are guided to critically engage with key issues such as authorship, the boundaries of cultural originality, and the ownership of digital heritage, thereby developing both critical thinking and cultural translation competence. This pathway not only aligns with the higher tiers of Bloom’s re-



vised taxonomy — namely, analyze, evaluate, and create — but also fosters a new generation of cultural inheritors who embody technological literacy, cultural self-awareness, and creative courage [10].

Through this closed-loop design of “objectives-pathways”, the study seeks to advance synergistically across three dimensions: theoretical construction, pedagogical reform, and educational practice. Its ultimate aim is to catalyze a paradigm shift in ethnic cultural heritage education — from passive preservation toward active co-creation, and from superficial technological layering toward deep, meaningful integration — thereby realizing the living transmission of culture, the modernization of educational models, and the innovative cultivation of future-oriented cultural practitioners.

2. Practical Foundations of AI-Enabled Education for Ethnic Cultural Heritage

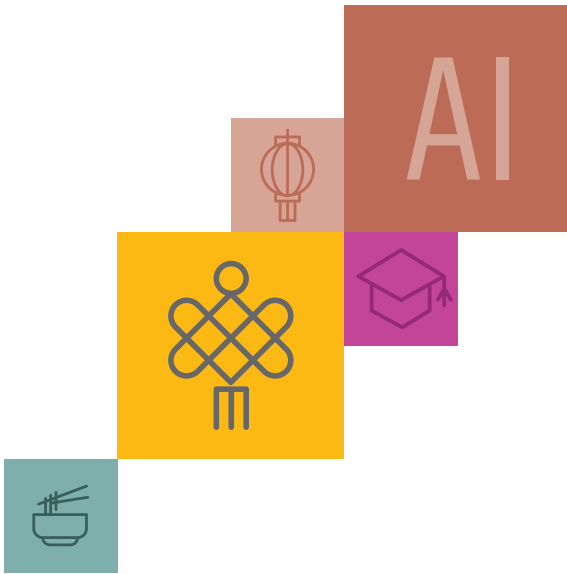
Globally, there is now broad consensus and a growing diversity of practices concerning the deep integration of artificial intelligence (AI) and art education. This convergence is particularly evident in the domain of ethnic cultural heritage education, where a distinct tripartite trend has emerged: interdisciplinary integration, project-based pedagogy, and human-centered orientation. These exploratory initiatives not only substantiate the feasibility of leveraging technology to empower cultural transmission but also provide empirical grounding for the development of intelligent educational models that affirm and uphold cultural subjectivity.

2.1. Domestic Pioneering Practices: Innovative Exploration of Localization Pathways

Art institutions across China are actively responding to the evolving demands of cultural heritage education in the intelligent era, giving rise to a series of demonstrative initiatives that exemplify context-sensitive innovation.

At Guizhou University, the “Jiangxin Yingzao Society” (Craftsmanship & Construction Studio) has, over a three-year period, developed a participatory educational framework for ethnic architectural heritage grounded in the CDIO engineering education model — Conceive, Design, Implement, Operate — with a central emphasis on the holistic preservation of “cultural genes”. The studio’s flagship project, Craftsmanship & Construction: Educational Practitioners of Architectural Heritage along Ethnic Corridors, integrates community collaboration, digital documentation, and immersive pedagogy to engage students deeply in the processes of heritage recording, interpretation, and revitalization. This initiative was awarded the “Rising Star Award” in the 2024 Global World Heritage Education Innovation Awards, underscoring the viability of integrating artificial intelligence with ethnographic fieldwork in ethnic cultural education [11].

Meanwhile, the Shanghai Institute of Visual Art (SIVA) has undertaken a comprehensive restructuring of its curriculum by embedding artificial intelligence systems into more than twenty



ty courses spanning visual design, animation, and creative writing. The institution has further established a micro-specialization in “AI Digital Art and Design”, which employs a problem-oriented and project-driven pedagogical approach. By dismantling disciplinary boundaries, this program guides students to apply AI tools in the creative transformation of authentic cultural themes, thereby significantly enhancing their cross-media expression capabilities and cultural innovation competencies [12].

2.2. International Experience: Collaborative Paradigms in a Global Context

Leading international institutions at the intersection of art and technology have accumulated substantial experience in integrating artificial intelligence with cultural education:

The Rhode Island School of Design (RISD) was among the first to establish a dedicated AI studio, offering courses such as Machine Learning and Design and Ethics of Digital Culture. These curricula emphasize the designer’s responsibility to maintain cultural discernment and ethical awareness within human-AI collaboration, thereby reconceptualizing technology not merely as a utilitarian instrument but as a dialogic partner in creative practice.

Similarly, the Massachusetts Institute of Technology (MIT) has developed platforms such as AIVIA (Artificial Intelligence for Visual and Interactive Arts) to facilitate joint development of generative AI applications for cultural heritage by artists and engineers. A defining feature

of MIT’s approach is its deliberate integration of cultural context and historical narratives into algorithmic training processes, thereby countering the myth of technological neutrality and mitigating the risk of semantic distortion in AI-mediated cultural representation.

2.3. Convergences and Emerging Trends: Toward a Human-Centered, Cross-Domain, Co-Creative Educational Ecosystem

An integrative analysis of domestic and international case studies reveals that AI-enabled education for ethnic cultural heritage has transcended the instrumental logic of technology-as-tool and is progressively coalescing around three consensus-driven trends:

2.3.1. Interdisciplinary Integration: Disciplinary boundaries between art, technology, and the humanities are being systematically dismantled to foster a pedagogical ecosystem grounded in epistemic fusion. This integration enables synergistic knowledge construction that reflects the complex, multifaceted nature of cultural heritage.

2.3.2. Project-Based Engagement: Authentic cultural issues serve as anchoring contexts for learning, with collaborative and inquiry-based pedagogies facilitating the transfer of competencies across domains. Through sustained engagement with real-world challenges — such as digital documentation of intangible heritage or the co-design of culturally resonant creative products — students develop both technical fluency and contextual sensitivity.

2.3.3. Human-Centered Orientation: Human agents — learners and educators alike — are consistently positioned as the primary interpreters of cultural meaning and guardians of ethical values. Artificial intelligence functions not as a substitute for human creativity but as an augmentative collaborator, supporting — but never supplanting — their capacity for critical interpretation, ethical judgment, and original expression.

These practices collectively demonstrate that, provided cultural subjectivity is rigorously upheld and ethical reflection is institutionally embedded, AI is not only usable but also ethically and pedagogically beneficial in the context of ethnic cultural



heritage education. Its viability rests not merely on technological maturity or curricular adaptability, but more profoundly on a shared global commitment among educational communities to the principle that “technology must serve humanity, and culture must remain the soul of education”. This normative alignment underscores a collective aspiration toward a new educational paradigm — one that harmonizes technological innovation with humanistic depth, cultural integrity, and collaborative creativity.

3. Pedagogical Reform and Practical Pathways

To systematically advance the deep transformation of ethnic cultural heritage education within the paradigm of Art-Science Integration, this study proposes an integrated reform framework organized around four core dimensions: curricular content, pedagogical methodology, institutional mechanism, and competency development. By strategically aligning and optimizing teaching approaches and implementation pathways across these dimensions, the research constructs a quadruple-integrated talent cultivation system — “Content-Method-Mechanism-Competency” — that ensures coherence between cultural grounding, technological enablement, institutional support, and learning outcomes. This holistic framework is designed not merely to incorporate AI as a technical add-on, but to foster a new educational ecology in which cultural subjectivity, interdisciplinary synergy, and human-centered innovation are mutually reinforcing.

3.1. Curriculum Restructuring

Centered on ethnic culture as its core, this study proposes a restructured curriculum in which intelligent technology modules — such as AI-generated content, VR/AR immersive experiences, and data visualization — are organically integrated. This approach deliberately breaks away from the historical path dependency of traditional art education on Western paradigms. Instead, it anchors curricular content in the cultural genes of the Chinese nation. By systematically embedding intelligent technologies into this culturally grounded

framework, the curriculum achieves end-to-end integration across three phases: cultural content → technological mediation → creative output.

Taking the course *Reimagining Ethnic Ornamental Patterns* as an exemplar, a three-tiered pedagogical sequence is implemented: AI-assisted deconstruction → parametric design → physical realization.

3.1.1. Foundational Tier: Students access localized databases of ethnic ornamental patterns — such as Miao silverwork, Yi embroidery, and Tibetan thangka paintings — and employ generative AI models (e.g., Stable Diffusion) to analyze compositional principles of point, line, and plane. Through AI-powered visualization, they rapidly test and validate aesthetic concepts such as symmetry, rhythm, and proportion.

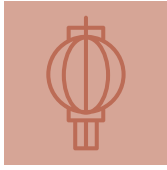
3.1.2. Intermediate Tier: Within collaborative projects with intangible cultural heritage (ICH) workshops, students digitize traditional patterns, optimize their structural logic, and experiment with sustainable materials, directly responding to real-world demands from cultural tourism or product design commissions.

3.1.3. Innovative Tier: Elective courses such as AI × Ethnic Pattern Innovation and Digital Weaving and Ritual Environments guide students to apply AI-generated motifs in advanced contexts — including interactive installations, metaverse fashion, and stage design — thereby incubating culturally rooted, market-viable ethnic intellectual property (IP).

While retaining foundational theoretical courses such as *The Three Fundamentals* (plane, color, and three-dimensional composition), the revised curriculum comprehensively localizes illustrative case studies. This shift facilitates a paradigmatic transformation — from imitating Western abstraction to activating indigenous visual vocabularies — ensuring that technical fluency is always cultivated within a framework of cultural self-awareness and creative authenticity.

3.2. Implementation of Project-Based Learning (PBL)

Guided by authentic societal needs, this study advocates for the implementation of project-ba-



sed learning (PBL) through carefully designed projects such as Digital Archiving of Intangible Cultural Heritage (ICH), Ethnic Intellectual Property (IP) Development, and Cultural Tourism Product Design. These projects are structured around a four-phase pedagogical cycle — field investigation → cultural interpretation → technological realization → ethical reflection — forming a closed-loop instructional model that integrates practice, theory, and critical inquiry.

3.2.1. Field Investigation: Students conduct immersive fieldwork in ethnic communities, engaging in oral history documentation, recording of traditional craft processes, and user-needs interviews to gather primary cultural data and contextual insights.

3.2.2. Cultural Interpretation: Building on empirical findings, students critically analyze the interplay between ethnic cultural practices and their social, economic, and spiritual dimensions. This phase emphasizes deep contextual understanding to prevent superficial or decontextualized appropriation of cultural symbols.

3.2.3. Technological Realization: Leveraging tools such as artificial intelligence, 3D modeling, and interactive design, students translate cultural elements into digital formats and develop functional prototypes — ranging from virtual exhibitions to tangible cultural products — ensuring technical fidelity and creative integrity.

3.2.4. Ethical Reflection: Structured seminars and reflective discussions are convened to interrogate critical issues including authorship, cultural sovereignty, and the ownership of digital heritage. This phase cultivates students' ethical awareness and reinforces their responsibility as culturally sensitive practitioners.

To enhance real-world relevance, a collaborative platform integrating academia, industry, and ICH bearers is established. By aligning universities, enterprises, and community-based heritage practitioners within a shared task chain, this PBL framework ensures that student outputs simultaneously embody cultural respect, technological innovation, and market viability — thereby bridging the gap between educational practice and societal impact.

3.3. Establishing an Interdisciplinary Collaborative Mechanism

This study proposes the establishment of a deep interdisciplinary convergence among art, anthropology, computer science, and design, institutionalized through a tripartite collaborative support system that is formalized in governance, enriched in resources, and operationalized via digital platforms:

3.3.1. Interdisciplinary Curriculum and Research Integration: Foster joint curriculum development and collaborative research initiatives with disciplines such as history, ethnology, and psychology. This integration expands the cultural interpretive dimensions of art education, enabling students to situate aesthetic practices within broader socio-historical, cognitive, and symbolic frameworks.

3.3.2. Co-Construction of Digital Cultural Resources: Partner with intangible cultural heritage (ICH) bearers, higher education institutions, and technology enterprises to co-develop a National Ethnic Cultural Digital Resource Repository. This repository aggregates multimodal data — including ornamental patterns, ritual footage, craft demonstration videos, and oral history archives — and leverages cloud-based platforms to enable remote access and real-time sharing. This infrastructure sustains



a normalized operational model of “digital heritage bearers + AI teaching assistants + cloud-based classrooms”, ensuring continuous, scalable, and participatory cultural transmission.

3.3.3. Institutional Safeguards and Policy Support: Implement enabling policies such as flexible credit recognition for interdisciplinary coursework, cross-disciplinary faculty appointments, and inter-departmental course credit reciprocity. These measures provide the necessary institutional scaffolding for the development of modular teaching materials and the establishment of “Art+” micro-specializations (e.g., Art+AI, Art+Ethnography), thereby cultivating a sustainable ecosystem for long-term interdisciplinary pedagogy.

Through this integrated mechanism, the study advances a systemic approach to breaking down epistemic and administrative silos, ensuring that cross-disciplinary collaboration is not merely ad hoc or project-based, but structurally embedded within the institutional fabric of art education.

3.4. Cultivating Advanced Cultural Innovation Competence

Grounded in Bloom’s Revised Taxonomy of Educational Objectives [17], this study delineates a clear functional division between artificial intelligence and human agents within the pedagogical process:

AI assumes responsibility for foundational cognitive tasks — namely remembering, understanding, and applying. Through capabilities such as big data analytics, generative content creation, and simulation-based testing, AI efficiently supports knowledge acquisition and initial application, thereby offloading routine cognitive labor.

Human-centered education, by contrast, concentrates on higher-order cognitive domains: analyzing, evaluating, and creating. The pedagogical emphasis is placed on empowering students to interpret cultural meaning, exercise ethical judgment, and generate original, contextually grounded expressions. This approach affirms the human learner as the central “meaning-maker” in cultural transmission.

To operationalize this vision, the study advocates for the integration of reflective learning, flipped classroom models, and collaborative creation:

Deepening reflection through structured project retrospectives, ethical debates on issues such as cultural appropriation, and reflective creative journals that document interpretive and decision-making processes;

Enabling student-centered hybrid learning via virtual laboratories and AI-augmented collaborative platforms that support iterative experimentation and personalized inquiry;

Fostering interdisciplinary innovation by assembling cross-specialty teams to address authentic cultural challenges — thereby nurturing a new generation of inheritors who integrate technical fluency, cultural self-awareness, and critical thinking.

Through the systematic integration of these four dimensions — curricular content, pedagogical method, institutional mechanism, and competence development — this research articulates a novel pathway for ethnic cultural heritage education: one that leverages technological empowerment without compromising cultural subjectivity, and achieves cross-domain integration while remaining steadfastly committed to the humanistic core of education.

4. Conclusion

Artificial intelligence functions as an “intelligent collaborator” — not as a substitute for human agency in cultural transmission. Globally, the integration of AI into education and cultural domains has become an irreversible trend. According to Gartner (2022), more than 30% of educational institutions worldwide had already deployed AI technologies by 2022 to enhance learning experiences. Empirical research from the Massachusetts Institute of Technology (MIT) further demonstrates that AI-assisted instruction can improve student learning efficiency by approximately 15% [18]. Additionally, UNESCO has affirmed the irreplaceable role of AI in the digital documentation, restoration, and dissemination of cultural heritage.

Nevertheless, the effective boundary of technological application is fundamentally contin-



gent upon its alignment with the internal logic and epistemic integrity of culture itself [14]. The value of AI in cultural education does not reside in its capacity to replicate “tradition-like” outputs, but in its potential to offload routine cognitive and technical tasks — such as data processing, stylistic simulation, and prototype generation — thereby liberating human learners to engage in higher-order activities of cultural interpretation, ethical judgment, and meaning-making. As the history of art repeatedly attests, from photography to digital media, technological revolutions have never supplanted artistic expression; rather, they have catalyzed its evolution toward deeper forms of humanistic articulation. Consequently, the core of ethnic cultural heritage transmission lies in achieving a dialectical unity between human subjectivity and technological appropriateness: technology must serve cultural self-awareness, not dictate cultural narrative.

Artificial intelligence is not the subject of cultural transmission but functions as an “intelligent collaborator”. Its true value does not lie in generating symbols that merely resemble traditional forms, but rather in leveraging data processing, pattern recognition, and interactive simulation to liberate human capacities for higher-order creativity — specifically in cultural interpretation, ethical judgment, and meaning-making. As art history repeatedly demonstrates, from the advent of photography to the rise of digital media, technological revolutions have never eradicated artistic practice; instead, they have catalyzed its evolution toward deeper, more nuanced forms of humanistic expression. Consequently, the crux of ethnic cultural heritage transmission resides in achieving a dialectical unity between human subjectivity and technological appropriateness: technology must serve cultural self-awareness, not dictate the terms of cultural narrative.

**Artificial intelligence
is not the subject
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collaborator”**



4.1. Recommendations for Pedagogical Reform: From Instrumental Application Toward Systemic Transformation of Talent Cultivation

Grounded in the paradigm of Art-Science Integration, art-focused higher education institutions must move beyond the superficial layering of “AI + courses” and advance three structural reforms to realize a holistic transformation in educational philosophy and practice:

4.1.1. Curriculum Reconfiguration:

From Technical Skill Training to Culturally Grounded Innovation

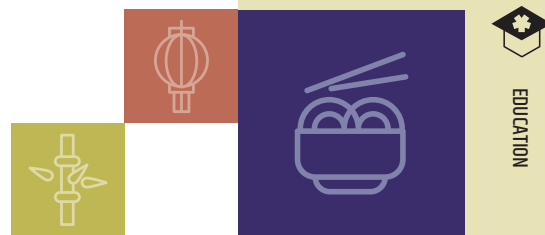
Centered on ethnic cultural heritage as its core, the curriculum should systematically integrate intelligent technology modules — including AI-generated content, VR/AR immersive experiences, and data visualization — to establish an integrated course chain that seamlessly links cultural understanding, technological translation, and creative output. For instance, in courses such as Reimagining Ethnic Ornamental Patterns or Digital Batik, students should not only acquire parametric design skills but also critically interrogate the cosmological worldviews, ritual functions, and socio-structural

meanings embedded in traditional motifs. This pedagogical shift enables a qualitative leap from formal imitation to meaningful regeneration.

4.1.2. Faculty Development: Cultivating

Dual Literacies in Art and Science and Cross-Domain Teaching Competence.

Educators must develop integrated competencies encompassing artistic sensibility, cultural interpretive capacity, and technological fluency. Institutions should establish dedicated Art-Science Integration Faculty Development Centers that offer workshops, interdisciplinary teaching-research collaborations, and industry residency programs. These initiatives empower instructors to master AI tools while deepening their contextual understanding of ethnic cultural systems, thereby preventing technological application from



devolving into “rootless innovation” devoid of cultural grounding.

4.1.3. Assessment Reform: Toward a Multidimensional, Process-Oriented, and Value-Driven Evaluation Framework. Moving beyond the narrow assessment of final artistic products, this study proposes a three-dimensional evaluation model that encompasses:

AI is not the subject of cultural transmission, but an “intelligent collaborator”. Its true value does not lie in generating symbols that merely “appear traditional”, but in releasing human higher-order creativity in cultural interpretation, value judgment, and meaning construction through data processing, pattern recognition, and interactive simulation. As art history has repeatedly demonstrated — from photography to digital media — technological revolutions have never eliminated art; rather, they have propelled it toward deeper levels of humanistic expression. Therefore, the key to the transmission of ethnic national culture lies in achieving a dialectical unity between “human subjectivity” and “technological appropriateness”: technology must serve cultural self-awareness, not dominate cultural narrative.

4.2. Future Directions

Toward a New Educational Ecosystem Grounded in Cultural Self-Awareness, Technological Empowerment, and Global Dialogue

In response to the complex challenges of cultural transmission in the intelligent era, education must evolve from a confined, classroom-centered model into a systemic endeavor that is lifelong, ecological, and global. This transformation entails the following strategic directions:

4.2.1. Constructing a Digital Ecosystem for Lifelong Learning of Ethnic National Culture. Leveraging AI-driven open-access platforms, this ecosystem integrates multimodal resources — including intangible cultural heritage (ICH) databases, oral history archives, and craft documentation videos — and enhances engagement through gamified learning, interactive storytelling, and virtual communities. The goal is to cultivate a participatory, co-creative, and iterative learning environment that shifts cultural transmission from passive reception to

active construction, enabling learners to continuously reinterpret and re-embed cultural knowledge throughout their lives.

4.2.2. Exploring an AI-Supported Synergy Between “Global Dialogue” and “Local Revitalization”. Under the dual pressures of globalization and cultural homogenization, AI can serve as a mediating bridge between local cultural expressions and global discursive contexts. By deploying multilingual cultural knowledge graphs, cross-civilizational comparative algorithms, and digital curation tools, AI empowers young people to re-interpret indigenous traditions through a global lens. This approach fosters a dynamic two-way interaction between “cultural outreach” (i.e., sharing local heritage globally) and “localized activation” (i.e., revitalizing heritage in situ), thereby avoiding the polar extremes of insular preservation or uncritical assimilation.

4.2.3. Cultivating the “Cultural Curator” of the New Era.

The future talent profile transcends that of a mere creator or technology user; it embodies the “cultural curator” — an individual equipped with cultural self-awareness, technological fluency, and global perspective. Such curators are capable of critically assessing the cultural appropriateness of AI-generated content, designing nuanced cultural narratives in digital spaces, and making ethically responsible judgments at the intersection of technology and tradition. This vision aligns with UNESCO’s conception of the “culturally literate citizen in the digital age” and responds to the fundamental demand of Chinese modernization for interdisciplinary professionals who integrate humanistic depth with technological competence.

The ultimate aim of AI-enabled education for ethnic cultural heritage is not to engineer “more efficient replication machines”, but to nurture “culturally discerning creative agents”. Only by steadfastly adhering to the triad of human-centered orientation, culture as the soul, and technology as the wing can we safeguard the roots of ethnic cultural identity amid the tides of intelligent transformation and simultaneously unleash its vibrant potential for the future. The future of art education does not reside in technology per se, but in how we harness technology as a medium to



reconfigure the relationships among human and culture, tradition and innovation, the local and the global — a mission that constitutes both the theoretical contribution and practical imperative of this research.

5. Glossary of Key Terms

For the purposes of this study, the following core concepts are defined as follows:

Art-Science Integration:

This study proposes a pedagogical reform pathway centered on Art-Science Integration, which denotes the deep integration — across curricula, methodologies, and value orientations — of art (including design, intangible cultural heritage, and aesthetics), science and technology (e.g., artificial intelligence, virtual/augmented reality, data visualization), and the humanities (e.g., ethnology, history). The objective is not the superficial layering of technologies but a fundamental reconfiguration of knowledge structures and a transformation of educational paradigms.

Human-AI Collaboration: In the context of ethnic cultural heritage education, human-AI collaboration refers to a division of labor wherein AI functions as an intelligent assistant, performing foundational and repetitive tasks such as data collection, pattern recognition, content generation, and prototype simulation. Meanwhile, human learners and educators serve as the primary interpreters of cultural meaning and arbiters of ethical judgment, retaining authority over the interpretation of cultural essence, the demarcation of ethical boundaries, the conception of original expression, and the contextual responsiveness to social realities. This model is grounded in the principle that “humans lead meaning-making; machines assist generation”, aiming to

harness technology to liberate higher-order human cognition — not to allow algorithmic logic to supplant cultural subjectivity.

Cultural Subjectivity: Cultural subjectivity emphasizes the human agent’s (particularly educators’ and learners’) authoritative role in cultural interpretation — specifically, their right to judge, express, and bear ethical responsibility for cultural meaning. Cultural representation must not be unilaterally determined by algorithmic logic or market-driven preferences. Under this premise, AI should not be regarded as a substitute creative agent but as an “intelligent collaborator” that handles basic tasks (e.g., data processing, stylistic simulation, prototype generation), thereby reserving higher-order cognitive activities — such as cultural interpretation, value judgment, ethical reflection, and original transformation — for human actors. This human-AI collaborative paradigm constitutes the foundational stance of this research.

Interdisciplinary Integration: Interdisciplinary integration in ethnic cultural heritage education entails dismantling both institutional and epistemic barriers among art, technology, and the humanities. Centered on authentic cultural issues, it organically synthesizes the knowledge systems, methodological tools, and value orientations of art and design (e.g., ornamental patterns, craft techniques, ritual aesthetics), science and technology (e.g., AI, data visualization, VR/AR), and the social sciences and humanities (e.g., ethnology, history, ethics). The resulting pedagogical structure is problem-oriented, project-based, and competency-driven. Its essence lies not in the additive aggregation of disciplinary knowledge but in knowledge reconfiguration and methodological cross-pollination, cultivating students’ integrated competencies to understand culture, translate tradition, and innovate expression under technological enablement.

Living Transmission: Living transmission does not merely refer to the performance or digital archiving of intangible cultural heritage. Rather, it denotes the sustained capacity of younger generations — cultivated through educational mechanisms — to internalize cultural logic and creatively re-embed heritage into contemporary life through ongoing acts of re-creation.

Cultural Translation: Cultural translation refers to the re-contextualization of traditional cultural elements through contemporary media, technologies, or forms, grounded in respect for the original cultural context and core values. Its success is measured not by visual resemblance but by its ability to evoke deep understanding of the source culture among audiences.

Ethnic Cultural Genes: Ethnic cultural genes denote stable, symbolically significant cultural units that can be identified, deconstructed, translated, and adapted for contemporary innovation. Examples include specific ornamental systems (e.g., Miao butterfly motifs), ritual protocols (e.g., the Zhuang “March 3rd” festival), and craft logics (e.g., the

polyphonic structure of Dong Grand Songs).

Advanced Cultural Innovation Competence: This term specifically refers to students’ integrated capacity — supported by AI — to analyze (e.g., deconstruct the cosmological worldview embedded in traditional patterns), evaluate (e.g., assess the ethical boundaries of cultural appropriation), and create (e.g., generate new expressions situated within contemporary contexts). This triad corresponds directly to the higher-order levels of Bloom’s Revised Taxonomy of Educational Objectives.

Intelligent Collaborator: An intelligent collaborator denotes AI’s role in cultural education as an auxiliary agent that performs supportive tasks — such as data processing, stylistic simulation, and prototype generation — while explicitly excluding it from meaning interpretation and value judgment. The scope and purpose of this collaboration are defined by human agents and oriented toward deepening cultural understanding, not prioritizing operational efficiency.

Liu Jia

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CONTEMPORARY TECHNOLOGIES IN STREET ART



Giorgi Gagoshidze

#Street Art #Contemporary Technologies



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Abstract

This article explores the integration of modern technologies into street art as a medium for social and political commentary. Street art has historically served as a powerful tool for public expression, protest, and cultural dialogue, often addressing pressing social and political issues. With advancements in technology, new opportunities have emerged to enhance the impact, accessibility, and interactivity of street art, transforming it into an immersive and participatory experience.

The research investigates how technologies such as Machine Learning, Augmented Reality, projection mapping, and interactive audio-visual tools can redefine the boundaries of street art. By analyzing historical examples and contemporary case studies, this study examines how these technologies can amplify the voice of artists, foster public engagement, and create meaningful discourse on societal issues. It also addresses the challenges posed by censorship and the ephemeral nature of street art, proposing innovative methods for digital preservation.

The practical component of the thesis involves the creation and implementation of technologically integrated street art projects in various urban settings. These installations aim to demonstrate how new media can enhance the communicative power of street art, foster audience interaction, and make art more accessible by bridging the gap between public spaces and everyday life. Through these projects, the research highlights the potential of street art to serve as a dynamic platform for community engagement and cultural transformation.

Ultimately, this thesis argues that the fusion of street art and modern technology not only enriches the artistic experience but also strengthens its role as a vehicle for social change. By expanding the scope and reach of street art, this study contributes to the evolving discourse on the intersection of art, technology, and public space.

A Short History of Street Art

Street art has its roots in ancient civilizations, where people used public walls to express their beliefs, document events, or communicate messages. From prehistoric cave paintings to Roman political graffiti, the act of marking walls has long served as a medium for human expression.

Origins and Evolution

- **Early Forms:** Graffiti-like inscriptions were common in ancient Rome, often used for political slogans, personal messages, or satire. Similarly, in the medieval and Renaissance periods, public spaces were decorated with murals depicting religious or civic themes.
- **20th Century Beginnings:** Modern street art emerged in the 20th century, particularly in the aftermath of urbanization and social upheavals. During the 1960s, graffiti became prominent in New York City, especially in marginalized communities, as a form of self-expression and resistance.

Key Movements and Milestones

1. 1970s – Graffiti Culture:

- Graffiti exploded as a subculture in cities like New York, with artists using tags and elaborate pieces to claim public spaces.
- Pioneers like TAKI 183 and Cornbread laid the groundwork for graffiti as a distinct urban art form.

2. 1980s – Mainstream Recognition:

- Artists such as Keith Haring and Jean-Michel Basquiat brought graffiti into galleries and mainstream culture.
- European cities, including Paris and Berlin, saw a rise in muralism and

stencil art, with figures like Blek le Rat influencing the scene.

The early 20th century also saw the significant rise of poster art, a crucial tool for visual communication in public space, carrying both propagandistic and artistic messages.

Posters, like graffiti, have been among the most significant tools of visual communication in public space since the early 20th century. Their influence on the visual language and public impact of modern street art, particularly stenciling and wheatpasting, is undeniable and provides vital historical context for this research.

3. 1990s – Emergence of Street Art:

- The term “street art” began to distinguish more conceptual and aesthetic works from traditional graffiti.
- Artists like Banksy used stencils to create politically charged imagery, often with humor and irony.

4. 2000s – Globalization and Technology:

- Social media and digital platforms helped street art reach global audiences, enabling artists to gain international recognition.
- Cities embraced street art as a tool for urban revitalization, with districts like Berlin’s Kreuzberg and London’s Shoreditch becoming hubs of creativity.

Integration with Technology

- In recent years, street art has evolved further through the incorporation of modern technologies.
- Projection Mapping: Used to animate public spaces, adding layers of meaning to static structures.
- Augmented Reality (AR): Artists create virtual extensions of their physical works, accessible via smartphones.

- **Artificial Intelligence (AI):** Collaborative art-making with AI has begun to challenge traditional notions of authorship and creativity.

Street Art Today

Modern street art transcends its rebellious origins to become a respected and dynamic form of contemporary art. While it continues to serve as a voice for social and political issues, its integration with technology has opened new possibilities, transforming public spaces into interactive, immersive experiences.

This evolving art form reflects the cultural and technological shifts of the times, remaining a vital medium for expression and connection in the urban environment.

Research Goal

The primary goal of this research is to explore how modern technologies can be integrated into street art to enhance its potential as a medium for social and political commentary. The study aims to:

1. **Investigate the Impact of Street Art:** Examine the historical and contemporary influence of street art on political and social processes
2. **Bridge Art and Technology:** Analyze how tools like augmented reality (AR), artificial intelligence (AI), audio-visual media, and interactive devices can be utilized in street art to create an immersive and engaging experience.
3. **Innovate and Experiment:** Develop and implement practical projects using modern technologies to demonstrate how street art can effectively convey messages, foster public dialogue, and increase societal engagement.

4. **Preserve Ephemeral Art:** Explore methods to document and digitally preserve street art that is inherently transient or at risk of censorship.
5. **Expand Accessibility:** Investigate how technology can bring art closer to audiences, eliminating barriers such as geographic or institutional constraints.

Research Methods

To achieve these goals, the following methods will be employed:

1. Theoretical Research

- **Literature Review:** Analyze scholarly works on street art, its historical impact, and theoretical underpinnings (e.g., postmodernism, subculture theory, and Roland Barthes' concept of "Death of the Author").
- **Case Studies:** Examine notable street art projects and artists (e.g., Banksy, JR, Blu) that incorporate technology or address social and political issues.
- **Technological Analysis:** Study existing tools and platforms for AR, AI, and audio-visual art to assess their applicability to street art.

2. Empirical Research

- **Field Studies:** Visit and document existing examples of technologically integrated street art in urban spaces.
- **Surveys and Interviews:** Collect qualitative data from artists, technologists, and audiences to understand their perspectives on the intersection of art and technology.
- **Audience Engagement Analysis:** Measure public interaction and

3. Experimental Design

- **Prototype Development:** Create small-scale installations that incorporate technologies like AR, projection mapping, soundscapes, and AI.
- **Iterative Testing:** Test prototypes in controlled environments and refine them based on audience interaction and technical performance.
- **Interactive Projects:** Develop large-scale, public-facing projects, such as interactive murals and immersive installations, to engage communities.

4. Technological Integration

- **Augmented Reality (AR):** Use AR applications to create virtual layers on physical street art.
- **Artificial Intelligence (AI):** Collaborate with AI to generate visual or audio elements and explore ethical implications.
- **Interactive Media:** Implement sensors, QR codes, or mobile apps to enable public participation in creating or interacting with the art.
- **Audio-Visual Components:** Incorporate soundscapes to add another sensory dimension to the art.

5. Documentation and Preservation

- **Digital Archiving:** Develop methods to digitally preserve ephemeral art forms, ensuring their impact extends beyond their physical lifespan.
- **Data Collection:** Record audience engagement, social media interactions, and public discourse generated by the projects.

6. Evaluation

- **Impact Assessment:** Evaluate the success of the projects based on audience engagement, media coverage, and public discourse.
- **Comparative Analysis:** Compare the outcomes of technologically integrated projects with traditional street art forms to identify strengths and areas for improvement.

This combination of theoretical and practical methods will allow the research to contribute both to academic understanding and to real-world applications in the evolving field of street art.



Year 1: Foundation and Preliminary Research

Months 1-6: Literature Review and Theoretical Framework

- **Objective:** Build a strong foundation of knowledge in street art history, its social and political impact, and its integration with modern technologies.
- **Activities:**
 - | Analyze existing street artworks with technological integrations (projection, augmented reality, AI).
 - | Study relevant theoretical concepts such as postmodernism, subculture, Death of the Author, Public art
 - | Explore case studies like Ai Weiwei, JR, Blu, Robin Rhode, Banksy, Shepherd Fairey, Kaws, Vhils, Damien Hirst, Takashi Murakami, etc.
 - | Analyze existing literature about how postmodernism and street art adopt cutting-edge technologies and create a new way of expression (Jerry Saltz, Arthur Danto, Lucy Lippard, Clement Greenberg).
 - | Analyze literature from the philosophical viewpoint that links socio-political phenomena to technological advances (Martin Heidegger, Marshall McLuhan, Walter Benjamin, Yuval Noah Harari, Luciano Floridi, Michel Serres, Gilles Deleuze, Felix Guattari).

Months 7-12: Technical Skill Development

- **Objective:** Gain proficiency in key tools and technologies.
- **Prepare for implementation of one of the public installations.**
- **Activities:**
 - | Learn software for AR/VR (e.g., Unity, Unreal Engine), projection mapping, and AI modeling according to the built tools needed for the public installation.
 - | Experiment with open-source electronic platform software and hardware such as Arduino, Raspberry Pi, and different sensors.
 - | Output: Prototype small-scale project for public installation.

Year 2: Experimentation and Intermediate Implementation

Months 1-6: Prototype Development and Testing

- **Objective:** Translate theoretical research into practice.
- **Activities:**
 - | Collaborate with urban planners and local communities to identify suitable locations for experiments.
 - | Design interactive murals or installations with preliminary technological integration (e.g., sensor-based responses, simple AR).
 - | Collect audience feedback to assess social engagement and impact.

The fusion of street art and modern technology not only enriches the artistic experience but also strengthens its role as a vehicle for social change.

By expanding the scope and reach of street art, this study contributes to the evolving discourse on the intersection of art, technology, and public space.

Months 7–12:

Intermediate Analysis and Refinement

- **Objective:** Evaluate prototypes and refine techniques.
- **Activities:**
 - | Analyze the data gathered from prototypes (audience interaction, technical performance, and social impact).
 - | Address challenges like accessibility, ethical concerns, and censorship.
 - | Start creating a comprehensive report on findings and lessons learned.
- **Output:** A refined version of prototypes ready for public display.

Year 3: Advanced Implementation and Dissertation Writing

Months 1–6:

Large-Scale Projects and Public Exhibition

- **Objective:** Implement and showcase mature projects.
- **Activities:**
 - | Deploy advanced street art installations using a combination of AR, projection mapping, sound, and AI.
 - | Partner with international artists to explore cross-cultural themes and expand the scope of the research.
 - | Document public interactions and feedback thoroughly.

Months 7–12:

Thesis Completion and Defense Preparation

- **Objective:** Synthesize research and practical findings into your dissertation.
- **Activities:**
 - | Write and organize your thesis into clearly defined chapters (Introduction, Methodology, Analysis, Case Studies, Conclusions).
 - | Include visuals, diagrams, and data from your projects to strengthen arguments.
 - | Prepare for your thesis defense with mock presentations and critiques.
- **Output:** Submission of your dissertation and final preparations for defense.

Key Milestones

- 1. End of Year 1:** Complete literature review, technical training, and small-scale prototypes.
- 2. Mid-Year 2:** Launch and analyze intermediate-level projects.
- 3. End of Year 3:** Publish findings and present a mature portfolio of projects.



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Culture-Semantic-Driven Framework For Digital Reconstruction of Cultural Heritage

A Case Study
on the Forbidden City's
Corner Tower



Bo Yang



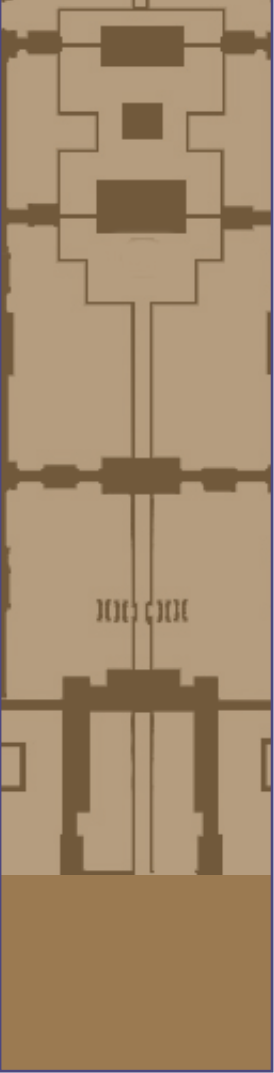
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This article is based on the presentation delivered at the C-IDEA Design Conference, held on 23-26 October 2025 at Shih Chien University, Kaohsiung Campus, Taiwan, China.

#Digital Heritage
#Parametric Modeling
#HBIM
#Arts-Based Research
#Cultural Semantics
#Narrative Revitalization
#Forbidden City

Abstract

Current digital heritage practice often focuses on creating the “digital twin”, a geometrically precise replica of an artifact. This approach can fail to capture the intangible cultural, symbolic, and narrative dimensions of heritage. This paper critiques this techno-centric model, which can reduce complex cultural meaning into simplified data. The paper proposes a new methodology called “Culturally-Semantic-Driven Digital Reconstruction”, which emphasizes ethical stewardship and narrative revitalization. The core of this method is an “Art-Led Dual-Track Framework”. This framework combines a Technical-Analytical track for parametric modeling with an Artistic-Interpretive track using Arts-Based Research (ABR). A case study of the Forbidden City’s Corner Tower in Beijing is used to show the limits of a purely technical approach. The case study also shows how the proposed dual-track framework can produce a more complete and ethically sound digital representation. The paper concludes that integrating artistic inquiry with computational modeling allows for a more thorough and honest engagement with cultural heritage.



1. Introduction

Digital technologies like parametric modeling and 3D laser scanning allow for the reconstruction of historical structures with high geometric accuracy [1]. This has led to the concept of the “digital twin”, a detailed virtual replica of a physical object, becoming a key goal in cultural heritage preservation [2]. These technical tools are useful for documentation and analysis. But their focus on physical accuracy can miss a basic fact. The value of cultural heritage is often not just in its physical form. It is also in the intangible meaning, belief, and symbolism connected to it [3]. Digitizing a structure’s form without its meaning can create a technically accurate but culturally empty model. This process can reduce complex symbolism into simple data points.

A new paradigm is needed to address this problem. This paper proposes a methodology called “Culturally-Semantic-Driven Digital Reconstruction”. This approach moves beyond the limits of the digital twin by focusing on ethical stewardship and narrative revitalization. To achieve this, the paper introduces an “Art-Led Dual-Track Framework”. This framework combines two different but related lines of inquiry. One is a Technical-Analytical Track for computational modeling. The other is an Artistic-Interpretive Track for exploring the intangible aspects of heritage through Arts-Based Research (ABR) [4].

The Forbidden City’s Corner Tower in Beijing provides a useful case study to test this framework. The tower is a physical expression of a cosmological worldview, incorporating complex philosophy and symbolism [5]. A purely technical reconstruction would

capture its form but miss its meaning. This makes the tower an ideal subject to show the limits of current methods and the potential of a culturally-semantic, art-led approach. This paper will review the theory behind the framework, describe the methodology, and then apply it to the case study to show its practical advantages.

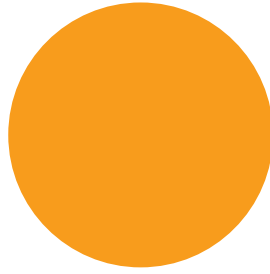
2. Theoretical Framework

2.1. The State of Digital Heritage:

Parametric Modeling and Its Limits

The technical basis for modern digital reconstruction is Heritage Building Information Modeling (HBIM). This is a special use of BIM for historic structures [6]. HBIM uses parametric design, which is an algorithm-based method for creating complex forms. This creates intelligent 3D models where each part contains both geometric and non-geometric (semantic) data [7]. The result is a central data source that can be used for restoration planning, structural analysis, and site management.

But these tools have limits when used for heritage. Standard BIM software is made for the regular parts of new buildings. It has trouble modeling the unique shapes, material decay, and irregular forms of historic structures. This can lead to a “normalization” of historical details, which causes a loss of important information [6]. A deeper problem is that this technical method can cause a “semantic thinning”. This reduces a rich system of cultural meaning to simple data. The model can show what a building looks like but has trouble explaining why it is important. It favors geometric data over the narrative and symbolic aspects of heritage [8].



2.2. The Cultural Imperative: Semantics and Narrative

A “Culturally-Semantic-Driven” approach tries to solve this problem. It is based on methods from the digital humanities. It works to put cultural meaning, historical context, and intangible values directly into the digital model. Researchers can use Semantic Web technologies like RDF and OWL to create structured, machine-readable metadata. This metadata can model the complex relationships between cultural objects, people, places, and ideas, turning the digital object into a knowledge base [9].

This semantic information provides a foundation for Narrative Revitalization. This process changes the goal of digital heritage from static preservation to active storytelling [10]. Digital storytelling uses multimedia tools to create engaging experiences that can explain complex histories to different audiences [11]. This is especially important for giving a voice to marginalized communities, allowing them to tell their own stories in a process called “restorying” [12]. Narrative revitalization helps users become active participants instead of passive observers. This can lead to a deeper, more personal understanding of historical contexts [13].

2.3. The Ethical Bedrock:

Stewardship and Responsible Representation

Any digital heritage project must be built on a solid ethical foundation. Ethical Stewardship provides a framework for the responsible management and sharing of cultural heritage [14]. It requires a move from being a passive guardian to an active custodian. This means prioritizing open dialogue and

shared authority with descendant communities and other stakeholders [15]. In the digital world, this includes making sure representations are authentic, balancing open access with the need to protect sensitive information, and reducing biases in algorithms [16].

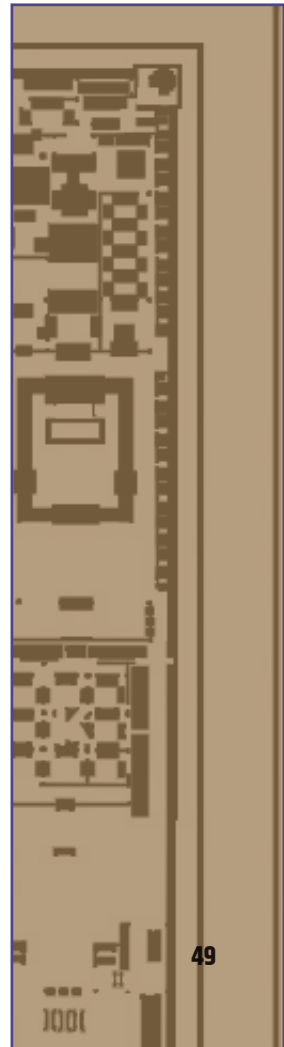
These ethical rules are important because of the risk of cultural appropriation. Digital platforms can make it easy to take cultural symbols out of context and use them for commercial purposes. This often happens when a dominant culture borrows from a minority culture [17]. Good ethical practice requires transparency. It is important to clearly show the difference between documented facts, scholarly interpretations, and myths. This follows international standards like the London Charter and the Seville Principles [18].

3. Methodology: The Art-Led Dual-Track Framework

This paper proposes the Art-Led Dual-Track Framework to combine technical precision with cultural depth. This method gives equal importance to two parallel but connected lines of inquiry. It creates a structure for them to interact and improve each other.

3.1. Arts-Based Research (ABR) as a Mode of Inquiry

The “Art-Led” part of the framework is based on Arts-Based Research (ABR). ABR is a qualitative research method that uses creative processes like visual art, performance, or poetry as a primary way to conduct research [4]. The idea behind ABR is that artistic practice is a valid way to create knowledge. It is especially useful for exploring knowled-



ge that is emotional, cultural, or based on lived experience, which can be hard to capture with traditional methods [21].

ABR is often participatory. It can challenge the traditional power balance between researchers and participants. This creates a safe space for dialogue and makes it a good method for working with diverse communities [6]. ABR is also good at generating new questions and perspectives. It can make familiar things seem strange, which challenges existing knowledge and reveals the complexity of a topic [5].

3.2. A Dual-Track Structure for Integrated Knowledge Production

The framework organizes the research into two separate but connected tracks:

- **Track A: The Technical-Analytical Track:** This track builds the computational foundation. Its main goal is accuracy and data integrity. The process is data-driven and uses methods like data capture (laser scanning, photogrammetry) and parametric modeling to build the core HBIM model from physical data. The output is quantitative and can be verified. It includes an intelligent 3D model and its related datasets.
- **Track B: The Artistic-Interpretive Track:** This track provides the cultural soul of the project. Its main goal is interpretation and critical thinking. The process is practice-led and uses creative practice, community workshops, and research into archives and oral histories [5]. The output is qualitative and subjective. It includes artworks, narrative designs, and interactive prototypes that can be interpreted in multiple ways.

The framework is “Art-Led” because the work in Track B helps shape the final form of the project. The technical model is not the final product. It is the raw material for the artistic and narrative experience [23]. The key to the

framework is the continuous feedback between the tracks. The qualitative data from Track B, such as the cultural meaning of a number, helps define important parameters for the technical model in Track A. At the same time, the technical data from Track A, like point clouds and 3D models, can be used as a canvas for the artistic work in Track B. This integrated method ensures that the final digital product is a complete synthesis of form and meaning.

4. Case Study: The Forbidden City's Corner Tower

4.1. The Semantic Density of the Corner Tower

The Forbidden City's Corner Tower is a good case study because its physical form is directly tied to its symbolic meaning. According to Zhao Guangzhi's analysis, the tower is a physical model of ancient Chinese cosmology [7]. Its design is a carefully coded expression of basic philosophical ideas:

Yin-Yang and the Five Elements: The whole structure is a balance of opposites. This can be seen in the three-tiered roof (Yang) on an eight-stepped base (Yin) (Fig.1). It is also seen in the use of metal finials (Fig. 2) on a wooden structure to symbolically prevent fire, based on the idea that “metal generates water”.

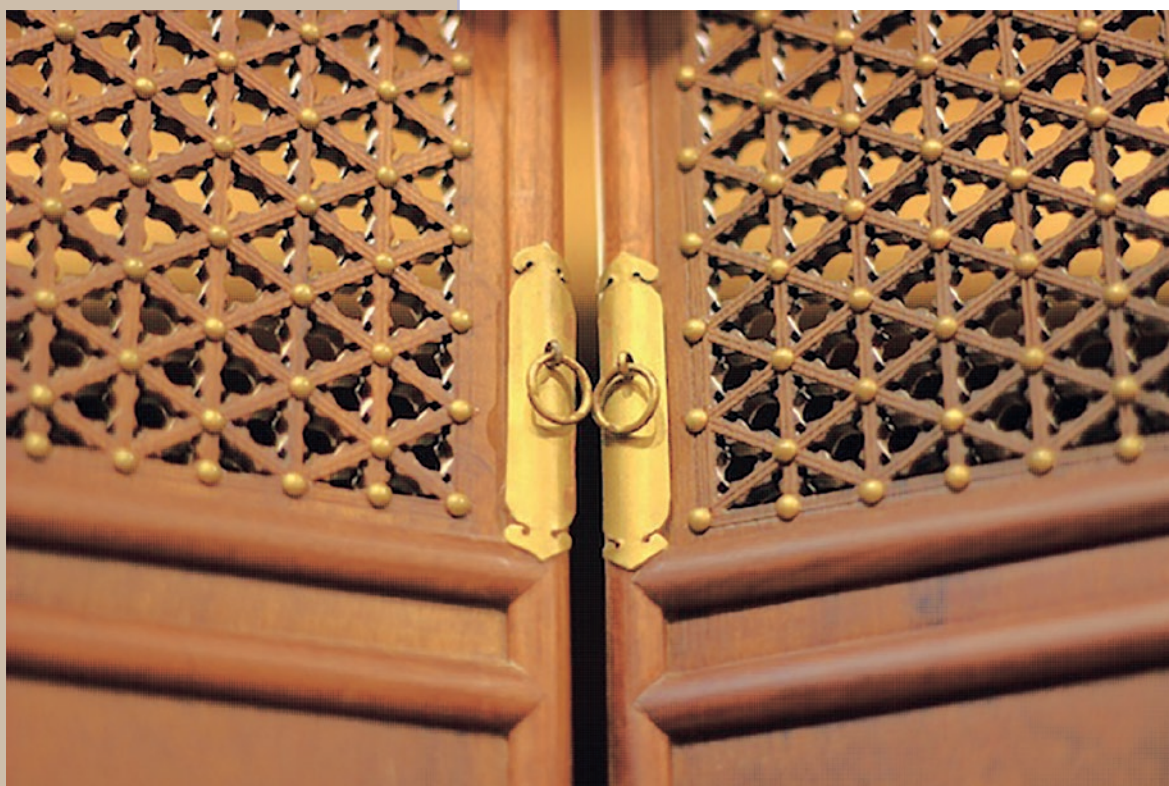
Numerical Symbolism: The design uses many auspicious numbers. The 72 roof ridges relate to the 72 Earthly Fiends of Daoism. The 28 bracket sets on the top tier represent the 28 constellations of Chinese astronomy. The repeated use of the number is connected to the “great number of heaven” from Jupiter's celestial cycle.

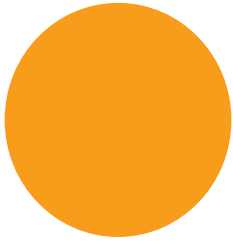
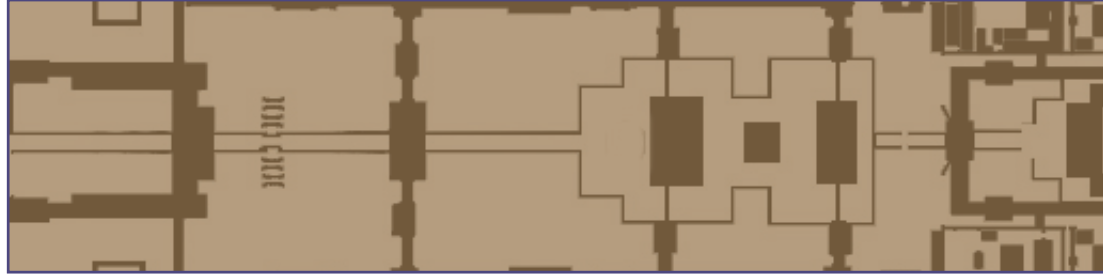
Mythology and Legend: The tower has 234 mythical beasts. Each has a specific protective role based on legends like the “nine sons of the dragon”. The entire structure was designed as a celestial pa-



↑ **Fig. 1** The Forbidden City's Corner Tower.
Source: https://m.thepaper.cn/newsDetail_forward_13081371

↓ **Fig. 2** Copper nails and handles installed on wooden doors.
Source: https://m.thepaper.cn/newsDetail_forward_13081371





lace to house the stars and protect the emperor.

A purely technical model would record these features as geometric data. It would note the 72 ridges and 28 bracket sets but would not include their cultural meaning. This would produce a silent monument, separate from the logic that makes it a “treasure”.

4.2. Applying the Dual-Track Framework

Applying the proposed framework to the Corner Tower would work as follows:

- **Track A (Technical-Analytical):** This track would start with a hybrid data capture plan. It would combine the geometric accuracy of 3D laser scanning with the detailed texture data from photogrammetry to create a complete point cloud of the tower [25]. A detailed parametric HBIM model would then be built from this data, accurately showing the tower’s complex form.

- **Track B (Artistic-Interpretive):** This track would work at the same time. It would use Zhao Guangzhi’s text and other historical sources as its main data [7]. Using ABR methods, the team would:

1. **Build a Semantic Ontology:** Map every symbolic element, like the number 72 or the Chiwu finial, to its related cosmological or mythological idea [12].

2. **Develop Narrative Prototypes:** Create interactive storyboards and animations to show the legend of Lu Ban and the cricket cage, or to explain the protective roles of the different mythical beasts [13].

3. **Create Artistic Interpretations:** Explore abstract ideas through creative work. For example, an interactive data visualization could show the astronomical alignments of the 28 constellations. A generative soundscape could be created based on the tower’s numerical patterns. These are not just illustrations but new ways to understand and experience the tower’s cultural logic [24].

Synthesis: The final digital product would be an integrated experience. A user could explore the high-fidelity HBIM model from Track A. When they interact with different parts, they would activate the semantic and narrative layers from Track B. Clicking on a roof ridge could bring up an explanation of the 72 Earthly Fiends. Looking at the sky from inside the model could show a map of the 28 constellations. The platform would offer a layered, interactive, and meaningful digital world that makes the tower’s cultural logic an experience.

5. Discussion and Implications

Applying the Art-Led Dual-Track Framework to the Corner Tower shows its potential to overcome the limits of conventional digital heritage. It directly addresses the problem of “semantic thinning” by making cultural meaning the main driver of the reconstruction. The framework provides a practical method for creating digital heritage that is not only technically accurate but also intellectually and emotionally engaging.

This approach also requires a commitment to Ethical Stewardship. The interpretation process in Track B must be transparent and collaborative. It should involve cultural experts and heritage institutions to make sure the representation is respectful and authentic [19]. The final platform must clearly separate documented reality, scholarly interpretation, and mythological narrative. This gives users the context they need for critical thinking instead of presenting a single, misleading digital truth [14].

The main limitations of this framework are the resources it requires. It needs interdisciplinary teams with skills in both computational modeling and arts-based humanities research [22]. Also, developing clear standards for judging

the quality of the work from the artistic-interpretive track is still a challenge in the field of ABR [20]. Future research should focus on creating and testing protocols for integrating the two tracks. It should also establish new evaluation methods that measure technical accuracy as well as community benefit, ethical process, and narrative impact.

6. Conclusion

The Corner Tower of the Forbidden City is more than a building; it is a cosmological diagram made of wood and tile. As a case study, it clearly shows the weakness of a digital heritage approach that focuses only on geometric replication. A digital twin of the Corner Tower would be a body without a soul.

The “Culturally-Semantic-Driven Digital Reconstruction” framework, put into practice through the “Art-Led Dual-Track Framework”, offers a more complete and responsible way forward. By combining the precision of computational modeling with the interpretive depth of artistic and humanistic inquiry, this method changes the act of digital reconstruction. It moves beyond the goal of creating a static copy of the past. Instead, it allows us to create dynamic, layered, and multi-vocal digital experiences that encourage a living dialogue with our shared heritage. By using such a framework, we can ensure that modern digital tools are used not to flatten culture, but to revitalize it, sharing its complexity, beauty, and wisdom with future generations.

Bo Yang

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Gifts in Symbolic Networks:

Information Visualization and Visual Storytelling of Ming-Dynasty Clothing Exchange



Menghe Tian



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This article is based on the presentation delivered at the C-IDEA Design Conference, held on 23-26 October 2025 at Shih Chien University, Kaohsiung Campus, Taiwan, China.

#Ming dynasty dress #Ming dynasty novel #gift exchange #information visualization
#visual communication #visual storytelling

Abstract

This research presents an innovative exploration of clothing gift exchanges depicted in Ming dynasty vernacular novels, employing information visualization and visual storytelling to uncover deep structural and symbolic patterns in historical Chinese society. By systematically analyzing 92 clothing gift episodes from representative Ming narratives, this study constructs detailed Sankey diagrams revealing previously hidden social interactions and hierarchical structures. The scholar-official class emerges as the dominant node in the gift exchange network, reinforcing their social centrality and symbolic control.

Significant findings include distinct preferences for specific garment types, fabrics, and colors in different social scenarios, betrothal gifts prominently featuring auspicious red colors and luxury fabrics, favor-seeking scenarios employing rare items to convey sincerity, reciprocal exchanges emphasizing practical equivalence, and hierarchical rewards utilizing garments as symbols of power. These insights demonstrate the complex interplay between material culture, social psychology, and symbolic communication in Ming dynasty China.

The results significantly advance the understanding of traditional Chinese gift culture and provide a robust methodological framework combining macro-scale visual analytics with micro-scale semiotic interpretation. This interdisciplinary approach opens substantial possibilities for creative research, influencing designers and researchers interested in historical textiles, social symbolism, and visual storytelling. Future applications include expanded analyses incorporating digital humanities methods, sentiment analysis, and dynamic visualization, potentially revolutionizing historical and cultural studies through integrative visual design methodologies.

1. Introduction

Gift exchange has long been recognised as a foundational mechanism through which societies negotiate obligation, status and affect. In sociology and anthropology, Marcel Mauss's theory of the gift as a performative act that transcends mere economic transactions, this study applies a visualized approach to analyze clothing exchanges in Ming dynasty novels [1]. Mauss identifies three essential obligations in gift exchanges, giving, accepting, and returning, which collectively establish and sustain social relationships. Expanding upon Mauss's insights, Mayfair Yang's ethnography of contemporary banqueting in China demonstrates how this logic is still mediated by intricate codes of face, hierarchy and moral sentiment [2]. Within the mid to late stages of China's feudal society, material tokens, particularly garments and accessories, carried additional layers of meaning. These items functioned not only as practical objects and social currency but also as visual representations of virtue, rank, or patronage. As Susan Kaiser notes, dress operates as a symbolic appearance [3], through which social actors negotiate identity within specific cultural scripts.

Chinese gift giving relies on culturally coded signs whose meanings shift with context and with participants' relative standing [4]. While scholarship on Ming material culture and dress has yielded insights into status display, sumptuary regulation, and ritual propriety, studies typically remain either interpretive text, like close reading of episodes or institution focused, with limited attention to cross text structural patterns of exchange, such as networks of who gives what to whom across multiple works. This gap obscures how symbolic garments circulate between strata in aggregate, and how scene types, which describe situations like marriage, favour seeking, reciprocity, reward, sort different fabrics, colours, and items.

Novel Title (English)	原题 (Chinese)	Author
Xingshi Yinyuan Zhuan	醒世姻緣傳	Xi Zhousheng 西周生
San Yan	醒世恆言、警世通言、	Feng Menglong 馮夢龍
Er Pai	案鵲奇初刻拍案驚奇、二刻拍	Ling Mengchu 凌濛初
Xihu Erji	西湖二集	Zhou Qing 周清
Tian Couqiao	天湊巧	Luofu Sanke 羅浮散客
Jingshi Yinyang Meng	警世陰陽夢	Lu Yunlong 陸雲龍
Weizhongxian Xiaoshuo Chijianshu	魏忠賢小說斥奸書	Changan Daoren 長安道人

Tab. 1 Corpus Information. Source: Own study

Ming dynasty vernacular novels amplify this complexity, depicting numerous objects imbued with exchange value, including dowries, betrothal gifts, gifts offered to curry favor, and even garments given to women upon the birth of a son. These chapters, saturated with characteristics of Chinese feudal society, provide critical insight into the social role of clothing during the Ming period. Clothing gifts in these novels frequently transcend individual actions, symbolizing interactions among families or social groups. In these contexts, clothing is not merely an item exchanged but also a mediating symbol that facilitates interpersonal communication. With giving, receiving, reciprocating as the logical sequence of the whole process, the expressive pattern of Chinese interpersonal interaction gradually took shape and became customary. To keep the object of analysis coherent, this study treats clothing and gift events as narrative units, in which garments or textiles are explicitly transferred between identifiable actors, together with a discernible purpose, like betrothal, favour seeking, return, reward and contextual cues like scene, fabric, colour, item type.

The focus is deliberately placed on Ming author wrote fiction set in Ming period society. Works written in later dynasties or narratives set in other periods are excluded to avoid anachronism. This delimitation allows us to observe how gift logics

operate within a relatively consistent cultural and historical frame, while still sampling different genres and voices within vernacular literature. Operationally, clothing is approached as a semiotic resource that encodes status (through fabric rarity and regulated motifs), emotion (through colour palettes) and obligation (through scene-specific conventions).

Clothing also symbolises the giver's social position and influence. When individuals bestow expensive or meaningful garments, their main purpose is not practical fulfillment for the recipient. Apart from those relatively impoverished, most recipients in these novels possess resources or qualities valuable to the giver, greater wealth, more power, or unique attributes otherwise unattainable by the giver. Such garments hold a memorial function, wearing gifted clothing symbolizes the wearer's social or familial relationships [5]. Thus, accepting clothing gifts implicitly acknowledges an obligation, with both parties sustaining and reinforcing their social bonds and ritual order through exchange. These acts of gifting fall broadly into four types, one is betrothal gifts and dowries required for marriage, second is gifts given when the donor has something to request of the recipient, third is returning gifts offered when the recipient has previously received material or immaterial help, and fourth is cross-class bestowals,

largely bearing the nature of relief. Building on these scene types, the present study asks four questions:

1. What structural patterns emerge when clothing-gift events are mapped across strata (scholar and officials, farmers, artisans, merchants, and others)?
2. How do motives (betrothal, favour-seeking, return, reward) sort specific fabrics, colours, and garment types?
3. In what ways do flows differ between intra-stratum and cross-stratum exchanges, and how do they reflect or reproduce hierarchy?
4. What additional insights into social psychology (face, obligation, gratitude) and semiotic meaning arise when textual events are visualised as networks rather than read only as isolated episodes?

Current studies seldom combine macro-scale information visualisation with semiotic analysis, the hidden who gives what to whom, and how clothing symbols travel across class boundaries, remains underexplored. Case-based interpretations are indispensable for nuance, yet they leave systemic dynamics largely invisible. A visual-analytic approach can bridge this divide by rendering cumulative patterns legible while preserving links back to scenes and actors. The world is material, and human life cannot be separated from things [6], relationships between people are built on a material basis. This act of gift giving is a relatively special form of interaction in the novels, generally divided into two directions, bidirectional, giving and returning or offering an equivalent sum once a request is fulfilled, or unidirectional, giving without receiving a return or failing to achieve the intended request. As a link in the chain of transaction, clothing is simultaneously a social symbol and an emblem of emotional and power relations. This paper consequently investigates how infographic networks can reve-

al structural patterns of Ming dynasty clothing gift exchanges and examines the additional insights into social psychology and symbolic meaning that emerge from visualizing these gifts as relational graphs.

This analysis integrates four theoretical strands, Mauss's logic of reciprocity, Blumer's symbolic-interaction paradigm, Kaiser's social psychology of dress, and best practices in infographic design. Mauss elucidates the compulsory nature of giving or receiving or returning, Blumer foregrounds meaning as socially produced in interaction, Kaiser specifies how appearance communicates identity, and visualisation principles enable these dynamics to be read at scale. Taken together, these lenses connect obligation to symbol, symbol to interaction, and interaction to structure.

Methodologically, I extract every clothing gift event from six representative Ming novels, encode giver, receiver, garment type, social rank and purposes, and render the data into Sankey graph. The study employs frequency-weighted-node-link and multilevel Sankey diagrams, node colour or size encode status and event counts, link width encodes flow intensity, secondary nodes capture motive and material attributes like fabric, colour, item.

This pipeline makes the network's directionality and composition visible while remaining auditable back to source events. Finally, the article contributes one a comparable dataset and coding scheme for clothing-gift events, second with an integrated semiotic visual analytic method for historical fiction, and the third is a set of hypotheses about hierarchy, social distance and material symbolism to be tested with larger corpora.

The remainder of the paper proceeds as follows: Section 2 details corpus, coding and visualization, Section 3 presents fabric or type or colour flows, Section 4 discusses mechanisms and limits, Section 5 concludes with contributions and future work.

2. Material and Methods

2.1. Corpus Selection and Inclusion Criteria

This study centres on the primary novel Xingshi Yinyuan Zhuan 醒世姻緣傳, supplemented by several shorter Ming dynasty narratives, yielding 92 distinct clothing gift events. The selection criteria required each text to be authored during and explicitly set in the Ming era, ensuring historical and cultural consistency. Texts depicting other dynasties or written in later periods, such as Qing dynasty authors describing Ming times, were excluded.

2.2. Event Extraction and Coding

A systematic procedure was employed to extract clothing gift events. An event qualified when the narrative explicitly described the exchange, gifting, or presentation of garments or textiles between two identifiable characters. Each event was recorded with close attention to textual detail, the giver, the receiver, the garment described, and the narrative context.

For every event, the following fields were coded:

1. Giver's social position;
2. Receiver's social position;
3. Garment, the specific item (e.g., robe, shoes, hat);
4. Colour and Fabric, as explicitly described in the original text;
5. Purpose, or scene contextual category (marriage, personal request, reciprocal return, or cross-class reward). To standardise coding, colour and fabric were categorised according to the prominence of such details in the text. If a garment's colour or fabric was specified, it was coded accordingly, if not, it was recorded as general apparel.

Drawing on established theories of symbolic interaction and gift exchange [1], [3], the symbolic purposes of each gift were classified into four categories:

1. Betrothal gift, gifts in marriage rituals, symbolising union, family status and prosperity;

2. Personal request, gifts intended to solicit assistance or favour, signalling social leverage or influence;
3. Reciprocal return, gifts given to repay previous material or immaterial help, highlighting mutual obligation;
4. Cross-class reward, gifts from higher status individuals to lower status recipients, often expressing generosity or reinforcing hierarchy.

Meanwhile, purpose coding decision rules are below. Labels were assigned using ordered cues to reduce ambiguity. First, betrothal gift when embedded in marriage negotiation or ceremony. Personal request when the gift clearly preceded a petition or was instrumental to seeking help. Reciprocal return when the gift followed a prior benefit and restored parity. Cross-class reward when hierarchical verbs or motifs signalled top-down bestowal with no expectation of equivalence.

Social classes basically were mapped to five classes: scholar-officials (士), farmers (農), artisans (工), merchants (商), others (其他), using occupational markers, titles, and the role activated in the scene. If a character held multiple identities (e.g., an ex-official turned merchant), I coded the identity the narrator mobilised to justify the exchange. Gifts conveyed via intermediaries were attributed to the principal giver or recipient, with the go-between recorded separately for auditability, coded into the social class.

It is worth noting that when determining textual inclusion, mere mention of clothing without any indication of transfer is not counted, in order to avoid redundant records. Borrowing clothes from others is likewise excluded, since the ownership has not changed hands, unless the narrative later specifies that the borrowed item was eventually transformed into a gift for other reasons. Because the corpus con-

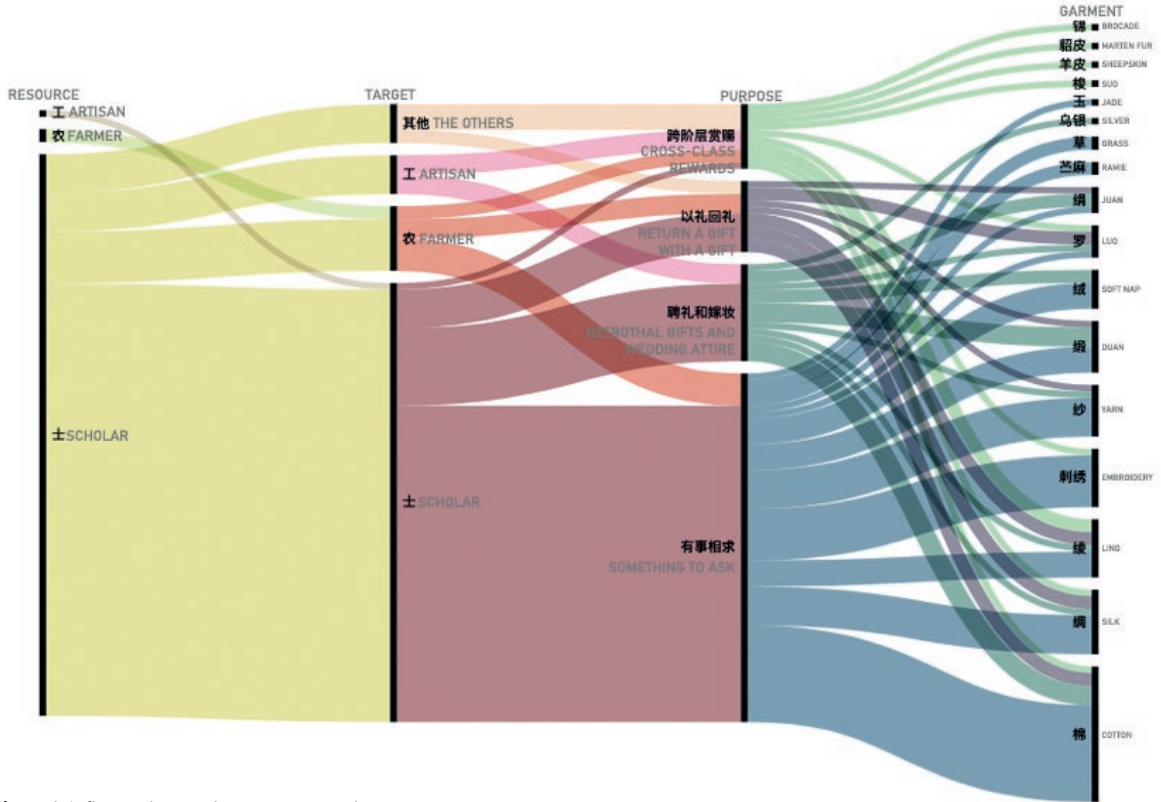


Fig. 1 Fabric flow Sankey graph. Source: Own study.

sists of Ming dynasty novels, I treat gift episodes as textual constructions indexing symbolic logics rather than direct historical records, accordingly, all counts are interpreted as relative patterns within narratives.

2.3. Data Normalisation

All events underwent rigorous normalisation. Social class was grouped into five categories, scholar-officials (士), farmers (農), artisans (工), merchants (商), and others (其他). Each clothing gift was further annotated along three dimensions, fabric (e.g., silk, cotton, brocade), type (e.g., robe, skirt, shoes), and colour (e.g., red, white, blue). Provenance of fabrics (e.g., Nanjing, Shanghai) was recorded as well and will be traced in future studies.

2.4. Data Aggregation and Visualisation

The visualisation proceeded in two sequential stages. Stage 1 is aggregation and statistical processing. After extraction and coding, data were imported into Microsoft Excel and categorised gifting interactions across four dimensions: giver's class, receiver's class, gift giving purpose, and gar-

ment attributes (fabric, type, colour). Each unique combination was counted for frequency. The aggregated dataset was exported as CSV files yielding 92 unique gifting pathways. And the second stage is multilevel Sankey diagram generation with RAWGraphs. The CSV files were uploaded to RAWGraphs, an open-source visualisation platform, using the Sankey Diagram module.

Data were mapped hierarchically as:

- Source (giver's class)
- Target (receiver's class)
- Purpose (gift symbolism)
- Garment attribute (fabric, type or colour), with link width representing frequency.

Three distinct Sankey diagrams were produced, one for each garment attribute dimension (fabric, type, colour).

2.5. Methodological Limitations

Several limitations must be acknowledged. First, as the corpus consists of fictional narratives, the frequency and nature of gift-giving may be exaggerated or stylised. Second, events involving multiple garments were recorded item by item, which

may inflate the prominence of certain fabrics or colours. Third, aggregation via Excel pivot tables depends on accurate and consistent labelling, any omissions or inconsistencies could underestimate particular pathways.

3. Results

3.1. Overall Network Characteristics

Based on the initial 45 textual records, this study statistically classified 92 unique flows of clothing gift exchange in Ming dynasty fiction. These flows involve interactions among five social strata. From the perspective of the overall network structure, the scholar occupies a central position. Of this, scholar-to-scholar exchanges make up 35% of the scholar flows. Gifts from the scholar to other strata are also notable, especially downward gifts to lower strata, which constitute about 30% of all scholar outflows. Specifically, scholar-to-farmer gifts account for 12%, scholar-to-artisans and merchants for 8% and 6% respectively, and scholar to the others for 4%. In addition, gifts from farmer, merchant and the others to the scholar stratum account for 6%, 5% and 4% respectively, reflecting the mobility of social resources and relationships. Thus, the scholar stratum, serving as a core node of social resources, clearly holds initiative within the gift economy.

3.2. Fabric Flow Analysis

Figure 1 shows the specific flows of clothing fabrics among the strata. The data indicate that the three most common fabrics are cotton (棉), embroidery (刺繡), and silk (綢), among which cotton appears most frequently, accounting for 40% of all fabric flows. Cotton is especially prevalent in exchanges within the scholar and from scholar to farmer and artisans, particularly in scenes of seeking a favour and reciprocal return. Luxury fabrics such as ling (綾), luo (羅), satin (緞) and gauze (紗) appear mainly in cross-class rewards and betrothal scenarios, making up 35%. These expensive materials are especially common when the scholar gives to lower strata, underscoring the social status and symbolic meaning carried by gifts. Among them, in betrothal scenes from scholar to

farmer, the proportion of ling and luo is noticeably higher than in other contexts.

In addition, inexpensive and practical fabrics are more often used in relief type gifting activities. For example, in relief scenes where the scholar gives to lower strata, cotton and ordinary satin frequently appear, highlighting the practical value of the gifts and their function as social relief.

3.3. Garment-Type Flow Analysis

Figure 2 displays the flows of garment types across different strata and gifting scenarios. The data show that the most common garment types are Daoist robes (道袍), trousers (褲) and skirts (裙). Mutual gifting of Daoist robes and shirts within the scholar is quite evident, underscoring the function of gifts in confirming identity and consolidating relationships.

Skirts are concentrated in betrothal scenarios, especially in flows from scholar to scholar and scholar to farmer accounting for about 20%. Accessories such as belts and hats mainly appear in downward reward contexts, given by the scholar stratum to lower strata, making up 15%, which reflects their role as symbols of status and instruments of power bestowal. By contrast, accessories like shoes, socks and other basic items (e.g., handkerchiefs) have relatively low flow frequencies, mostly appearing in seeking a favour and relief scenes, accounting for 10%. These basic garments reflect everyday practicality and social mutual aid, particularly evident in gifts from the scholar to lower strata.

3.4. Colour Flow Analysis

Figure 3 illustrates the flow characteristics of clothing colours across different gifting scenarios and strata. Red garments are the most prominent among all colours, accounting for 35% of the total colour flows, and are mainly associated with marriage. They are especially frequent in betrothal gifts from scholar to scholar and scholar to farmer.

Relatively lighter colours, such as white, blue and green, account for 30%. These colours mainly appear in relief and seeking a favour scenarios from the scholar to other strata, reflecting a so-

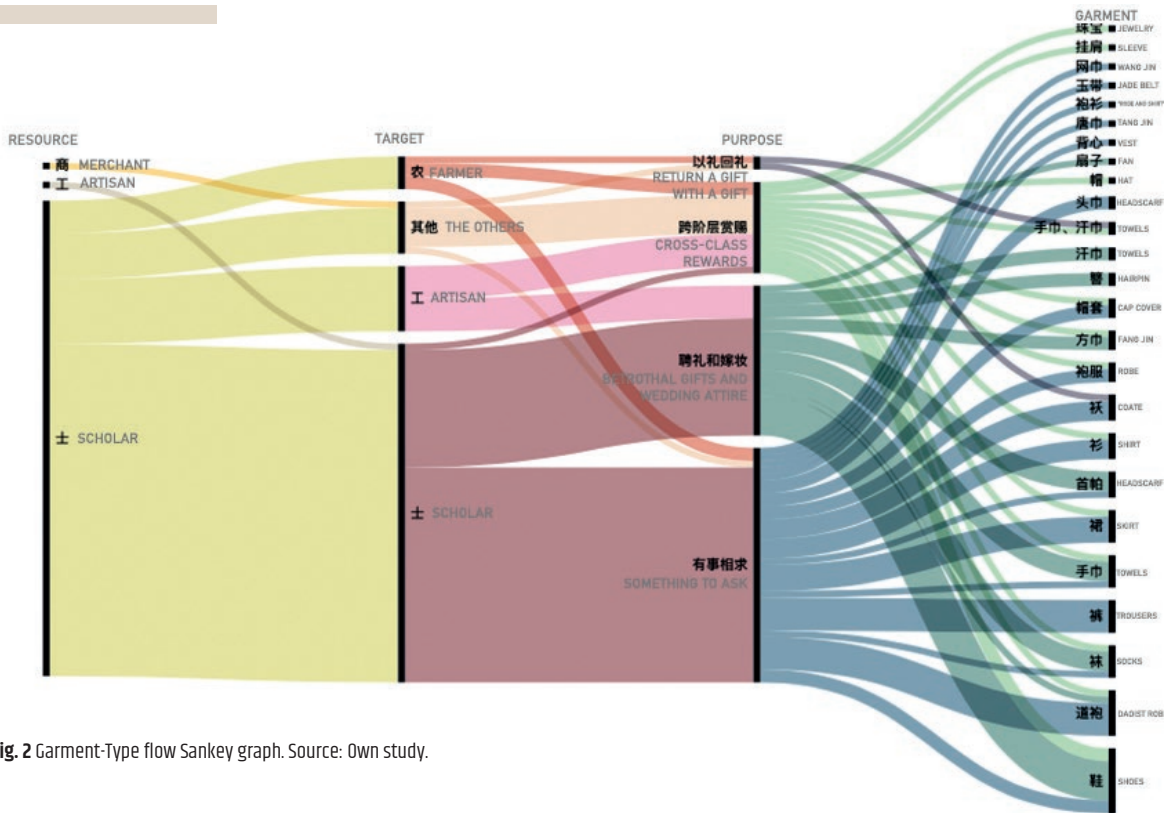


Fig. 2 Garment-Type flow Sankey graph. Source: Own study.

cially pragmatic and low-key psychological trait. Blue and green are mostly used in relief contexts, for example, when the scholar provides relief gifts to lower strata, indicating the social emotion and ritual norms encoded in clothing colour. Colours such as black and purple, which symbolise status, make up only 15% of the overall colour flows and are mainly seen in reward scenarios. Particularly when the scholar gives to other strata, these colours are usually associated with deep social relations such as power and the conferment of identity.

3.5. Supplementary Statistical Analysis

Taken together, the data show that the three most frequent gift-flow pathways are intra-scholar betrothal gifts, scholar to farmer betrothal gifts, and scholar to the others reward acts. This demonstrates that reward activities are the dominant type of cross class gift flow, reflecting a marked social hierarchy and power structure.

In sum, through detailed analysis across three dimensions, fabric, garment type and colour, this study systematically presents the social structure and symbolic meaning of clothing gift exchange in Ming dynasty fiction, revealing interaction

patterns among different strata, the symbolic functions of garments, and the complex network structure of the gift economy.

4. Discussion

4.1. Hierarchical Dominance in the Gift Economy

In ancient societies, exchanges fundamentally occurred between clans, tribes, and families, collectives for which individuals acted merely as representatives. Consequently, gifts inherently possessed political and legal attributes [1]. In contrast, the gift network depicted in Ming novels clearly places the scholar at the conspicuous center, acting as the primary hub for clothing gifts, either as individuals or small households. Scholars consistently represent the largest proportion, whether as givers or receivers, indicating that gift flows in Ming fiction revolve predominantly around a network centered on the scholar-official class. This scholar-centric gift economy mirrors and reinforces the Ming social hierarchy through gift exchanges. Most clothing gifts exhibit a vertical flow from higher to lower strata. Upper groups, including officials and gentry who possess wealth, power, or both, commonly bestow gifts upon lo-

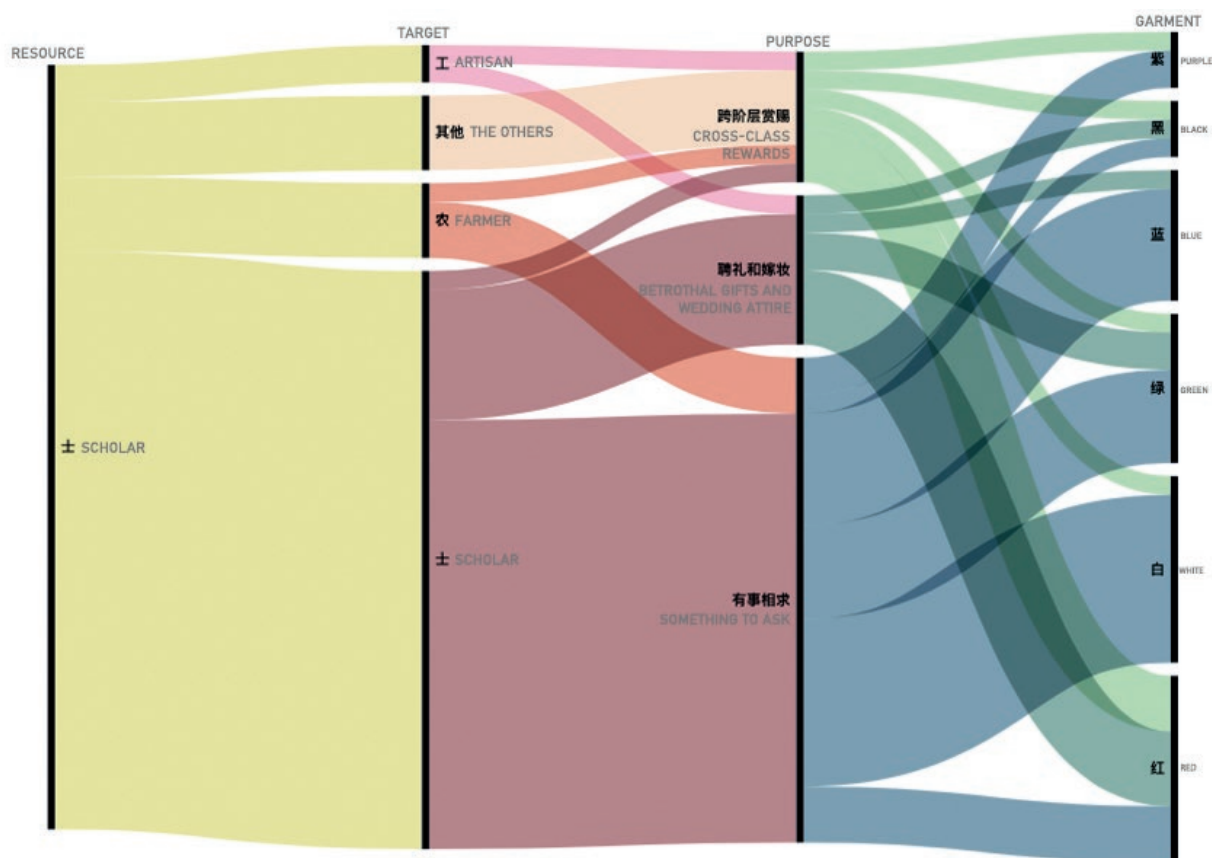


Fig. 3 Color flow Sankey graph. Source: Own study.

wer groups as displays of grace and efforts at co-optation, whereas the lower strata rarely possess the capacity to reciprocate upwards, typically remaining mere recipients.

Bourdieu points out that beneath the gentle surface of gift giving lies a process of power operation, what is accumulated is not merely favour but symbolic capital circulating in society [13]. Through such acts, the giver can accumulate social prestige and respect by offering clothing, an essential social resource, thus consolidating a superior position, safeguarding power and the benefits it brings. Imperial bestowals of clothing to ministers in the Ming era are the source of this practice, the emperor's conferral of garments as political reward fulfils ethical ritual while tightening hierarchical bonds between ruler and subject. The patterns and materials of bestowed garments often exceeded what the recipient's rank

allowed, technically transgressing dress laws, yet, because the giver was of the highest status, recipients seldom feared legal punishment. In fact, from the early Ming onward, dress regulations were bifurcated: one set for imperial and noble attire, another stipulating what commoners could not wear, to distinguish the populace from the power structure. Ming Shi 明史 states "officials and commoners alike have fixed regulations for attire. If anyone weaves or embroiders forbidden patterns such as dragons, flying fish or constellations, artisans are to be beheaded and their families exiled to border garrisons.

Those who wear them shall not be pardoned for serious crimes" [7]. Yet the very emperor who promulgated this in the Zheng tong 正統 reign, Yingzong of Ming 明英宗, was recorded as having "recklessly granted such favours even to distant princely relatives, no one cor-

rected him" [7]. In the Wanli 萬曆 reign, the emperor "granted Zhang Juzheng 張居正 a seat in a python robe" [7], reserved strictly for individuals of a specific rank, despite Zhang remaining a subject, inevitably eroding the credibility of dress regulations.

In the novels, and as counted in the charts, the eunuch Wei Zhongxian 魏忠賢 frequently appears. Wei Zhongxian Xiaoshuo Chijianshu 魏忠賢小說奸書 says he "sat in casual python-patterned factory robes on a chair," while lower-ranked officials even hired tailors to "embroider a multicoloured mang robe and present it to Eunuch Wei for his birthday". Even though it was illegal, the habit of high strata bestowing garments that defied dress laws fostered downward gift flows. In Xingshi Yinyuan Zhuan, there are multiple cases of scholar figures giving Daoist robes to people of other strata. Daoist robes were not meant for ordinary folk. Yet Tong Qi 童七, a silversmith, wears a "sky-blue crepe Daoist robe" given by someone else to meet a scholar person, in order to highlight his own status and capability, seeking greater respect. The spread of such practices blurs the identity boundaries that clothing was supposed to demarcate. Lower strata, as recipients, acknowledge and reinforce established hierarchy and social identity in accepting benefits, thereby reproducing the original status structure. This is not a sign of equality, while the upper class dispenses material rewards, it simultaneously imposes symbolic control on the lower.

Notably, rare clothing materials exhibit a distinct flow within this gift network. Precious Ming fabrics such as ling, Luo, brocade, and other costly silks were predominantly monopolized by higher classes. Their distribution carried evident exclusivity and exemplary significance, implying a top-down redistribution of resources. Within the scholar class, gifting also facilitated comparisons of wealth and power. Hence, the circulation of rare garments

reinforces hierarchical distinctions regarding who is qualified to give and who is qualified to wear certain items, subtly shifting the focus away from broader class strata. Even among scholars, gift-giving could redefine perceived social ranks. Overall, the clothing gift network in Ming fiction portrays a gift economy dominated by class distinctions, with scholars occupying central positions and actively engaging in downward gifting practices to symbolically reinforce social status and maintain social order.

4.2. The Symbolic Logic of Materials and Colours

Clothing gifts in Ming fiction are not only media of interpersonal exchange but also carriers of rich cultural symbolism. First, the materials themselves imply rank and value. Luxurious silks are closely tied to wealth and nobility in traditional culture, symbolising the giver's status and sincerity. Xingshi Yinyuan Zhuan and other works repeatedly depict these gifts, using lavish fabrics to highlight the solemnity of the gift and the importance of the recipient. By contrast, more affordable textiles such as cotton or plain cloth often appeared in relief-oriented gifting, where practicality and benevolence were emphasised. Thus, different materials carried distinct symbolic logics depending on the ceremonial scene, from prestige and solemnity in marriage and reward contexts to care and compassion in relief scenarios. Conveying sentiment and identity through precious materials reflects principles of dress semiotics, material gifts, via texture and fabric, become vehicles of social meaning, with different materials generating distinct symbolic connotations in different ceremonial contexts.

Colour in clothing gifts also bears symbolic significance in Ming culture. Red, the most auspicious color in Chinese tradition, holds an irreplaceable role in wedding and celebratory gifting. Symbolizing joy, auspiciousness, and vitality, red is believed to ward off

evil and bring good fortune. Consequently, Ming novels frequently depict the gifting of red garments during weddings, marriages, or celebrations of childbirth. The association between red clothing and celebratory events traces back to antiquity, where red was worshipped for its perceived mystical power to dispel darkness. Historically, red gained dual functions, exorcism and celebration, fitting precisely with weddings and births. Esteemed by successive rulers and regarded as the southern color, red enjoyed supreme status, believed to repel misfortune and radiate life-nurturing divinity, thus becoming a symbol of festivity and good luck [8], [9]. Ming fiction, deeply influenced by this cultural psychology, treats red attire almost as a default in auspicious events, red becomes a code for blessing and joy, generally expressing a positive mood. In *Xingshi Yinyuan Zhuan*, the scholar figure Chao Yuan 晁源 buys clothes for his concubine Zhen Ge 珍哥, including a “bright red narrow-sleeved flying-fish jacket”. Both the flying-fish motif and the colour red violate dress regulations for a courtesan, yet knowing this, she still accepts the gift and wears the flamboyant garment to go hunting with Chao Yuan, showing her delight and display. The passionate red palette clearly reveals her closeness to the core of power and her active pursuit of desire.

Besides red, white also possesses a unique symbolic logic within Ming clothing gifting. Typically associated with mourning attire symbolizing purity or grief, white garments, such as shrouds or white silk, frequently appear in novels. Unlike red’s flamboyance and passion, white in Ming fiction commonly represents simplicity and virtue. Lin Meixiang [10] notes a bibli-

cal reference that an individual must first don clean white garments to be worthy of redemption. For instance, in *Xingshi Yinyuan Zhuan*, when a scholar required a Daoist priest or nun’s assistance in performing a ritual, gifts such as “white cotton cloth for making a gown” or “white cloth skirts” were presented as respectful gestures. Other colours such as blue and green often signalled modesty and benevolence, especially in relief contexts, while black and purple were associated with dignity, solemnity, and authority in reward scenarios. These symbolic codes were not static but negotiated in interaction, allowing givers and receivers to re-interpret obligation and status through the medium of clothing.

4.3. The Social Functions of Gift Scenarios

All knowledge is situated, differing across geographical and linguistic contexts [11]. Clothing gifts in Ming novels typically appear in specific social scenarios, each conferring distinct functions and meanings upon the exchange. Textual analysis of ritual scenes allows for the categorization of gift-giving into betrothal or dowry, seeking favor, reciprocal return, and cross-class reward. Each category demonstrates a specific structure and preference, reflecting the functional divisions and psychological dynamics of Ming social interactions.

In marriage contexts, gifts primarily bless the couple and forge alliances. As significant life rituals, wedding gift types and meanings are particularly nuanced. Novels emphasize auspicious colors and symbolic beauty within wedding gifts. For instance, a bride’s natal family typically presents dowry garments like brocaded wedding clothes and red silks to convey blessings and confirm the union’s propriety.



Gifts from friends and relatives often emphasize pairs or sets, symbolizing prosperity and harmonious unions. Jin Ping Mei 金瓶梅 depicts Ximen Qing 西门庆 throwing a grand banquet for his son's marriage, receiving congratulatory gifts from many guests, including fine fabrics, gold and silver jewellery, both to honour the marriage and to curry favour with Ximen Qing. Thus, wedding gifts serve dual purposes: private blessings and public declarations, allowing network actors to reinforce bonds and display status.

However, betrothal and dowry gifts often contain a competitive edge. Givers try to flaunt family wealth and aesthetic taste with fine fabrics and sumptuous ornaments, aiming to gain the upper hand in the gift game, there is an element of ostentation. Similarly, givers attempt to prove generosity and superiority through the quantity, quality or lavishness of ritual. Thus, in Ming social novels, clothing becomes a medium of status competition. The quality and number of gifts, and the grandeur of the ceremony, all reveal the giver's inner calculations and the recipient's delicate situation [1]. In Xingshi Yinyuan Zhuan, when a shi household gives garments to a family about to be allied by marriage, it differentiates sharply. To the other family's servants, the shi give "one bolt of red satin," "a headscarf and a large floral kerchief", emphasising cost-effectiveness. But when sending a betrothal gift to the family members themselves, they "return with one bolt of red satin, a pair of silver ornaments, a square kerchief, a silver-red Ba-family silk Daoist robe, a pair of felt shoes, a pair of silk socks...", yet significantly richer and more diverse offerings to the family members themselves, highlighting social calculation and value differentiation.

When gifts appear in scenes seeking favors, their function leans more towards exchange or bribery. In Ming officialdom and everyday social life, requests typically require a peach for plum. Novels reflect this, whenever someone asks a powerful figure for help, they first present generous gifts to win favour or add weight to their plea. In Xingshi Yinyuan Zhuan, a scholar who wants to befriend the Chao family deliberately offers "two bolts of Nanjing satin, two bolts of Songjiang silk." Here, "Nanjing satin" indicates fabric made in Nanjing 南京, and "Songjiang silk" in Songjiang Shanghai 松江上海. Both regions were famed for craftsmanship, thus making these fabrics key gifts. The author highlights origin to show that while fabric is common, provenance is the mark of its value. In this process, clothing becomes a token of symbolic exchange, the giver converts economic capital into human sentiment capital, hoping for future returns. This behaviour embodies China's traditional renqing logic, gift exchange carries deferred reciprocity, giving plants the seed for later benefit. As Fei Xiaotong 费孝通 showed, Chinese interpersonal networks operate on a differential mode, renqing 人情 is crucial for maintaining ties and mutual assistance. Therefore, in favour-seeking scenes, preferred gifts are garments that signal value and sincerity, rare ling and brocade, carefully tailored formal wear, or accessories symbolising power, thereby expressing earnestness and acknowledging the recipient's status. Sometimes the gift even contains a "code", giving official boots implies a wish for promotion, presenting a crane cloak conveys hopes of longevity and continued patronage. Such choices, rich with connotation, show that under favour-seeking conditions, gifts transcend material exchange, becoming strategic social tools.

Reciprocal-return scenarios embody principles of equivalence and balance. Chinese interaction has long valued the norm of courtesy demands reciprocity, “If one goes and there is no coming, it is not ritual, if one comes and there is no going, it is also not ritual” [12]. This means that after receiving a gift, one must respond with a comparable gift to meet ritual expectations. If one only takes and never returns, feelings will fade. In Ming novels, characters often seek opportunities to return gifts after receiving them. Yet compared with other purposes, return gifts are usually cheaper and more everyday. In Tan Xin Wu 貪欣, a scholar wishes to thank the impoverished scholar Xia Fang 夏方 who once helped him, so he “takes three taels of silver from his sleeve and hands them to Xia Fang as travel money,” rather than giving a materially significant garment. In Xingshi Yinyuan Zhuan, to thank two performers who had helped him gain promotion, a shi gives them “two

bolts of sauce-coloured silk and two bolts of white silk,” intended for winter clothes, again practical, meeting urgent needs. Such return gifts are the least common in the novels, because the giver usually cannot gain a more significant benefit than before; the scene mainly highlights character, showing someone as grateful and loyal. This pattern may suggest that the relatively low value and practicality here may reflect the author’s neglect of gift value, focusing instead on the act itself, and this part deserves more excavation: in this exchange mode, gifts enter a benign cycle, without the corruption or bribery of favour-seeking, without the comparison or plunder between families in betrothal or dowry, and without the pity-laden mismatch of cross-class reward. When emotion is toned down, both sides can manage the rela-

tionship routinely, avoiding long-term indebtedness on one side. Therefore, such clothing gifts carry the giver’s feeling. In return scenarios, the choice of garment and the timing of giving reveal fine social calculation, one must express gratitude and respect without overstepping status or seeming distant. Clothing gifts become the vehicle and witness of this back-and-forth of sentiment.

Finally, reward scenarios represent strictly hierarchical giving, mostly between ruler and subject, master and servant, clothing here functions as a grant of honour and an acknowledgement of identity. Earlier I mentioned Chao Yuan giving his concubine clothes that violated her dress code, and she flaunted them, this is a typical cross-class reward in fiction. In such flows, movement is one-way, the superior gives; the inferior accepts and cannot repay equivalently. The upper class must display wealth and power; the lower class uses this chance to wear clothes they could not otherwise buy. Thus cross-class rewards carry a strong sense of mismatch. In Xingshi Yinyuan Zhuan, a scholar promises a doctor better clothes to motivate him to cure a family member, if he heals him well, they will give “another purple flower shuttle-weave Daoist robe, a gauze hat, a pair of shoes and socks”. In

*If one goes
and there
is no coming,
it is not ritual,
if one comes
and there is no going,
it is also
not ritual*

truth, such incentives have nothing to do with illness, nor will the doctor improve his skills because of them. In reward scenarios, the social-psychological meaning of clothing gifts lies in the redistribution of power and symbolic confirmation. The ruler transfers part of his prestige to the recipient, who becomes grateful and more loyal, wearing bestowed garments in public showcases the giver's benevolence and institutional authority. In this gift structure, value lies not at the economic level but at political and moral levels. Ming novels often employ such plots to praise enlightened rulers and loyal ministers, but they also hint at the danger that excessive rewards may disrupt ritual order. An issue sometimes mirrored in fiction showing that while rewards are good, they must align with ritual to maintain stability.

These distinctions show that in different scenarios, clothing gifts perform different social functions: marriage gifts stress blessing and bonding; favour-seeking gifts lean towards exchange and empowerment; return gifts emphasise balance and continuity, reward gifts are used for commendation and regulation. Preferred garment types and symbolic meanings also shift, festive scenes favour auspicious red attire, favour-seeking prefers rare and precious items; return gifts value parity; reward gifts highlight honour and identity. This rich gift culture reflects the situational wisdom of Ming social interaction, people choose appropriate clothing gifts according to occasion to achieve communicative aims and symbolic expression. In literature, these details enhance realism and the persuasiveness of relationships, offering modern readers vivid notes on Ming social life.

4.4. Methodological Limitations

This study analyses clothing gifts sociologically using Ming fiction and visualisations, nonetheless, certain methodological limits remain, requiring caution in interpreting conclusions.

First, fiction is literary creation, its plots do not necessarily mirror Ming reality. Authors, for dramatic or didactic purposes, may exaggerate or distort gift phenomena. Gift scenes often serve plot advancement and characterisation, stressing extreme luxury or unconventional interactions that may not reflect social norms. Hence, when studying gift culture through novels, we must note discrepancies between fiction and history. Although this study employs a diverse sample, it is inevitably influenced by narrative tendencies, conclusions must be cross-checked with official histories and miscellanies.

Second, subjectivity in data coding and classification may affect results. Constructing the network and counting colour or fabric preferences relied on manual extraction and annotation. Researchers' judgments are shaped by personal understanding, like, how to define a character's stratum or how to determine a scene's nature. Ambiguous cases may be interpreted differently, causing functional misclassification. This limits precision. Future work could adopt multi-coder cross-validation or computational text analysis to reduce bias and improve consistency.

Third, because the focus is on class relations, other social factors (e.g., gender) were not fully incorporated. Gender plays a crucial role in Ming clothing gift culture, but my network uses class nodes and does not distinguish gender, so I cannot reveal male–female differences in gifting behaviour, which is an analytical limitation. Similarly, regional and urban rural differences were not mentioned in novels, though they could significantly impact gift culture. Therefore, current conclusions reflect general trends and do not cover the entire picture.

Finally, visualisation itself imposes constraints. We used static tools such as Sankey diagrams, which, while intuitively showing flows and composition, are limited in presenting dynamic evolution and complex relations. Changes

in gift networks across periods, or an individual's growth within the network, cannot be fully shown. Readers unfamiliar with graphic symbols may misread flows or proportions. Moreover, charts cannot cover all details, narrative contexts and emotional value of specific gifts still require textual analysis.

In sum, this study's data selection and methods have the above limits. These shortcomings remind us to remain cautious when interpreting clothing-gift phenomena in Ming fiction and to acknowledge the situational applicability of conclusions.

Looking over the whole, I find that clothing gifts in Ming novels are far from mere decorative incidents, they are deeply embedded in social relations and cultural value systems. Clearly, the gift system contains three equally important obligations, one must give, one must accept, and one must return. Refusing to give or accept amounts to severing ties or even declaring war [1]. The dominance of the scholar in the gift network highlights the mechanism by which gifts operate as social capital. Preferences for precious materials and colours reflect the richness of traditional dress symbolism, and functional differentiation across scenarios showcases the subtle orchestration of human relations in the Ming world. The social logic and symbolic structure embodied in Ming clothing gifts enrich our knowledge of Ming culture, in the intertwining of material and sentiment, the values of giving gifts to scholar, the rules of renqing 人情, and the workings of

power. This is precisely the main contribution of this study to understanding Ming culture.

5. Conclusion

5.1. Research Question's findings

The main findings are as follows. First, the structural pattern of the gift network. Clothing gifts in Ming social novels are not decorative plot devices but integral components of social relationships and cultural value systems. Visualisation reveals the scholar-gentry stratum as the dominant hub, confirming that gifts operate as social capital that regulates relations across classes. Gift flows display clear directionality, downward rewards that recipients cannot repay, upward offerings that seek favour, and horizontal exchanges such as betrothal or reciprocal gifts between peers, patterns that remain hidden without graphical analysis. Second, the symbolic meaning of clothing gifts. Different scenarios endow gifts with distinct functions and meanings: red wedding garments symbolise auspicious union; rare items in favour-seeking scenes highlight interest-based exchange; pragmatic reciprocals express gratitude and parity; honourific rewards signal power and identity. Preferences for materials and colours underscore the richness of traditional dress semiotics, demonstrating that garments transcend materiality to become media for negotiating status and emotion.

Third, social psychology and ritual norms. Narrative evidence shows that Ming society adhered to Mauss's

threefold obligation of giving, accepting, and returning. Both givers and recipients carefully calibrated timing and value to preserve face and uphold ritual propriety, revealing the subtle social psychology embedded in gift exchange.

These results respond to the questions raised in the Introduction, information-visualised gift networks can reveal the hidden structure of “who gives what to whom” in Ming clothing gifts, presenting a clear social-relations map, meanwhile, combining macro-level graphs with textual semiotic interpretation allows us to uncover the social-psychological motives and cultural symbolic meanings behind these gifts. In other words, this study demonstrates that visualising narrative textual data can effectively display the structural patterns of gift exchange and lead to a deeper understanding of interpersonal operations and symbolic meanings.

5.2. Research Contributions

The main contributions lie in deepening academic understanding and innovating cross-disciplinary methods. On the level of academic understanding, this study quantitatively organises and qualitatively interprets gift episodes in Ming novels, enriching scholarly knowledge of Ming clothing gift culture. It reveals the unique role of gifts in maintaining hierarchical order, conveying cultural symbols, and regulating interpersonal relationships in Ming society. The social logic and symbolic structure embodied in clothing gifts provide a new perspective for understanding Ming culture.

On the methodological level, this study constructs, for the first time, a visualised network map of Ming clothing gifts, transforming dispersed textual gift events into a single, interactive information graphic. This visual synthesis method realises a combination of macro information visualisation and micro-semiotic interpretation, the graphic narrative method developed here expands the toolbox of traditional historical-literary research and provides a new analytical paradigm.

5.3. Research Limitations

Despite these achievements, several limitations remain and require caution in interpretation. First, source limitations. This study relies mainly on Ming novels, which, as literary creations, may exaggerate or stylise gift episodes and do not necessarily reflect historical reality. Authors may heighten certain gifting phenomena for dramatic or didactic purposes; thus the conclusions need corroboration from official histories and miscellanies. Second, subjectivity in coding. Extracting and classifying gift events involves researcher judgement. In dividing character strata and determining gifting scenarios, our criteria may not be fine-grained enough. Third, limited analytical dimensions. This study focuses mainly on class relations in gift exchange, other social factors (such as gender, region, urban–rural differences) were not sufficiently incorporated.

Finally, limitations of visualisation. The Sankey diagram is a static visualisation tool. Although it intuitively

displays gift flows and category composition, it is inadequate for showing dynamic evolution and complex associations. Static charts cannot present changes in gift networks over time or the evolution of an individual's relationships. Readers unfamiliar with graphic symbols may misinterpret flows and proportions. Furthermore, charts cannot cover all narrative details, specific gift contexts and emotional values still require textual explanation. Therefore, visualisation should be regarded as an analytical tool rather than the conclusion itself; its conveyed information must be interpreted cautiously to avoid overextension.

5.4. Future Research Directions

Research on clothing gifts in Ming novels provides key insights into traditional Chinese gift culture but still leaves significant scope for theoretical and methodological innovation. Future work could model the relationship between social distance and gift value, testing whether greater hierarchy or relational distance correlates with more expensive or formal gifts, while closer ties favour practical or symbolic items. This approach might draw on social network analysis and economic anthropology to quantify interpersonal distance and correlate it with gift rank. Digital humanities techniques such as sentiment analysis and semantic networks could further uncover emotional tones and conceptual associations embedded in gifting narratives, revealing macro-patterns beyond manual reading. A first priority is to operationalise the relationship between social distance and gift value/formality. Building on initial finding, that greater hierarchy or relational distance tends to produce more expensive or ceremonially formal gifts, future work can construct a social distance index that synthesises

- (a) relative class positions
- (b) role differences, and
- (c) kinship or affiliation proximity.

Gift value can be proxied by fabric prestige, colour symbolism associated with rank or ritual, item type, and provenance signals. Dynamic visualisation and cross-media comparison, linking novels with letters, drama, and painting, would allow reconstruction of gift culture in a more multidimensional form. The current visualisations capture structural patterns, but time and plot progression remain underexplored. A dynamic approach would segment long narratives by chapters and build time slice networks to observe how gift flows thicken around turning points. Finally, integrating Mauss's reciprocity, Fei Xiaotong's differential mode, and Bourdieu's symbolic capital could establish a gift-economy framework rooted in Chinese experience yet broadly explanatory.

Summary

This research presents an innovative exploration of clothing gift exchanges depicted in Ming dynasty vernacular novels, employing information visualization and visual storytelling to uncover deep structural and symbolic patterns in historical Chinese society. By systematically analyzing 92 clothing gift episodes from representative Ming narratives, this study constructs detailed Sankey diagrams revealing previously hidden social interactions and hierarchical structures. The scholar-official class emerges as the dominant node in the gift exchange network, reinforcing their social centrality and symbolic control.

Significant findings include distinct preferences for specific garment types, fabrics, and colors in different social scenarios, betrothal gifts prominently featuring auspicious red colors and luxury fabrics, favor-seeking scenarios employing rare items to convey sincerity, reciprocal exchanges emphasizing practical equivalence, and hierarchical rewards utilizing garments as symbols of power. These insights demonstrate

the complex interplay between material culture, social psychology, and symbolic communication in Ming dynasty China.

The results significantly advance the understanding of traditional Chinese gift culture and provide a robust methodological framework combining macro-scale visual analytics with micro-scale semiotic interpretation. This interdisciplinary approach opens substantial possibilities for creative research, influencing designers and researchers interested in historical textiles, social symbolism, and visual storytelling. Future applications include expanded analyses incorporating digital humanities methods, sentiment analysis, and dynamic visualization, potentially revolutionizing historical and cultural studies through integrative visual design methodologies.

Menghe Tian

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Liang Ruonan

Fostering Farmer Agency through Co-Design:

A Study on Social Innovation for Rural Revitalization in China

#Farmer Agency #Social Innovation #Rural Revitalization
#Co-Design #Urban-Rural Disparity

Abstract

The rural revitalization strategy in China represents a systemic effort, encompassing the core elements of industry, culture, ecology, talent, and organization. Within this framework, fostering farmer agency in industrial development is critical, serving as the key to leveraging local talent and building a foundational industry. Empowering farmers enables the extension of industrial chains, resource integration, and ultimately, a more comprehensive revitalization. Adopting a social innovation perspective, this paper investigates a “farmer + designer” collaborative pathway for industrial transfor-

mation based on local resources. Guided by the principles of “sourcing materials locally, sourcing meaning locally, and sourcing craftsmanship locally” (就地取材, 就地取意, 就地取艺), the research explores how design-driven social innovation can activate rural communities by enhancing farmer agency. This process establishes an actionable pathway for integrated revitalization across the five key dimensions: industry, culture, talent, ecology, and organization. The study concludes by offering a potential model for design-driven approaches to rural revitalization.



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Introduction

Rural revitalization in China has long been recognized as a systemic project integrating the revitalization of industry, culture, ecology, organization, and talent. Scholars such as Liang Shuming [1] and Wen Tiejun [2] have emphasized that genuine transformation must originate from within rural society – through the activation of farmers’ internal motivation and collective agency – rather than through unilateral external intervention. In this sense, the key to sustainable revitalization lies in cultivating endogenous innovation from the bottom up.

In recent years, design has emerged as a critical medium for linking technology, culture, and community development. When design enters the rural context, it no longer serves merely as a form of aesthetic creation, but as a social innovation mechanism capable of reorganizing local resources and empowering residents. However, while extensive studies have examined policy- or economy-driven rural revitalization, few have addressed how design-driven social innovation can operationalize farmer agency and promote self-sustaining development at the community level.

To address this gap, this study proposes a “farmer + designer” collaborative model that explores how design empowerment can stimulate the creativity of rural residents, extend industrial value chains, and rebuild local socio-material systems. By combining theoretical analysis with on-site field experiments, the research aims to construct a design framework that enhances local resilience and contributes to a globally relevant model of design-driven rural transformation.

Chapter 1: Literature Review: Design for Social Innovation

Globally, the discourse of design for social innovation has evolved over the past two decades as a response to complex social, environmental, and cultural challenges. Manzini [11] defines it as the use of design to enable new forms of collaboration and value co-creation within communities. Sangiorgi [12] and Meroni & Sangiorgi [13] further emphasize its role in shaping participatory systems that promote social transformation through collective creativity. Murray et al. [15] and Jégou & Manzini [14] highlight that social innovation not only generates new products and services but also fosters new relationships and institutional frameworks that sustain change.

These international perspectives converge on one principle: design acts as a catalyst for empowering communities to imagine and construct their own futures. Yet, in the context of China’s rural revitalization, the question remains—how can design translate this global concept into a locally grounded practice that mobilizes farmers’ agency and revitalizes traditional industries?

Existing Chinese scholarship (Pi et al. [3]; Duan & Zhang [9]; Wei et al. [6]) has explored design’s role in empowering rural culture and industry, but such studies often remain at the level of case description or policy alignment. They rarely build a theoretical bridge between design empowerment and social innovation mechanisms. Thus, there is a pressing need for a model that articulates how design, when embedded in everyday rural production, can si-

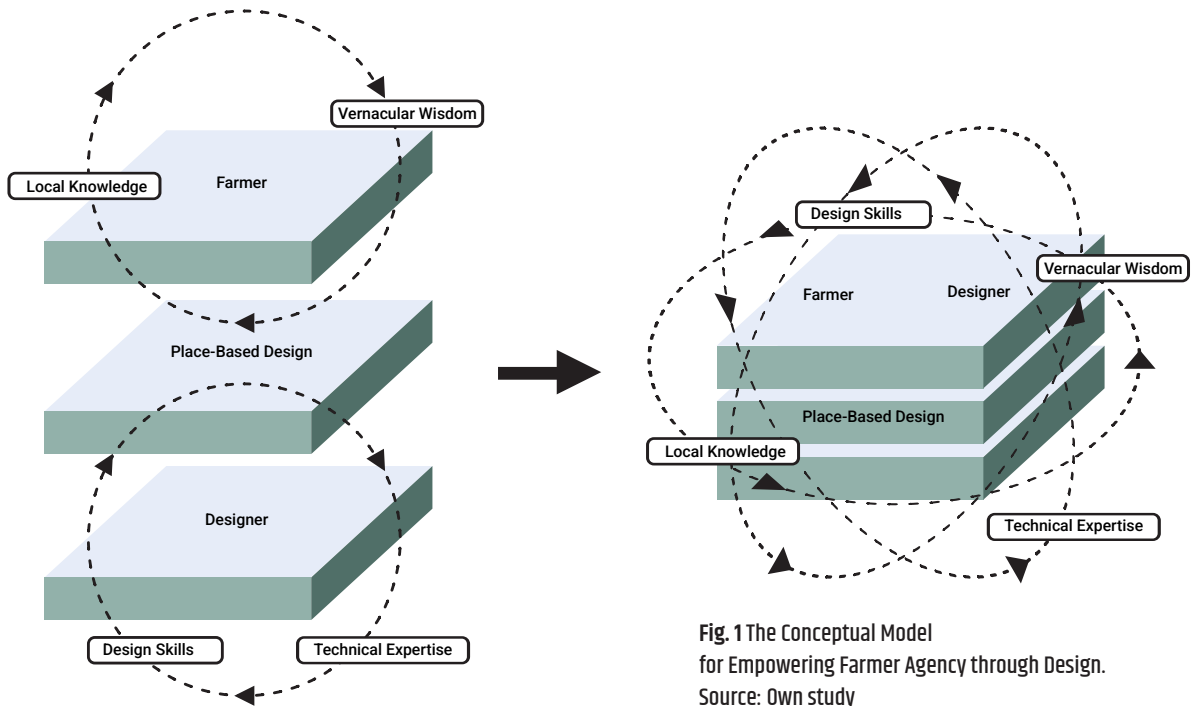


Fig. 1 The Conceptual Model for Empowering Farmer Agency through Design.
Source: Own study

multaneously serve as a driver of social innovation and as a platform for cultivating local creative talent.

This research responds to that need by situating China's rural revitalization within the international discourse of design for social innovation. It proposes a practice-based framework — the “farmer + designer” model — that operationalizes design empowerment through three locally grounded principles: sourcing materials locally, sourcing meaning locally, and sourcing craftsmanship locally. The model not only advances the theory of participatory design but also contributes to the global dialogue on how design can mediate between technological rationality and cultural value in sustainable rural transformation.

Chapter 2: Design as a Mediator for the Advantages and Disadvantages of Rural Development

Although rural areas offer diverse local products, plural cultures, and organizational flexibility, outdated information access and conservative mindsets constrain their sustainable development, creating an urgent need for innovation

to stimulate internal vitality. In terms of regional development, the countryside faces three primary disadvantages, which I term the “Three Great Gaps”. Yet, from a design perspective, the potential energy created by these gaps can be precisely transformed into design impetus. Within this context, a social innovation model of “farmer + designer” collaboration can, on one hand, provide products for industrial development that are rooted in local resources. On the other hand, it can cultivate farmers' innovative consciousness and capabilities in the process, thereby mediating the inherent advantages and disadvantages of rural regional development.

1. The Rural Disadvantages Generated by the “Three Great Gaps”

In the processes of urbanization, industrialization, and modernization, traditional rural crafts and industries have increasingly declined relative to their urban counterparts. This “urban-centrism” has gradually generated “Three Great Gaps” — in income, resources, and location. Following the logic of Fei Xiaotong's “differential mode of asso-

ciation”, the farther a village is from a city, the more pronounced its developmental disadvantages become.

First is the urban-rural income gap. In 2022, the per capita disposable income of urban residents in China were 49,283 yuan, compared to 20,133 yuan for rural residents. In 2023, these figures were 51,821 yuan and 21,691 yuan, respectively. In 2024, they were 54,188 yuan and 23,119 yuan. While these data show a continuous rise in the income of rural residents, the gap with urban incomes remains immense. This disparity has led to a large-scale migration of farmers to cities, exacerbating the problem of “hollowed-out villages”.

Second is the urban-rural resource gap. Disparities exist between urban and rural areas in terms of resource endowments, cultural traditions, and infrastructure. Situated in natural environments, the ecological landscapes of rural rivers and mountains stand in stark contrast to the urban scenery of high-rise buildings. When viewed through an urban-centric lens, the countryside is perceived as having numerous disadvantages in industrial-core economic and social development, perennially judged as a “lesser city”.

Third is the urban-rural locational gap. Regional development typically radiates from a central point, with the influence diminishing toward the periphery. Consequently, locational differences are widening the disparities not only between urban and rural areas but also among different rural areas themselves. Taking the Chongqing region as an example, towns close to the main

metropolitan circle are relatively economically developed, whereas remote mountainous areas far from the city center, such as Wuxi, Youyang, Xiushan, and Chengkou, are significantly more underdeveloped.

2. From the “Potential Energy of Gaps” to “Design Impetus”

Imbalanced urban-rural development has created the “Three Great Gaps”, which now serve as both the logical starting point for design empowerment and the driving force for generating unique design practices. In other words, the income gap can be converted into an advantage in human resources; the resource gap highlights the intrinsic value of rural ecology, culture, and agriculture; and the locational gap underscores the importance of inheriting and protecting rural culture. In this light, the potential energy created by the “Three Great Gaps” can be transformed into design impetus.

First, design promotes the value-addition of the rural labor force. Design can empower farmers’ creativity. By replacing the simple manual labor often found in cities with purposeful, planned creative activities rooted in the local context, design can facilitate value-addition for the rural workforce, attracting farmers to return from cities and continuously replenishing the rural population.

Second, design activates the advantages of rural ecological and humanistic resources. In a sense, design can bestow contemporaneity and modernity upon old things. Following this line of tho-



Fig. 2 Overlooked and Neglected Local Materials in the Village. Source: Own study.



Fig. 3 Outcomes of Collaborative Materials Research by the “Farmer + Designer” Team. Source: Own study.

ught, the natural ecosystems of the countryside serve as a raw material library for design, while the unique cultural elements of agricultural civilization, such as folk customs and solar terms, can become sources of inspiration and creative content. The rural “production-life-ecology” system, distinct from that of the city, enables the countryside to achieve a unique form of modern transformation, radiating new vitality in the current era.

Third, design inherits and innovates local culture (乡土文化, *xiāngtǔ wénhuà*). The greater the locational distance from a metropolitan center, the better the preservation of original local culture, and the richer its cultural value distinct from the city. This local culture is a systemic integration of production methods, lifestyles, customs, ethics, and craft traditions formed under agricultural and pastoral life. In the contemporary context, it is the very source of “nostalgia” (乡愁, *xiāngchóu*), spiritual sustenance, and meaning. Design can excavate, inherit, and innovate this local culture, thereby empowering the countryside’s cultural value and enhancing its industrial value in the new era.

Rural areas possess enormous potential and advantages. However, when the farmer community is unable to exercise its agency, rural industry

loses its driving force, and the advantages in ecology, culture, and organization cannot be extended. It is necessary to empower farmers with innovation while empowering industry with design. This approach can open the closed internal loop of the village and solve the problems of lacking innovation and contemporaneity, thus promoting rural revitalization at a systemic level [3].

3. Empowering Farmer Agency to Convert “Potential Energy” into “Impetus”

As General Secretary Xi Jinping pointed out, “Development is the top priority, talent is the primary resource, and innovation is the primary driving force”. Therefore, relying on the revitalization of rural talent can empower rural culture, organization, and ecology, which in turn can leverage industrial revitalization. In other words: farmers are the core resource of the countryside, and cultivating their agency is the key to promoting rural industrial revitalization [4]. For a long time, farmers have been on the periphery of modern industrial knowledge. To enable their leap toward the center, a simple top-down “infusion” model of training has proven to have minimal effect. The “farmer + designer” model explored in this paper enhances farmers’ innovativeness within a framework of

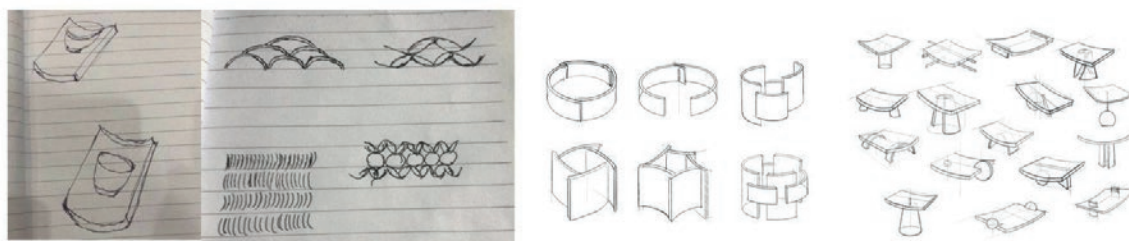


Fig. 4 From the Farmer's Initial Sketch to the Designer's Refined Draft. Source: Own study.



Fig. 5 A Farmer and a Designer Collaborating on the Design Proposal. Source: Own study.

collaborative design, unifying inherent rural ways of thinking with new industrial technologies [5]. This model encourages farmers' active involvement; through this legitimate participation, they can make the leap to the center of modern industrial knowledge. Through theoretical deduction, the "farmer + designer" model can be seen as a crucial method for promoting farmer agency, as it empowers farmers with a certain degree of scientific and technological knowledge, innovative capacity, and market sensitivity. In local design practice, the rural experience and local wisdom of farmers can ferment with the design skills and scientific knowledge of designers, achieving a result where one plus one is greater than two. Thus, the design practice of the "farmer + designer" model can truly serve to empower farmers.

Chapter 3: Field Experiments of the "Farmer + Designer" Model

Building upon the theoretical framework, the project team established practical bases in several villages, including the Daning River Basin in the Three Gorges Reservoir area,

Chetian Township in Youyang County, Wangjiawan in Chongqing's Beibei

District, and Xiaota Village in Chongqing's Hechuan District. In these locations, we initiated on-site design activities by forming collaborative "farmer + designer" teams with local villagers.

1. Materials Research in the "Farmer + Designer" Model

On-site design must prioritize the protection and sustainable development of the rural ecology. Guided by the principle of "sourcing materials locally" (就地取材, jiùdì qǔcái), the project team focused on neglected and discarded ecological materials such as dried corn, peanut shells, and dry straw. After collecting suitable raw materials, each "farmer + designer" team proposed and discussed material processing ideas to determine the optimal solution.

This long-term collaborative research yielded rich results. For instance, using ancient papermaking methods, the team created fiber paper from materials like *Broussonetia papyrifera* (mulberry tree) bark and corn leaves, suitable for product packaging design. By employing mold-making techniques, they replicated textures from stones and corn, which could be applied to product surface decoration. Through natural dyeing techniques, pigment extracts were obtained



Fig. 6 A Showcase of the Final Design Outcomes. Source: Own study.



Fig. 7 A Designer Demonstrating a Production Technique to a Local Farmer. Source: Own study.

from materials like purple potatoes and persimmons, which could be used for product color enhancement. In total, this research phase utilized 18 types of rural materials, yielding 186 distinct materials samples and summarizing 56 material reprocessing methods, culminating in the establishment of a Rural Materials CMF (Color, Materials, Finish) Library. The results of this materials research demonstrate that, while adhering to a philosophy of green and circular development, the “farmer + designer” team achieved a significant fusion of traditional rural wisdom and modern industrial technology. This not only broadened the possibilities for applying rural materials in design but also revitalized the life force of local resources.

2. Design Creation Inspired by Farmer Wisdom.

While the materials research provided a rich foundation for design, further enhancing farmers’

agency required strengthening their voice (话语权, huàyǔquán) in the design process itself. This was guided by the principle of “sourcing meaning locally” (就地取意, jiùdì qǔyì). During a product design project in Xiaota Village using roof tiles (瓦片, wǎpiàn) as the primary material, the team proposed using local characteristic elements as the design’s entry point.

In the creative process, the team invited local farmers to draw the first draft sketches based on their own understanding and interpretation of roof tiles. The designers then applied design methods such as symmetry, reconstruction, and transformation to the farmers’ drawings, creating a second draft that also considered the product’s function. Finally, the optimal solution was selected through discussion with the farmers, and the final work was produced using local materials (Fig. 6). In this manner, the design process was no lon-

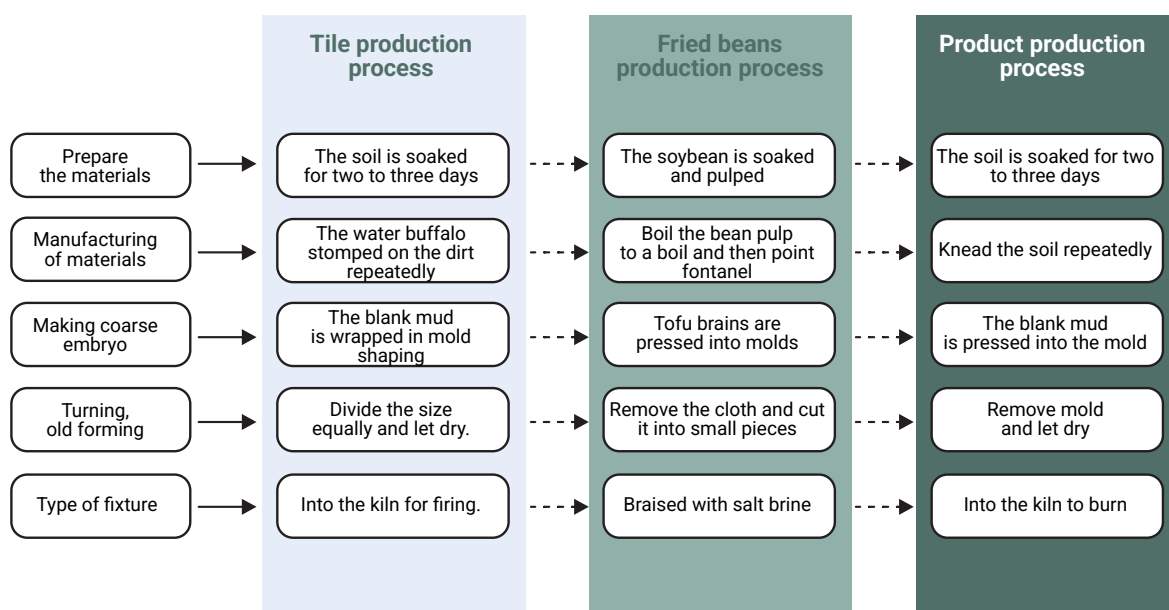


Fig. 8 The Skill Transformation Flowchart. Source: Own study.

ger dominated by the designer but was centered on the subjective cognition of the farmers. The farmers' influence on the creative direction was continuously reinforced, and their agency was subtly yet significantly made prominent. The "farmer + designer" team completed a series of works, including Zàozhǐ Qījiàn (Papermaking Lacquerware), Chǐchuán Piànwǎ (A Piece of a Rafter, a Slice of a Tile), and Zàoshí Qījiàn (Stonemaking Lacquerware). These works integrated rural ecological materials, characteristic local elements, and traditional wisdom. They extended the local, rustic attributes to the greatest extent in terms of materials, conception, and fabrication, while simultaneously creating an intersection with scientific technology, industrial production, and design thinking. The final products embody both traditional rural culture and a modern life aesthetic.

3. Establishing a Production Process Supported by Rural Handicraft Skills.

Although the "farmer + designer" teams completed numerous on-site works, moving from product development to market promotion, sales, and economic

monetization required solving a primary challenge: enabling ordinary farmers to quickly master the production methods. The solution was guided by the principle of "sourcing craftsmanship locally" (就地取艺, jiùdì qǔyì). Early collaboration revealed that farmers were generally proficient in the cooking techniques for local specialty foods and were familiar with the step-by-step processes of handicrafts. Using this as an entry point, the team proposed using cooking techniques as a conceptual starting point to link traditional handicraft with industrial production. Applying design thinking, the teams created isomorphic transformations that broke down the barriers between handicraft and industrial manufacturing.

An example is the isomorphic transformation among the production processes for traditional roof tiles, bean products, and the new tile-based products (Fig. 8). For the farmers, the transformed production process became simple and easy to master. They could rely on the strength of their kinship networks to implement distributed production within the family, which was conducive to increasing the speed



Fig. 9 The Retail Stall for Cultural and Creative Products from the Daning River Basin. Source: Own study.

of production. This approach established a balance between traditional skills and modern production models, accelerating the fusion of handicraft and scientific technology, and promoting the establishment of new models for rural production organizations.

4. The Social Effects of the “Farmer + Designer” Model

The project team established its first collaborative base in Chetian Township, Youyang, in September 2017, with only five participating farmers. By October 2021, six bases had been established across Chongqing, the number of participating farmers had grown to 158, and 83 on-site design works had been completed. In the Daning River Basin, the development of 32 new products based on local resources led to a significant increase in industrial value. For example, after a design upgrade, the price of a common wooden comb rose from 29 yuan to 139 yuan, leading to a substantial increase in the income of local farmers. In another case,

Xiaota Village resident Zhong Weibing, in collaboration with the project team, designed a series of tile-based products. This venture successfully transformed an old, dilapidated tile factory into a modern workshop producing tile-based tourist souvenirs. He also mobilized his relatives to join the production effort. The circulation of these tile products has, in turn, helped to promote the unique architectural landscape of Xiaota Village’s traditional tile-roofed houses.

Chapter 4: Construction of the “Farmer + Designer” Design Model

Under the shared vision of rural revitalization, farmers, as the primary subjects, require innovation to drive the extension and upgrading of industrial chains. Designers, in turn, need creative solutions to fulfill their mission and responsibility in the new era. The inherent coupling of these needs has catalyzed the “farmer + designer” model.

Based on the preceding theoretical deductions and on-site practical validations, this model re-



presents a new construction of meaning within the broader context of the rural revitalization strategy. By summarizing its structural innovation, practical principles, and value realization, we can construct a formal “farmer + designer” design model that offers a referenceable path for design-driven rural revitalization.

Structural Innovation of the “Farmer + Designer” Design Model

The “farmer + designer” design model facilitates equal collaboration by integrating “the local advantages of farmers with the creative advantages of designers”, “the traditional wisdom of farmers with the creative abilities of designers”, and “the rural life experiences of farmers with the design skills of designers”. Based on our practical experience, the on-site creation process of this model can be divided into two main stages: The Collaborative Research Stage: Farmers and designers jointly research local resources. They then synthesize their findings from an objective standpoint to identify design opportunities. The Participatory Design Stage: Farmers provide the initial design elements or identify opportunities. Designers then undertake the formal design work. Finally, the production process is adapted from existing rural handicraft skills to be feasible for local production (Fig. 10). This structure forms a cyclical, closed-loop model that enables mutual learning and the co-creation of design Outcomes.

Practical Principles of the “Farmer + Designer” Design Model

The goal of the “farmer + designer” model is to stimulate farmer agency, which in turn drives the systemic revitalization of the countryside. In practice, the project team proposed the three principles of sourcing materials, meaning, and craftsmanship locally. These can be understood through a more evocative framework: achieving the goal of “enhancing local potential” (提地能, tí dì néng) by “gripping the

land” (抓地力, zhuā dì lì), “connecting with the local spirit” (接地气, jiē dì qì), and “following the lay of the land” (顺地势, shùn dì shì). Sourcing Materials Locally – “Gripping the Land”: This principle prioritizes local resources in product development [6] to highlight rural characteristics. While maintaining the authenticity of rural life, materials that are common and easily accessible are chosen. This approach lowers the barrier for farmers to participate in research and production and maximizes the product’s local, rustic character, thereby expanding the utilization space of rural resources [7]. Sourcing Meaning Locally – “Connecting with the Local Spirit”: This principle uses local cultural characteristics as core design elements [8]. Different cultural contexts yield different perspectives; for example, farming culture may be a unique life experience for an urban consumer, but it is daily labor for a farmer. In the “farmer + designer” model, the designer must guide farmers to exercise their agency, sharpen their observation of local features, and extract the unique spiritual meanings and local flavors to be used innovatively in design practice.

Sourcing Craftsmanship Locally – “Following the Lay of the Land”: It relies on local skills to establish production methods that farmers can easily master. Rural skills include handicrafts like bamboo and rattan weaving, culinary arts like making zongzi (rice dumplings) and cured meats, and construction techniques like ramming earth for walls [9]. To farmers, these are not just ordinary life skills but also a spiritual culture worthy of inheritance. Using these skills as the technical foundation for production [10] enhances farmers’ confidence in their own abilities, simplifies the production process, helps popularize the methods, alleviates the pressure on farmers to learn complex modern production models, and simultaneously inherits and innovates traditional handicrafts.

Value Realization of the “Farmer + Designer” Design Model

The “farmer + designer” design model connects two distinct actors — farmers and designers— to co-develop local products aligned with contemporary life aesthetics, activating the rural resource system of “people, place, and things” (人、地、物). Its purpose is to stimulate the transformation of farmers from their traditional roles into innovative farmers for the new era. This encourages them to proactively use “rural resources as product raw materials”, “handicraft skills as product production processes”, and “rural culture to empower new products” as their own design entry points. Therefore, the model can innovate local products while simultaneously cultivating local innovative talent. This, in turn, helps to reconstruct the rural “production, life, and ecology” system, form new production and organization chains, and mitigate the conflict between modern industrial technology and rural handicraft skills. At the same time, the innovative products effectively enhance the value of rural resources, driving industrial revitalization in a way that is linked to the revitalization of talent, culture, ecology, and organization.

Summary

The “farmer + designer” design model is a social innovation model born from real-world needs. It constructs a cooperative system that drives the five dimensions of rural revitalization through innovation, leveraging talent as the “primary resource” in this process. The model strengthens the fusion of modern technology, design aesthetics, and rural culture, promoting the development of both material wealth and spiritual civilization in the countryside. The study provides a practical pathway for converting rural ecological resources into value through design. It has expanded the methods for cultivating local talent, activated farmer agency, and optimized the organizational system for empowering rural resources through innovation. In doing so, it offers a transferable and referenceable framework for promoting the national strategy of rural revitalization.

Liang Ruonan

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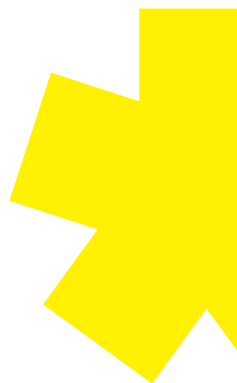
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