Journal of Artificial Intelligence Practice (2025)
Clausius Scientific Press, Canada

DOI: 10.23977/jaip.2025.080103
ISSN 2371-8412 Vol. 8 Num. 1

Exploration of Rural Micro-Renewal in the Context of AIGC and Cross-Media Integration: A Case Study of an Artistic Practice in Wupu Village

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Keywords: AIGC; Cross-Media; Rural Micro-Renewal; Wupu Village; Artistic Rural Development

Abstract: With the ongoing implementation of the rural revitalization strategy, generative artificial intelligence content (AIGC) technology has demonstrated significant potential in the field of rural renewal. This paper, starting from a case study of artistic rural development in Wupu Village, Huzhou, Zhejiang Province, explores how AIGC and cross-media integration can drive micro-renewal in rural areas through ecological education, multi-modal experiences, and digital communication. The ecological content generated by AIGC, through rich interactive forms, can enhance participants' observation of nature and multi-sensory cognition, realizing the effective integration of "technology and education. "Multi-modal expressions that combine visual, tactile, and auditory elements create an immersive artistic experience, which can further strengthen the audience's sense of identity with rural culture. Using the design practice case of Wupu Village as a focal point, this paper extracts specific application strategies for AIGC and cross-media integration in rural micro-renewal, discussing their potential for development in future rural revitalization efforts.

1. Introduction

With the explosive growth of ChatGPT both domestically and internationally, artificial intelligence has once again attracted widespread attention and heated discussion.In September 2022, the China Academy of Information and Communications Technology and JD Exploration Research Institute jointly released the "Artificial Intelligence Generated Content (AIGC) White Paper (2022)," defining AIGC as "a type of content classified from the perspective of content producers, a method of content production, and a set of technologies for automatically generating content" [1]. Against the backdrop of the rapid development of artificial intelligence and digital technology, generative artificial intelligence content (AIGC) is gradually becoming an important force in promoting artistic creation and optimizing rural habitat. AIGC not only provides artists with

innovative creative tools but also empowers rural micro-renewal through automated content generation and multi-media expression.Rural micro-renewal is a small-scale, low-cost, and high-efficiency renewal strategy, focusing on localized and precise spatial improvements in rural environments to promote the gradual realization of rural revitalization.As one of the core strategies for China's social development, rural revitalization involves multi-dimensional construction needs, including culture, ecology, and economy. The application of AIGC in rural micro-renewal promotes the innovation and inheritance of rural culture, and injects new momentum for sustainable development.

In recent years, the integration of AI and art has gradually become a core topic in the fields of art studies and technology research.In 1936, Benjamin in his work *The Work of Art in the Age of Mechanical Reproduction*, proposed that the development of technology has altered the "aura" of art, enabling it to be replicated and disseminated through technological means.With the continuous innovation of AI technology, artworks can not only be replicated but also generated in new artistic forms through AIGC.Wu, J, based on the classification of the design process and task categories, explored ways in which AIGC can be embedded in the design field, summarizing four task categories: creative divergence, design generation, assistance and advice, and evaluation and feedback [2]. Hang Ren explored strategies for embedding artistic cultural elements into agricultural product packaging design, using AIGC platforms (such as MidJourney and Qiyu AI) to efficiently extract and reconstruct traditional patterns, colors, and images to enhance the aesthetic and cultural value of products.

Wen Wang, based on AIGC technology, explored the historical context of the development of intangible cultural heritage in Guizhou Province, analyzing its digital development path from four aspects: reconstructing the protection model of intangible cultural heritage, innovating its transmission dimensions, developing products of intangible cultural heritage, and expanding its dissemination channels [4]. In the context of the integration of AI technology and cross-media art, Jenkins' (2006) "transmedia storytelling" theory points out that diverse media can enhance the richness of information transmission. AIGC,through multi-modal generation and real-time data processing, enables artistic creation to transcend a single medium, presenting multi-layered artistic expressions in the interaction of multiple media. In the process of rural micro-renewal, the integration of artificial intelligence and art also holds potential for cultural inheritance and ecological education. By combining AI technology with cross-media art, rural micro-renewal can achieve low-cost immersive experiences, transforming the ecological and cultural features of rural areas into more intuitive and vivid artistic displays, thereby promoting the protection and inheritance of rural culture.

This paper uses a case study of the "Wupu Village Neighboring Ecological Circle Observation" as an example to explore how AI and cross-media art can be integrated to promote cultural dissemination and ecological education in rural micro-renewal. It analyzes how AIGC and cross-media art can realize ecological education, cultural promotion, and immersive experiences in rural micro-renewal, exploring their potential in promoting rural cultural identity and future artistic rural development.

2. Literature Review and Case Analysis

The rise of generative artificial intelligence content (AIGC) technology has transformed the methods of artistic creation and simultaneously introduced innovations in the theoretical and practical approaches to art. AIGC technology, utilizing deep learning models such as Generative Adversarial Networks (GAN), enables automated generation in art creation, altering the process of artistic production and fostering innovations in both the form and content of art. In contrast to

traditional art creation, AIGC does not involve manual drawing by artists; instead, it uses algorithms to learn elements such as artistic style, color, and composition from large datasets, automatically generating works that adhere to specific thematic content. AIGC generates art content such as text, images, and music through deep learning algorithms, and is pushing cross-media art from traditional manual creation to machine-assisted or even automatically generated creation models. This transformation disrupts traditional boundaries between artists and audiences, as well as between media and content, offering a new theoretical foundation and creative practice for multimodal, cross-media art.

2.1 The Application of AIGC and Cross-Media Technology in the Field of Art Rural Construction

The Art Management and Cultural Industry Summer School at Peking University applied creative rural development in the Bai Ma Huatian project with a micro-renewal of the "Bai Ma Fantasy Bridge" (Figure1). The practice emphasized a balance between creativity and reality, the core value of locality, the deep integration of culture and technology, and interdisciplinary collaboration. At the same time, the design team deeply explored the love stories within the local "Ba culture," using them as the narrative thread for graphic storytelling. They employed AIGC and used the themes "Ba Kingdom's Mysteries", "Pleasure in the Mountains and Waters," and "Cultural and Creative Exhibitions," referencing the Matisse style for graphic design, generating vivid cultural scrolls and creating a mysterious atmosphere for the "Ba Kingdom's Mysteries. "In this way, the design team infused the bridge with deeper local cultural meaning, promoting the innovative transformation of indigenous culture.

The "Art Rural Construction: More Than Just a Concept — Yaoli Youth Artist Residency Program" in Yaoli Village, Zhejiang Province, has implemented many local rural creative works within a span of 15 days. Among them, the "Love Kiln Installation: Yaoli Village AR Cultural Tourism Interactive Design" exemplifies the application of AIGC and cross-media technology in art rural construction (Figure2). This project is a 15-day children-friendly rural space transformation initiative, aimed at improving the lack of entertainment facilities for children in Yaoli Village through three major modules: a dance floor interactive installation, hopscotch floor painting, and Yaoli Village AR cultural tourism experience. The project utilizes the main corridor of Yaoli's main road as a medium, designing a hopscotch floor painting with waltz steps that integrates the village's IP image, "Yaolili," symbolizing the joy and vitality of children's childhood. At the same time, augmented reality technology is incorporated into the hopscotch floor painting, enabling 3D interactive effects through scanning with a WeChat mini-program, thereby enhancing the fun of the project. Additionally, cultural and creative products are introduced, providing visitors with an immersive experience.

(Image Source: WeChat Official Account of 'Baima Flower Field Construction Society')

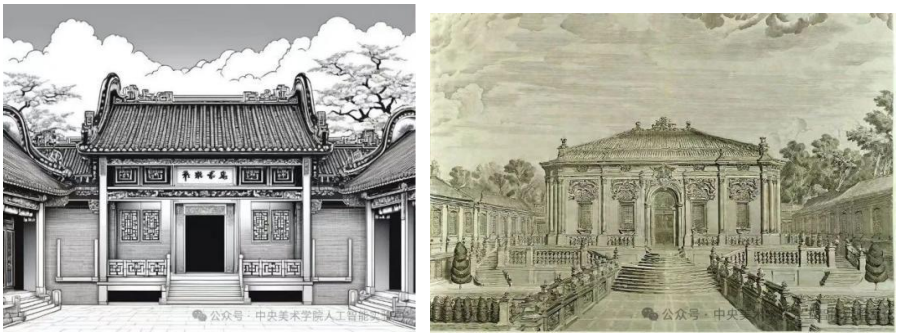
Figure 1: Artistic Practice of the Baima Fantasy Feather Bridge Renovation

(Image Source: WeChat Official Account of 'Yaoli Bu Yi Yang')

Figure 2: AR Cultural Tourism Interactive Design of Yaoli Village

2.2 Artistic Creation in the Context of Cross-Media Integration and AIGC

The core characteristic of cross-media art is the integration of different media forms for artistic creation. With the involvement of AIGC, such multimodal artistic practices leverage a comprehensive sensory experience—including visual, auditory, and tactile stimuli—to break free from the limitations of single-media approaches. AIGC technology leverages algorithm-generated content to drive innovation and expansion in the multimodal expression of cross-media art. In the realm of visual arts, AIGC is capable of generating static two-dimensional images and creating immersive three-dimensional spatial experiences through the integration of augmented reality (AR) and virtual reality (VR) technologies. For example, the Central Academy of Fine Arts' AI laboratory developed the "CAFA Xuanhui Model," a large-scale art AI model that generates artworks consistent with the aesthetic principles of traditional Chinese art (Figure3). This was achieved through extensive learning of traditional Chinese artistic techniques and styles, in conjunction with deep learning methods such as generative adversarial networks (GANs).The technology deeply assimilates the techniques and stylistic characteristics of traditional Chinese painting. Through deep learning and iterative training, it captures the essence of Chinese artistic styles with precision, effectively showcasing the distinctive charm and spirit of Chinese aesthetics during the creative process.



(Source: WeChat Official Account of the Artificial Intelligence Laboratory, Central Academy of Fine Arts)

Figure 3: 'Xu án Hu ìLarge Model' Training Results from the Central Academy of Fine Arts

3. "Observation of the Wupu Village Neighboring Ecosystem" Rural Innovation Design Practice

Wupu Village is located in the northeastern part of Zhili Town, Wuxing District, Huzhou City, Zhejiang Province, south of Binhu Avenue, with Huxue Road running through the village, offering convenient transportation and a picturesque natural environment. Wupu Village, together with several nearby lakeside villages, forms the "Taihu Xinlou Port" area. These villages have been collectively developed as a demonstration area for ecological protection and cultural revitalization, focusing on "Beautiful Countryside" construction and rural ecological experience projects. This design practice takes the waterfront forest space of Wupu Village as the research subject, observing the species categories within the spatial ecosystem and conducting scientific investigations of local plants. Through a practical approach of "spatial creation + visual design" and the application of the "micro-transformation" concept, the project aims to draw attention to the shared and symbiotic spaces of the village, emphasize the vitality of plants and animals, and activate underutilized areas within the village. Starting from the cross-media interaction between AIGC and art, this project explores cross-media strategies for AIGC-driven rural artistic development, seeking new pathways for advancing artistic rural construction (Figure 4).

Figure 4: Analysis of Current Issues in the Site

3.1 The Educational Value of AIGC-Generated Content in Science Popularization and Culture

In the "Observation of the Wupu Village Neighboring Ecosystem" initiative, the author utilized ink-style plant learning cards generated by AIGC software, which carry significant value for science popularization and cultural education. By modifying the base model and adjusting textual and image prompts, the stylization of images for different regions can be achieved. For instance, by using an illustration-style base model and inputting keywords such as "minimalist" and "ink painting," images in an ink painting style can be generated. These learning cards serve as an accessible learning medium for children to understand and observe the field. Each card features an ink-style illustration of a plant in the field, aligning with children's aesthetic preferences and fostering interest in natural aesthetics through the integration of traditional cultural elements. Additionally, children can interact with the plants in the space, matching the contents of the cards with the corresponding plants. This interactive and active learning approach enhances their natural

observation skills and ecological awareness.

By employing MidJourney and QiYu AI technologies to generate these learning cards, children's learning of ecological knowledge moves beyond traditional abstract teaching methods to an approach that combines visual sensory and interactive experiences, enabling a gradual understanding of plant growth environments and ecological functions. This form of science popularization, combining art and education, stimulates children's curiosity while facilitating progressive learning through the learning cards. It fosters a deeper understanding of ecosystems (Figure 5) and achieves an organic integration of art and nature in education (Figures 6-7).

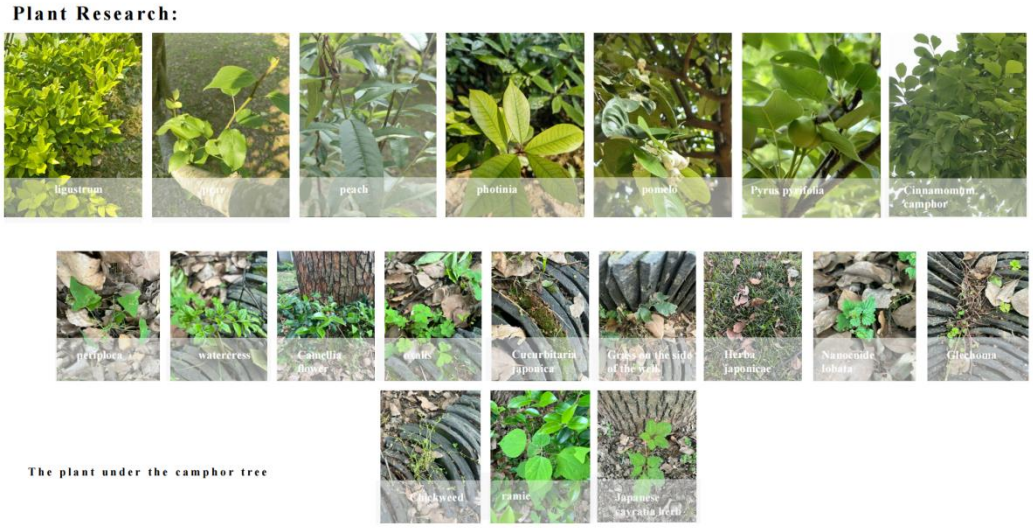


Figure 5: Research on Riverside Forest Plants in Wupu Village

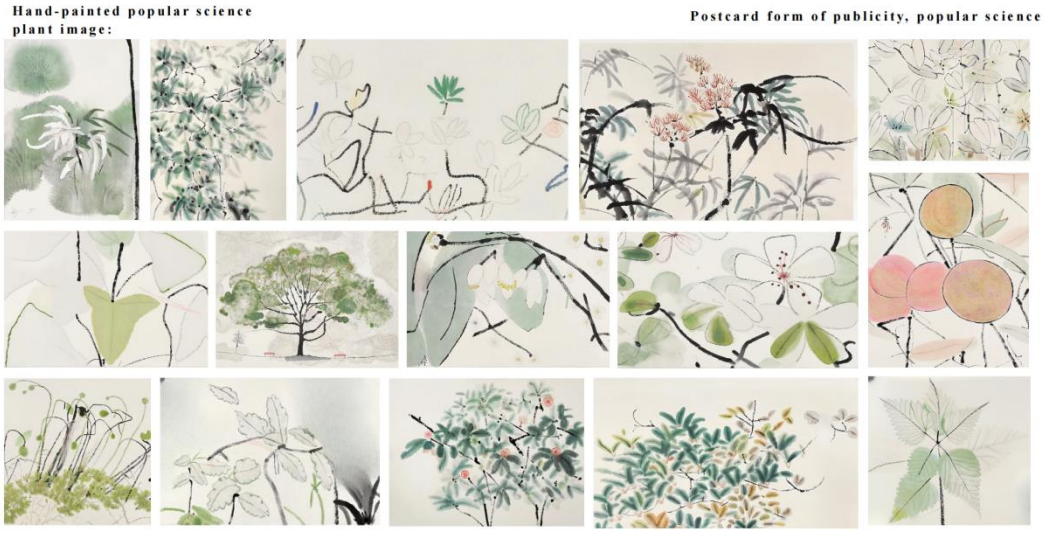


Figure 6: AIGC-Generated Ink Style Ecological Plant Images for Popular Science

Figure 7: Postcard Science Education On-Site Scene

3.2 Cross-Media Interactive Experiential Art Installation Design

Figure 8: Artistic Installation Design Rendering (Not Yet Constructed)

In this project, the design of the "Shadow Theater" integrates the functions of "viewing, interaction, and experience." While strengthening the connection between children and nature, it enriches participants' perception of natural ecology through artistic expression. Its spatial positioning is defined as an interactive learning and exploration space within a forest—an ecological study base. The site's primary values are "art-science integration," "interactive

exploration," and "community hub." It aims to leverage the natural resources of Wupu Village to establish the site as an ecological education center, providing schools and visitors with educational content about the local ecosystem, biodiversity, and environmental conservation. Through interactive exhibitions and on-site explanations, the project enhances visitors' understanding of and interest in ecological conservation. "Light and shadow interaction" is a key feature of the project and an essential method for achieving the integration of art and nature. The reflective light and shadow effects of stainless steel serve as cues for children to locate plants. Guided by these effects, children search for plants corresponding to their experience cards in the ecological space, enhancing their observational skills and spatial awareness.

This interactive and exploratory learning approach successfully transitions ecological education from a traditional classroom model to an immersive experiential activity, enabling children to directly perceive and learn ecological knowledge in a natural environment. Additionally, the "Shadow Theater" can host regular community events and workshops to encourage resident participation and interaction, further strengthening its role as a community hub. This diversified functional positioning not only enhances the site's educational value but also offers new perspectives and models for the sustainable development of Wupu Village (Figure8).

3.3 Application of AIGC-Generated Local Cultural Elements

By organizing the visual cultural elements of the village, decorative patterns and color schemes from traditional rural architecture are extracted and used by AIGC to generate graphic elements applicable to Art Rural Construction. These elements are innovatively incorporated into activity areas within public spaces through arrangements and combinations. Furthermore, by transforming intangible cultural heritage symbols or content into accessible everyday products and branding them, emotional connections between people and culture can be effectively established [3]. The application of these local cultural elements enriches the artistic expression of public spaces, strengthens villagers' sense of identity with local rural culture, and promotes the inheritance and development of rural culture (Figure9).

Figure 9: Extraction of architectural elements in the village

4. Exploration of AIGC and Cross-Media Strategies for Rural Micro-Renewal: A Case Study of Art Rural Construction

In future Art Rural Construction, AIGC technology will empower the field through generative content and cross-media forms of expression, thereby promoting the integrated development of rural culture, ecology, and education. Starting from the case study of the "Wupu Village Neighboring Ecological Circle Observation," this explores the innovative integration of AIGC and Art Rural Construction, proposing the following design strategies.

4.1 Data-Driven Approach: Digital Integration and Exploration of Local Cultural Resources

As the core material for rural art construction, local cultural resources play a key role through AIGC, which is driven by data. On one hand, in terms of data collection and integration, it focuses on corpus construction and multi-modal analysis, which are the primary tasks of digitizing local cultural resources. AIGC, by building large-scale corpora, collects a wide range of multi-source information, including rural historical documents, architectural blueprints, folklore photographs, oral histories, and more. It integrates text, images, audio, and other multi-modal data, deeply analyzing local cultural resources. This results in a cultural database that encompasses symbols, styles, narratives, and other comprehensive content, providing a solid data foundation for subsequent stages. It achieves the systematic integration of traditionally fragmented cultural resources and lays the groundwork for symbol generation and design optimization [5].

4.2 Content Narrative: Optimizing the Context of Educational Knowledge through AIGC-Generated Content

The application of AIGC (Generative Artificial Intelligence Content) technology today enables the innovative and efficient generation of dynamic content, which can be applied in rural science education. This includes elements such as experience cards, interactive games, and visual knowledge maps, with content that can be dynamically adjusted based on real-time environments or learners' needs. The main target group for rural science education consists of children and adolescents, who are curious about new things and are in a stage of rapid knowledge absorption. The dynamic science content generated by AIGC aligns perfectly with their cognitive characteristics. For example, generative experience cards present the features of natural elements on a visual interactive page, allowing learners to observe natural phenomena in real time and directly participate in nature observation and ecological exploration activities. AIGC can dynamically optimize generated content based on real-time environmental changes, such as plant growth variations due to seasonal transitions, or based on feedback about learners' progress in knowledge acquisition. This game-like experience not only enhances the educational enjoyment but also stimulates learners' curiosity and enthusiasm for exploring ecosystems, thus forming an initial educational loop of "ecological content - audience - interaction" [6].

4.3 Cross-Media Multi-Modal Experience to Enhance Cultural Identity

In cross-media Art Rural Construction, multi-modal expressions provide audiences with an immersive ecological education experience. By integrating various senses such as vision, hearing, and touch, AIGC-generated content creates possibilities for audiences to experience nature through multi-sensory dimensions. For example, during the interactive experience, the design of the "Shadow Theater" in this Art Rural Construction combines actual light and shadow effects, tactile feedback, and visual elements to enhance the participants' multi-dimensional perception of natural

phenomena. Furthermore, incorporating local cultural symbols into ecological education helps foster the audience's sense of identity with the village's culture. For example, in this practice, AIGC-generated ink-style plant experience cards not only display the ecological features of plants but also allow viewers to appreciate the beauty of traditional culture. This multi-modal experience enhances the cultural appeal and strengthens the viewers' recognition of local culture [7].

4.4 Multi-Dimensional Evaluation: Optimizing Feedback Models through AIGC to Promote Digital Dissemination of Culture

The application of digital tools provides new pathways for the dissemination of rural culture. Content generated by AIGC can be shared through social media, online displays, virtual exhibitions, and other formats, reaching a broader audience. This dissemination method helps promote rural ecological education and cultural knowledge, attracting more attention to the protection and preservation of rural environments and cultures, thereby fostering the development of the rural economy and enhancing cultural value. In this process, feedback from participants is key to improving ecological education content. By collecting feedback from participants, the presentation of AIGC-generated content can be improved to better meet their needs. Additionally, AIGC technology can further integrate rural science education resources, breaking the limitations of geography and time, and building a model for online and offline collaborative science education [3].

Driven by AIGC technology, through diversified content generation, precise communication strategies, interactive innovation, and cross-media approaches, the dissemination threshold is lowered, enhancing the efficiency of traditional cultural transmission. This drives the creative transformation and innovative development of culture, fostering a continuous optimization cycle through audience participation and feedback, ultimately achieving the ongoing optimization of rural ecological education content and the widespread dissemination of rural culture. The widespread application of digital platforms breaks the limitations of geography, allowing rural culture and ecological knowledge to reach a wider audience and promoting the healthy development of both the rural economy and culture.

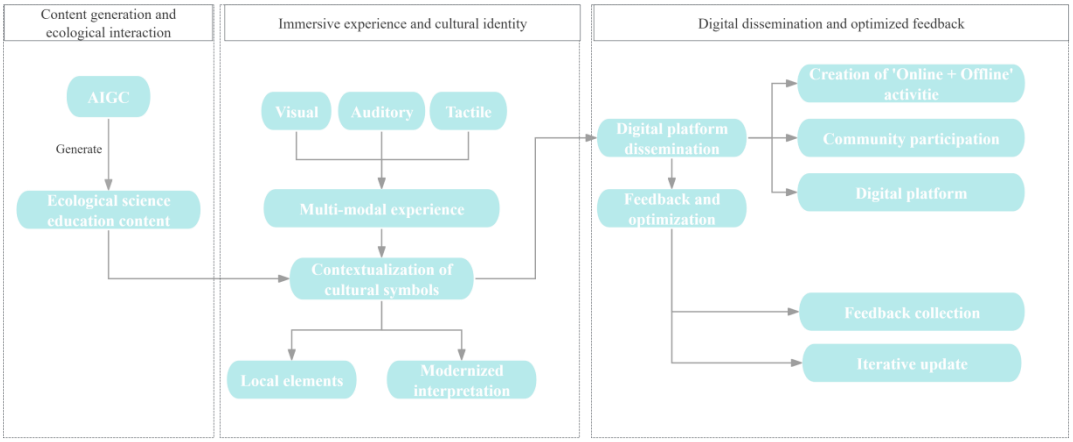


Figure 10: Exploration Model of Rural Micro-Renewal Pathways under AIGC and Cross-Media Integration

5. Conclusion

This paper takes the Art Rural Construction practice in Wupu Village, Huzhou City, Zhejiang Province, as a case study to explore the application strategies and development potential of

Generative Artificial Intelligence Content (AIGC) and cross-media integration in rural micro-renewal. The study highlights that AIGC technology provides innovative pathways for rural micro-renewal through data-driven local cultural excavation, dynamic science content generation, multi-modal experience design, and optimized feedback models. Through the "Wupu Village Neighboring Ecological Circle Observation" project, AIGC technology not only achieved the organic integration of ecological education and cultural heritage but also enhanced the attractiveness and sense of identity of rural culture through cross-media interaction. The integration of AIGC and cross-media effectively promotes the synergistic development of rural culture, ecology, and education, providing a new theoretical and practical framework for the implementation of rural revitalization strategies. The limitations of this paper include the absence of an evaluation system to assess the effectiveness of AIGC's cross-media innovation strategies in Art Rural Construction, as well as the lack of quantitative research.

Overall, AIGC technology and cross-media art provide innovative pathways and the potential for sustainable development in rural micro-renewal. In the future, as technology continues to develop and its application scope expands, the role of AIGC and cross-media art in rural micro-renewal will become more significant, with the potential to have a greater impact on promoting rural revitalization, community participation, and cultural identity.

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