



Research Progress on Chinese Art Education Models Guided by Core Competencies and the Application of Artificial Intelligence

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Abstract. With the rapid development of artificial intelligence (AI) technology and its deep penetration into the field of education, AI-enabled art education has become a hot research topic. However, most current studies focus solely on what AI can do and its technical potential, effectively remaining at the level of merely “knowing what AI can be used for.” There has been no systematic review or reflection on how AI is actually used in art classrooms in Chinese primary and secondary schools, whether it is used effectively, or the actual outcomes for students after its implementation. Furthermore, there are no concrete practical application cases to support these findings. Therefore, building on the research context outlined above, this paper adopts the following research methodology: guided by core competencies, it integrates artificial intelligence with art education, employing both CiteSpace knowledge mapping analysis and case studies. First, the CiteSpace tool is used to conduct knowledge mapping analysis, reviewing relevant research from 2000 to 2026 to clarify the development trajectory of the entire field. Next, three representative case studies were selected—the UNESCO Jeju “AI + Culture” project, the AI curriculum reform at the Cleveland Institute of Art in the United States, and the “Chinese Patterns” AI revitalization course at Nanjing Normal University—for systematic analysis. Based on the findings from the preliminary research, the volume of publications in this field has been steadily increasing, and the research focus has gradually shifted—no longer focusing solely on the technology itself, but placing greater emphasis on using technology to help students enhance their comprehensive literacy, thereby ensuring that technology truly serves the teaching process. Each of the three case studies adopt distinct approaches: one focuses on AI-enabled cultural dissemination, other centers on institutional frameworks and ethical norms, and the third concentrates on the AI-driven revitalization of traditional culture. These cases also demonstrate that AI is merely a supplementary tool; it cannot replace the teacher’s guiding role, nor can it supplant the teacher’s central position in the classroom. The core of using AI in art education is to enhance teaching effectiveness, rather than letting it dominate the classroom. Subsequent efforts—whether refining evaluation systems or optimizing teaching models—must revolve around this core principle. At the same time, leveraging AI to optimize teaching models and help students improve their comprehensive competencies represents the primary research direction at present.

Keywords: Artificial Intelligence; Art Education; Core Competencies; CiteSpace; Case Comparison; Research Progress

1 Introduction

In recent years, the global rise of artificial intelligence (AI) technology has profoundly impacted the field of education, with countries worldwide emphasizing the strategic cultivation of innovative talent. In the realm of art education, nations such as the United States, the United Kingdom, and Japan have already integrated AI technology into art instruction, highlighting the innovative thinking fostered by AI [1].

China similarly emphasizes the integration of AI with education. The 2022 edition of the Compulsory Education Art Curriculum Standards emphasizes that art instruction should prioritize student development and competency-based learning, focus on integrating knowledge and creating context, effectively utilize diverse media to combine tradition with innovation, and employ scientific mechanisms to stimulate students' artistic potential [5]. Meanwhile, with the full implementation of the arts component in the high school entrance exams in 2022, art education has shifted from an elective to a mandatory subject. Future art education is likely to evolve into a model that integrates online and offline learning [2]. However, the emergence of generative AI in 2023—which allows students to quickly generate images and videos simply by inputting their ideas—poses a serious challenge to the very purpose of school-based art education [1].

Therefore, exploring the current status and future trends of AI applications in K-12 art classrooms is of great significance for advancing art education reform.

Looking at current research developments, scholars have achieved certain results in studies on AI-enabled art education. Yang Liwang [3] states that AI has driven innovative changes in education and teaching, exerting an unprecedented revolutionary impact on teacher competencies, teaching methods, educational management, educational assessment, and the educational environment. He emphasizes that AI is not intended to replace art teachers but rather to serve as a powerful auxiliary tool. Through a survey of secondary schools in Shanghai, Liu Yatian [4] found that VR technology, ChatGPT, and AI-generated art have already been integrated into art classrooms. In art classes utilizing AI technology, student engagement has increased by 30%.

Synthesizing the research perspectives and findings of the aforementioned scholars, the academic community has made some progress in studying the integration of AI and art education. However, research has primarily focused on what AI can do and how it should be implemented, or on presenting application cases from specific regions or individual schools. Systematic research on the current status and development trends of AI's practical application in art classrooms across primary and secondary schools nationwide remains insufficient. In particular, empirical research that conducts in-depth analyses of multiple typical cases from the perspective of core competencies still requires further exploration. Therefore, this study aims to fill this gap by adopting a core literacy-oriented approach to investigate the progress and trends in the application of AI in art classrooms in Chinese primary and secondary schools.

Although current educational policies have long established core competencies as the central goal of education, research within the academic community that applies this

theoretical framework to explore the integration of AI and art education remains relatively limited at this stage. The core competencies of the art discipline encompass five dimensions: image literacy, artistic expression, aesthetic judgment, creative practice, and cultural understanding, thereby establishing clear value standards for the conduct of daily art instruction. With the rapid development of artificial intelligence technology, traditional classroom models face significant adjustments, and the concept of core competencies also places higher demands on new teaching methods: while leveraging AI to broaden creative forms, enrich pathways of aesthetic perception, and harness the pedagogical advantages of the technology itself, we must also avoid over-reliance on technology that could undermine students' hands-on practical skills. Therefore, examining the application of AI in art education from a core competencies perspective can provide theoretical grounding for current pedagogical research, holding significant theoretical value and practical significance.

In recent years, there has been a growing number of studies utilizing CiteSpace bibliometric analysis. This method employs a knowledge graph perspective to clearly and systematically outline the developmental trajectory, research priorities, and future directions of relevant fields. Consequently, this paper first employs CiteSpace to conduct a graph analysis of 389 relevant documents in the fields of artificial intelligence and art education from the China National Knowledge Infrastructure (CNKI) database spanning 2000-2026. By utilizing the knowledge graph perspective to examine research hotspots and cutting-edge theories, the study aims to reveal the developmental patterns of teaching models, construct a theoretical framework, and highlight the practical significance and value of optimizing instructional design, thereby contributing to future reforms and innovations in related educational models.

2 Analysis of Research Progress in Art Teaching Models

Based on CiteSpace metrics, this study examines the key discussion topics in relevant literature on artificial intelligence and art education from 2000 to 2026, identifies research gaps and potential directions, and lays the groundwork for subsequent research.

Table 1. Sources of Major Literature

Journal Name	Number of Articles
Chinese Journal of Education	29
Education and Vocational Training	28
Decoration	27
The Big Stage	19
Art Review	17
Chinese Adult Education	12
Art 100	11
Chinese Science and Technology Papers	11
Journal of Nanjing University of the Arts (Fine Arts and Design Edition)	10
Fine Arts	9

The literature data is sourced from the China National Knowledge Infrastructure (CNKI) database. To ensure the quality of the articles, papers from Peking University Core Journals and CSSCI-indexed journals were selected as the analysis sample. The search terms combined “artificial intelligence” and “art education,” while also expanding to include related terms such as “digital,” “art studies,” “art,” and “teaching models.” The publication period was set from January 1, 2000, to December 31, 2026, yielding a total of 389 articles. The distribution of journals publishing these articles is shown in Table 1.

2.1 Analysis of Overall Research Progress and Trends

Between 2000 and 2026, the volume of publications in the field of artificial intelligence and art education generally exhibited a fluctuating upward trend (Figure 1), which can be divided into three phases:

Phase 1 (2000-2010): Initial Exploration Period. During this phase, the number of publications grew from 1 in 2000 to 23 in 2010. After 2005, the annual output began to consistently exceed 10 publications, indicating that the academic community had begun to focus on the initial integration of AI technology and art education. However, the research remained relatively superficial and had not yet formed a systematic framework.

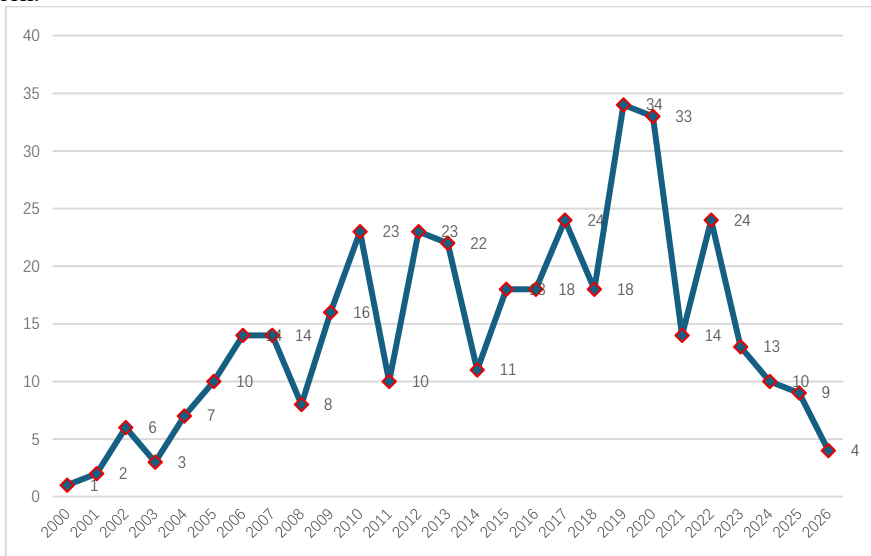


Fig. 1. Analysis of Publication Trends in Research on AI and Art Education Teaching Models from 2000 to 2026

Phase Two (2011-2020): Steady Growth Period. Between 2011 and 2020, the number of publications fluctuated upward from 10 to 33, reaching its first peak of 34 in 2019. The sustained growth in publications during this period reflects the increasing research momentum in this field.

Phase Three (2021-2026): Deepening and Adjustment Period. Between 2021 and 2026, the number of publications initially rose steadily, reaching 24 in 2022, before gradually declining to just 4 by 2026. Given that 2026 is not yet halfway through, and new relevant literature may still emerge, the data for this year will not be used to assess the overall research trend at this time.

Overall, research activity in this field reached its first peak in 2019 and a second minor peak in 2022.

2.2 Keyword Clustering and Analysis of Research Hotspots in the Field of Art Teaching Model Research

2.2.1 Keyword Clustering Analysis.

Using the CiteSpace bibliometric tool, we conducted co-occurrence and clustering analyses of relevant literature in the field of artificial intelligence and art education from 2000 to 2026. A total of 191 valid keywords were extracted. High-frequency keywords were clustered and combined with the clustering visualization map (Figure 2), eight core research clusters were ultimately identified: #0 Teaching Models, #1 Art Education, #2 Artificial Intelligence, #3 Teaching Practice, #4 Teaching Reform, #5 Art Education, #6 Fine Arts Majors, and #7 Creativity. A tightly interconnected research network has emerged among these clusters.



Fig. 2. Keyword Cluster Map of Artificial Intelligence and Art Education Teaching Models, 2000-2026

From the perspective of the cluster map structure, Teaching Model #0 forms a core cluster with Fine Arts Major #6 and Art Education #1, exhibiting the highest node

density and connection density. This indicates that “Teaching Model” serves as the core vehicle for art education research, while “Fine Arts Major” and “Art Education” represent its foundational domains and target orientations; Clusters #4 (Teaching Reform) and #5 (Art Education) are closely connected to the core region, reflecting that teaching model reform consistently revolves around the essence of art education and serves as the core guiding principle for optimizing fine arts teaching models; The clusters #2 Artificial Intelligence, #3 Teaching Practice, and #7 Creativity form an extension zone. Among these, #2 Artificial Intelligence is a recently emerged cluster, #3 Teaching Practice focuses on practical application, and #7 Creativity points toward the goal of cultivating competencies. Together, these three clusters collectively illustrate the trajectory of the transformation in fine arts teaching model research from traditional approaches toward intelligent, practical, and competency-based approaches.

2.2.2 Analysis of the Keyword Timeline.

Building upon the keyword co-occurrence analysis, the Log-Likelihood Ratio (LLR) algorithm was employed to conduct keyword clustering analysis, resulting in a keyword clustering map. This further categorizes and summarizes similar hotspots, highlighting research directions. Compared to the keyword clustering spatial map, the temporal map better reflects the evolution and associations of keywords across clusters, effectively illustrating changes in research hotspots, developmental trajectories, and evolutionary trends. Using the timeline feature of CiteSpace software for keyword clustering, the year of the keyword’s first appearance is plotted on the X-axis, and the keyword cluster labels are plotted on the Y-axis (Figure 3).

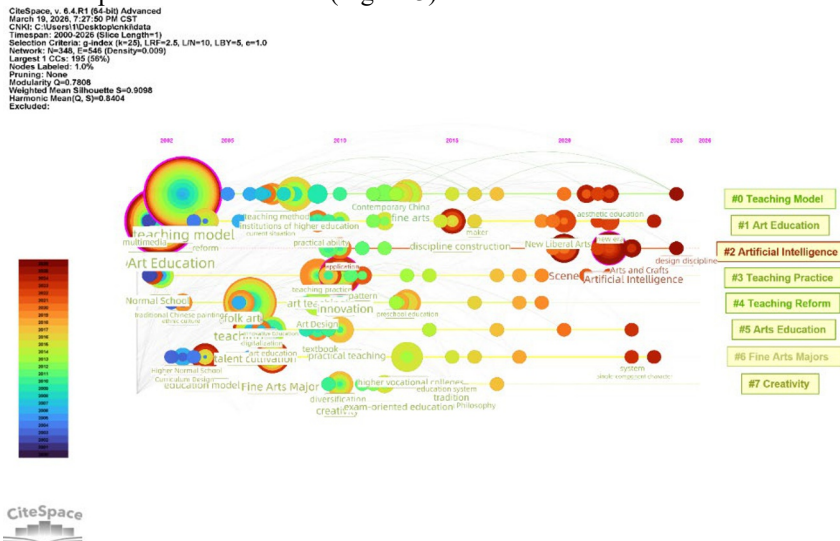


Fig. 3. Timeline of keyword clusters for "Artificial Intelligence and Art Education Teaching Models" from 2000 to 2026

(1) During the embryonic development stage (2000-2009), research primarily focused on constructing knowledge systems for foundational art education in various higher education institutions, as well as the basic popularization and dissemination of art education—such as art curriculum design—with a greater emphasis on traditional foundational content and the development of the discipline’s own teaching framework.

(2) During the slow growth phase (2010-2017), research began to concentrate on practical implementation, reform, and innovation. This included exploring practical teaching pathways in art education across major institutions and developing innovative approaches to art instruction, reflecting a shift in art teaching models from “theoretical construction” to “practical implementation.” Research dimensions became more diverse, and efforts were more targeted.

(3) In the rapid development phase (2018-2026), artificial intelligence and scenario-based teaching have become the primary focus of research. The academic community has been actively integrating digital and intelligent technologies into art classrooms, with a core emphasis on developing students’ core competencies, particularly their creativity. This approach is no longer confined to traditional teaching frameworks but is moving toward intelligent, interdisciplinary, and competency-based directions, ushering art education research into a new phase of transformation.

2.2.3 Citation Burst Analysis.

As a key tool for content mining in literature, a burst term refers to a keyword whose usage frequency surges sharply during a specific period, indicating that the term has received significant attention from researchers during that timeframe. Burst analysis (Citation Burst) is used to detect emerging dynamic concepts and latent research questions within a field. It effectively identifies emerging trends and sudden shifts in disciplinary development and accurately pinpoints active or cutting-edge research nodes. This study utilized the CiteSpace tool to analyze relevant literature and conduct a citation burst analysis of keywords in the field of art teaching models. The results are shown in Figure 4.

It can be observed that “teaching model” is the keyword with the earliest first appearance and the longest duration. It first emerged in 2003 with a burst intensity of 1.92, and its burst period spanned from 2006 to 2009—a duration of three years. This indicates that in the early stages of research, “teaching model” was the core focus in the field of art education, with scholars engaging in concentrated discussions on the paradigm shift in traditional art education. Close behind, keywords such as “Fine Arts Major” and “Art Education” emerged simultaneously in 2007, with emergence intensities of 1.37 and 1.36, respectively. Their emergence periods overlapped significantly with those of “Teaching Model,” indicating that the research focus during this phase gradually shifted toward professional talent cultivation and the construction of disciplinary education systems. This formed an early cluster of research hotspots centered on “Teaching Model” and supported by “Fine Arts Major” and “Art Education.”

Combining the time series and changes in the intensity of emerging terms shown in the figure reveals that, as the development of the New Liberal Arts progresses, research focus is gradually shifting toward intelligent teaching, interdisciplinary integration, and

the cultivation of core competencies. These areas are expected to remain key research priorities in future studies on art education models.

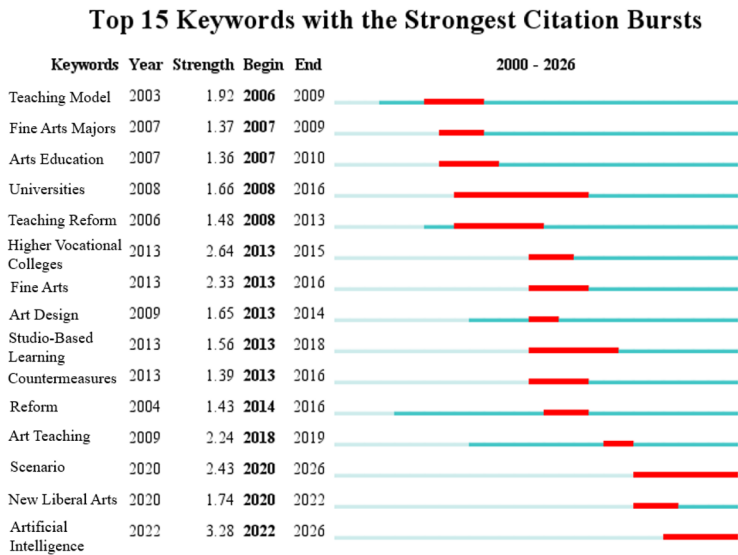


Fig. 4. Analysis of Emerging Terms in Artificial Intelligence and Art Education Models, 2000-2026

3 Literature Review and Conclusion

3.1 Research Review

Between 2000 and 2026, the number of publications in the field of artificial intelligence and art education showed a fluctuating upward trend, with publication peaks occurring in 2019 and 2022, respectively. From the perspective of keyword clustering, research in this field has formed eight core clusters, including “teaching models,” “art education,” and “artificial intelligence.” Among these, “artificial intelligence”—as a recently emerged cluster—exhibits the highest emergence intensity and the longest duration, indicating that AI technology has become a current research hotspot in this field.

These findings reflect the phased evolution of research in this field. During the first phase (2000-2010), research primarily focused on experimenting with the application of AI technology in art education. No comprehensive system or framework had yet been established; overall, the field was in the early stages of technology adoption, with few mature approaches. In the second phase (2011-2020), the focus of research shifted. It is no longer centered solely on the technology itself but instead leans toward teaching reform in art classrooms and innovative attempts in actual teaching practices. Areas such as reforming teaching methods, applying the studio model, and fostering student creativity garnered widespread attention. This also demonstrates that the academic community has been continuously seeking ways to optimize the delivery of art classes;

the core of this phase was exploring suitable teaching models. Phase Three (2021-2026): Artificial intelligence, scenario-based teaching, and the “New Liberal Arts” have emerged as mainstream research keywords. Research is no longer confined to the use of individual technologies but has shifted to focus on the organic integration of intelligent tools with art education. Overall, research has begun to revolve around core disciplinary competencies, marking a comprehensive transformation in research direction.

When viewed as a whole, it is clear that the research focus in this field has quietly shifted. Researchers are no longer fixated on whether AI can be integrated into art classrooms; instead, they place greater emphasis on how this technology can help students develop comprehensive competencies. The use of AI has also evolved from merely serving as an auxiliary tool to gradually optimizing teaching methods and upgrading classroom models. Therefore, with AI as a foundation, innovative exploration of art classroom teaching methods has become the most mainstream research direction in this field, both now and in the future.

3.2 Insights from Related Research

Although research in this field has made some progress, a comprehensive analysis reveals that existing studies still have the following shortcomings:

First, there is an overemphasis on theoretical exposition at the expense of analysis of real-world teaching scenarios. A large number of studies remain at the level of forward-looking discussions regarding “what AI can do” and “how it should be used,” lacking in-depth observation and analysis of AI’s actual application in real art classrooms.

Second, there is a focus on exploring technological prospects while neglecting the evaluation of educational value from the perspective of core competencies. Most existing literature focuses on the functions and development potential of artificial intelligence itself, with few systematic analyses of the extent to which the application of technology can enhance students’ comprehensive competencies, such as aesthetic judgment, creative practice, and cultural understanding.

Third, there is a focus on individual application introductions, with insufficient systematic comparative research on representative cases. Existing studies mostly consist of fragmented introductions of single cases, lacking systematic comparisons of cases of different types and models, making it difficult to distill teaching experiences with universal applicability.

To address these shortcomings, this study selects three representative cutting-edge cases, each corresponding to a distinct application model: the UNESCO Jeju Project represents the “AI + Cultural Dissemination” model; the Cleveland Institute of Art represents the “Institutional + Ethical” model; and the Nanjing Normal University Pattern Course represents the “Traditional Culture + AI Revitalization” model. Each of these three cases possess unique characteristics in terms of type, AI application methods, and emphasis on core competencies, offering strong representativeness and comparative value.

This paper will conduct case analyses and draw lessons from these examples in terms of application models, the educational value of core competencies, practical limitations,

and future trends, with the aim of providing guidance for practical explorations in AI-empowered art education.

4 Analysis of Typical Cases: Cutting-Edge Practices in AI-Empowered Art Education

4.1 Case Selection and Analysis Dimensions

To address the shortcomings of existing research, which tends to “emphasize theoretical exposition while neglecting analysis of real teaching scenarios,” this study selects three representative AI+art education cases for analysis. The three cases correspond to distinct application models: the UNESCO Jeju Project represents the “AI + Cultural Dissemination” model; the Cleveland Institute of Art represents the “Institutional + Ethical” model; and the Nanjing Normal University Pattern Design Course represents the “Traditional Culture + AI Revitalization” model. Each case exhibits unique characteristics in terms of type, AI application methods, and emphasis on core competencies, offering strong representativeness and comparability.

This analysis primarily covers four dimensions: case content, application forms, operational characteristics, and existing shortcomings and future directions. Grounded in the perspective of core competencies, the study comprehensively evaluates the educational value and practical reference significance of various case studies.

4.2 Analysis of Typical Cases

4.2.1 UNESCO Jeju Global AI Art Classroom: An “AI + Culture” Model Oriented Toward Cross-Cultural Communication.

In June 2025, UNESCO partnered with Jeju National University in South Korea to launch a three-year “AI+Culture” education program [6]. The first cohort included 85 students from 11 countries, including Austria, Spain, Mongolia, Vietnam, China, Japan, Mexico, Argentina, Brazil, Colombia, and Chile. The curriculum included lectures on Jeju culture, AI-driven creative production, and an exhibition of works (the Jeju AI International Film Festival). The project established a model for “AI + Cultural Dissemination,” utilizing generative AI as a tool and Jeju’s local culture (such as haenyeo, basalt, and rapeseed flowers) as content carriers to facilitate cross-cultural communication through the participation of international youth. The program adopted a comprehensive framework of “cultural lectures + AI creation + exhibition of works.”

Key features of this case include: strong official endorsement and authority, as it is directly promoted by UNESCO; large scale and broad coverage, with the first cohort involving 85 participants from 11 countries; and a comprehensive curriculum design that forms a closed loop from cultural input to creative output and final exhibition.

However, this application model still has several notable shortcomings. There has been no long-term follow-up research, nor is there a comprehensive evaluation system in place, making it impossible to use concrete data to prove that students’ overall literacy has truly improved. Furthermore, most such projects are aimed at middle and high

school students, which does not align well with the current state-of-the-art education in ordinary elementary and middle schools in China, leaving little that can be directly referenced. However, from a long-term development perspective, this case aligns with the broader trend of integrating AI with cultural education. It can be piloted in more regions in the future, while simultaneously establishing a more comprehensive evaluation mechanism to measure the actual outcomes of the curriculum.

4.2.2 Cleveland Institute of Art's AI Curriculum Reform: A University Reform Model Integrating Institutional and Ethical Considerations.

For the 2025-2026 academic year, the Cleveland Institute of Art designated technology ethics as its annual theme and established an AI philosophy: “not to promote AI for its own sake, but to advocate for its responsible use” [7]. Student attitudes are diverse: some use AI for creative ideation, while others refuse to use it. The president noted that “AI literacy will become part of digital literacy.” The project has established an “institutional + ethical” application model, advancing the integration of AI and arts education from both institutional and ethical perspectives. The college conducted student surveys to understand genuine concerns and established a dedicated position for the “Emerging Technologies Teaching and Research Project.”

Key features of this case include: institutional leadership, where the college established an official AI philosophy and required all courses to incorporate AI syllabus statements; a student-centered approach, involving a year-long survey of student concerns; emphasis on critical thinking, with in-depth discussions on AI ethics; and respect for diverse attitudes, allowing students to choose not to use AI.

However, a limitation lies in the fact that such research tends to focus primarily on discussions at the level of institutional rules, with almost no concrete examples of AI tools being implemented in actual teaching. Overall, the content largely remains confined to theoretical exploration. From a long-term developmental perspective, this case also reveals a direction for the evolution of art education in higher education, shifting from merely knowing how to use AI tools toward a deeper focus on institutional norms and ethical constraints. Further exploration is needed to establish a more comprehensive supporting mechanism that can effectively assist students.

4.2.3 Nanjing Normal University's “Chinese Patterns” AI Revitalization Course: A Teaching Model for the Creative Transformation of Traditional Culture.

In February 2026, Nanjing Normal University collaborated with the Confucius Institute in Argentina to offer a specialized course on traditional Chinese patterns to local Argentine students [8]. In class, students first identified and studied five classic traditional patterns, then drew these designs onto folding fans. Subsequently, using AI tools, they transformed the originally static drawings into dynamic visuals, creating visual effects such as dancing cranes and flowing cloud patterns. Students who participated in the course stated that they genuinely experienced the unique charm and characteristics of Chinese art.

This educational initiative has gradually established a method for innovatively revitalizing traditional culture through the integration of artificial intelligence. By using

various traditional patterns as the core learning content and relying on AI to transform static images into dynamic effects, the approach not only helps students understand traditional culture but also cultivates their creative abilities. The entire teaching process consists of several sequential stages: cultural knowledge lectures, hand-painting creation, AI dynamic processing, and a showcase of outstanding works.

This teaching case has several distinct advantages: AI operations are simple and intuitive, and the process of transforming static images into dynamic effects is highly engaging. Furthermore, by closely integrating cultural understanding with creative production—and drawing on students' authentic feedback, it effectively demonstrates the tangible outcomes of the course. However, it also has significant shortcomings: the entire course was conducted as a short-term, approximately two-week study program, with no follow-up to observe students' long-term gains. Since the participants were all international students, the relevant experience cannot be directly applied to art classes in domestic primary and secondary schools. Furthermore, AI was used only to create simple, entertaining animated effects, rather than to deeply cultivate students' advanced artistic creation skills. From a long-term perspective, this practice sufficiently demonstrates that artificial intelligence has significant potential for application in traditional cultural education. Moving forward, this model could be introduced into primary and secondary school art classrooms to gradually refine a more comprehensive and in-depth curriculum plan.

4.3 Case Comparison and Summary

A comparative analysis of the three cases is presented in Table 2. The current application of AI in art education is no longer limited to serving merely as an auxiliary tool. Not only must the overall design of classroom curricula be adjusted accordingly, but this also involves the external dissemination of culture and the arts, as well as the establishment of rules and ethical frameworks for AI usage. The scope of application has become extensive, and the forms of development are increasingly diverse. Art education aimed at fostering core competencies is intended to ensure that technologies like AI truly serve student growth and classroom education.

Taken together, these three case studies reveal a shared emphasis on helping students understand culture, engage in hands-on creative work, develop aesthetic discernment, and cultivate the ability to think and judge independently. It is worth noting that these three case studies directly address the three shortcomings of existing research identified in the preceding section (3.2): the UNESCO Jeju project addresses the issue of “overemphasizing theoretical exposition while neglecting analysis of real teaching scenarios” through large-scale international practice; the Cleveland Institute of Art addresses the issue of “overemphasizing discussions of technological prospects while neglecting educational value assessments oriented toward core competencies” through reforms that balance institutional frameworks and ethical considerations; and the Nanjing Normal University pattern design course addresses the issue of “overemphasizing introductions to individual applications while neglecting systematic comparative studies of typical cases” through the deep integration of traditional culture and AI technology.

Each of these three cases has its own focus, collectively addressing the shortcomings of existing research in terms of practical implementation, competency assessment, and comparative analysis. From a longer-term perspective, both domestic and international cases need to strengthen evaluations of long-term effects, shifting from “short-term experiences” to “long-term competency development.” Future research could further explore how to integrate the strengths of these three models to form a more universally applicable framework for AI-assisted art education.

Table 2. Comparative Analysis of Case Studies

Dimension	UNESCO Jeju		Cleveland Institute of Art	Nanjing Normal University	Pattern
Type	International	Official Programs	Curriculum Reform in U.S. Universities	Domestic Cultural Exchange	Cross-Cultural
AI Application Methods	Generative AI Creation		Discussions on Systems and Ethics	From Static to Dynamic	
Focus on Core Competencies	Cultural Understanding, Practice	Understanding, Creative	Critical Thinking, Aesthetic Judgment	Cultural Understanding, Practice	Understanding, Creative
Model	AI + Cultural Communication		Institutions + Ethics	Traditional Culture + AI Revitalization	
Characteristics	Official Endorsement, Large Scale	Endorsement, Large Scale	System-driven, diverse perspectives	Clear AI Implementation, Feedback	Student
Limitations	Lack of Long-Term Evaluation		Lack of specific tool examples	Short-term activities, limited outreach	

5 Conclusions and Recommendations

5.1 Research Conclusions

This study focused on the core issue of “Progress and Trends in the Application of Artificial Intelligence in K-12 Art Classrooms,” employing two methods—CiteSpace bibliometric analysis and case studies—and ultimately reached the following conclusions.

From 2000 to 2026, research in this field has undergone three distinct phases: first, the introduction of relevant technologies; second, the exploration of specific application models; and third, the current shift toward a core literacy-oriented approach. The focus of research has also gradually shifted: it no longer dwells on the question of “whether technology can be applied in art education,” but has turned to “how to better leverage technology to cultivate students’ core competencies.” Among these, artificial intelligence has consistently been the most prominent and enduring research focus in this field.

However, existing research suffers from structural shortcomings characterized by “three emphases and three neglects”: an emphasis on theoretical exposition at the

expense of analysis of real teaching scenarios; an emphasis on discussions of technological prospects at the expense of educational value assessments oriented toward core competencies; and an emphasis on introductions to individual applications at the expense of systematic comparative studies of typical cases.

The three representative case studies demonstrate distinct application models while sharing a common value orientation. The UNESCO Jeju Project exemplifies the “AI + Cultural Dissemination” model, emphasizing cultural understanding and creative practice; the Cleveland Institute of Art represents the “Institutional Framework + Ethics” model, focusing on critical thinking and aesthetic judgment; and the Nanjing Normal University Pattern Design Course embodies the “Traditional Culture + AI Revitalization” model, prioritizing cultural understanding and creative practice. Collectively, these three cases demonstrate that AI should serve as a supplementary tool rather than a substitute in art education; under a competency-based approach, technology should be harnessed to support “nurturing students.”

5.2 Research Recommendations

Looking toward practical curriculum design, elementary and secondary school art classes can fully adopt this model of combining AI with culture, integrating locally unique cultural resources into AI-based creative courses. Content such as local intangible cultural heritage and folk art can be introduced into the classroom. By using AI tools to re-create and transform traditional content, students’ cultural awareness can be gradually cultivated during this process, while simultaneously honing their creative hands-on skills.

At the institutional level, schools can draw inspiration from the Cleveland Institute of Art’s “institutional-first” approach to establish a framework for AI usage and ethics education, develop guidelines for the use of AI in teaching, and simultaneously strengthen students’ education on AI ethics to foster critical thinking and a sense of responsible use.

Regarding effectiveness evaluation, long-term follow-up assessments of AI-assisted art education should be strengthened, shifting the focus from “short-term experiences” to “long-term competency development.” This involves exploring systematic curriculum design that integrates technology, culture, and competencies, and accumulating replicable teaching practices.

5.3 Research Innovations

This study demonstrates a degree of innovation in its methodology by combining CiteSpace bibliometric analysis with case study methods. By integrating the mapping of macro-level knowledge frameworks with the analysis of micro-level practical cases, it addresses the limitations inherent in single-method approaches.

Furthermore, this study adopts a distinct research perspective. Unlike previous studies that focused solely on the functional aspects of AI technology, this research uses core art literacy as an analytical framework. It comprehensively examines the role of

AI art education in student development from the perspectives of cultural understanding, creative practice, aesthetic judgment, and critical thinking.

Furthermore, the selection of case studies demonstrates the study's innovative approach. This paper employs three representative case studies representing distinct models: AI integrated with cultural dissemination, institutional and ethical norms in AI art education, and the revitalization of traditional culture through AI. By conducting a comparative analysis of these cases, the study ultimately distills teaching practices that serve as universally applicable references.

5.4 Research Limitations and Future Prospects

From a theoretical perspective, this study primarily relies on bibliometric methods to outline the overall development trajectory of AI art education in recent years. However, objectively speaking, the paper does not sufficiently elucidate the underlying logic of relevant theories, nor does it delve deeply into existing disagreements and controversies within the field. Additionally, regarding the analysis using CiteSpace software, the appropriateness of the parameter settings requires further testing to verify. In future research, it would be beneficial to first clarify the relationship between core competencies and AI-based art education to establish a more comprehensive analytical framework. At the same time, experimenting with different parameter settings for comparison would enhance the persuasiveness of the research conclusions.

From the perspective of case studies, the examples analyzed in this paper are primarily derived from online reports and existing literature. The authors did not conduct on-site visits to schools nor gather primary data through face-to-face interactions with frontline art teachers, making it difficult to fully reconstruct the actual teaching conditions in the classroom. Furthermore, two of the three selected cases originate from overseas. These international teaching experiences are not suitable for direct application in domestic K-12 art classrooms, and their practical reference value is therefore limited. Future research should conduct field-based action research directly within domestic primary and secondary school classrooms. This would involve piloting and testing teaching models that integrate AI with traditional culture in real classroom settings. Additionally, the number of case studies from local schools should be increased, and first-hand data should be collected through questionnaires and interviews to develop teaching methods that are more aligned with the current domestic educational landscape and can be effectively implemented in practice.

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