Proceedings of ICEIPI 2026 Symposium: Inclusive Education, Cultural Transformation, and the Ethical Dimensions of Learning
DOI: 10.54254/2753-7048/2026.LD35673

# *Applications of Artificial Intelligence in Art Education: Opportunities, Challenges, and Limitations*

**Yuanyuan Lu**

*School of Music and Dance, Lingnan Normal University, Zhanjiang, China*
*3630819458@qq.com*

***Abstract.*** This study focuses on integrating Artificial Intelligence (AI) technology into art education, with dance education as the core research subject. Through bibliometric analysis of 210 articles from Web of Science (2015-2025) using VOSviewer, systematic review of 809 records from CNKI (2014-2024), and case study of the "AI Mina" virtual dance teaching project, combined with the TPACK theoretical framework, this research explores how AI tools transform traditional art pedagogy and examines their fundamental limitations. The study highlights four major limitations of AI in art education: lack of emotional expression, one-way interaction, technology-culture misalignment, and implementation barriers, especially the "form without spirit" problem in physical arts like dance. It also identifies three core application areas: personalised learning, creative assistance, and automated assessment. Findings indicate that although AI can improve teaching efficiency, it cannot replace human teachers' core role in emotional transmission, cultural interpretation, and creative guidance. Sustainable integration of AI in art education requires a human-machine collaborative teaching model. This study provides practical pathways for educators to incorporate AI technology while maintaining the humanistic essence of art education.

***Keywords:*** Artificial Intelligence, Art Education, Dance Education, Generative AI, Human-Machine Collaboration

## 1. Introduction

The rapid development of AI has fundamentally transformed education, with AI art education becoming a hotspot for interdisciplinary research [1]. Bibliometric analysis of Web of Science data reveals explosive growth: publications increased from 15 in 2020 to 85 in 2024, then to 122 in 2025, with cumulative citations of 2,113 [1]. Generative AI tools such as DALL-E, Midjourney, and ChatGPT have entered art classrooms worldwide. However, critical voices regarding AI limitations in physical arts continue to emerge [2]. The "AI Mina" virtual dance-teaching project demonstrates that while students can imitate movement trajectories through AI, they cannot perceive the unique passion of Uyghur dance, highlighting AI's shortcomings in emotional and cultural transmission [2].

This study focuses on AI application in art education, with dance education as a case for in-depth analysis. Dance, as a typical "physical art," has characteristics of physical presence, rich emotional expression, and unique cultural context that are difficult to quantify through algorithms. The

© 2026 The Authors. This is an open access article distributed under the terms of the Creative Commons Attribution License 4.0 (https://creativecommons.org/licenses/by/4.0/).

DOI: 10.54254/2753-7048/2026.LD35673

research examines three types of AI applications: generative AI, intelligent tutoring systems, and VR/AR technology, while analyzing four fundamental limitations: lack of emotional expression, one-way interaction, technology-culture misalignment, and implementation barriers.

This study adopts a mixed-methods approach, combining quantitative analysis with qualitative research, and unifying theoretical analysis with practical verification:

(1)Bibliometric method: Using VOSviewer to analyze 210 AI art education articles from Web of Science (2015-2025) to identify research hotspots [1];

(2)Systematic literature review: Reviewing 809 AI dance education records from CNKI (2014-2024) for current research status and limitations;

(3)Case study: This study takes the "AI Mina" Uyghur virtual dance teaching project as a case (see Research Methods and Appendix for details);

(4)Theoretical framework analysis: Using the TPACK framework to construct an analysis system for AI and art education [2] integration.

Understanding AI limitations is equally important as recognizing its potential. Existing research focuses on AI's efficiency advantages while neglecting its shortcomings in physical cognition and emotional expression, creating a research gap [3]. By analyzing why AI struggles to grasp the "spirit" of art education, particularly in dance, this study constructs a cognitive framework for understanding AI art education limitations.

Practically, the human-machine collaborative model and optimization strategies proposed provide empirical references for sustainable AI-art education integration while maintaining humanistic essence, aligning with UNESCO's people-centered philosophy and Sustainable Development Goals for quality education [4].

## 2. Current applications of AI in art and dance education

### 2.1. Generative AI in visual arts and design

Generative AI tools have been widely adopted in visual arts classrooms, forming an "AI-assisted + human-led" hybrid model. Case studies from Lindenwood University show students use DALL-E 2, Midjourney, and Craiyon to generate concepts iteratively, then refine work in Photoshop [5], enabling multiple iterations per session.

In Chinese art universities, design majors use Midjourney to innovate visual style [6], while drama and film majors use AI for scriptwriting and storyboard design.

### 2.2. AI applications in dance education

AI applications in dance education concentrate in four directions: (1) movement recognition and scoring systems using computer vision; (2) personalised learning path recommendations based on students' data; (3) virtual teachers and simulation teaching, such as the "AI Mina" project for Uyghur dance; (4) dance creation assistance using algorithms to analyze classic works.

Among these, the application of mobile AI scoring technology has been empirically verified, effectively improving the academic performance, learning motivation [7], and classroom participation of Chinese dance majors.

DOI: 10.54254/2753-7048/2026.LD35673

### 2.3. Intelligent tutoring and automated assessment

Intelligent tutoring and automated assessment achieve personalized teaching and standardized evaluation through data analysis. In music education, AI analyzes performance audio for pitch, rhythm, and tone quality; in visual arts, scholars developed a six-dimensional assessment system (aesthetics, color, texture, details, line, and style) in 2024 [8].

AI tutoring enables transition from "batch teaching" to "personalized teaching" by analyzing learning behaviors to identify weaknesses and provide targeted guidance [9].

## 3. Fundamental limitations of AI in art education

### 3.1. Lack of emotional expression: the core issue of "form without spirit"

The lack of emotional expression is the most profound limitation of AI in art education, manifesting as the "form without spirit" problem in physical arts. Dance is not merely physical movements but a carrier of emotional transmission. While AI achieves high precision in movement recognition, it cannot understand the emotional meaning behind movements.

The essence of "spirit" conveyed through force variation, rhythm, and space utilisation is not captured by AI; it only captures "form" like joint coordinates and trajectories. Current AI struggles to establish mapping between movement features and emotional semantics.

### 3.2. One-way interaction: inherent defects of the input-output mode

Current AI systems operate in an "input-output" one-way mode, lacking two-way interaction and dynamic feedback. AI can provide standardised feedback on movement performance but cannot modify teaching strategies based on students' emotional states like human teachers. This limitation is especially noticeable in creative and improvisational dance instruction [10], where AI cannot provide prompt guidance for improvisational creations.

### 3.3. Technology-culture misalignment: neglect and dissolution of cultural context

AI technology in art education often neglects cultural backgrounds and body language particularities, creating technology-culture misalignment. Western-developed AI systems construct models based on Western art systems, making it difficult to understand core elements like "artistic conception" and "rhyme" in traditional Chinese dance [11].

In ethnic dance teaching, this misalignment manifests as AI capturing only superficial movement forms while failing to transmit cultural heritage and spiritual core behind the dance [12].

### 3.4. Implementation barriers: dual barriers of resources and context

AI implementation in dance education faces dual barriers: resource thresholds and context adaptation. First, high costs of motion capture systems and AI scoring platforms limit promotion in schools and underdeveloped areas; teachers' insufficient digital literacy creates "technology-teaching disconnection" [13]. Second, tension between standardization and creativity: AI excels in standardized movement assessment but poorly in open, creative teaching, especially improvisation, where it cannot understand students' creative intentions.

The "AI Mina" project epitomizes these limitations: students can imitate movement trajectories but fail to perceive the passion of ethnic dance; meanwhile, hardware requirements make it difficult

DOI: 10.54254/2753-7048/2026.LD35673

to promote in under-resourced schools, reflecting the predicament where "having form but lacking spirit" coexists with "implementation difficulties."

## 4. Cause analysis of limitations in AI dance education

### 4.1. Technical ontological limitations: capability boundaries of weak AI

Current AI remains in the weak AI stage, limited to learning from existing data, lacking deep understanding of complex human behavior. AI can capture quantifiable indicators like joint angles using computer vision, but cannot perceive emotional changes or understand artistic conceptions behind dance movements [14].

For artistic elements like "rhyme" and "artistic conception" that are difficult to quantify, current AI algorithms struggle to identify and interpret them, leading to "form-spirit separation."

### 4.2. Design logic deviation: conflict between efficiency orientation and educational value

The design of some AI art education tools prioritizes "efficiency," creating a conflict with dance education's core concept. Developers focus on algorithm accuracy and processing speed, while dance education centers on "cultivating people"—students' comprehensive development and creativity rather than mere movement standardization [15].

This deviation triggers "technological alienation." Research indicates AI scoring systems lead students to imitate standard movements for high scores, losing individual expression [5]. When AI is merely a "scoring machine," it weakens humanistic care in art teaching.

### 4.3. Research paradigm fragmentation: lack of interdisciplinary collaboration and disciplinary barriers

AI in dance education spans computer science, education, art, and dance studies, yet current research shows "technology-dominated" characteristics and disciplinary barriers. Research teams are mostly computer scientists, lacking experts in education and dance, leading to tool design based on technical feasibility rather than actual teaching needs.

This single-disciplinary perspective neglects the complexity of education and art, leading AI tools to fall into the dilemma of "advanced technology but insufficient practicality [16]."

## 5. Optimization strategies for addressing limitations of AI in dance education

### 5.1. Technical optimization: from movement recognition to emotional understanding and cultural adaptation

Addressing AI ontological limitations, future R&D should move beyond movement recognition toward emotional understanding and cultural adaptation. On one hand, integrating multi-modal data with affective computing to judge emotional states through facial expressions and body tension; on the other hand, establishing algorithmic models for different cultural backgrounds, such as a rhyme recognition model for traditional Chinese dance.

DOI: 10.54254/2753-7048/2026.LD35673

### 5.2. Model reconstruction: building a new paradigm of human-machine collaborative art teaching

Addressing technological alienation, the core is transforming AI's positioning: AI should not replace teachers but become a professional assistant, constructing a human-machine collaborative teaching paradigm.

In this model, AI undertakes repetitive technical work: movement recognition and correction, learning data analysis for personalized teaching, and practice supervision for after-class feedback.

Human teachers concentrate on high-level tasks AI cannot replace: emotional guidance, creative stimulation for improvisational expression, and cultural transmission explaining heritage and spiritual core.

### 5.3. Ecosystem construction: strengthening interdisciplinary collaboration and policy resource support

To address paradigm fragmentation and implementation barriers, government, universities, and enterprises should build a sustainable AI dance education ecosystem. At the policy level, increase financial investment and reduce costs through special funds and school-enterprise cooperation; at the teacher training level, strengthen AI capabilities and digital literacy to solve "technology-teaching disconnection [6]."

At the interdisciplinary level, establish exchange mechanisms among computer science, education, art, and dance researchers to ensure AI tools are based on actual educational needs [17].

## 6. Conclusion

This study finds AI has formed three core application areas in art education: creative assistance, personalized learning, and automated assessment [18, 19]. However, AI has significant limitations in physical arts like dance: "form without spirit" in emotional expression, one-way interaction, technology-culture misalignment, and resource barriers. Cause analysis identifies three factors: weak AI's difficulty understanding context and emotions, conflict between efficiency-oriented design and humanistic values, and disciplinary fragmentation. Sustainable integration requires optimization from technology, model, and ecosystem dimensions. This study constructs a cognitive framework for understanding AI art education limitations. Future research should focus on longitudinal assessment of AI's impact on dance skill retention and creative identity, plus culturally responsive AI systems for non-Western traditions.

## References

[1] Lu, T., et al. (2025). A bibliometric exploration of AI influence on art pedagogy. *TEM Journal, 14*(3), 2689–2700.
[2] Liu, Q., & Chew, R. S. Y. (2025). Generative AI and creative thinking in art education: A TPACK-based theoretical framework. *Journal of China-ASEAN Studies*.
[3] Chen, Y. (2025). Research on the differentiated application of generative AI in the training programs of art universities: A case study of Shanghai Institute of Visual Arts. *Advances in Education, 15*(9), 849–855.
[4] Zhang, X., & Li, C. (2025). Research on innovative methods of dance education in the new media AI era. *Journal of Higher Education Teaching, 2*(2), 56–68.
[5] Qi, T., & Xu, B. (2024). Research on the status and development pathways of artificial intelligence technology in dance education. *Region - Educational Research and Reviews, 6*(9), 1–12.
[6] Xu, S., et al. (2025). The impact of mobile AI scoring technology-assisted dance practice on dance education: Improving students' achievement, learning motivation, and engagement in China. *International Journal of Chinese*

DOI: 10.54254/2753-7048/2026.LD35673

*Education, 14*(2), 1-15.
[7] Lu, Y. (2025). AI-driven interactive digital technology in dance: Application status and limitations. *Shangwu (Dance)*(6), 81-83.
[8] He, Q. (2025). Exploration of college dance teaching model under the "AI+Education" new trend. *Daguan (Forum)* (8), 135-137.
[9] Tian, X. (2025). Exploration of preschool dance teaching under the "AI+Education" new trend. *Shangwu (Dance)* (13), 135-137.
[10] Cao, X. (2024). Case study of China's compulsory education system: AI apps and extracurricular dance learning. *International Journal of Human-Computer Interaction, 40*(13), 3419-3426.
[11] Yang, Y., & Yu, R. (2024). Breaking and establishing: College dance general education in the AI perspective. *China National Expo*(21), 158-160.
[12] Liu, W., & Cao, H. (2021). Exploration of dance teaching model under the "AI+Education" new trend. *Contemporary Music*(11), 169-171.
[13] Wang, L. (2024). Analysis of dance teaching model under the "AI+Education" background. *Shangwu (Dance)*(13), 111-113.
[14] Gong, J. (2025, March 4). Research on new models of dance education and teaching in the AI era. *Shanxi Science and Technology News*, p. A05.
[15] Dai, Q. (2025). Exploration of dance teaching model under the "AI+Education" new trend. *Shangwu (Dance)*(4), 155-157.
[16] Mengyu, H., & Jingyi, W. (2021). Artificial intelligence in dance education: Dance for students with special educational needs. *Technology in Society, 67*, 101784.
[17] Mao, M. (2024, December 23). Analysis of college dance teaching model in the "AI+Education" era. *Gansu Science and Technology News*, p. 003.
[18] Xu, J. L., Wu, J., & Zhu, D. J. (2025). Effects of AI-assisted dance skills teaching, evaluation and visual feedback on dance students' learning performance, motivation and self-efficacy. *International Journal of Human-Computer Studies, 195*, 103410.
[19] Su, H., & Mokmin, N. A. M. (2024). Unveiling the canvas: Sustainable integration of AI in visual art education. *Sustainability, 16*(17), 7849.