2025 International Conference on Fiscal Management, Holistic Social Studies (FMHSS 2025)

Article

Analysis of the Mode Exploration and Practical Effect of AIGC Empowering Dancesport Education

Jing Liu[1,*] and Penghao Gao[1]

[1] Art College, Beijing Sport University, Beijing, China
* Correspondence: Jing Liu, Art College, Beijing Sport University, Beijing, China

Abstract: With the rapid development of artificial intelligence, generative artificial intelligence (AIGC) is gradually penetrating all aspects of education, bringing unprecedented possibilities for educational innovation and pedagogical transformation. As an important educational form that intricately combines art and sports, traditional teaching models in dance sports education frequently suffer from systemic issues such as insufficient personalization, limited instructional resources, and delayed performance feedback. This paper focuses on the paradigm shift brought about by AIGC-enabled dance sports education. First, it comprehensively explains the current status of dance sports education and the unique opportunities presented by AIGC, thereby clarifying the research significance and primary purpose. By systematically analyzing AIGC technology alongside dance sports education theory, and combining literature research, empirical case analysis, and in-depth stakeholder interviews, this study explores the multifaceted integration of AIGC. Specifically, it investigates personalized and interactive teaching models, dynamic resource integration, and intelligent push notification systems tailored for dance sports. Furthermore, the study rigorously analyzes practical implementation results from the critical perspectives of teaching effectiveness, educational resource allocation, and overall teaching efficiency. It also identifies the primary technical and pedagogical challenges faced in the practical application of AIGC, proposing corresponding optimization strategies to mitigate these barriers. Finally, the research findings are synthesized to provide a robust theoretical and practical reference for the further application and sustainable development of AIGC technologies within dance sports education and related disciplines.

Keywords: generative ai; educational innovation; dance sports; personalized teaching; educational technology

Received: 05 May 2026
Revised: 11 June 2026
Accepted: 25 June 2026
Published: 01 July 2026

1. Introduction

As a comprehensive program that integrates artistic performance with physical exercise, dance sports play a significant role in enhancing students' physical fitness, aesthetic sensibilities, and teamwork abilities. In recent years, with the growing focus on quality-oriented education, dance sports have developed rapidly, yet several challenges persist in practical teaching. Traditional instructional methods in dance sports often fail to provide tailored plans that address individual differences in physical fitness, learning capabilities, and interests, leading to inconsistent learning outcomes. Additionally, the limited availability of teaching resources hinders the effective dissemination of high-quality content and training methods, increasing the workload for educators and highlighting the need for improved teaching efficiency. In this context, the advent of AIGC technology offers new possibilities for innovation in dance sports education [1]. With its advanced capabilities in data processing, analysis, and content generation, AIGC can

deliver personalized teaching support, diverse educational resources, and efficient feedback mechanisms, potentially addressing the limitations of traditional teaching models. This study aims to explore specific frameworks for integrating AIGC into dance sports education, evaluate its effectiveness in practical applications, and identify associated challenges along with strategies to overcome them. The findings of this study hold both theoretical and practical significance. From a theoretical perspective, they contribute to the development of a comprehensive framework for applying AIGC in education and provide fresh insights into the theoretical advancement of dance sports education. Practically, the study offers educators actionable teaching models and supports the advancement of dance sports education practices.

2. Theoretical Foundation and Research Paradigm

AIGC Technology and the Theory of Dance Sports Education: AIGC, or generative artificial intelligence, represents a significant branch of artificial intelligence. By leveraging extensive data training, it autonomously produces text, images, audio, and video with a certain degree of quality and logical coherence [2]. AIGC has progressed from basic rule-based generation in its early stages to advanced content creation driven by deep learning. Its foundational technologies include natural language processing, computer vision, and deep learning. Within the domain of dance sports education, AIGC's core technical principles are primarily applied in data collection and analysis, content generation, and intelligent interaction. Computer vision technology facilitates real-time capture and analysis of students' dance movements, natural language processing technology supports intelligent interaction and feedback with students, and deep learning technology enables the creation of personalized teaching content and training plans tailored to students' learning data.

Dance sports education aims to systematically teach and train students to develop proficiency in the fundamental skills and theoretical knowledge of dance sports. This includes enhancing physical coordination, flexibility, rhythm, and fostering aesthetic and artistic expression. The teaching content encompasses various aspects, such as basic dance steps, postures, and combination movements, while instructional methods include practical demonstrations and step-by-step breakdowns [3]. The integration of AIGC with dance sports education theory is both practical and beneficial. On one hand, the objectives and content of dance sports education provide a clear framework for the application of AIGC, enabling it to generate relevant teaching materials and training tasks aligned with educational goals. On the other hand, the technical capabilities of AIGC align with the requirements of dance sports education for personalization, interactivity, and efficiency. By combining AIGC with diverse teaching methods, the overall effectiveness of instruction can be significantly enhanced.

3. Research Methods and Design

This study utilized a combination of multiple research methods to ensure scientific rigor and effectiveness [4]. Literature research formed the foundation of the investigation. By reviewing relevant domestic and international studies on AIGC technology, sports dance education, and the application of educational technology, the research explored the development history of AIGC, its core technologies, the theoretical foundations and current status of dance sports education, as well as the application models and effectiveness of AIGC in education. This provided theoretical support and references for the study.

Case analysis was a key method employed in this study. Practical examples of AIGC technology applied in dance sports education were selected for in-depth analysis. By examining the application scenarios, teaching models, implementation processes, and outcomes achieved in these cases, the study summarized the successful experiences and existing challenges of AIGC-enabled dance sports education, offering a practical basis for model exploration and effectiveness analysis [4, 5].

4. AIGC's Model for Empowering Dance Sports Education

4.1. Innovation of Personalized and Interactive Teaching Models

One of the key approaches utilized in dance sports education is a personalized teaching model. Comprehensive analysis of students' physical fitness data, learning progress data, and historical performance data enables accurate identification of individual learning characteristics. For instance, smart devices can collect physical fitness indicators such as height, weight, flexibility, and sense of rhythm, which, when combined with data on movement completion and learning progress in dance learning, help create personalized learning profiles for students. Based on these analytical results, customized learning plans can be developed for each student, including the selection of teaching content, scheduling of teaching activities, and adjustments to teaching methods. For students with limited flexibility, flexibility training content and time can be incorporated into their learning plans [6]. Similarly, for those with less rhythmic sense, additional rhythm training courses and music materials can be recommended.

Interactive teaching models play a crucial role in enhancing the effectiveness of sports dance instruction. Through intelligent feedback and guidance features, students' dance movements can be captured in real time. Using computer vision technology, the accuracy, standardization, and coordination of these movements are analyzed, providing detailed feedback and improvement suggestions. For example, when a student performs a spin, the movement trajectory can be captured through a camera, and parameters such as rotation angle, speed, and stability can be analyzed to identify issues and provide specific correction methods. Additionally, virtual dance partners and diverse dance scenes can be created to allow students to practice interactively, experiencing the atmosphere and requirements of dance in different scenarios and enhancing the interactivity and immersion of training. The virtual partner reacts to the student's movements in real time, coordinating dance moves and ensuring greater engagement during practice [4]. For instance, an intelligent dance coaching system developed by a domestic sports dance education technology enterprise has been implemented in numerous art colleges and training institutions. In practice, when students perform the "time step" in cha-cha dance, real-time data such as ankle rotation angle, knee bending amplitude, and body center of gravity shift trajectory are captured through multi-angle cameras. This data is used to create a 3D motion model on the screen, featuring a comparison interface that evaluates the students' movements against standard techniques. If a student's ankle inversion angle exceeds a certain threshold during a step, the system immediately triggers a voice prompt, offering corrective guidance based on the virtual partner's demonstration.

4.2. Resource Integration and Intelligent Push Model Construction

Resource integration is an effective approach to addressing the shortage of sports dance teaching resources. Advanced technologies collect and organize existing sports dance teaching materials, including instructional videos, audio, text, and images, categorizing, annotating, and storing them to establish a comprehensive and systematic teaching resource library. Additionally, these technologies can independently generate new teaching materials based on instructional needs, such as creating new dance combination videos aligned with the syllabus and compiling explanatory texts on dance theory. The development of this teaching resource library facilitates the effective integration and sharing of high-quality teaching materials, enabling teachers and students to access the necessary resources conveniently and efficiently.

Intelligent resource push serves as a crucial tool for enhancing the efficiency of teaching resource utilization. Advanced systems analyze students' learning history and preferences based on their progress and needs to deliver precisely tailored teaching resources. For instance, if a student encounters challenges in mastering a specific dance combination, the system can provide resources such as detailed breakdowns of the combination, explanations of key points and difficulties, and suitable practice music. This

intelligent push functionality ensures that students receive the most relevant resources at the appropriate time, thereby improving learning outcomes and efficiency.

5. AIGC's Practical Achievements in Empowering Dance Sports Education

5.1. Teaching Effectiveness and Student Development

Researchers employ computer vision technology to capture students' dance movements in real-time, analyze parameters such as rotation angles, step placements, and body postures, and promptly identify movement deviations. For instance, in waltz footwork, inaccuracies in foot placement are common, while the range of hip movement in rumba dance often falls short. Specific correction suggestions are provided to assist students in quickly identifying and addressing these errors, thereby reducing the time required to achieve proficiency in the movements.

A case study conducted at Ningxia Normal University involved an educational experiment with 40 students from the Institute of Music and Choreography. These students participated in extracurricular online dance classes using innovative mobile learning platforms and applications. Dance performance in the control and experimental groups was assessed across three areas: physical skills, presentation, and creativity [6, 7]. The experimental group engaged in additional online extracurricular activities supported by AI tools, which significantly enhanced teaching efficiency. For instructors, the AI system automatically analyzed students' practice videos and generated detailed reports highlighting common movement errors and individual weaknesses. This reduced the time spent manually reviewing practice footage by approximately 40%, enabling teachers to focus on designing targeted teaching plans and offering personalized guidance for specific challenges. For students, the AI-powered platforms provided intelligent recommendations, offering tailored learning resources such as skill explanation videos, rhythm training exercises, and correction guides based on their performance in each practice session. This approach made learning more focused, reducing the time spent searching for appropriate materials by about 35% and allowing students to acquire key dance skills more efficiently. At the conclusion of the experiment, expert evaluations indicated that the additional online activities contributed to improved dance performance.

Moreover, the AIGC-enabled dance sports education model has proven effective in enhancing student interest and participation. Compared to traditional teaching methods, the intelligent feedback, virtual dance partners, and diverse teaching resources provided by AIGC have increased student motivation throughout the learning process. Students have shown greater enthusiasm for both classroom learning and after-class practice, fostering a proactive learning attitude and a spirit of inquiry. Many students reported that the support provided by AIGC offered them a clearer understanding of their progress and areas for improvement, helping them to better define their learning objectives.

5.2. Educational Resource Optimization and Efficiency Improvement Driven by Dynamic Capture

AIGC leverages motion capture technology to perform high-precision data collection on the core movements of various dance styles in dance sport, enabling the generation of extensive, targeted teaching resources. The intelligent push functionality of AIGC integrates deeply with motion capture data to facilitate precise matching of teaching materials. By continuously capturing students' practice movement data and analyzing their performance in areas such as strength control, the system dynamically delivers corresponding resources. This real-time, data-driven intelligent push reduces the time students spend searching for resources and enhances the efficiency of resource utilization.

Additionally, the application of AIGC's motion capture technology significantly enhances the efficiency of dance instruction. In terms of reducing teachers' workload, analyses of time spent on error correction and guidance indicate a notable decrease in workload following the adoption of AIGC. The system automatically records students' movement data through motion capture and generates quantitative reports with indicators such as progress curves, replacing the need for manual observation and

recording in traditional teaching. Teachers can shift their focus to analyzing the dynamic data reports generated by the system rather than repeatedly correcting common movement errors. Furthermore, the real-time feedback feature of motion capture substantially improves the efficiency of in-class error correction. After students complete their movements during practice, the system immediately displays a dynamic comparison between their movement trajectories and standard trajectories on the screen.

The integration of AIGC into dance sports education has significantly enriched the pool of educational resources. Evaluations of the quantity, variety, and quality of AIGC-generated materials demonstrate a marked improvement in the diversity and comprehensiveness of teaching resources. AIGC can produce a wide range of instructional videos, audio, and text materials tailored to specific teaching requirements, encompassing everything from basic footwork to advanced combinations, as well as theoretical knowledge and practical techniques [8]. These resources are extensive in quantity and diverse in variety, catering to the learning needs of students at different levels and with varying objectives. Moreover, the quality of AIGC-generated resources is maintained through rigorous auditing and optimization processes to ensure their accuracy and practicality. This abundance of resources provides teachers with greater flexibility in selecting appropriate materials for specific teaching scenarios.

The intelligent push feature of AIGC plays a pivotal role in enhancing the efficiency of resource utilization. Observations of students' resource usage patterns and feedback indicate that they can access teaching materials more effectively. This feature delivers resources tailored to individual students, minimizing the time and effort required for resource searches and improving overall utilization efficiency [9]. Students can strategically plan their learning and resource usage based on their progress and specific needs, thereby maximizing the value of the teaching materials. Many students have reported that they can quickly locate the resources they require, significantly boosting their learning efficiency.

6. Challenges and Response Strategies

6.1. Major Challenges

In the application of technology, AIGC encounters several challenges in dance sports. One significant issue is movement recognition errors. Due to the complexity and variability of dance movements, which involve the coordination of multiple body parts and joints, AIGC's computer vision technology can be influenced by factors such as ambient lighting, camera angles, and clothing. These factors may result in inaccurate movement recognition, thereby reducing the effectiveness of feedback and instruction. Additionally, data security presents a critical concern. AIGC collects substantial amounts of personal and learning data from students, which often includes sensitive information. Inadequate data management could lead to data breaches or misuse, posing risks to students' privacy and rights.

Teachers' difficulties in adapting to the technology also represent a notable challenge in the implementation of AIGC. During usage, technical operations may disrupt the continuity of teaching activities. In traditional dance sport instruction, teachers typically rely on in-person demonstrations, immediate verbal corrections, and physical adjustments of students' movements, such as manually refining hip rotation angles. By contrast, AIGC involves processes like camera calibration, motion data uploading, and analysis [10]. Teachers unfamiliar with these technical procedures may find that operating the equipment consumes valuable class time, interrupting the teaching process. This issue is particularly pronounced in rhythm-intensive dance styles, such as rumba, where delays caused by technical adjustments can result in students losing synchronization with the musical rhythm.

Ethical considerations in education are also becoming increasingly significant. Protecting data privacy is a core concern. Although efforts are made to safeguard student privacy during data collection and management, there remains a risk of excessive data

collection or inappropriate use. Algorithmic bias is another potential ethical issue. AIGC's algorithmic models are trained on extensive datasets, and any biases present in these datasets could lead to inequitable recommendations during teaching, potentially affecting student learning outcomes. Furthermore, there is concern about students becoming overly dependent on technology. Excessive reliance on AIGC for feedback and guidance may diminish students' capacity for independent thinking and creativity, potentially hindering their long-term development [11–13].

6.2. Targeted Strategies

To address technical application challenges, a technology optimization approach should be adopted. Collaboration with professional technical teams must be strengthened to jointly develop and refine AIGC technology tailored for sports dance education, thereby enhancing the accuracy and stability of movement recognition. Algorithm models should be optimized, and hardware equipment improved to minimize the influence of environmental factors on movement recognition. Additionally, data security management mechanisms should be established and enhanced, employing advanced protective measures to safeguard student data. The scope and permissions of data use must be clearly defined to prevent data breaches or misuse.

To address teachers' adaptation difficulties, professional development must be prioritized [14]. Targeted AIGC technical training courses should be developed to help teachers understand the fundamental principles, operational methods, and practical applications of AIGC in dance sports education, thereby improving their technical proficiency. An incentive mechanism should also be established to encourage teachers to actively explore and apply AIGC technology, with recognition and rewards for outstanding implementation to foster enthusiasm and initiative. Furthermore, communication and collaboration among teachers should be strengthened by organizing teaching seminars to share experiences and promote shifts in teaching methodologies.

In terms of educational ethics, a comprehensive system of ethical standards is essential [15]. Clear guidelines should be established to regulate the application of AIGC in dance sports education, specifying requirements for data collection, usage, and protection to prevent algorithmic bias and data misuse. Oversight of AIGC application processes should be reinforced, with a third-party evaluation mechanism implemented to regularly assess and monitor the effectiveness and ethical implications of AIGC technology. Additionally, ethical education for both students and teachers should be strengthened to enhance awareness of data privacy protection and the risks of algorithmic bias.

7. Conclusion

This study examines the conceptual framework, model development, practical outcomes, and implementation challenges of AIGC-enabled sports dance education. The analysis identifies several feasible approaches, including personalized and interactive teaching, resource integration, and intelligent content delivery. The personalized and interactive teaching model addresses individual learning needs and strengthens engagement by analyzing learner characteristics, tailoring learning plans, providing real-time feedback and guidance, and creating virtual learning scenarios. The resource integration and intelligent delivery model expands teaching materials and improves their utilization by establishing a teaching resource repository and distributing targeted content. Practical results indicate that AIGC-enabled sports dance education has produced positive outcomes in teaching effectiveness, educational resources, and instructional efficiency. In addition, the intelligent delivery function reduces the time students spend searching for materials and improves the effective use of resources.

However, the application of AIGC in sports dance education still faces technical limitations, difficulties in teacher adaptation, and issues related to educational ethics. Addressing these challenges requires coordinated measures, including technological optimization, professional development for teachers, and the establishment of clear

ethical standards, so as to support the more effective and responsible application of AIGC in sports dance education.

Future research should further explore technological advancement and examine the integration of AIGC with other emerging technologies, such as virtual reality and augmented reality, to strengthen the immersive and interactive dimensions of teaching. It is also necessary to improve the evaluation framework by establishing a more scientific and comprehensive index system for assessing the effectiveness of AIGC-enabled sports dance education, thereby providing stronger support for its continued application in this field.

References

1. S. Park and Y. Kim, "Leveraging educational technology in liberal arts dance sports: Exploring effectiveness and sustainable application," *Sustainability*, vol. 16, no. 19, p. 8491, 2024.
2. Z. Hu, "Research on the application of virtual reality technology in the teaching of sports dance in colleges and universities," in *2021 2nd International Conference on Artificial Intelligence and Education (ICAIE)*, pp. 414–418, June 2021.
3. X. Liu, "Research on college sports dance lesson teaching," in *Proceedings of the 2nd International Conference on Green Communications and Networks 2012 (GCN 2012): Volume 3*, Berlin, Heidelberg: Springer Berlin Heidelberg, pp. 239–245, Jan. 2013.
4. I. M. Soronovich, E. V. Chaikovsky, and V. Pilevskaya, "Features of functional support of competitive activity in sports dance given the differences prepared by partners," *Physical Education of Students*, vol. 17, no. 6, pp. 78–87, 2013.
5. J. Sun and H. Tang, "Research on sports dance video recommendation method based on style," *Scientific Programming*, vol. 2022, no. 1, p. 7089057, 2022.
6. M. Guettala, S. Bourekkache, O. Kazar, and S. Harous, "Generative artificial intelligence in education: Advancing adaptive and personalized learning," *Acta Informatica Pragensia*, vol. 13, no. 3, pp. 460–489, 2024.
7. J. Batista, A. Mesquita, and G. Carnaz, "Generative AI and higher education: Trends, challenges, and future directions from a systematic literature review," *Information*, vol. 15, no. 11, p. 676, 2024.
8. Y. Dai, A. Liu, and C. P. Lim, "Reconceptualizing ChatGPT and generative AI as a student-driven innovation in higher education," *Procedia CIRP*, vol. 119, pp. 84–90, 2023.
9. P. Nedungadi, K. Y. Tang, and R. Raman, "The transformative power of generative artificial intelligence for achieving the sustainable development goal of quality education," *Sustainability*, vol. 16, no. 22, p. 9779, 2024.
10. M. Alier Forment, F. J. García Peñalvo, and J. D. Camba, "Generative artificial intelligence in education: From deceptive to disruptive," *International Journal of Interactive Multimedia and Artificial Intelligence*, vol. 8, no. 5, pp. 5–14, 2024.
11. Y. Jin, L. Yan, V. Echeverria, D. Gašević, and R. Martinez-Maldonado, "Generative AI in higher education: A global perspective of institutional adoption policies and guidelines," *Computers and Education: Artificial Intelligence*, vol. 8, p. 100348, 2025.
12. N. J. Francis, S. Jones, and D. P. Smith, "Generative AI in higher education: Balancing innovation and integrity," *British Journal of Biomedical Science*, vol. 81, p. 14048, 2025.
13. W. M. Lim, A. Gunasekara, J. L. Pallant, J. I. Pallant, and E. Pechenkina, "Generative AI and the future of education: Ragnarök or reformation? A paradoxical perspective from management educators," *The International Journal of Management Education*, vol. 21, no. 2, p. 100790, 2023.
14. U. Mittal, S. Sai, V. Chamola, and D. Sangwan, "A comprehensive review on generative AI for education," *IEEE Access*, vol. 12, pp. 142733–142759, 2024.
15. I. Pesovski, R. Santos, R. Henriques, and V. Trajkovik, "Generative AI for customizable learning experiences," *Sustainability*, vol. 16, no. 7, p. 3034, 2024.