

# Application of Artificial Intelligence in Teenage Dance Education

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**Abstract:** With the continuous development of technology, artificial intelligence (AI) has penetrated into various aspects of people's lives, and it is playing an increasingly important role in dance education. The application of AI can effectively improve the quality of dance teaching and stimulate students' interest, which has significant implications for the development of dance teaching. This article introduces the concept of AI and its relationship with dance teaching. It explores the main trends of dance teaching in the AI perspective, starting from the intelligentization of teaching equipment, archiving of dance information, and humanized training methods. It provides a new path for the innovative reform of youth dance teaching.

**Keywords:** Artificial Intelligence; Dance Teaching; Teenagers

## 1. Introduction

At present, artificial intelligence technology is not only accelerating the restructuring of industrial structures and economic and social transformation in the fourth industrial revolution, but also playing a huge role in promoting talent development and educational reform.<sup>[1]</sup> The maturity of 5G communication, AI technology's voice recognition, facial recognition, motion capture, and VR's motion capture technology, as well as cloud computing technology, provides us with more possibilities to improve dance education using modern technology. Under the dual empowerment of artificial intelligence and education, how to use artificial intelligence to promote high-quality education in the new era has become an important research topic that needs to be studied urgently.<sup>[2]</sup>

## 2. Artificial Intelligence in Dance Teaching

### 2.1. The Origin and Concept of Artificial Intelligence

The dream and pursuit of artificial intelligence and intelligent machines by humans can be traced back to more than 3,000 years ago. China is not short of stories and historical records in this regard.<sup>[3]</sup> Since the term "Artificial Intelligence" was proposed at the Dartmouth Conference in 1956, artificial intelligence has achieved significant development over the past 60 years.<sup>[4]</sup> All fields are closely integrated with artificial intelligence, which has a significant impact on various aspects of society and is closely related to people's lives. For example, the face recognition technology and fingerprint authentication technology used in mobile phones are based on the information recognition technology in artificial intelligence. The development of artificial intelligence will bring great convenience to human production and life.

### 2.2. The Relationship between Artificial Intelligence and Dance Teaching

Artificial intelligence is an interdisciplinary field that has developed through the integration of computer science, cybernetics, information theory, neurophysiology, psychology, linguistics, philosophy, and other disciplines.<sup>[5]</sup> Education is not only about imparting knowledge to students, but also about cultivating their good habits of thinking and learning. Therefore, the nature of artificial intelligence as a scientific discipline is highly related to that of education. The purpose of applying artificial intelligence to dance teaching is not only to fully utilize the role of intelligent tools, but also to provide teachers with some new ideas for solving teaching problems.

Under the framework of dance education, intelligent tools can collect action information during the

teaching process and analyze it. Then, by combining it with neural network algorithms, it can generate results that meet the teaching needs, providing a new path for students to feel and study dance. From a practical perspective, artificial intelligence is highly suitable for dance teaching, mainly in two aspects: On the one hand, the feedback system based on artificial intelligence can effectively improve the students' practice efficiency. On the other hand, the digital processing of dance movements facilitates teachers' dance research, enabling them to develop more scientific and reasonable teaching plans.

### **3. The Application Value of Artificial Intelligence in Dance Teaching**

#### ***3.1. Beneficial to enhance students' autonomy.***

For dance students, they must undergo rigorous and systematic training to acquire solid dance fundamentals, which requires a lot of time and effort. Such basic training is often dull and boring, and students are prone to becoming complacent. Traditional dance teaching is limited by teaching space, resources, and methods, resulting in a teacher-centered approach in teaching. This lacks personalized design, which is not conducive to students' autonomous learning. The application of artificial intelligence technology in dance teaching can effectively acquire students' dance training actions and provide personalized, real-time, and in-depth analysis. The analysis results can help students identify the shortcomings in their practice and motivate them to take the initiative in learning. This ultimately enhances their autonomous learning and improves learning efficiency.

#### ***3.2. Beneficial to enhance teachers' capabilities***

The integration of artificial intelligence and dance teaching can promote the development of dance education towards a technological direction. First, artificial intelligence tools can simplify the evaluation method of dance, thereby improving classroom efficiency. Second, the concept of machine learning introduced by artificial intelligence can make the process of dance practice easier. Third, artificial intelligence teachers transform procedural labor into creative labor, play a role in human emotional companionship, and teachers can achieve zero-distance interaction between people and achieve the diagnosis of individualized development needs of students. In addition, the improvement of teachers' level by artificial intelligence can also be reflected in stimulating their sense of crisis, urging them to keep up with the times to understand cutting-edge technologies and transform procedural labor into creative labor.

#### ***3.3. Expand teaching content***

Technology has changed traditional communication methods and brought people closer together. The arrival of the network era also means that people have to face an explosion of massive information every day. Under the trend of diversified development of art and culture, the dance class also needs to adapt to the times and supplement some up-to-date content. In the limited classroom time, the knowledge and skills that teachers can demonstrate are limited, and the introduction of artificial intelligence into dance teaching can to some extent solve this problem. Artificial intelligence can supplement classroom instruction by using network data as an analysis source. New types of media supported by artificial intelligence can provide teaching materials in various forms, including sound, text, and video, which are presented in a three-dimensional manner using digital means and vividly displayed before students, making knowledge more interesting and easier for students to understand and learn.

### **4. Application of Artificial Intelligence in Dance Teaching**

#### ***4.1. Smart Tutor: Collaborative Teaching Assistance***

The modernization of education in China necessitates the increased integration of cutting-edge technologies, notably artificial intelligence (AI), into daily teaching practices. Dance educators, too, are exploring innovative ways to transform traditional classrooms into more contemporary learning environments leveraging these new technologies. Presently, the "Internet+Dance" paradigm has emerged as a pivotal approach in dance instruction, with digital technologies exerting profound influence on the evolution of dance education. Looking ahead, AI is poised to significantly empower dance pedagogy, with Smart Tutors playing a pivotal role. Unlike conventional AI applications, Smart Tutors intelligently analyze students, enhancing their comprehension of dance learning and collaborating with teachers to

optimize teaching methods. Leveraging AI and somatosensory technology, they enable students to mimic precise movements and musical beats, recognizing their gestures and offering immediate feedback to correct errors, thereby enhancing practice efficiency. In large dance classes where teachers' individual attention is stretched, Smart Tutors act as invaluable assistants. They systematically address students' specific challenges and difficulties, facilitating personalized learning. Beyond class hours, Smart Tutors tailor practice routines and accompanying music for each student based on classroom content and progress, fostering structured learning plans. They also keep students engaged by announcing practice steps and providing interactive encouragement, ensuring focus and minimizing distractions. After practice sessions, Smart Tutors document performance, enabling dance teachers to promptly review and assess students' progress online, fostering collaborative advancement. In essence, these advanced systems revolutionize dance education, offering a seamless blend of technology and human guidance to maximize student learning outcomes.

#### ***4.2. Virtual simulation: creating teaching scenarios for reenactment.***

Virtual reality technology, as a representative of the new digital media technology, has the characteristics of interest, uniqueness, simulation, and flexibility, which have injected new vitality into dance teaching classes. Virtual reality technology promotes the development of situational experiential teaching. Situational experiential teaching requires teachers to create teaching scenarios, restore teaching content, and give students sensory stimulation or psychological preparation. Before the traditional dance class begins, teachers will have corresponding introductions. These scenes are merely images in the students' consciousness, with no physical representation. For younger students, who have less life experience, it is difficult for them to imagine these things, and the two-dimensional nature of videos is not enough to create a realistic scene. However, virtual display technology can allow students to feel as if they are standing on the vast Tibetan Plateau, creating a scene where eagles soar overhead and cows and sheep graze nearby, giving students a more realistic experience and helping them better grasp the dance style. In addition, virtual simulation technology is used to establish dance training spaces, where the entire class's training situation, class activity ranking, best learner PK rankings, and most beautiful dance movements can all be displayed to students through the smart dance training AI interactive screen in the classroom. This provides a basis for dance teaching. Through the intelligent training system, a good assistance can be provided for simulated practice, and the intelligent acquisition of dance teaching evaluation reports can be realized in real time. Teachers can use smart management technology to control the sound, lighting, multimedia, and automatic recording and broadcasting equipment in the classroom, providing students with an immersive dance training space that can stimulate their learning interest and cultivate their creative thinking. Finally, teachers can use dance academic reports, dance learning seminars, and small dance performances to stimulate students' interest, and record their dance videos. In this way, a training space with teaching, recording, rehearsal, and performance functions can be created for students, fully leveraging the advantages of artificial intelligence technology to meet the training needs. Achieving further improvement in dance teaching effects.

#### ***4.3. Data Statistics: Forming Information Archives***

Today, the internet serves as a vast digital repository, allowing individuals worldwide to delve into diverse dance cultures and admire choreographic masterpieces from various cultural contexts. This expansive database forms the foundation for artificial intelligence's machine learning capabilities, which, through relentless computation, continually enhances its intelligence, mirroring aspects of human cognition. In dance education, this paradigm holds immense potential. Educators can harness this technology by amassing digital footage of dance movements from their instructional activities. These digital assets empower smart tools to generate tailored content tailored to teaching needs, enriching students' learning experiences. Consider the case of dance choreography courses. AI systems can capture students' movements, integrate them with the database's extensive resources, and conduct comprehensive analyses from multiple dimensions, including force, range, and speed of movements. This information is then archived for future choreographic endeavors. Moreover, in technique training classes, where movements are executed at lightning speed, capturing precise form through smartphone footage alone can be challenging. As a result, students often struggle to accurately assess their own technique, hindering the autonomous development and refinement of their dance skills. However, AI systems offer a solution by visualizing training outcomes, skill proficiency, and movement deviations in intuitive data reports. This approach enables students to clearly identify their shortcomings in dance learning and training, fostering self-reflection and strategic planning. Such practices not only bolster their learning mindset but also actively contribute to the construction of their knowledge framework.

Currently, the most prevalent dance digitization technology in the realm of artificial intelligence primarily encompasses motion capture technology. Teachers simply need to wear motion capture suits adorned with markers to facilitate teaching, transforming the traditional 2D video footage into immersive 3D VR experiences. Traditional 2D videos often lack realism, their style tends to be rigid, and they struggle to convey intricate teaching details, resulting in suboptimal learning outcomes. In contrast, 3D VR videos eliminate blind spots, empowering students to autonomously switch perspectives and observe the teacher's demonstrations from all 360 degrees, thereby enhancing their comprehension of movement nuances. Furthermore, teachers can store the captured 3D data, artistically process it, and integrate music and commentary. These curated videos form an informative archive, enabling students to engage in dance learning anytime, anywhere. This approach not only fosters flexibility but also facilitates scientific assessment of teaching effectiveness, thereby elevating the overall educational experience.

#### ***4.4. Smart Teaching: Integration of Online and Offline Learning***

Traditional dance instruction primarily relies on face-to-face methods, with teachers verbally imparting theoretical knowledge and physically demonstrating dance moves, typically within a confined classroom setting. However, by harnessing artificial intelligence technology, we can diversify teaching scenarios and seamlessly integrate online and offline learning spaces, significantly enhancing students' learning experiences. This blended model of teaching and learning transcends the constraints of time and space, fostering interactive learning and streamlining management processes. AI empowers students to engage in dance studies both within and beyond the classroom, effectively bridging gaps in traditional dance education. From a hardware perspective, devices like smart dance mirrors revolutionize dance teaching. These mirrors boast sophisticated monitoring capabilities, leveraging AI-powered body tracking sensors to enable human-machine interaction without the need for additional wearable devices. Students' movements are captured, instantly analyzed for corrections, and subjected to data analysis, fostering a more intelligent teaching approach. The smart mirrors tailor practice sessions according to classroom content and progress, synchronizing music and routines, ensuring that every lesson is accompanied by immediate practice, structuring dance learning into a meticulous plan. Professional teachers lead the demonstrations, while interactive companions guide students through the exercises, maintaining their focus and preventing distractions during solo practice sessions. Furthermore, the subjective and potentially inaccurate nature of traditional dance evaluations is addressed by the objective, precise, and authentic assessments generated by the smart mirrors' big data analytics, addressing students' specific challenges and hurdles.

On the software front, platforms like Tencent Meeting, ZOOM, and MOOCs facilitate online teaching, obliterating geographical and temporal barriers. These platforms offer features like video playback, enabling students to access dance lessons from anywhere, anytime. MOOCs, for instance, feature renowned dance instructors, leveraging AI-driven personalized recommendations to captivate students' interests and motivate them to actively engage with their chosen dance content. Additionally, intelligent dance robots serve as virtual training partners, leveraging neural network algorithms to analyze users' movements and provide tailored learning suggestions via server feedback, transcending the traditional classroom boundaries. These video resources also democratize dance education, making it accessible to students hindered by geographical constraints. Moreover, MOOCs foster flipped classrooms, empowering students to customize their learning schedules and take ownership of their studies. By sharing pre-recorded content, students can preview lessons before class, facilitating deeper discussions and collaborations with teachers during class hours. This approach not only saves time but also fosters autonomy, marking a significant leap towards facilitating dance education.

### **5. Conclusions**

Incorporating artificial intelligence into youth dance instruction addresses the limitations of traditional teaching methods, leading to a marked improvement in educational quality. Dance educators must strategically employ AI technology to augment autonomous learning opportunities, stimulate students' interest in dance, and foster their creative thinking. This approach positively impacts both the enhancement of dance teaching quality and the holistic development of dance students. Currently, the "AI + Dance Education" model in youth dance instruction is still in its nascent stages of exploration. Nevertheless, as technology and education continue to intertwine, this innovative teaching paradigm is poised to become the future direction of education. By leveraging AI's capabilities, dance educators can unlock new avenues for learning, engaging students in ways that traditional methods could not, ultimately propelling dance education forward.

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