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AI Choreographic Assistants: Will Dance Teachers Be Replaced? - The Balance between Technology and Humanities

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Abstract: With the advancement of Artificial Intelligence (AI), its application in various fields has grown, including in the realm of dance education. AI-powered choreographic assistants are emerging as powerful tools, capable of generating complex choreography and analyzing dance movements. However, the role of human dance teachers remains essential in conveying emotional expression, cultural context, and individualized guidance. This article explores the integration of AI in dance education, examining both the advantages and challenges it presents. It highlights the complementary relationship between AI and human teachers, arguing that while AI can enhance teaching efficiency and creative possibilities, it cannot replace the deeper human aspects of dance education. The article concludes with an outlook on the future of dance education, emphasizing the collaborative potential of AI and teachers to enrich the learning experience and elevate the quality of artistic education.

Keywords: AI in dance education; choreographic assistants; human teachers; emotional expression; personalized teaching

1. Introduction

The intersection of technology and the arts has become an increasingly relevant topic in contemporary education. In particular, the emergence of Artificial Intelligence (AI) in the field of dance raises important questions about its potential to revolutionize the way we approach dance education. With AI-powered choreographic assistants now available, the traditional role of dance instructors is being brought into question. Could AI technology, capable of generating complex choreography and analyzing dance movements, eventually replace the human touch that dance teachers bring to their students?

Over the past few years, AI has made significant strides in various creative industries, and dance is no exception. AI choreographic tools are now able to analyze vast amounts of dance data, assist in creating choreographic sequences, and even simulate different dance styles. These innovations promise to democratize dance education, making high-quality choreography and instruction accessible to a wider audience. However, this rapid technological advancement begs the question: what role will human dance teachers play in an AI-assisted world?

This article aims to explore the relationship between AI choreographic assistants and dance teachers, focusing on the potential impact of AI on dance education. While AI offers new possibilities for choreographic creation and teaching efficiency, it is essential to assess how these technological tools intersect with the human aspects of teaching, such as cultural transmission, emotional engagement, and personalized instruction. The article argues that while AI can significantly enhance dance education, it cannot replace the nuanced and irreplaceable role of the human teacher in fostering creativity and nurturing students' artistic growth [1].

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2. AI Choreographic Assistants: Functions and Development

2.1. Technical Background of AI Choreographic Assistants

Artificial Intelligence (AI) has begun to make significant inroads into the field of dance choreography, reshaping how movement creation and performance analysis are conceptualized. Through the use of advanced algorithms and data-driven modeling, AI systems can generate dance movements, design choreographic sequences, and even simulate stylistic transformations across different genres. These applications rely heavily on machine learning, deep neural networks, and computer vision, which enable machines to learn from extensive datasets of human motion. By capturing data through motion sensors, 3D motion capture, or video analysis, AI can recognize spatial-temporal patterns, identify stylistic features, and model the dynamics of body movement [2].

At the heart of AI choreography lies its capacity for pattern recognition and sequence generation. Machine learning models such as Recurrent Neural Networks (RNNs) and Generative Adversarial Networks (GANs) are often employed to process continuous motion data and produce fluid, human-like sequences. For instance, an AI model trained on ballet performances can generate movement suggestions consistent with classical aesthetics, while another trained on hip-hop datasets might produce improvisational and rhythm-driven motions. Through reinforcement learning, AI systems can further refine these outputs based on feedback—either from human users or internal evaluation metrics—resulting in progressively more expressive and context-appropriate choreography.

Furthermore, AI choreographic tools integrate music analysis and emotion recognition to synchronize movement with rhythm and mood. By analyzing tempo, melody, and intensity, the system can adjust motion dynamics to fit emotional contours, creating more holistic and expressive performances. This technical foundation allows AI not merely to mimic existing choreography but to act as a creative collaborator, offering choreographers new insights, alternative movement possibilities, and a broader experimental space. Ultimately, the technological backbone of AI choreographic assistants demonstrates how computational intelligence can intersect with human creativity, laying the groundwork for a new paradigm in dance creation and education.

2.2. Specific Functions of AI Choreographic Assistants

AI choreographic assistants offer a wide range of functions that transform both the creative and instructional aspects of dance. One of the most prominent features is their ability to automatically generate dance sequences. By analyzing existing choreography and learning from motion datasets, AI can produce new movement combinations that align with a specific rhythm, musical style, or emotional tone. These systems are capable of simulating various genres—such as ballet, contemporary, or hip-hop—allowing choreographers to explore cross-genre compositions that were previously difficult to conceptualize manually. This automation not only supports professional choreographers in creative exploration but also serves as a valuable tool for students learning the structure and flow of movement [3].

Another core function of AI choreographic assistants lies in their ability to support learning and teaching. Through motion capture and real-time feedback, AI can assess students' performance accuracy, identify deviations from standard movement patterns, and suggest personalized corrections. Some advanced systems incorporate virtual reality (VR) and augmented reality (AR) technologies, providing immersive learning environments in which students can interact with digital instructors or observe virtual demonstrations. This capability helps learners quickly grasp technical details, improve rhythm perception, and enhance body coordination through visualized guidance and repetition-based feedback.

In addition to technical training, AI serves as a creative partner in choreography. It can suggest alternative sequences, introduce innovative transitions, and even propose unconventional movements derived from data-driven analysis rather than human

intuition. This not only stimulates artistic experimentation but also expands the choreographer's imagination by presenting novel combinations and spatial arrangements. In educational settings, such AI systems encourage students to think beyond imitation and engage in creative problem-solving. Ultimately, AI choreographic assistants function as both analytical and inspirational tools-helping teachers and learners integrate data intelligence with artistic intuition to foster innovation in dance education [4].

3. The Role and Educational Value of Dance Teachers

3.1. *The Multifaceted Role of Dance Teachers*

Dance teachers occupy a unique and irreplaceable position in the process of artistic education. Their role is not limited to instructing students in movement techniques but extends to shaping the learner's artistic vision, cultural awareness, and emotional intelligence. As pedagogical guides, teachers provide structured training that helps students understand the logic of movement, spatial rhythm, and body coordination. Yet their function goes beyond mechanical correction: through physical demonstration, verbal explanation, and intuitive feedback, teachers interpret each student's strengths, limitations, and expressive tendencies. They are able to read subtle cues-such as hesitation, posture, or energy flow-and tailor their guidance accordingly, creating an individualized learning experience that no algorithm can fully replicate.

In addition to technical instruction, dance teachers serve as cultural transmitters who connect students to the historical and social roots of their art. Every dance form carries symbolic meaning and cultural memory, whether in the gestures of classical ballet, the rhythms of African dance, or the flowing lines of Chinese classical dance. Teachers mediate these cultural layers, helping learners understand that dance is not only a sequence of movements but also a language of identity and belonging. Through storytelling, historical interpretation, and contextual discussion, teachers ensure that students internalize the values and aesthetics embedded in each style, thus preserving the continuity of cultural heritage in an age increasingly shaped by digital abstraction [5].

Furthermore, dance educators act as emotional mentors and creative catalysts. They cultivate students' self-expression, confidence, and imagination by encouraging them to discover personal meaning in movement. Through empathetic dialogue and performance feedback, teachers help learners explore the emotional depth that transforms physical motion into artistic expression. In this sense, dance teaching is a profoundly human process-one that integrates intellect, emotion, and body awareness. The teacher's sensitivity, intuition, and cultural insight allow the learning experience to transcend mere technical training, forming a holistic educational journey that integrates knowledge, creativity, and humanity.

3.2. *The Humanistic Value of Dance Education*

Dance education is not merely a process of physical training or technical refinement; it is, at its core, a humanistic endeavor that integrates emotion, culture, and self-discovery. The essence of dance lies in its ability to convey what words cannot - to express emotion through movement and to connect human experience with aesthetic form. In this sense, dance education transcends functional learning and enters the realm of emotional and cultural cultivation. Through guided practice, reflection, and performance, students develop not only bodily control but also empathy, creativity, and an appreciation of beauty. These qualities are deeply human and cannot be replicated by artificial systems that lack consciousness, emotion, and moral awareness [6].

From a humanistic perspective, dance teachers play a central role in shaping students' artistic and personal identities. They encourage learners to engage in self-expression, helping them translate inner feelings into physical form and discover their own artistic voice. This process involves emotional resonance, interpersonal communication, and the exploration of individuality-all of which foster self-

understanding and confidence. Dance classrooms, therefore, function as spaces of human connection, where learning is grounded in shared emotion and mutual inspiration rather than mechanical repetition. By emphasizing the link between emotion and movement, teachers nurture a deeper form of learning that integrates both affective and cognitive development.

Moreover, the humanistic value of dance education extends to personalized guidance and moral formation. Every student embodies a different story, physicality, and emotional landscape; teachers, through sensitivity and observation, design individualized learning paths that respect these differences [7]. They also serve as moral and aesthetic exemplars, guiding students to appreciate discipline, respect, and artistic integrity. Such forms of education cultivate a sense of empathy and cultural understanding that goes beyond technical mastery. In a time when artificial intelligence can replicate style but not sentiment, dance education reminds us that art remains a profoundly human act - one that connects body, mind, and spirit in a shared pursuit of meaning and beauty.

4. The Integration of AI in Dance Education: Advantages and Challenges

4.1. Advantages of AI in Dance Education

AI offers several significant advantages when integrated into dance education, particularly in terms of enhancing teaching efficiency, expanding creative possibilities, and democratizing access to dance resources.

One of the primary benefits of AI is its ability to enhance teaching efficiency. By quickly analyzing dance movements and simulating different actions, AI can assist teachers in streamlining the learning process. AI systems can automatically generate movement sequences, assess students' performances, and provide instant feedback, saving valuable time for dance instructors. This allows teachers to focus more on individual student development and emotional engagement, while AI handles more of the repetitive or time-consuming tasks [8].

In addition, AI can expand the creative possibilities for both choreographers and students. With its ability to simulate a wide range of dance styles, AI introduces new elements into the creative process, offering a rich variety of cross-cultural dance elements that may not have been easily accessible before. This can inspire choreographers to experiment with new combinations of movements and styles, fostering innovation in dance composition. Moreover, students can explore diverse dance forms from different cultures, broadening their understanding of global dance traditions and enriching their artistic expression.

Furthermore, AI has the potential to democratize access to dance education, making high-quality instruction available to a wider audience. In regions with limited access to professional dance education or where resources are scarce, AI-powered tools can provide students with the opportunity to learn dance movements, receive feedback, and improve their skills without the need for a personal instructor. This can help bridge the gap in dance education, offering equal opportunities for students regardless of geographic location or financial background [9].

4.2. Challenges of AI in Dance Education

While AI brings numerous advantages to dance education, it also faces significant challenges, particularly when it comes to emotional expression, creativity, and the holistic development of students.

One of the primary challenges of AI in dance education is its inability to convey emotional depth and cultural context. Dance is inherently tied to human emotions, stories, and cultural traditions, and teachers play a crucial role in imparting these aspects to students. AI, on the other hand, may be able to generate movements and sequences, but it lacks the emotional understanding and cultural nuance that a human teacher brings. AI cannot fully replicate the connection that dancers develop with the emotional and cultural

layers of the dance forms they study. As a result, AI falls short in conveying the rich, multifaceted nature of dance that teachers transmit through their personal experiences and cultural knowledge.

Another challenge lies in the area of creativity and personalization. While AI can generate dance sequences and movements, it lacks the true artistic inspiration and creativity that human choreographers bring to the process. AI operates based on data and patterns, which allows it to create combinations of movements, but it does not possess the intrinsic spark of creativity that a human mind can offer. Dance, as an art form, requires a level of originality, intuition, and personal expression that AI cannot replicate. Furthermore, AI is not capable of providing the individualized creative guidance that dancers need to find their own unique voice and style.

Finally, AI falls short when it comes to addressing the emotional and psychological development of students. While AI can assist with technical aspects, such as movement practice and correction, it cannot offer the emotional support or guidance that students need for their overall growth. Dance education is not just about learning the right movements; it also involves personal development, building confidence, and fostering emotional well-being. Teachers are essential in providing personalized emotional guidance, helping students overcome insecurities, build resilience, and express their emotions through dance. AI cannot fully replicate the human touch necessary to nurture a student's mental and emotional growth.

5. The Collaborative Role of AI and Dance Teachers

5.1. *AI as a Supportive Tool*

Rather than replacing dance teachers, Artificial Intelligence should be understood as a supportive partner that enhances the efficiency and creativity of dance education. The collaborative use of AI in pedagogy allows educators to combine the precision of data analysis with the intuition of human teaching. Through motion capture, pattern recognition, and performance evaluation, AI can assist teachers in identifying posture errors, analyzing rhythm synchronization, and monitoring students' physical progress. This data-driven feedback system enables teachers to deliver more accurate and personalized instruction, saving time on repetitive technical corrections and allowing greater focus on artistry and emotional development.

Beyond technical improvement, AI can serve as a creative stimulus. By generating alternative movement sequences or suggesting unexpected choreographic combinations, AI provides teachers with a new palette of possibilities. Educators can use these algorithmic suggestions as points of inspiration, integrating them into classroom experimentation or stage creation. This cooperative model transforms AI from a passive tool into an interactive co-creator, where the teacher's artistic judgment determines which computational outputs align with the emotional and aesthetic goals of a performance.

Moreover, AI contributes to inclusive and accessible education. Through digital learning platforms, remote instruction, and virtual simulation, students in under-resourced areas can receive guidance previously limited to professional training centers. In this sense, AI assists teachers not by replacing their functions, but by extending their reach and amplifying their pedagogical influence. When used ethically and creatively, AI becomes a bridge between technology and artistry—a tool that magnifies the human capacity for teaching, rather than diminishing it.

5.2. *The Unique Value of Dance Teachers*

Despite the many advantages AI brings to dance education, the unique value of human dance teachers remains irreplaceable, particularly in the realms of emotional communication, cultural transmission, and artistic creation.

Dance teachers play an essential role in facilitating emotional expression and connection within their students. Dance is a deeply personal and emotional art form, and

teachers help students navigate the complexities of expressing emotions through movement. By observing students' physical and emotional responses, teachers provide personalized guidance, helping students understand how to channel their emotions into their dancing. This emotional guidance fosters a deeper connection between the student and the art form, allowing them to grow not only as dancers but also as individuals. AI, while useful in technical aspects, cannot replicate the depth of emotional insight and support that a human teacher offers.

In addition, dance teachers serve as cultural transmitters, passing down the history, context, and traditions of various dance forms. Dance is often rooted in specific cultural, historical, and social contexts, and it is through the teacher's guidance that students gain an understanding of these rich traditions. Whether teaching classical ballet, folk dances, or contemporary movement, teachers help students appreciate the cultural significance of the dances they perform. This cultural transmission ensures that students not only master the physical techniques of dance but also connect with its deeper meaning and heritage.

Moreover, dance teachers play a critical role in nurturing students' creative potential. Through careful observation and individualized feedback, teachers can identify each student's unique strengths and challenges, and tailor their instruction to meet those needs. This personalized approach stimulates students' creativity, helping them discover their own artistic voice and develop original work. By fostering a safe and supportive environment for exploration, teachers inspire students to push their boundaries and express themselves fully through dance, something that AI is unable to do.

6. Conclusion

6.1. *The Balance between Technology and Humanities*

The integration of Artificial Intelligence into dance education represents not merely a technological innovation but a redefinition of the relationship between humans and art. As explored in the previous chapters, AI choreographic assistants demonstrate remarkable capabilities in generating movement sequences, simulating diverse dance styles, and providing data-driven feedback for learners. These advantages greatly enhance teaching efficiency, broaden creative horizons, and democratize access to high-quality dance education. However, this technological advancement also exposes the limitations of AI in capturing the essence of dance as a human-centered art form. Dance is not only a set of movements governed by rhythm and structure but also a profound expression of emotion, history, and cultural identity - elements that require human understanding, empathy, and interpretation.

Dance teachers, therefore, remain indispensable in the educational process. Their role extends beyond instructing movements; they nurture creativity, transmit cultural heritage, and foster the emotional connection between performer and audience. Through face-to-face interaction, teachers can perceive students' subtle emotional states, tailor their guidance accordingly, and inspire personal artistic growth - capacities that no algorithm can fully replicate. The human teacher's presence ensures that dance education continues to cultivate not only technical skill but also aesthetic sensibility and cultural awareness.

Thus, the future of dance education depends on achieving a dynamic balance between technological empowerment and humanistic cultivation. AI should serve as an intelligent collaborator - a supportive tool that amplifies the teacher's pedagogical power - rather than a substitute for human artistry. When technology and humanity coexist harmoniously, dance education can achieve both innovation and depth, efficiency and emotion, rational precision and artistic inspiration.

6.2. *Future Prospects*

The future of dance education will likely involve a collaborative approach, with AI and human teachers working together to enrich the learning environment. This partnership has the potential to transform dance education, offering more personalized

and diverse learning experiences for students. AI can provide new avenues for creative exploration and improve the technical aspects of dance education, while teachers continue to foster emotional and cultural connections with their students.

The application of AI in dance education should be aimed at enhancing the quality of artistic education rather than replacing the teacher. As AI tools become more advanced, they can serve as valuable assets to support teachers, allowing them to focus more on individualized instruction, emotional support, and the cultural transmission that are at the heart of dance education. Moving forward, the goal should be to strike a harmonious balance where technology amplifies the role of the teacher, rather than diminishes it.

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