

The Effects of AI-Assisted Dance Learning on Embodied Awareness and Creative Self-Efficacy

Yue Mao

Rochampton University, Arts, Humanities and Social Sciences, London, The United Kingdom

Abstract: Artificial Intelligence (AI) in dance education has begun to change the teaching, practice and absorption of human movement in a new way. This paper investigates the two sides of AI-assisted dance classes on students' sense of embodiment and creative self-efficacy. Integrate phenomenological frameworks of the moving body with Bandura's social cognitive theory to explore how AI-driven computer vision and real-time pose estimation technologies alter dancers' sense of proprioception. Research on the shift from older mirror-based externalisation to new algorithmic systems for self-monitoring has been conducted. Although AI feedback has improved the precision of kinematics, it may also harm the all-encompassing phenomenology of the 'lived body' if not used in teaching thoughtfully. In addition, the paper also studies how adaptive, confidence-weighted AI feedback loops affect creative self-efficacy, that is, individuals' sense of their own ability to create new works of art. Based on the above results, AI should be used as a cooperative learning partner rather than an inflexible test-taker to improve both the accuracy of movement and the self-confidence needed for creative exploration. Finally, this paper proposes a human-AI cooperative model for dance education that combines the accuracy of algorithms with the expressiveness of human art.

Keywords: Artificial Intelligence; Dance Education; Embodied Awareness; Creative Self-Efficacy; Pose Estimation; Phenomenology.

1. Introduction

Dance is a whole-body art form that uses various movements, spaces and emotions to convey expressions without words. Traditionally, the inheritance of dance culture has been transmitted through a teacher-student model, and students must be physically present in the teacher's studio to learn. Previously, most learning took place in a traditional way; it was mainly based on external visual prompts from teachers and internal adjustments of students' proprioception. However, the development speed and diffusion scale of digital technology have altered the situation of this teaching model. Artificial Intelligence (AI) can be used with high-end computer vision and machine learning to perform skeletal pose estimation, and it is now applied in dance studios to change the way movement classes are taught.

Artificial intelligence is being introduced into dance education to offer a practical solution for the problems of remote classes, and at the same time, a new way of learning through movement for students is about to begin. At any time, the AI system will gather data and analyze changes in a person's body to provide learners with objective biomechanical feedback. Dance is not merely the display of technically correct angles and time; it is the subjective expression of the 'lived body'. Therefore, a problem arises: How does algorithmically generated feedback interact with a dancer's inner sense and feeling of movement? Does hyper-quantification of the dancing body increase somatic awareness, or does it move the dancer away from their own sense of movement?

Based on the above new technology, we will explore in detail how digital mediation changes the essential features of body learning. A traditional dance studio is a highly specialised place that aims to reduce distractions and increase sensory focus. Mirrors are a type of specific visual feedback, but they require the dancer to perform a movement and observe their own reflection simultaneously, which adds a

significant cognitive burden. AI technology can be applied to asynchronously analyse videos and add augmented-reality overlays to reduce the cognitive load on students by processing visual data for them. Screens, wearable sensors, and auditory digital cues have been added to the delicate ecosystem of the dance studio, and these are entirely new variables. Researchers and educators need to determine whether the added sense information in these digital modifications expands the dancers' senses or creates an artificial barrier to reality. The aim is to avoid reducing the learning process to commodities by means of technology, and thus prevent a deep artistic journey from becoming a collection of gamified, algorithmic achievements.

At the same time, the psychological level of dance education—that is, how to foster a sense of self-worth in students' creative ability—will also be changed by AI integration. In addition to technical skills, dancers also need the emotional strength to improvise and create freely in a performance. The psychological attribute mentioned above is called creative self-efficacy. The impact of continuous algorithmic evaluation on students' sense of creativity. If the AI system is only a rigid, punitive judge of technical deviation, it will fail to allow for the artistic risk-taking required in new choreography.

Systematically explore the impact of AI-assisted dance learning on both embodied awareness and creative self-efficacy in this paper. Based on the above introduction, Section 2 will explore the phenomenological idea of embodied consciousness and how AI pose-estimation technology is applied to it. Section 3 investigates the effect of algorithmic feedback on Bandura's idea of creative self-efficacy. Section 4 puts forward a system of human-AI cooperative pedagogy that integrates technological precision and artistic subjectivity. Finally, Section 5 presents the main contents and offers a concluding thought on the future development of digitally enhanced dance education.

2. AI Pose Estimation and the Phenomenology of Embodied Awareness

Before we learn how artificial intelligence will change the sense of movement for dancers, we should first be able to experience this movement ourselves. Based on the basic ideas of Merleau-Ponty, the human body is not an object in space but rather serves as the principal way through which we perceive and experience the world; this is referred to as the 'lived body' (*corps vécu*) [5]. Embodied awareness refers to the deep, pre-reflective, proprioceptive sense of one's body's weight, momentum and spatial orientation in the context of dance [2]. Traditional dance education creates this consciousness through bodily practices and repeated exercises of movement sequences under the guidance of a human teacher, based on subjective and qualitative feedback [6].

Artificial Intelligence (AI) can be used in real-time computer vision and pose estimation to construct a closed-loop feedback system. Now, advanced skeletal-tracking frameworks are employed by the AI to map the movement of a dancer in a precise mathematical way and instantly calculate angular deviation and time differences from an ideal model [11]. The following are the reasons for the above goal in terms of biomechanics. It can instantly show learners any small postural deviations that are difficult to observe by themselves or are hidden in two-dimensional images produced by a studio mirror [8]. The AI will be a perfect, very careful external observer and significantly improve the accuracy of the technical data.

Too much reliance on AI evaluation is not suitable for promoting all-around growth of embodied consciousness in a phenomenological way. If a student is only focused on meeting the mathematical requirements set by the AI, they may start to treat their own bodies as mechanical devices that need to be optimised rather than as subjects for expression. AI's feedback is by nature visual and numerical; it cannot feel how deep someone's breath is, what small changes in muscle tension occur, or why people move this way emotionally [7]. As a result, there is a risk of 'kinesthetic alienation', in which the dancer gives too much importance to the external digital approval of the screen and neglects their internal, somatic felt-sense of the choreography. For AI to improve embodied awareness in people more effectively, it should be designed to shift a dancer's attention back to their body, thereby connecting external visual data with deep-seated internal feelings of proprioception.

At the same time, AI feedback in the temporal domain will modify the process of learning embodied awareness. In a traditional class, the teacher's oral correction is usually made after a set of operations have been completed, and the student needs to use kinesthetic memory to remember and apply the correction retrospectively. Real-time AI systems, however, provide immediate and continuous audio or visual signals about how much a limb has deviated from the standard path at that exact moment. Although the quick-response mode can correct relatively large errors in motion, it is not suitable for conveying the sense of time for dancers. Realised embodied awareness is to feel all parts of a movement phrase and to understand how the momentum of one movement naturally carries over to the next. The algorithm is constantly interrupting; therefore, continuous movement cannot occur, and the dancer is forced to move in jagged intervals until the

machine accepts them. Therefore, based on the best practices of teaching, real-time AI feedback should be used mainly at the beginning of learning movement or during focused technical training. As the dancer learns, the AI's continuous feedback should be gradually reduced in an organised way so that the student can perform the choreography by herself through their own developed internal sense of position, reducing their dependence on the algorithm and achieving autonomous body awareness.

3. Algorithmic Evaluation and Creative Self-Efficacy

Dance education also aims to foster the psychological growth of students; at the same time, movement is also important. Improvisation ability, interpretation of dance in a new way, and creation of new works are all related to a particular psychological attribute called creative self-efficacy. Albert Bandura's first social cognitive theory is the foundation of self-efficacy; that is, an individual's confidence in their own ability to perform behaviourally demanding activities is known as self-efficacy [1]. Organisational and educational psychologists have extended this idea to define creative self-efficacy as one's belief in one's own ability to create [3].

The development of creative self-efficacy is a slow, long-term process. It is highly sensitive to the type of feedback that a person receives from their surroundings [4]. After the introduction of AI systems in the dance studio, they have become the primary source of this criticism. The effect of AI on a dancer's creative self-efficacy will vary according to the design of the evaluation algorithm. If the AI is to penalize any deviation from the 'master' reference video strictly, then a rigid and conformist teaching model will be implemented. In light of the above, the dancer learns that improvisation and unique stylistic interpretation are considered "mathematical errors". Such punishment and algorithmic rigidity can significantly reduce the student's creative self-efficacy, causing them to fear taking artistic risks necessary for genuine choreographic expression.

At the same time, AI can be developed with pedagogical considerations to inspire a sense of creativity in students. Recently, improvements have been made in confidence-adaptive AI feedback systems to this extent [12]. They are not "right" or "wrong"; rather, these advanced systems offer many degrees of freedom and provide specific reasons for the various styles. AI offers students an objective instrument for self-study and thus helps them learn independently. When a dancer can use an AI tool to correct a difficult technical error on their own outside of class, they experience a strong sense of 'mastery' and boost their self-efficacy, as shown by Bandura [1]. This technically grounded confidence provides the psychological basis for the dancer to engage in risk-taking and exploration in improvisation and build strong creative self-efficacy.

At the intersection of AI and creative self-efficacy is the choreographic process. Choreography is by its nature a vulnerable act; the student must create movement from their own world of imagination and offer it for external evaluation. A student uses AI-assisted motion capture to record and analyse their choreography drafts, and is thus exposed to the objective visual output of their creative ideas. A low sense of self-efficacy in creativity among dancers may be demotivating. They may feel significant 'choreographic

imposter syndrome' because the movements of the digital avatar do not align with their mental concepts, and thus their physical realisation seems inadequate. If the AI system is also capable of generation, for example, suggesting other routes for travel or changing the theme of a party, it could provide an excellent creative starting point. Work with a non-judgmental, generative AI partner to explore a new direction in choreography freely and move away from conventional patterns. Through iteration and technological support, creative blocks can be overcome; at the same time, students are shown that creativity is not an inborn quality but a learnable and expandable skill set. As a result, strategically use generative AI tools to enhance students' sense of creativity and motivate them to explore various avenues for art creation.

4. Toward a Human-AI Cooperative Pedagogical Framework

To reconcile the objective accuracy of artificial intelligence with the subjective, creative character of dance, the educational model should no longer be "AI as a replacement for teachers", but rather "AI as a collaborative learning assistant". The best learning results are achieved through 'Teacher-AI cooperation' [9]. The AI will be used in this cooperative mode to find errors in the biomechanical data more easily and precisely match their times. It will give me a little help with the difficult parts of learning the new exercises. Delegate the technical correction and thus be freed from correcting angles yourself, teacher.

Free from the burden of technical policing, the human dance teacher can shift their teaching focus to the non-algorithmic spheres of art, emotion, music and history. The human instructor will use the AI's raw kinematic data to create art [10]. For example, if an AI system indicates that a student's arm extension is mathematically 'incorrect' according to a reference model, a human teacher can determine whether this deviation is due to a biomechanical flaw that needs correction or a beautiful, idiosyncratic style that should be encouraged.

This cooperative model must also have a clear division of teaching authority. Use AI feedback to pinpoint deficiencies in the work and do not treat them as final artistic assessments. The system can inform that the joint angle, timing or spatial trajectory of a dancer is not the same as that in a reference model, but it does not know whether this deviation has lowered the performance or if it is intended to express a certain style. Therefore, the teacher should act as an interpreter of the machine-generated data and art education. AI can identify the following technical problems in actual classroom applications: unstable balance, slow weight shifting and uneven arm motion. Then, based on the above patterns, the teacher can present various types of movement exercises, images for inspiration, or open-ended tasks to bring living movement into the studio. Therefore, the algorithm will not be fixed in the sense of bodily propriety. It can help students learn that precision in technology and creativity are not opposed to one another; instead, they can be combined to build a more secure foundation for the exploration of art.

The end of integrating AI in dance education is not to have perfect, lifeless copies of a master choreographer. To use the high accuracy of machine learning to rapidly build a strong physical foundation for dancers and help them achieve deep embodied awareness and confident creation. Through intentional balancing of algorithmic feedback and empathetic human guidance, the dance studio of the future will use digital

technology to foster technically excellent yet fiercely and creatively independent dancers.

5. Conclusion

The convergence of artificial intelligence and dance education is a new focus for teaching and a subject of phenomenological inquiry into the human body. As shown in the above analysis, AI-based pose-estimation technology has the power to alter the course of study for dancers. The two systems will be able to provide immediate and objective biomechanical feedback to boost learning efficiency through high-precision analysis. However, if implemented without strong teaching purposes, this excessive quantification may cause dancers to lose their sense of self-awareness in space and reduce the profound, subjective experience of the 'lived body' to a mechanical device.

In addition, the psychological damage to a dancer's sense of self-efficacy in creation by algorithms is also severe. Rigid AI systems that penalise artistic deviation may restrict the spontaneous spirit required for choreographic innovation. At the same time, adaptive AI tools for autonomous learning and independent problem-solving can offer strong technical support and provide the foundation for all sorts of creative risk-taking. The technology is psychologically neutral; therefore, the design of its structure and how it is used in the learning environment will determine whether it is beneficial.

To fully realise the prospects of digital technology in the arts, the future direction of dance education will be a cooperative model of humans and artificial intelligence. Use a machine-learning algorithm to automate the relatively monotonous operations of angle adjustment and time synchronization, freeing up teachers' time for other, more in-depth teaching activities, such as exploring emotion and narrative in dance. It is in this harmony of the infallible precision of algorithms and the boundless subjectivity of the human spirit that the real strength of digitally augmented dance education will be revealed.

References

- [1] Bandura, A. (1997). Self-efficacy: The exercise of control. W.H. Freeman and Company.
- [2] Parviainen, J. (1998). Bodies moving and moved: A phenomenological analysis of the dancing subject and the cognitive and ethical values of dance art. Tampere University Press.
- [3] Tierney, P., & Farmer, S. M. (2002). Creative self-efficacy: Its potential antecedents and relationship to creative performance. *Academy of Management Journal*, 45(6), 1137-1148. <https://doi.org/10.5465/3069429>
- [4] Tierney, P., & Farmer, S. M. (2011). Creative self-efficacy development and creative performance over time. *Journal of Applied Psychology*, 96(2), 277-293. <https://doi.org/10.1037/a0020952>
- [5] Merleau-Ponty, M. (2012). *Phenomenology of perception* (D. A. Landes, Trans.). Routledge. <https://doi.org/10.4324/9780203720714>. (Original work published 1945)
- [6] Warburton, E. C. (2011). Of meanings and movements: Re-languaging embodiment in dance phenomenology and cognition. *Dance Research Journal*, 43(2), 65-84. <https://doi.org/10.1017/S0149767711000064>
- [7] Pickens, J. (2021). Dancing through the digital landscape: Friction, control, and the need for information proprioception.

- Information Matters, 1(8).
<https://doi.org/10.2139/ssrn.4145790>
- [8] Tsuchida, S., Mao, H., Okamoto, H., Suzuki, Y., Kanada, R., Hori, T., Terada, T., & Tsukamoto, M. (2022). Dance practice system that shows what you would look like if you could master the dance. In *Proceedings of the 8th International Conference on Movement and Computing* (pp. 1-8). ACM. <https://doi.org/10.1145/3537972.3537991>
- [9] Kang, J., Kang, C., Yoon, J., Ji, H., Li, T., Moon, H., Ko, M., & Han, J. (2023). Dancing on the inside: A qualitative study on online dance learning with teacher-AI cooperation. *Education and Information Technologies*, 28(9), 12111-12141. <https://doi.org/10.1007/s10639-023-11649-0>
- [10] Swain, M. K., Simonthomas, S., Sharma, M., Singh, P., Kulkarni, N., & Dev, R. (2025). Evaluating the impact of AI on dance pedagogy. *ShodhKosh: Journal of Visual and Performing Arts*, 6(5s), 109-119. <https://doi.org/10.29121/shodhkosh.v6.i5s.2025.6912>
- [11] Bhan, S., Khan, A. K., Bekal, S. K., Saini, P., Singla, A., Thakuriya, K., & Mundada, D. K. (2025). Real-time AI feedback for dance students. *ShodhKosh: Journal of Visual and Performing Arts*, 6(3s), 122-132. <https://doi.org/10.29121/shodhkosh.v6.i3s.2025.6798>
- [12] Lin, Z., & Gee, L. P. (2026). Confidence-adaptive AI-instructor feedback fusion for enhanced engagement in online Latin dance learning. *Journal of Arts & Humanities*, 15(1), 26-34. <https://doi.org/10.18533/journal.v15i1.2587>