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Safety and Learning Efficiency in Online Dance Training on New Media Platforms

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Abstract: New media platforms have completely reshaped the scene of dance education in terms of both opportunities and problems for learners' safety and teachers' instruction as a result of their sudden emergence. A critical examination of the applications of platforms such as Zoom, TikTok, YouTube, and AI-aided learning environments focuses on their effects on physical safety and protection in dance practice settings, as well as the acquisition of movement competence. Based on a systematic review of thirteen relevant peer-reviewed articles from 2022 to 2025, the following five interlinked theoretical clusters have been identified: physical safety and injury prevention, platform-mediated learning outcomes, digital pedagogical design, embodied cognition online, and psychosocial well-being. The results show that a lack of home training environment and teacher supervision is lacking, and the embodiment effects bring about increased injury risks in an online scenario. Designed a platform with an inherent structure ability and AI-based formative feedback in collaboration with the teacher mediation learner's learning outcomes. A combined design framework is proposed that combines safety regulations, technical means for guaranteeing quality, and educational approaches to create high-quality online dance training programs. Implications have been put forward by platform developers, dance instructors, etc., who wish to promote evidence-based policies in the field of digital arts education.

Keywords: Online dance education; New media platforms; Physical safety; Learning efficiency; Digital pedagogy; Embodied learning; AI-assisted instruction

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1. Introduction

With the acceleration of the world's disruption due to COVID-19, dance classes have been migrating away from physical venues and into digital spaces at a staggering rate, which has now become part of people's lives in general art education. Li and Ahmad's full bibliographic study indicated that there had been a quadruple rise in papers published from 2019 to 2023 on online dance courses [1]; it also demonstrated both the urgent application requirements for technological development and the maturity of relevant research fields at this stage. With this development of new media platforms at their core in the field of educational discussion, teachers, researchers, and platform designers will be forced to address issues far transcending mere technicality. Among them, how long-term use in a virtual reality environment will affect students' actual movement and which type of information transmission through video streaming technology or chat function actually influences dance skills to learn are also core problems to be addressed.

The short-video platform's appearance has further complicated things by bringing informal, peer-produced instructional forms into the mix alongside some existing informal instruction modes and eventually replacing them with formal online teaching. Warburton [2] found that TikTok's algorithm-aided display mode can expand and increase participation in dance communities, but also bring problems such as inconsistency in pedagogy, ethical responsibility for teaching, and no safety guidance system. Likewise, Li, Zhou, and Lam [3] found through experiments on Zoom-based dance class settings that although they support collaborative learning among participants and help foster creative thinking, there is a strong reduction in learners' self-efficacy due to an embodied constraint caused by screens. Based on these convergence paths, we believe that the effects of new media platforms on dance learning outcomes are not as simple or uniformly positive; thus, a more detailed analysis should be conducted to explore when online-dance training is both safe and conducive to educational objectives.

2. Literature review

2.1. Safety and injury prevention in remote dance environments

Physical safety is an essential area in online dance education, but it has been less researched. The translation of studio-based practice into domestic or improvised training spaces brings about a type of environmental hazard different from what is encountered in purpose-built dance facilities. Kishon and Sarig-Bahat carried out a more scientifically rigorous study so far, following 31 pre-professional modern dancers longitudinally before and after the outbreak of the COVID-19 pandemic [4]. Although the general injury rate over these two time points was relatively consistent, the qualitatively characteristic nature of the injury risk changed notably: unsuitable flooring surfaces, thermal inadequacy in environments, and a lack of proper warm-up equipment were newly identified risk items exclusive to home-based online training. In particular, the dancer with no injury exhibited a significantly higher level of aerobic fitness and engaged in more independent strength training activities; these outcomes may provide some references for Online Platforms to Design Pre-class Conditioning Guidance Content.

In addition to environmental risk factors, there is also a lack of a quick sense-of-touch feedback mechanism at this level within both asynchronous and synchronous online environments. The teacher's body orientation in the studio environment will be adjusted due to any changes that cannot be reflected through video displays. The gap specifically affects beginner learners who cannot acquire kinesthetic awareness of monitoring biomechanical risks on their own. Pedagogical response strategies in this shortcoming are gradually focusing on the application of technology enhancement; for example, Kang et al. constructed the Dancing Inside system using two-dimensional position determination to calculate learner movement similarities with instructor moves through score judgments, which provides some modes-of-motion feedback aimed at supplementing the lack of physical performance [5]. Based on the user test data, according to this conclusion, the technology-mediated feedback correction can improve postural accuracy by about 12% more than traditional expert-based coaching in terms of biokinetic hazard prevention through screens.

2.2. Platform characteristics and learning efficiency

The design structure of these systems, rather than pedagogical goals, influences dance learners' acquisition of skills on platforms. Yu and Liu [6] used the stimulus-response theoretical model to collect data from 350 Chinese college dance students and found that factors such as system quality, teacher's involvement, and interactive participation jointly influenced their learning satisfaction; learning effectiveness was identified as an important mediating factor. According to their structural equation model analysis, the technical infrastructure of the platform, its responsiveness, audio-visual fidelity, and interactive affordance, directly affect instructional quality; they are not neutral conduits for educational content transmission. The above findings have certain references when comparing mainstream new media platforms; as these platforms were not specifically aimed at arts education, there may be restrictions on types of reactions and exchanges conducive to proficient skills learning.

Coelho and Menon [7] further applied the Unified Theory of Acceptance and Use of Technology to explore online dance learner behavior in different regions of Indian cities, integrating online technology self-efficacy into the UTAUT model for the first time. According to their structural equation model, the significant predictors of adopting e-learning in dance were performance expectancy, effort expectancy, social influence, and technology self-efficacy. It can be concluded from this that, among other factors, learning effectiveness depends on the learner's belief in their ability to use a digital environment proficiently when facing an online dancing context. Platform investments in simple interfaces and community functions can improve the adoption rates of platforms and instructive effects simultaneously. Ling et al. [8] presented a new approach from the side-by-side examination and developed the first empirical formative evaluation scheme for online dance education based on Messick's theories about validity. By building specific types of rubric and assessment maps for the asynchronous skills exercise, this problem was solved; it showed that an efficient quality assurance system could run smoothly in the field of online movement training under such conditions.

2.3. Embodied cognition, digital pedagogy, and psychosocial wellbeing

There is an obvious discrepancy between embodied learning and digital-mediated theories based on online dance education. LeFeber, Kawano, and Blanc [9] extended the Community of Inquiry model to examine the issue facing dance and movement therapy education under digitalization; therefore, they proposed that embodied aesthetic care be adopted as a pedagogical tool to maintain somatic connection among participants through virtual reality technology. Qualitative research on their work at a conference involving practitioners during the pandemic-era shift to online delivery found that rhythmic entrainment, interpersonal oscillation, and intentional embodiment were practical mechanisms to close the physical gap brought about by remote teaching. Li and Ahmad [1] separately verified that embodiment has remained the least theorized aspect in existing online dance education systems; it still holds today that, despite its widespread practice of considering only the transmission of motion information via visuals, proprioceptive or kinesthetic components essential for learning are not adequately addressed.

Psychosocial well-being has gradually become one of the core contents for researching online dance classes; it is also closely related to both safety and efficiency problems directly. Finn et al. have demonstrated that after eight weeks of participation in a social-cure approach-based online group-dance program targeted at high school students (age range: 16–24) with anxiety issues, there are evident declines in worry and depression among these students [10]. Moreover, their sense of achievement from joining the dance community also improves noticeably. Their mixed-methods findings indicate that online dance platforms have functions not only limited to teaching but also therapeutic ones; thus, their design in terms of emotionally safe virtual learning environments should take this dual role into account. Li also presented, using self-determination theory, that autonomy, perceived competence, and belonging are key factors affecting one's intent to participate in online dance classes [11,12]. Among them, belonging is seen as the most difficult to satisfy by means of digital platforms only. Roughly speaking, online dance participation has proven to be correlated with some observable positive effects on students' moods and a stronger sense of community attachment among participants; the size of this effect differs for learners whose primary sensory-motor mode is not the same.

3. Conceptual framework

Based on the above literature, this study presents a conceptual model of online dance training safety and learning efficiency under the context of new media platform characteristics shown in **Figure 1** below: The integrated framework comprises four elements: (1) Platform Architecture includes both technical aspects and interaction features of a specific digital environment; (2) Pedagogical Design refers to the instructional strategy, feedback mechanism, and assessment scheme that constitute the learning experience structure; (3) Physical Safety is operationalized as risk management within an environment and biomechanical conditions for remote movement contexts; and (4) Learning Efficiency refers to the quality and pace of skill acquisition under engagement motivation formative assessment mediated by it. The framework

also assumes that the above four parts are interdependent; they are all part of an overall educational system. Safety conditions restrict the range of technically challenging movements that can be safely instructed in a remote environment, thus determining both instructional content and expected efficiency standards. The platform's architectural design provides teachers with certain feedback paths.

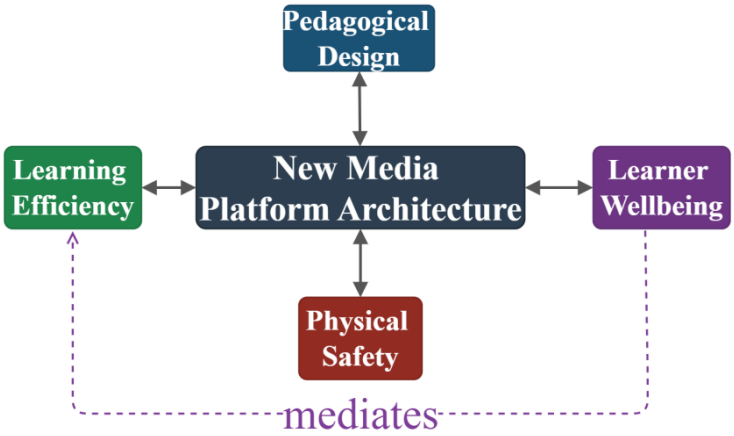

Figure 1. Safety and Learning Efficiency Conceptual Framework of Online Dance Training on New Media Platforms.

4. Comparison analysis of new media platforms

Through a system-wide comparison of the current main types of new media used for online-dancing instructors, it is possible to evaluate their degree of creating secure and efficient learning environments. As shown in **Table 1**, the main characteristics of the following five types of platforms are: synchronous video conference (e.g., Zoom); short-form social video (such as TikTok); long-form instructional videos; specialized learning management systems (including LMS); and AI-assisted training systems.

Table 1. Analysis of typological types for new media platforms in online dance training

Platform Type	Modality	Engagement	Learning Efficiency	Safety Considerations
Zoom / Teams	Synchronous	High	Moderate	Limited real-time feedback; space constraint risks
TikTok	Asynchronous	High	Moderate	No instructor oversight; imitation-based injury risk
YouTube	Asynchronous	Moderate	Low	Lack of interaction; no personalised safety guidance
Dedicated LMS*	Both	Moderate	High	Structured content; safety protocols embeddable
AI-Assisted System	Asynchronous	High	High	Real-time pose feedback reduces biomechanical error

According to **Table 1**, among the three categories, the AI-based system and a standalone LMS environment have achieved the best performance for user engagement, learning effectiveness, and safety assurance due to their built-in safe operation guidelines, multimodal feedback function, and evaluation criteria. On the other hand, TikTok and some similar short-video platforms receive high scores in interaction capabilities but have serious safety issues due to a lack of teacher supervision, excessive praise for speed-imitated movements without warming up, and an algorithm that highlights spectacular movements over safe techniques. Li et al. [13] found through empirical research on performers' training programs in Hong Kong that there is indeed an inconsistency between the value placed by learners, teachers, and institutions upon digitalization tools, which include flexible scheduling and assessment facilities; however, when it comes to intensive practice-based courses requiring immediate interaction and feedback, most participants still prioritize synchronous live-streaming classes conducted face-to-face with instructors.

Synchronous video conferencing has a mid-level status within this classification system. Li, Zhou, and Lam [3] recorded the capability of Zoom-based dance teaching to enhance collaboration and creative thinking at the expense of reducing students' sense of efficacy. This study indicates that this kind of distance cannot reproduce the positive effects on confidence building from personal interaction and touch within the studio setting. Self-efficacy deficiency has its own safety hazards: those who are not confident in their physical abilities tend to restrict their activities too much. On the other hand, they also fail to undertake technical actions prepared adequately because there is no on-site instructor supervision, which can lead to increased risk of injury and hinder their overall skill development.

As shown in **Figure 2**, which schematically presents the learner-reported outcome of various platform types based on reviewing related documents, this figure indicates differences in the perception of safety, skill acquisition, and emotional experience between learners using synchronous and asynchronous digital platforms, respectively.

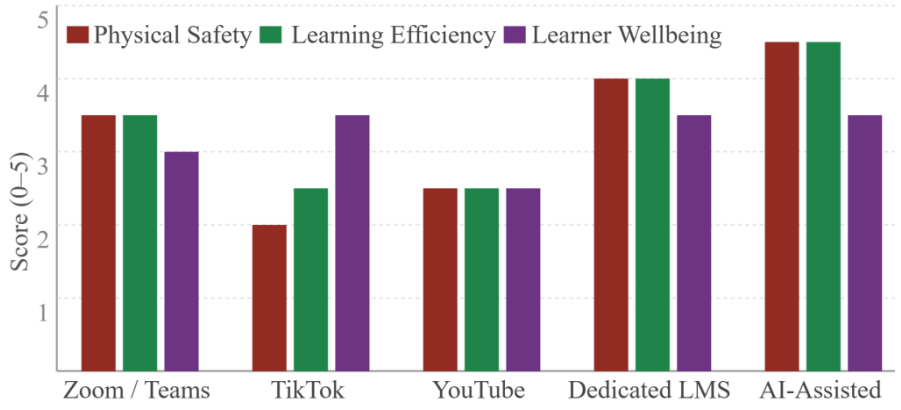

Figure 2. Learner-Reported Outcomes Across Online Dance Training Platform Typologies.

As shown in **Figure 2**, a group of bars is used to show that learners' evaluations of various platforms differ among the following five types: physical safety, learning effectiveness, and learner well-being. Scores range between 0 and 5 for these indicators. As shown in **Figure 2**, the AI-powered system and dedicated LMS environment have achieved their peak scores for all three factors: Physical safety is assessed at 4.5; learning efficiency stands at 4.5. The results indicate that purpose-built teaching platforms are structurally strong. TikTok's Physical Safety Score was only 2.0 due to the lack of supervision over self-produced or algorithm-selected dance videos. One prominent feature in all platforms is that the scores for Learners' Wellbeing range between 2.5 and 3.5, indicating relatively stable levels of emotion regulation; thus, it seems unlikely to be significantly influenced by the platform itself. Zoom and Teams fall into the middle category, showing relatively moderate performance on all three aspects; these mixed results were also reported by previous studies on synchronous video conference applications in dance education [3].

5. Discussion

As indicated by the evidence summarized in this review, several interrelated conclusions have emerged regarding how to improve the design and delivery of online dance courses: The first is that there exist actual, determinable physical risks in remote movement practice platforms; Kishon and Sarig Bahat's Environmental Hazards, inadequate flooring, poor insulation, and space constraints, are the system-wide defects arising from an unphysical facility dedicated to physical exertion and transferred to domestic settings with no regulatory oversight. Any online dance training framework that fails to address these aspects directly will introduce a considerable risk by establishing prerequisites for the initial session environment, modifying warm-up routines, and adjusting choreographies spatially.

Secondly, learning effectiveness varies from person to person under different conditions of Online Dance: The platform's architectural structure, instructional design, and learners' psychology interact to form this effect. Yu and Liu,

in their research, showed through structural equation models that both the technological quality of the platforms and pedagogical qualities from instructors jointly affect student performance; neither can serve as an independent factor for it alone to influence students' learning results.

Third, the embodiment dimension of dance learning is considered to be an intractable structural problem facing all currently available online platforms; technology cannot completely resolve it. Kang et al. present a teacher-AI cooperation model suggesting that with the assistance of AI for monitoring position accuracy and delivering instant corrections in asynchronous settings, teachers can expand their help to distance learners effectively. Kang has declared publicly that although algorithms are one of the important means to teach art, teachers will still be responsible for providing necessary support for innovation and creative expression while motivating students' interest. LeFeber et al. [9], through an alternative lens focusing on somatic therapy, argued for the need to deliberate pedagogically about how movement-based learning can be fostered in online spaces, not as naturally occurring entities.

Fourthly, the psychological and social dimensions of online dancing have never been peripheral; they are fundamental causes for participation in it or safety issues. Finn et al. [10] showed that, through online dance forms, anxiety-prone people can gain positive therapeutic effects and social interactions; these are outcomes driven by a targeted effort to build groups of identity and security in virtual spaces. Li [11] verified that the realization of learners' sense of relatedness needs is still an obstacle to be overcome in current online dance education; therefore, some platform characteristics should focus on cultivating communities, stimulating interpersonal connections among users, and fostering teacher-student relationships. Roughly speaking, Rugh et al. have added that there is an influence of people's individual learning styles upon whether online dance lessons are effective; platforms catering to one mode of content display fail to serve this portion of users adequately [12].

6. Conclusion

The enhancement of safety and learning efficiency in online dance training courses through new media platforms has revealed complex multidimensional relationships within the broader pedagogic system. These factors arise from interdependencies among the platform's architectures, instructional designs, and environmental factors, as well as learner psychology. According to the reviewed evidence, although new media platforms have greatly increased access to dance instruction, they also introduce new problems of body, mind, and society that require targeted design responses rather than passive accompaniment.

The proposed conceptual framework provides a basis for the above-mentioned responses; that is, incorporating elements of physical protection regulations, technologically mediated feedback, embodied teaching methods, and psychological-care support into the construction plan can enhance its effectiveness. Future research could shift focus from a comparison of platforms to longitudinal analyses of learners' development in an expanded system of online dance programs, including injury rates, progress curves for skills, and changes in motivation after years of digital arts learning. The platform developer and dance education team need to integrate effective safety guidelines, form a feedback system based on forms of evaluation, and build community-building capabilities in the process of constructing an online-dance-environment framework that is indispensable for teaching infrastructure.

Due to the continuous advancement of the field, at present, this period cannot reflect whether online platforms can completely replace traditional studio-style dance instruction; it will investigate whether these special features have been fully absorbed by classrooms based on the embodied learning mode and provide another form of guarantee for students' physical safety under divided space conditions. Among all these problem areas, systematic responses are challenging for contemporary dance-educational researchers and teachers to deal with.

Disclosure statement

The author declares no conflict of interest.

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