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Evolution and trends in online dance instruction: a comprehensive literature analysis

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Literature related to the topic of “online dance” was selected as a sample through the database Web of Science (WoS), and the number of publications, the distribution of research countries and regions, and the distribution of research institutions were analyzed. Through analyzing the keywords, we analyze the research hotspots of online dance teaching from three perspectives: the educational environment and learning scenarios, the transformation of teaching methods and approaches, and the research objects and their impacting factors, sort out their paths of evolution, and carry out cutting-edge analyses. Two implications of the study were drawn: a focus on the use and continuation of new technologies in the development of dance teaching and learning, and a flexible and open-minded approach to the design of online dance courses.

KEYWORDS

online teaching, CiteSpace, quality education, analytical research, online dance

Introduction

In recent years, the online teaching mode in the field of education has shown a rapid development trend. According to the research statistics of 恒州诚思 (YH Research), Li (2024) the global online education market will reach 956.8 billion yuan in 2022, and it is expected that the market will continue to grow steadily in the future. The market size will be close to 1,672.1 billion yuan in 2029, with a Compound Annual Growth Rate (CAGR) of 8.2% in the next six years. With the rapid development of the online education market, the user base is also expanding. According to statistics, the number of global online education users reached about 300 million in 2020 and maintained a high growth rate.

Online education, as a mode of distance learning, provides more possibilities for the popularization and development of professional dance courses in the field of higher education. The emergence of online courses has changed the teaching philosophy of the traditional dance classroom, transforming the teacher-centered teaching mode into a student-centered teaching mode (Alvarez, 2013; Christie, 2016), meeting students' needs for fragmented, diverse, personalized, and independent learning. Studies have also suggested that online dance education enhances flexibility and accessibility, making dance education available to students who may not have access to in-person training due to geographical or financial constraints (You, 2020; Delabary et al., 2022). However, some scholars argue that online dance education presents significant challenges, particularly in the areas of physical guidance, embodied cognition, and movement correction (Mabingo and Ssemaganda, 2023; Papp-Danka and Lanszki, 2020). These issues raise concerns about

whether online dance instruction can truly replace traditional dance education or if a blended model is more effective.

The COVID-19 pandemic has resulted in a proliferation of studies that are highly relevant to the design of online teaching courses, teaching content, teaching modes, post-class reflection, and student feedback. Research has shown that online learning was already growing in popularity even before the COVID-19 outbreak, and specific methods and functions were designed to ensure efficient teaching and learning processes (Li et al., 2023). In the last decade, there have also been several studies focusing on web-based online teaching and learning models, including teaching and learning processes, methods, assessment requirements, and assessment systems (Alvarez, 2013; Bayne, 2008; Christie, 2016; Dias et al., 2014; Johnston and Whitehead, 2011; Kreitem, 2017; Melin, 2013). The online environment has brought changes to the sense of space and the way visual and physical perception are perceived, which in turn has affected the way dance is taught (Delabary et al., 2022).

Relying on the high-speed development of 5G Internet, the popularization of modern education technology, and the rapid progress of video communication technology (Dou, 2024), online education is driving the process of education reform in higher education (Sjolie et al., 2022). The online dance teaching model has gradually been widely promoted and utilized globally, taking its place in the field of higher education and continuing to develop.

By analyzing the current research status of online dance teaching, we hope to explore the current research hotspots, research methods, research objects, and differences in influencing factors (Markula et al., 2023). Through the research differences of online dance teaching, drawing on previous studies, we provide theoretical and empirical insights into the effectiveness of digital dance pedagogy. This study also examines whether emerging technological tools, such as AI-assisted movement analysis and motion capture, can enhance the efficacy of online dance education compared to traditional in-person instruction (Kang et al., 2023; Li et al., 2023). Furthermore, studies have noted that dance learners' engagement and performance outcomes in online settings are influenced by their motivation, learning environment, and access to interactive feedback tools (Hsia et al., 2016; Rugh et al., 2022).

Considering the quality of the research, the scope of this study is limited to relevant papers that have been published in WoS and contain the keyword "online dance." By analyzing the existing relevant literature, it is evident that online dance education is deeply influenced by external factors. The emergence of new Internet technologies, virtual wearable devices, and COVID-19 have all impacted online dance teaching, requiring continuous updates to the teaching model. Additionally, factors such as students' engagement, satisfaction, and self-efficacy play crucial roles in shaping the effectiveness of online dance education (Leijen et al., 2009; Westby, 2022).

Taking all of these factors into account, three distinct research questions arose. In the process of analyzing the data from the study, it was found that external factors had a greater impact on the development of online dance teaching than the online teaching model itself. The specific research questions are as follows:

RQ1: What external and pedagogical factors influence the adoption of online dance education?

RQ2: What key drivers have fundamentally transformed pedagogical approaches and learning paradigms in online dance education, and how do they compare to traditional models?

RQ3: What factors enhance students' engagement and learning outcomes in online dance education, and how do they differ from in-person learning environments?

Methodology

In this study, a systematic review of online dance papers was conducted. Literature was analysed using CiteSpace software, a software specifically applied to identify and display new trends and developments in science in the scientific literature, as well as a useful visual analysis software. In terms of scientific citation analysis, CiteSpace is able to present the relationships between the literature in the form of a scientific knowledge graph, which helps to sort out the trajectory of past research and give a general idea of future research prospects.

The main function of CiteSpace is to analyse trends and patterns in the scientific literature, in particular to look for key points in the development of an industry or field, especially intellectual turning points and critical points. It provides simple interfaces for obtaining data from PubMed, arXiv, ADS, and NSF Award Abstracts, and supports structural and temporal analyses of a wide range of networks from scientific publications, including collaborative networks, author co-citation networks, and document co-citation networks. It also supports networks with mixed node types such as terminology, institutions and countries, and mixed link types such as co-citation, concurrent and directed citation links.

The strength of CiteSpace lies in its ability to provide an intuitive way to understand the dynamics and trends in the research field. By generating a visual knowledge graph, CiteSpace can help research quickly grasp the latest advances and cutting-edge developments in the research field.

The stages of the research methodology are as follows:

The selection criteria

To ensure the quality of the literature, the core collection of Web of Science (WoS) databases was selected as the source. The samples are analysed after searching through specific strategies.

The search strategy

With "topic = Online Dance" as the search formula, document types as "(Article) OR (Proceedings Paper)," and the time span of 1994–2024, 757 relevant articles appeared. In the Web of Science Index on the search result page, check SCI-EXPANDED, SSCI,

AHCI, CPCI-S, and 549 articles appeared. In the “Web of Science Categories” section, items containing the fields “Dance” and “Education Educational Research” were selected for refinement, and 83 related articles appeared as research samples.

Coding studies

This study used the current, latest version of the software CiteSpace 6.3.R1 (64-bit) Basic (c) version to visualize and analyze the above literature.

Results

Publication volume analysis

The annual number of articles in WoS about online teaching and learning research was counted, and the results are shown in [Figure 1](#). With 83 articles from 1999 to 2024, research on teaching dance online began in 1999, with the first article in the core collection of the WoS database relying on the then-heated topic of online learning (E-Learning). Since then, research on online learning for dance has almost come to a standstill. After a small increase in research on teaching dance online in 2008 based on the appearance of new 3D technologies and wearable electronic devices, related research has returned to its previous near stagnation, maintaining a volume of two to three publications per year. In 2020, influenced by COVID-19, the relevant research in recent years has exploded in growth and maintained a steady rise. In 2023, WoS will carry 13 articles, a more than 4-fold increase from 3 articles in 2019. Research related to teaching dance online gradually increased with the impact of the epidemic in the years 2020–2024, with a cumulative WoS load of 39 articles during this period, twice the number of related studies in the previous decade. A preliminary analysis of these 39 papers revealed that most of the papers discussed the factors influencing learners’ self-efficacy and community interactions in the context of new forms of learning such as dance, online videos, artificial intelligence, and virtual technologies.

Distribution of countries or areas studied

CiteSpace analysis shows (see [Figure 2](#)) that a total of 23 countries have conducted research on online dance from 2014 to 2024, illustrating the wide geographic distribution of researcher sources. Among these countries and regions, PEOPLES R CHINA and ENGLAND are currently the two main locations for online dance research, producing 17 and 13 articles, respectively, accounting for 24.28% and 18.57% of the total literature. These studies are overwhelmingly quantitative and up-to-date. The United States is the earliest core position of this research, although the number of studies in the last decade has been 11 articles, accounting for 15.71%. However, in the early stages of this research area, the United States had a dominant and influential role.

Distribution of research institutions

Cluster analysis of the WoS literature using CiteSpace (see [Figure 3](#)) revealed that the initial collaboration was centered on the University of Birmingham, which joined with four other institutions to form a network of small-scale research collaborations in this research area.

In other aspects, international research is distributed through multiple institutional cooperation networks, but the scale of each relationship network is relatively small; some studies involve only two core institutions, and there is no connection between different cooperation networks. This suggests that international research in the fields of online dance teaching and learning is not closely linked to each other and has not yet formed a stable research community.

Keyword analysis

Keywords are the refining of the content of the literature and the identification of the core viewpoints. Through the frequency of keywords, this study combines the keyword centrality index to explore the research hotspots in the field of online dance teaching, analyzes the evolution of research topics with the help of keyword co-occurrence mapping and keyword time zone view, and explores the research frontiers with keyword emergence detection.

The WoS bibliographic data were analyzed through CiteSpace, and based on the generated keyword lists, synonyms that differed in singular and plural, lexical, and abbreviation forms were merged. Subsequently, the keyword analysis was run again and combined with the interpretation of high-frequency citations. It was found that the research hotspots in the field of online dance teaching mainly involved the following three aspects: [Figure 4](#).

Results with those obtained in the paper (RQ1)

Firstly, the evolution of educational environments and learning scenarios is markedly evident in the realm of dance education. For the representative keywords, the WoS literature is “pedagogy” “education” “dance education” “higher education” “online education.” It is clear to note that online dance education has evolved to become a part of the future of higher education. Especially with the rapid development of 5G Internet technology and the emergence of large-scale open courses such as MOOCs, it makes dance online teaching has gradually become a mainstream learning mode. These developments underscore the transformative potential of online education, positioning it as a pivotal element in the future landscape of dance education and beyond.

According to [Li et al. \(2022\)](#), the proposed 4C skills concept suggests the feasibility of future sustained online dance instruction through the analysis of student self-efficacy after triangulation ([Leijen et al., 2009](#)). [You \(2020\)](#) conducted an assessment case study analyzing how ballet students reflected on their learning through video-based platforms. The study compared Chinese higher education practices with global trends, emphasizing the role of Internet-based e-learning technologies in enhancing student reflection and choreography skills. [Heyang and Martin \(2020\)](#)

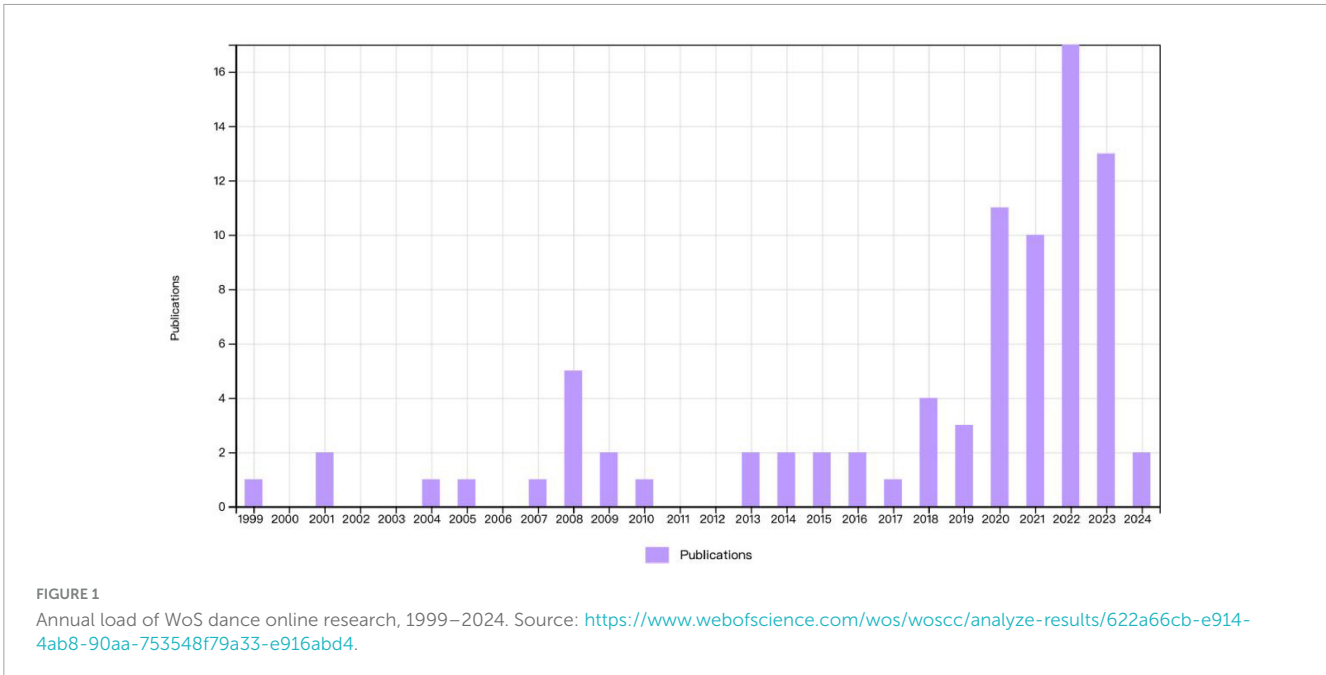


FIGURE 1 Annual load of WoS dance online research, 1999–2024. Source: <https://www.webofscience.com/wos/woscc/analyze-results/622a66cb-e914-4ab8-90aa-753548f79a33-e916abd4>.

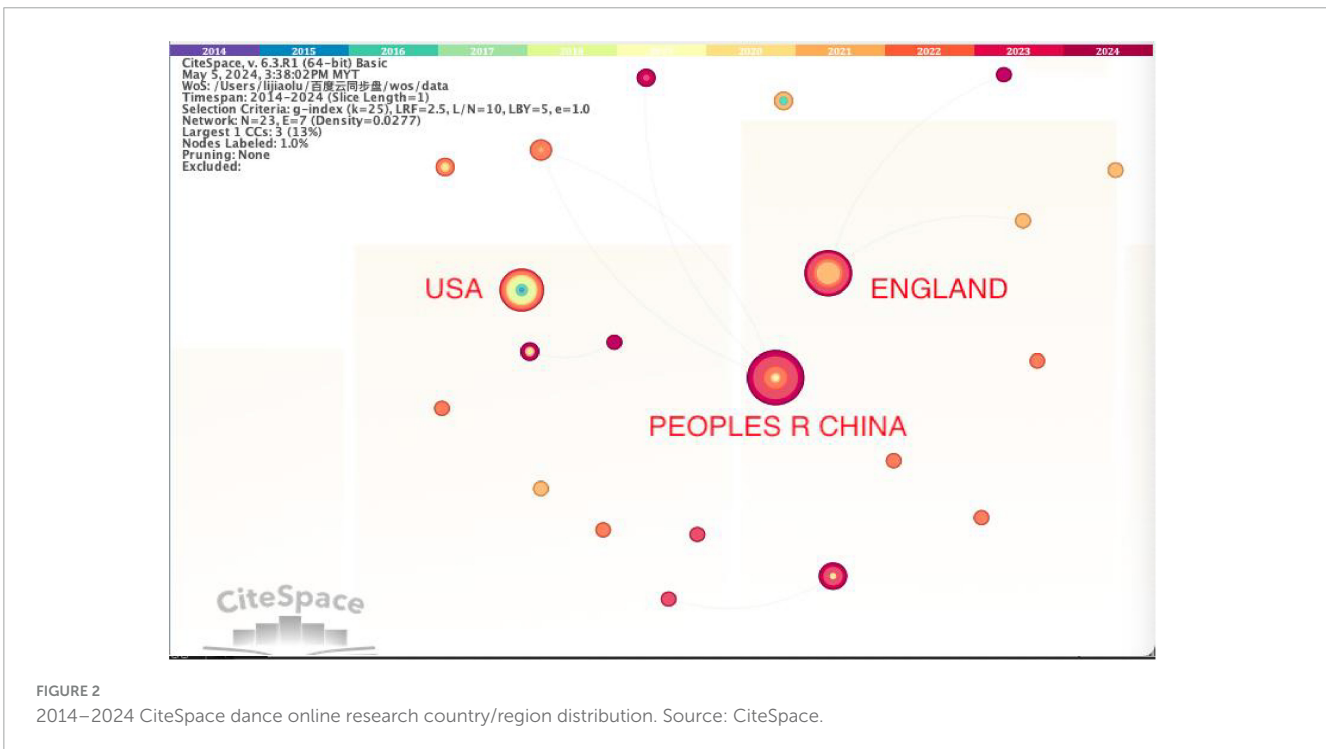


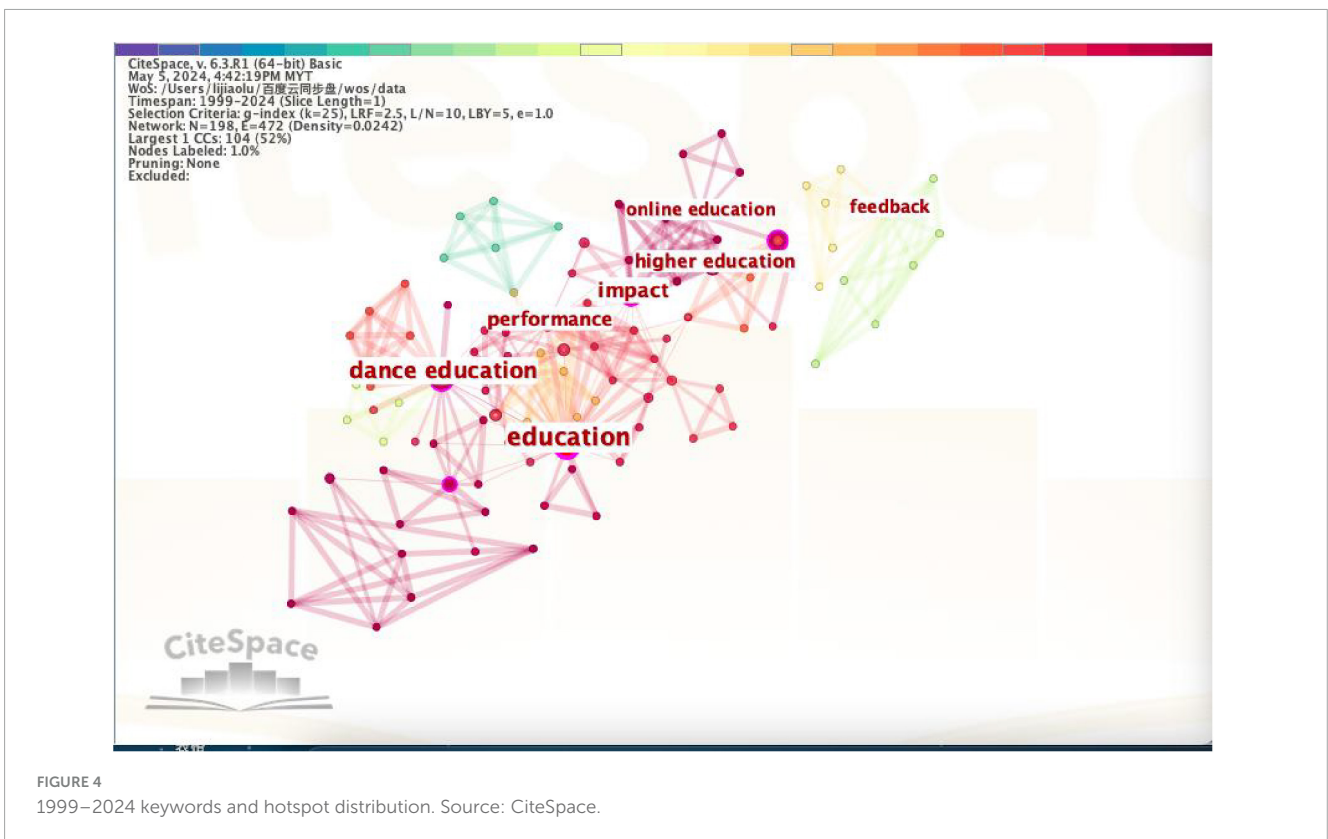
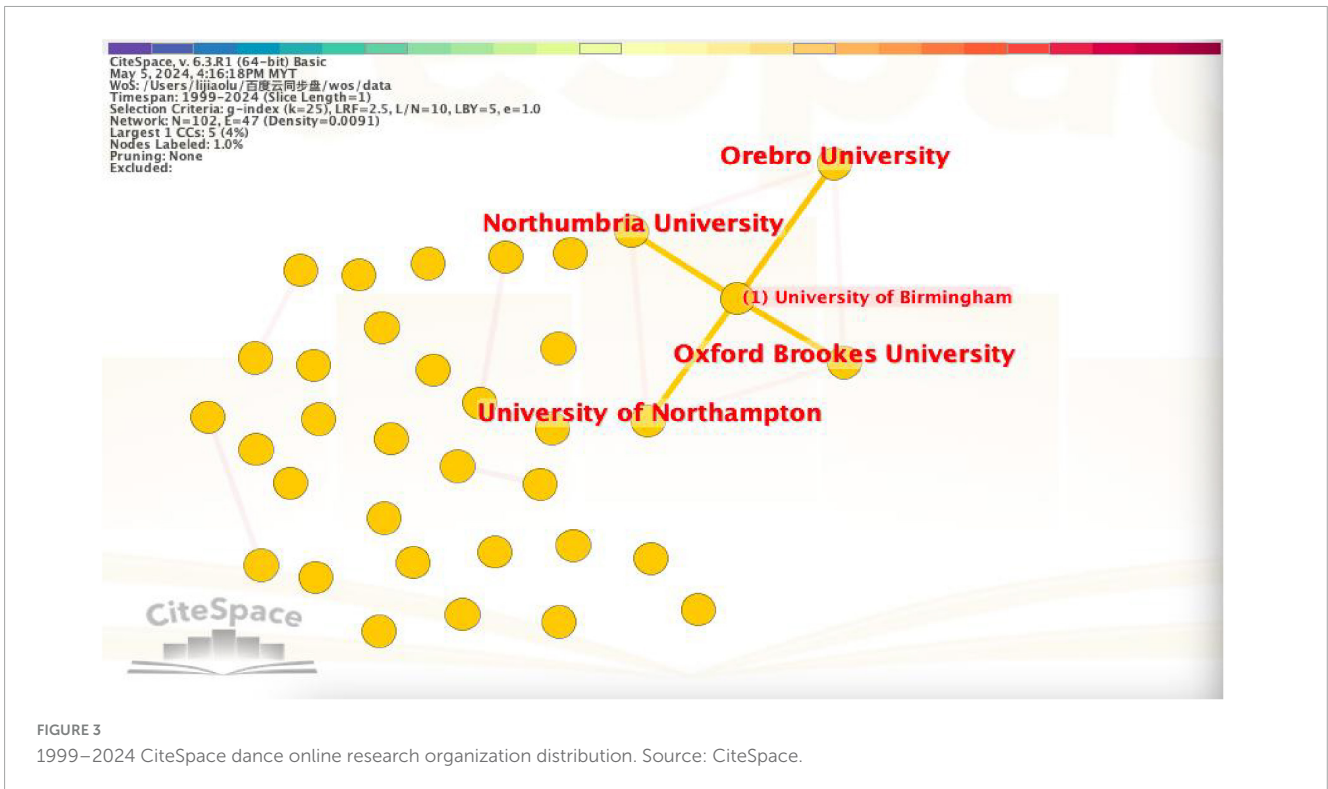
FIGURE 2 2014–2024 CiteSpace dance online research country/region distribution. Source: CiteSpace.

describe the relationship between online dance pedagogy and international higher dance education and how creativity can be utilized in dance education.

Results from changes in online dance in terms of teaching methods and tools (RQ2)

Secondly, the transformation of teaching methods and approaches is significantly influenced by the advent of new

technologies. Important keywords in the WoS literature are “technology,” “motion capture,” and “performance,” underscoring the central role these advancements play in education. With the appearance of new technologies such as AI and virtual technology, online teaching has undoubtedly become the new direction of higher education and even education in the future. Kang et al. (2023) created an AI tutor model to develop a new dance learning system based on collaboration between teachers and AI. The 4C skills concept proposed by Li et al. (2022) reconstructed the dance teaching methodology to a greater extent. You (2020) described the characterization of web-based technologies in the field of



dance training in Chinese higher education from the perspective of a Master of Fine Arts (MFA). These developments collectively indicate a profound transformation in teaching practices, driven by technological advancements, which are reshaping the future of education (Lin et al., 2018).

Li et al. (2017) proposed that the emergence and use of new technologies (blogs) and online courses such as online virtual learning platforms (Moodle / Blackboard) have allowed learning to be very effective, and both students and teachers have benefited. Heyang and Martin (2022) conducted a study to explore the

use and exploration of TiKToK in higher dance education by teaching specific examples through TiK ToK. Magnenat-Thalmann et al. (2007) found that teachers and students enhanced the learning process by interacting with animated dancers using a Web3D platform. Westby (2022) claimed that transforming dance education, social engagement, and technology through online participation would enhance the quality of dance education performance. Collectively, these studies underscore the pivotal role of technology in modern education, offering diverse and effective methods to enhance learning experience across various disciplines.

Results related to the influencing factors derived in the paper (RQ3)

Third, the emergence of online dance teaching has fundamentally transformed the traditional mode of dance education, introducing new possibilities for its development in the modern era. The hot keywords of research subjects and influence factors in the WoS literature include “student” “feedback” and “impact.” The emergence of online dance teaching has changed the traditional mode of dance teaching. The emergence of online dance teaching has changed the traditional dance teaching mode. It puts forward new possibilities for the development of dance education in the new era. Consequently, online dance teaching is poised to play a crucial role in the evolution of dance education, shaping its future trajectory.

Leijen et al. (2009) conducted a study of feedback activities in a ballet course based on a video learning environment. Most of the instructors believed that the presence of streaming media had a practical effect on the students’ post-course reflection process; students found streaming videos effective for conducting self-assessment. Hsia et al. (2016) found an impact on students in areas such as self-efficacy through a study of online peer feedback methods and systems in dance education. Rugh et al. (2022) suggest that virtual learning replaces live training. Online dance education gains measurable mental health and social connections (Mabingo and Ssemaganda, 2023). The emergence of online teaching and learning enhances dance education in less ICT-developed areas (Li et al., 2022). Zoom is an effective tool for online teaching and learning in dance higher education that meets the diverse needs of students while stimulating creativity and collaborative skills, resulting in increased satisfaction with the program.

Discussion

Research theme evolution and frontier analysis

Using CiteSpace, the most popular keywords for citation explosion in online dance teaching research (as shown in Figure 5) were generated along with the corresponding time zone views. Based on the keyword analysis mapping, topic evolution and frontiers were analyzed.

In 2005–2016, scholars have been focusing on the technological issues in the field of online learning (Whatley, 2008). Coventry University (AHRC) pioneered the digital archive recording system

for dance works and attempted to identify effective approaches in online teaching. A breakthrough in online teaching and learning through video, VR, virtual reality technology, emerging platforms, and other methods. Researchers at the time favored online dance learning and community feedback communication as applications of information technology in education, and many new technologies were used to interpret user feedback on online learning.

In 2008–2009, with the development of new technologies and wearable electronic devices, motion capture became a hot research topic at that time, including video platforms, 3D, and virtual technologies for motion capture. Andrews and Thoms (2008) used a virtual learning environment (VLE) forum to deliver an academic writing course to dance students through images and emails. In Japan, this virtual reality technology was found to be effective in improving the dance skills of 75% of beginner ballet students through a study of 3D motion capture and 3D movement data (Umino et al., 2009).

In 2008–2013, online dance teaching was more concerned with the timely communication between teachers and students after class, including community communication and feedback evaluation. From 2016 to 2021, “pedagogy” became the research hotspot. Online teaching models in pedagogy began to penetrate educational practices, gradually developing into more effective and contextually appropriate approaches. Oh (2020) explores the use of YouTube and virtual reality technology in K-POP dance teaching and communication. Chao et al. (2021) using the digital flipped learning model can break the limitations of dance teaching in time, space, and geography by proposing the concepts of lifelong learning and digital teaching technology and applying them to the curriculum of dance teaching.

From 2021–2022, “performance” and “impact” were key to the two years of research at that time. Many colleges and dance institutions around the world were forced to turn to online instruction due to the epidemic’s limitations on human interaction (Delabary et al., 2022). Dance teaching, especially courses related to dance performance, focuses on accuracy and finesse of movement and requires more postural guidance and correction than other disciplines. Therefore, how to achieve effective movement and correction interactions in distance learning becomes a problem to be solved (Papp-Danka and Lanszki, 2020). Coelho and Menon (2022), through an empirical study in India based on the UTAUT model, found that external variables have a significant impact on e-learning adoption. The creation of e-learning platforms that can support the business of performing arts is proposed. On the other hand, due to the paradigm shift in dance teaching and learning, the impact on curriculum teaching and student learning in various aspects came to the fore. Also receiving more attention are various emerging learning approaches, such as mobile learning, online collaborative learning, and AI technologies (Hsia and Sung, 2020). At the same time, researchers have paid increased attention to motivation as an influencing factor.

From 2022 to 2024, “education” and “dance education” have emerged as key words in the last three years of research. Unlike previous studies that focused on a relatively homogenous research direction and content, researchers have emphasized the prospects for the development of online dance education in the broader field of education (Li et al., 2023). Enhancing online learning for dance majors through artificial intelligence and developing

Top 8 Keywords with the Strongest Citation Bursts



FIGURE 5
1999–2024 top keywords with the strongest citation bursts. Source: CiteSpace.

matching pedagogies (Saarani, 2022). Began to focus more on the characteristics of online dance teaching in the educational field.

Key findings and contributions

This study analyzed the evolution of online dance instruction by examining publications indexed in the Web of Science database. The findings reveal a surge in research interest following the COVID-19 pandemic, with notable contributions focusing on technology-enhanced pedagogy, student engagement, and the impact of external factors such as digital platforms and virtual reality. The study highlights three primary research themes: (1) the transformation of educational environments and learning scenarios, (2) the integration of advanced teaching methodologies and tools, and (3) factors influencing student engagement and learning outcomes.

Addressing research gaps and theoretical contributions

While previous studies on online education broadly discuss the effectiveness of digital platforms in learning (Alvarez, 2013; Bayne, 2008; Delabary et al., 2022), there is a lack of research specific to online dance education and its unique challenges. This study fills that gap by emphasizing the role of embodied cognition and kinesthetic learning in dance, which are often overlooked in traditional e-learning frameworks (You, 2020). Moreover, the study engages with recent literature (Kang et al., 2023; Li et al., 2023) to reinforce its theoretical contributions and increase generalizability by integrating research from both Western and Eastern educational contexts.

Challenges and limitations

Despite the increasing adoption of online dance instruction, several challenges persist. One critical issue is the lack of a

standardized curriculum for online dance education, making it difficult for institutions to establish consistent teaching methodologies (Hsia et al., 2016). Additionally, student engagement and retention remain a concern, as online learning lacks the immersive and embodied experience of traditional in-person dance training (Hsia et al., 2021; Mabingo and Ssemaganda, 2023). Furthermore, technological accessibility and digital literacy impact the effectiveness of online dance instruction, particularly in less developed regions (Hsia and Hwang, 2020; Hsia and Hwang, 2021; Li et al., 2022).

Comparing online and traditional dance education

While online dance education offers flexibility and accessibility, traditional dance education provides in-person mentorship, tactile feedback, and spatial awareness, which are essential for mastering movement-based disciplines (Rugh et al., 2022). Unlike subjects that rely solely on cognitive learning, dance education requires an integration of kinesthetic, visual, and auditory learning modes (Westby, 2022). The current study suggests that hybrid models, which combine online theory instruction with in-person practical sessions, may provide an optimal solution (Oh, 2020; Coelho and Menon, 2022).

Future research directions

To address these challenges and further advance the field, future research should explore the following areas:

Comparative studies on learning outcomes: Future studies should compare the effectiveness of online versus in-person dance education, focusing on aspects such as skill acquisition, creativity, and performance assessment.

Technological innovations for enhanced learning: Research should investigate the role of AI, motion capture, and virtual/augmented reality in creating immersive dance learning experiences. Studies could also examine the

effectiveness of adaptive learning platforms in personalizing dance instruction.

Cross-cultural perspectives in online dance education: Given the global nature of online learning, comparative studies should explore how cultural differences influence pedagogical approaches and student engagement in various regions.

Teacher training and curriculum development: More research is needed on how educators can be trained to effectively integrate digital tools into dance instruction and design online curricula that maintain pedagogical rigor.

Longitudinal studies on student engagement: Future research should conduct long-term studies to track student engagement, motivation, and skill retention in online dance education, considering factors such as social interaction and self-efficacy.

Theoretical and practical implications

The study contributes to the literature by mapping the evolution of online dance education and identifying research gaps. It underscores the need for an interdisciplinary approach, integrating insights from educational technology, cognitive science, and performing arts to optimize online dance pedagogy. Practically, the findings provide guidance for educators, policymakers, and technology developers in designing more effective online dance learning environments.

Conclusion and recommendations

The shift to online dance instruction presents both opportunities and challenges. While technological advancements have enabled greater accessibility and flexibility, issues related to student engagement, pedagogical effectiveness, and technological disparities must be addressed. Future research should adopt a multidisciplinary perspective, leveraging emerging technologies and pedagogical innovations to enhance the quality and sustainability of online dance education. By fostering collaboration among researchers, educators, and technology experts, the field can evolve toward more inclusive, effective, and engaging digital learning experiences for dance students worldwide.

Using the authoritative database WoS as the data source and based on infometrics and CiteSpace visualization technology, this study compares the number of articles, the distribution of research countries and regions, the distribution of research institutes, the comparative analysis of keywords, and the analysis of co-citation between literature and authors in the field of online dance teaching and learning from 1994 to 2024 and obtains the following conclusions.

In the first place, research on online dance teaching has been influenced by the general environment. Research began in 1994 but has remained relatively stagnant. For the most part, the output of literature related to online teaching and learning has been influenced by the development of the Internet and the emergence of new technologies. Research on online

dance teaching sharply increased due to COVID-19 starting in 2020, maintaining strong publication numbers annually, although recent data indicate a potential decline in interest this year. In addition, there are few collaborative relationships among research institutions and scholars in various countries, and no influential core has been formed. Most of the research directions are also fragmented, and institutions and authors usually work independently, which limits the development of research to some extent.

Secondly, the research direction of online dance teaching and learning has different focuses in different countries and regions. Although the earliest research on online dance teaching was based on the theme of e-learning, the exploration of online dance teaching began. However, in the later development process, the research on online dance teaching was too scattered. Most of the studies focused on school programs and were conducted on a variety of factors affecting online dance teaching, such as new technology, communication and feedback, teachers, dance education, self-efficacy, satisfaction, and so on.

However, less attention has been paid to the specific implementation of teaching and learning and the design and impact of online dance teaching in other fields, suggesting that scholars have not paid enough attention to the structure of the online dance teaching model and the role of teachers in the design of courses and teaching, resulting in a lack of research to form a relevant system and scale. To a certain extent, this explains the sluggishness of the previous research.

Reflecting on the findings of the study, the paper draws the following recommendations

First of all, promote mutual cooperation among research organizations in the field of online dance teaching. Sharing research results, focusing on the crossover and continuity of research with the development of other disciplines. In recent years, the integration and development of new technologies and online dance teaching have injected new energy into the online dance teaching mode. This interdisciplinary academic exchange, especially under the influence of MOOCs, TiK ToK, and other social media platforms, and the efficient integration of online dance education with AI intelligence, virtual reality, and other new technologies, provide new ideas for future dance teaching research.

Secondly, as the field of online dance teaching continues to develop, course design research should be conducted with a flexible and open perspective. Dance e-learning is constantly being enriched by mobile learning, blended learning, flipped classroom, game-based learning, virtual reality, 3D technology, VR technology, etc. The boundaries between different learning modes are no longer clear (Fernandes et al., 2020). Online dance teaching is not just limited to university courses. More medical therapy programs (Delabary et al., 2022) or other dance enthusiasts are joining in to popularize online dance teaching methods (Lara-Aparicio et al., 2021). This means that researchers should be more flexible in their perspectives, and their research designs should be closely aligned with and applicable to all learning scenarios (Hsia et al., 2022).

Data availability statement

The data used in this study were obtained through systematic searches of the Web of Science (WoS) database. As these data are subject to subscription access and database licensing restrictions, they are not publicly available. However, detailed information on the search strategy and inclusion criteria is provided in the article to ensure transparency and reproducibility.

Author contributions

JL: Writing – original draft, Visualization. MA: Supervision, Writing – review and editing.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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