



Research Overview on the Teaching Mode and System Construction of Traditional Instrumental Music in Universities under the Background of AI Empowerment

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Abstract: In an era where digital technologies are deeply embedded in socio-cultural development, their profound integration with the field of education is bringing new opportunities for systemic transformation to traditional instrumental music teaching in universities. This paper focuses on the integration and application of artificial intelligence technology in this domain, providing a systematic review of related research and practical developments both domestically and internationally. Through an analysis of current trends, this study identifies the shortcomings and limitations of existing achievements. Furthermore, it proposes a systematic framework for development around key areas such as core theoretical foundations, innovative teaching models, curriculum reform empowerment, optimization of teaching practices, focused teaching evaluation, and technological software support. The aim is to offer theoretical insights and practical guidance for advancing the intelligent transformation and substantive development of traditional music education in Chinese higher education institutions.

Keywords: artificial intelligence, traditional instrumental music teaching, teaching mode, teaching system, educational innovation

1. Introduction

Artificial intelligence (AI) technology, as the core driver of the new wave of scientific and technological revolution, is widely penetrating the field of education through various smart devices. It is profoundly reshaping the forms and paradigms of education, driving systemic transformation and leapfrog development. According to the “China AI Application Development Report (2025),” the application of AI in education in China has shown explosive growth, with an average annual compound growth rate of 67% in its penetration into fields such as language training and STEAM education. This trend has progressed from localized assistance to deep integration. It not only restructures the traditional closed-loop of “teaching-learning-assessment” but also gives rise to innovative educational models such as personalized learning path planning, intelligent diagnosis of teaching effectiveness, and precise resource allocation. This marks the transition of educational informatization from the digital stage to a new developmental phase centered on intelligence. [1]

Currently, from the perspective of research on AI technology empowering the field of music education, the application of artificial intelligence in music education largely focuses on fundamental functions such as music theory instruction and intelligent practice accompaniment. However, there remains a significant gap in both practice and research within the specific domain of traditional ethnic instrumental music classroom teaching. As crucial carriers of national cultural inheritance and innovation, higher education institutions bear a key mission in fostering cultural confidence and advancing the construction of a culturally strong nation. Achieving the digital and intelligent transformation of intangible cultural heritage, such as traditional ethnic instruments, in university teaching is not only an important measure to implement the national “Education Power” strategy and the “Project for the Inheritance and Development of Excellent Traditional Chinese Culture” but also an urgent need to enhance the effectiveness of curriculum-based education and deepen the reform of the teaching system. Based on actual classroom observations, current traditional instrumental music instruction in higher education institutions primarily faces the following dual challenges: Firstly, there exists a structural contradiction between standardized teaching paradigms and the individualized development needs of students. Within limited classroom time, it is difficult for teachers to provide detailed guidance tailored to the differences in each student’s performance techniques, musical expression, and other aspects. Secondly, there is a noticeable time lag in teaching feedback. Incorrect performance habits formed during students’ after-class practice are difficult to correct in a timely manner and can easily solidify into technical bottlenecks, thereby constraining the overall improvement of teaching quality.

Therefore, exploring how to systematically empower the teaching of traditional instrumental music in higher education through artificial intelligence—particularly by establishing an intelligent human-computer collaborative assistance model in the design and implementation of classroom instruction, such as integrating functions like pitch recognition, rhythm

analysis, and technique evaluation to optimize the teaching process, and conducting empirical research to compare its effectiveness with traditional teaching methods—has emerged as a research direction in urgent need of breakthroughs. This study is grounded in pedagogical fundamentals, aiming to conduct a detailed analysis of the practical outcomes and adaptability issues arising from such applications[2], with the goal of advancing both theoretical and practical developments in this field as a significant starting point.

2. Core Theoretical Foundations

As mentioned earlier, with the advancement of the internet, the Internet of Things, and smart hardware [3], digital technology has permeated every aspect of education and teaching. AI teachers have emerged as new elements in classroom instruction, transforming traditional teacher-student dynamics into a human-machine-human relationship[4]. Adapting to the trend of artificial intelligence development promotes the transformation and innovation of learning methods[5]. Concurrently, leveraging the widespread application of AI technology in the field of music education drives collaborative innovation and development across various aspects, including teaching models, methods, practices, and evaluation in music education. Utilizing AI technology to empower the innovation of music education teaching capabilities and enhance teaching efficiency is a crucial measure to advance the high-quality development of education.

In the context of this research, focusing on the domain of traditional instrumental music classroom teaching in higher education, we aim to construct a novel tripartite teaching model integrating “theoretical foundation—practical training—intelligent diagnosis/evaluation” by systematically leveraging the enabling advantages, innovative models, and practical effectiveness of artificial intelligence technology. This innovative practice provides a critical breakthrough for the modern transformation of traditional Chinese music education. Specifically, it requires a certain foundation in educational and teaching theory, along with support from relevant software and technical resources.

3. Innovative Teaching Model

In today’s era, where digitalization and personalized learning needs are becoming increasingly prominent, innovative teaching models are redefining the boundaries of education. By integrating artificial intelligence technology into the instrumental music classroom teaching system in higher education, the limitations of the traditional “oral transmission and mental comprehension” teaching approach can be overcome through AI support. This enables the continuous optimization of students’ foundational skills and intelligent instruction[6], constructing a personalized, precise, and standardized teaching pathway that tailors education to individual students and specific contexts[7]. Simultaneously, grounded in the student-centered and adaptive teaching philosophy, an innovative teaching model and personalized instructional methods that emphasize “practice-guided learning, learning-informed teaching, and competency orientation”[8] can be implemented. This approach explores new pathways for the deep integration of artificial intelligence with traditional instrumental music classroom teaching.

4. Empowering Curriculum Reform

Leveraging artificial intelligence (AI) technology to empower the reform of instrumental music teaching in higher education facilitates the paradigm shift of traditional classrooms from “teacher-centered” to “learner-centered.” By establishing an intelligent teaching support system that integrates core functional modules such as intelligent error correction, real-time feedback, and personalized learning path planning, a new adaptive instrumental music teaching model is developed, enabling genuine tailored instruction. This innovation in teaching methodology not only drives curriculum reform but also significantly enhances the efficiency of instrumental skill training and fosters continuous improvement in teaching quality. Through these comprehensive advancements, curriculum reform is fully empowered, offering intelligent course solutions for cultivating high-caliber music talents.

5. Optimizing Teaching Practices

Optimizing teaching practices is a crucial pathway to enhancing the quality of education. Teachers should adopt differentiated teaching strategies based on students’ needs to accommodate diverse learning conditions and provide personalized learning solutions, thereby improving classroom teaching practices. For instance, during classroom instruction, teachers can utilize intelligent AI systems to analyze students’ performance in real-time, including aspects such as pitch accuracy and rhythm, generating on-site visual feedback. This helps students better recognize their shortcomings during practice or performance reviews, enabling more precise improvement of their playing skills and self-training capabilities after class, as well as correcting improper practice behaviors. This teaching model, which integrates classroom instruction with intelligent technology, retains the interactive advantages of traditional teaching while infusing classroom education with new contem-

porary significance. It aims to better guide instruction[9], thereby enhancing and optimizing the feedback and effectiveness of classroom teaching practices.

6. Focusing on Teaching Evaluation

Teaching evaluation is a core component of enhancing educational quality. The integration of artificial intelligence (AI) technology into the teaching of traditional instrumental music in higher education has brought innovative changes to the teaching evaluation system. By leveraging the advantages of cutting-edge AI technologies[10]—such as intelligent audio analysis—the system can capture issues in students’ actual performances in real time and generate multi-dimensional evaluation reports. This approach addresses certain limitations inherent in subjective teacher evaluations, helping both teachers and students identify underlying learning challenges while providing feedback and solutions[11]. For example, during students’ performance reviews, AI-powered diagnostic evaluations can offer precise improvement suggestions for their interpretations, compensating for nuances that may be missed by the human ear. In terms of evaluation methods, the intelligent system establishes a dynamic model combining “formative assessment and summative assessment.” This model not only tracks students’ progressive growth in practice but also emphasizes the cultivation of artistic expression. By providing a relatively reliable quality monitoring mechanism for traditional instrumental music classroom teaching, this approach promotes the transformation of teaching evaluation from experience-based judgment to intelligent, scientifically-driven diagnosis.

7. Relevant Technical/Software Support

Technology empowerment leverages advanced technologies to infuse new momentum into music education, breaking through spatial and temporal constraints, optimizing resource allocation, and enhancing the overall capacity of the educational system[12]. Today, music technology has already transformed the ways of music learning[13]. Based on the practical exploration of this research, leveraging AI to empower traditional instrumental music classroom teaching in higher education naturally relies on the support and innovative application of relevant software and technologies. The core lies in the systematic integration of various innovative software tools and their deep immersion into both teaching scenarios and students’ after-class practice scenarios.

Specifically, mainstream AI interaction platforms such as DeepSeek, ChatGPT, and Doubao can be utilized to construct a multi-dimensional intelligent auxiliary teaching dialogue system model. In an interactive teaching process characterized by “you play, I listen” and “you perform, I evaluate,” this system can assist students by providing identification, personalized feedback, and suggestions related to pitch, tone, and melodic expression. At the same time, natural language dialogue processing technology can be employed to generate personalized learning theories and instant feedback mechanisms.

Furthermore, in terms of analytical and creative teaching approaches, specialized music software such as Audacity and Sonic Visualiser, along with mainstream generative AI tools for music like Melodic, Suno, MuseAI, and DeepSeekAI, can generate authentic performance data based on practical needs. They can also create accompaniments for related works or model performance styles, addressing the pain points in traditional instrumental music classroom teaching, such as the scarcity of accompaniment resources and the lack of melodic sensibility. These tools help students understand the improvisational rules of traditional music. After listening, students will develop corresponding melodic perceptions, retain related melodic imprints, and preserve the accompaniment audio. This allows them to repeatedly recall and practice with the accompaniment during after-class sessions. Such an analytical and creative teaching approach has the potential to shift the focus of instruction toward the deeper transmission of the cultural connotations of music. By leveraging AI to organically integrate and synergize these key technologies, it will to some extent transform the teaching models and effectiveness of traditional instrumental music classrooms, providing an innovative development pathway for the modern inheritance of teaching methods in traditional instrumental music education.

8. Conclusion

In summary, driven by artificial intelligence technology, the teaching of traditional instrumental music in higher education is gradually constructing a new educational ecosystem characterized by personalization, intelligence, and systematic integration. This system adheres to the fundamental principles of “AI assistance, teacher-led instruction, and student-centered learning.” It achieves precision in the teaching process and efficiency in practice sessions through intelligent technological tools, expands the boundaries and forms of teaching content via industry-education integration and interdisciplinary collaboration, and fundamentally ensures the quality and effectiveness of talent cultivation through systematic curriculum restructuring.

It is important to note that while AI currently falls short of fully replacing teachers in their critical roles of emotional

communication, artistic inspiration, and humanistic care, its demonstrated advantages in areas such as learning data analysis, real-time feedback intervention, virtual resource generation, and personalized path recommendation have made it an indispensable core pillar in advancing the modernization of traditional instrumental music teaching. Looking ahead, the deep integration of AI and traditional instrumental music education will not only reshape the pathways of skill transmission but also expand the horizons of artistic education. With this article, the author hopes to “spark further discussion” and open a new chapter for traditional instrumental music classroom teaching at the intersection of technology and humanity.

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