Research on the Implementation Path of Empowering High-Quality Development of Music Education in Chinese Colleges and Universities with Artificial Intelligence

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ABSTRACT

The widespread application of artificial intelligence has brought new opportunities for the professional development of music education in colleges and universities. It has unique value in improving teaching effectiveness, optimizing educational concepts, innovating teaching methods, and cultivating comprehensive intelligent teachers. However, while artificial intelligence empowers music education in colleges and universities, it also faces issues such as imbalanced allocation of digital resources, digital literacy improvement brought about by technological iteration, and ethical misconduct caused by outdated constraint mechanisms. College teachers need to grasp the development trend of artificial intelligence, promote the integration of mathematics and physics in college music education, apply artificial intelligence for intelligent emotional analysis, flexibly use artificial intelligence concerto and accompaniment modules to assist students in practicing instrumental and vocal works, and rely on artificial intelligence technology to achieve high-quality development of college music education.

Keywords: *Artificial intelligence, Piano teaching in colleges and universities, Implementation path.*

1. INTRODUCTION

General Secretary Xi Jinping emphasized that "digitalization of education is an important breakthrough for China to open up a new track for educational development and shape new advantages in educational development." The application research of artificial intelligence in the development of higher education in China is mainly reflected in promoting supply side reform, advancing teaching mode reform, and promoting the internationalization of colleges and universities. To deeply understand the improvement of educational philosophy, teaching methods, and teaching effectiveness brought by artificial intelligence to colleges and universities, relying on artificial intelligence technology will better adapt to this new opportunity of transformation. Recently, with the advent of the generative AI DeepSeek, which represents a major breakthrough in China's generative AI, it has opened up a research and development path of "low-cost" AI equipped with "high-performance" AI at the technical algorithm level, and also broke the absolute leading edge of the US AI at the international level. DeepSeek has achieved low-cost and efficient output by cracking algorithm patterns and thought chain patterns. Especially DeepSeek's thought chain model can simulate human thinking processes by serializing thought patterns, and construct a relatively logical thought chain, enabling the model to gradually reason and analyze, and then generate logically rigorous and literary text, enhancing the interpretability of the model's thinking and the flexibility of input. It is suitable for more complex task instructions and effectively captures key information from multiple rounds of dialogue. The emergence of DeepSeek class generative artificial intelligence not only presents interdisciplinary and integrated technological effects, but also breaks down barriers to human cultural dissemination with its multilingual support and translation capabilities.

Therefore, college teachers can fully utilize generative artificial intelligence tools such as DeepSeek to improve the efficiency of research and management in innovative teaching plans, scientific research, academic exchanges, and student homework grading.

2. THE CONNOTATION OF EMPOWERING HIGH-QUALITY DEVELOPMENT OF MUSIC EDUCATION IN CHINESE COLLEGES AND UNIVERSITIES WITH ARTIFICIAL INTELLIGENCE

The concept of artificial intelligence (AI) was officially proposed by McCarthy at the Dartmouth Conference in 1956. It belongs to one of the important branches of computer science and is known as one of the top three technologies in the world. In recent years, artificial intelligence has brought disruptive effects in various fields around the world. With the continuous improvement and widespread promotion of algorithm recommendation, deep learning, and big data technologies, artificial intelligence has gradually shown a trend of precision, intelligence, and personalization in the field of higher education. Artificial intelligence has the ability to promote learning transfer, learning communication, teaching perception, and teaching control, and is subtly changing people's lifestyles, learning styles, and ways of thinking. Artificial intelligence can continuously and accurately collect data on the thoughts, emotions, behaviors, and other aspects of educational objects from massive music education resources, and construct digital models for students. Through multiple dimensions such as interests, emotions, and values, artificial intelligence can use multimedia graphics, videos, and other intuitive forms of expression to transform music theory knowledge into language that students can understand, ensuring that students learn at a suitable pace, improving learning effectiveness, and fully optimizing the expression of music education content. At the same time, it can enable every student to break through the limitations of the field and rebuild an intelligent field that combines real-time interaction and audio-visual capabilities. This immersive learning not only stimulates students' interest in learning, but also enhances their sense of identification with the learning content, thereby improving the infectiousness of music education. In addition, the use of artificial intelligence technology can divide the requirements of music education in universities into indicators, forming a scientific evaluation index system. [1]

The report of the 20th National Congress of the Communist Party of China clearly stated that "high-quality development is the primary task of comprehensively building a socialist modernized country". The high-quality development of music education in universities must firmly grasp the teaching objectives, take "cultivating virtue and educating people" as the foundation, organically integrate ability shaping and knowledge imparting, and deliver high-quality music talents to society.[2] It is necessary to resist in leading the high-quality development of colleges and universities with high-quality party building and ideological and political work, strengthen the connotation construction of colleges and universities, empower music education with artificial intelligence, provide supporting conditions for the high-quality development of colleges and universities, and improve the efficiency of education. Artificial intelligence can achieve refined intelligent curriculum design, enrich the levels of courses, expand the scope of courses, and comprehensively improve the management level of courses in college music education. In the context of contemporary intelligence, educational authority and beliefs have been shaken by artificial intelligence. College teachers need to rethink the essence of higher music education, clarify the issue of "how to cultivate contemporary college students", clarify the role and application scale of artificial intelligence in higher education, and provide strong driving force for higher music education.

3. THE PROBLEMS AND CHALLENGES FACED BY ARTIFICIAL INTELLIGENCE IN THE DEVELOPMENT OF HIGHER MUSIC EDUCATION IN CHINA

3.1 The Imbalance in the Allocation of Digital and Intellectual Resources in Higher Education Restricts the High-quality Development of Music Education in Colleges and Universities

The imbalance of digital and intelligent resources in higher education refers to the uneven distribution of digital and intelligent resources (such as online courses, intelligent teaching platforms, data analysis tools, etc.) in the field of

higher education, resulting in significant differences in access and utilization of these resources among different regions, schools, or student groups. This imbalance may be reflected in the following aspects: firstly, colleges and universities in developed regions usually have more advanced digital infrastructure and more intelligent resources, while colleges and universities in underdeveloped regions may face problems such as insufficient funding and outdated technology, leading to uneven distribution of intelligent resources. Secondly, the urban-rural gap makes it easier for urban colleges and universities to access digital resources, while colleges and universities in rural or remote areas may lack basic network infrastructure and digital tools. Thirdly, the differences between key universities and private universities (such as "Double First-Class" universities) usually have more funding and policy support, which can lead to the introduction of advanced digital teaching tools and platforms, while ordinary universities may struggle to keep up with the pace of digital development due to limited resources. Public colleges and universities usually receive more government funding support, while private colleges and universities may face greater financial pressure, leading to insufficient investment in digital resources. Fourthly, the differences in student groups result in students with better economic conditions being able to purchase better devices (such as computers, tablets, etc.) and internet services, thereby making more full use of digital resources, while students with economic difficulties may not be able to access these resources, leading to unequal access to learning resources. Some students may lack the skills to use digital tools, resulting in ineffective utilization of resources even if they are available.

3.2 The Ability of College Teachers and Students to Apply and Analyze Digital Information Needs to Be Improved

Entering a new era of intelligence, the application of artificial intelligence in the field of music education in colleges and universities is still in its initial stage. Teachers and students are still unable to intuitively feel the practical benefits and profound value brought by the transformation of artificial intelligence. Influenced by traditional teaching concepts, teachers still focus on mining professional knowledge in their own disciplines, especially in the use of advanced technological means such as online teaching platforms, intelligent teaching systems, virtual technology applications, data mining and analysis. Their mastery of artificial intelligence technology is clearly insufficient. The role and experience-oriented teaching model that has long been formed by piano teachers in colleges and universities has brought unprecedented challenges due to the integration of artificial intelligence. The role of teachers should be transformed from traditional knowledge transmitters to collaborative learning designers. In terms of teaching, college teachers need to proficiently master various types of information tools, redesign teaching content, and use artificial intelligence to analyze teaching effectiveness. Strengthening the artificial intelligence literacy of college teachers will profoundly influence the innovation of students' and teachers' thinking patterns. Digitization of education is not only about equipping students with knowledge and skills of the new era, but more importantly, about shaping new thinking patterns and cognitive frameworks. Applying artificial intelligence to various teaching scenarios, obtaining massive data through large models, analyzing students' emotional states, cognitive abilities, and knowledge levels in detail, predicting their performance and trends, and combining artificial intelligence with traditional music education methods in colleges and universities can help create a complementary and diversified research ecosystem, and help university students deeply understand the essence of learning.

3.3 The Ethical Misconduct and Data Security Risks Brought About by Artificial Intelligence Technology Need to Be Addressed

There are some security risks in the data collection, transmission, and storage of artificial intelligence teaching platforms. Generative artificial intelligence usually stores data on servers in multiple different regional locations, especially in the reasoning process of AI's thought chain technology. The reasoning process is the process of data participating in information processing, and the thought chain captures different websites, resulting in some unverified false information data, ensuring that the security of data will face huge challenges. In teaching practice, unauthorized data is accessed and tampered with, especially in terms of data privacy and protection, which poses risks of data tampering and deletion, causing some impact on teaching and management. The digitization of education has also brought potential damage to the thinking patterns and values of young students. Many students rely heavily on digital devices,

resulting in a lack of development in social communication skills. Many college students exhibit digital autism. In the digital teaching environment, some teaching software focuses more on improving students' answering efficiency and scores, neglecting the improvement of students' innovation and cooperation abilities. Therefore, building a digital regulatory mechanism involving multiple stakeholders and forming a comprehensive regulatory system can ensure the healthy development of digitalization and cultivate students to adapt to future digital needs. [2]

Finally, there is a risk of intellectual property infringement, and the application of artificial intelligence has also brought about problems related to intellectual property. Due to the openness of digital resources in artificial intelligence, teachers using video resources in teaching may infringe on the intellectual property of others due to the lack of attribution. Students may also use digital resources to plagiarize homework after class, resulting in some ethical misconduct. All of these issues indicate that the intellectual property problems brought by artificial intelligence need to be highly concerned. Developers of artificial intelligence can prevent malicious destruction and tampering of data during storage by adopting a hierarchical system to encrypt and store certain sensitive words. They can also make full use of dynamic methods such as algorithms and feedback models to monitor the confidentiality and integrity of data transmission.

4. OPTIMIZATION IMPLEMENTATION PATH OF ARTIFICIAL INTELLIGENCE IN HIGH QUALITY DEVELOPMENT OF COLLEGES AND UNIVERSITIES

College teachers will fully utilize the highly integrated intelligent education scenarios of big data simulation, monitoring, and management to achieve an integrated intelligent teaching mode of online teaching and online testing. This paper will focus on in-depth research on how artificial intelligence can empower the implementation path of music education in colleges and universities. College teachers need to actively adjust the training objectives of various disciplines and majors, pay attention to the cultivation of students' algorithmic thinking and computational thinking in the field of intelligence, and comprehensively enhance the intelligent technology application literacy of college teachers and students.

4.1 Promoting the Integration of Artificial Intelligence and Mathematics in Music Education in Colleges and Universities

Music education practice activities can be delivered to educational platforms in a precise and effective manner, surpassing temporal and spatial limitations through artificial intelligence technology. Firstly, the emergence of artificial intelligence has revolutionized the teaching mode, mainly reflected in the rapid extraction and internal logical connection of knowledge data from instrumental skills courses and vocal courses in the field of music teaching in universities, making the knowledge points of isolated playing and singing techniques more systematic and graphical. This fast and flexible intelligent processing method creates a classroom atmosphere with logical structure, which is in line with the thinking characteristics of students in the new era. The processing can also enhance students' systematic understanding of knowledge and strengthen the framework and logic of background knowledge in music works. Secondly, artificial intelligence can promote the flexible use of information space in educational methods. Artificial intelligence has expanded the transmission of data through methods such as data transmission, data sharing, and data co construction, reconstructing and matching theoretical databases for music teaching, breaking the information space limitations of university music teaching, and utilizing intelligent learning to transfer data and practice. The AI system recommends works and resources that match students' learning progress based on their mastery of theoretical knowledge points and interests, assisting students in firmly mastering knowledge points. Thirdly, artificial intelligence empowers music teaching content, creating a music classroom with knowledge and warmth. Teachers can use artificial intelligence multimedia software to play the background materials and pictures of the creation of works, allowing students to truly perceive the historical background and cultural form of the work creation, presenting vivid, comprehensive, and clear teaching content.

4.2 College Teachers Apply Artificial Intelligence for Intelligent Chemical Situation Analysis

Colleges and universities have developed an intelligent teaching assistant system based on the characteristics of artificial intelligence technology according to the standards of course evaluation, and have built a network teaching assistant platform on both the mobile and PC ends of the system. Artificial intelligence technology can efficiently integrate students' performance, learning attitudes, machine learning, and deep learning to clarify algorithm goals. Through an intelligent teaching assistant platform, teachers can provide personalized guidance and targeted evaluations for students, allocate different weights based on data indicators, construct models such as comprehensive evaluation and special assessment, continuously optimize the evaluation models, use tight algorithms to analyze data, and generate detailed feedback reports. Students can quickly search for the background and music style related content of music works, and mark the wrong notes played or sung to improve learning efficiency. [3] The intelligent teaching assistant system has great potential in data collection, processing, analysis, and prediction. With the support of a series of technologies such as artificial intelligence linking, recognition, and feedback, it can intuitively recognize the hand shape and key touch force of students practicing the piano. It can also measure and control the pitch and accuracy of students in vocal practice, generate a large amount of training data, help students clarify the key points and technical difficulties of practice, guide students to clarify goals, self-plan, and improve their ability to explore and learn. In addition, it can collect and integrate the performance and singing records of all students in class, and intelligently analyze the learning situation of the teaching results, which helps teachers to carry out precise teaching, discover weak links in students' practice process, focus on tutoring difficult paragraphs, and enhance students' sense of effectiveness in piano and vocal practice.

4.3 College Teachers Apply Artificial Intelligence Concerto and Accompaniment Modules to Assist Students in Practicing Instrumental and Vocal Works

The design of intelligent piano concerto module is based on the teaching content of piano concerto or instrumental concerto, and is divided into intelligent concerto module and accompaniment module. Teachers can design the intelligent concerto ensemble module in detail. Performers can input the movement of the music and select the instrument mode of the concerto or ensemble. The system will automatically perform intelligent matching and searching in the repertoire, and output concerto pieces that match the music, which will intelligently recommend one or more intelligent concertos for students. [4] Next, students can engage in personalized playing exercises and practice with intelligent peers to improve their concerto skills while experiencing the fun of human-computer interaction. This allows performers to experience real-time collaborative sound effects with high-level pianists or professional orchestras during practice or even performance. This module will provide performers with a hands-on experience of playing in the concert hall. The intelligent concerto and performers will create an unparalleled band rehearsal experience during practice, allowing performers to gain a deeper understanding of the musical connotations and simulate situational playing experiences. In addition, this module can also automatically record and mix playback, presenting systematic data reports on practice effects. Students can analyze their performance and singing status through playback or report data.

5. CONCLUSION

With the development of artificial intelligence, various types of mobile terminals, intelligent sensors, and intelligent sensing devices have been deeply embedded in the physical space of music education in colleges and universities, thus achieving precise matching between intellectual resources and governance needs in colleges and universities. The ability of colleges and universities to respond to artificial intelligence technology once again proves the sensitivity and innovation of the university education ecosystem. It is necessary to actively encourage teachers and students to use various tools of artificial intelligence with a sense of responsibility. It is also necessary to improve the

technical level of college teachers and students in using artificial intelligence by publishing relevant intelligent tools online, holding training courses, and adding relevant general courses. At the same time, colleges and universities need to develop detailed principles for the use of artificial intelligence in teaching, research, management, and other aspects to avoid potential adverse consequences such as information leakage and integrity issues, in order to achieve the goal of using new technologies to improve the efficiency of university teaching operations. The level of digitization is an important manifestation of optimizing university teaching management and achieving high-quality development. In the wave of rapid development of artificial intelligence, we need to steadily improve the intelligent transformation of university music education, take innovative development as the main line, enhance the ability of music talents to serve society, and fully stimulate the vitality of university music teaching.

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