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# Optimization Strategies for Introducing Artificial Intelligence into Primary School Music Education

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**Abstract:** The rapid development of artificial intelligence (AI) technology in today's society has brought varying degrees of influence to various industries and fields, and this transformation is also playing a profound role in the field of education. This paper intends to analyze the social background, cultural background, and policy background of introducing AI technology into the primary school music education system, deeply explore the important value and practical path of applying AI technology in the field of primary school music education, and provide corresponding optimization strategies for teaching, with a view to providing some theoretical references for promoting the in-depth integration of AI and primary school music education.

**Keywords:** Artificial intelligence; Primary school music education; Teaching optimization strategies; Teaching quality

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## 1. Introduction

At present, China has fully entered an information-based society, and the field of education and teaching should also keep up with the trend of the times. Aiming to improve teaching quality, information technology such as artificial intelligence should be introduced into teaching. The Fourth Plenary Session of the 19th Central Committee of the Communist Party of China proposed to "give play to the advantages of online education and artificial intelligence, and innovate education and learning methods". AI technology has very obvious advantages in practical applications, which can effectively promote the reform of education and teaching and play a very important role in innovating teaching methods and means. Therefore, on the basis of fully respecting the law of physical and mental development of primary school students, primary school music teachers should actively use and develop modern information means. By effectively and deeply integrating AI technology with primary school music teaching, they can finally stimulate students' learning interest, form good learning habits, and improve the overall quality of education and teaching.

## 2. Research background

### 2.1. Social background

Today, with the rapid development of science and technology and their deep integration with life, the shortage of regional educational resources has become a key factor restricting the high-quality development of education, which is particularly prominent in the aesthetic education link of the compulsory education stage. According to incomplete statistics, in the compulsory education stage of towns and townships in China, the gap rate of music teachers is as high as 35%, and some remote and economically backward areas have never offered music-related courses. In addition, the traditional music education model relies heavily on professional teachers and various multimedia equipment and musical instrument resources, which also leads to the extremely unbalanced distribution of these teaching resources between urban and rural areas and different economic regions. In such a social background, introducing AI technology into primary school music classrooms has, to a certain extent, provided new solutions and methods for promoting aesthetic education and balancing educational resources. For example, under the careful guidance of Associate Professor Quan Lei, a provincial teaching master, the undergraduate team of the School of Software, East China University of Technology, successfully developed an AI-empowered immersive music creation education platform called "Lehui Xinghe." The platform aims to solve the core problems existing in traditional music education, such as high musical instrument threshold, difficulty in creation, and weak parent-child interaction. It promotes the inclusive development of art education through scientific and technological innovation and injects new vitality into the aesthetic education work of schools in the new era. This music teaching mode using AI technology breaks the excessive dependence on learning venues and musical instrument equipment in traditional teaching, so that every student can obtain the aesthetic experience and artistic taste brought by music education anytime and anywhere [1].

Therefore, the social demand for music education continues to promote the transformation of teaching models and the development of technology, and parents' educational concepts are gradually changing from single skill training to comprehensive quality training. The traditional music teaching methods and concepts can no longer meet the requirements of modern society for the cultivation of compound talents. Therefore, AI technology plays a very important role in primary school music education through new teaching methods such as contextualization and gamification. Introducing AI into primary school music classrooms is a positive attempt and bold exploration of the changing needs of modern society for talent cultivation.

### 2.2. Cultural background

The latest version of the Compulsory Education Art Curriculum Standards (2022 Edition) clearly states in Learning Task 1 "Listening, Appreciation and Review" for the second learning stage (grades 3-9) that students "need to perceive and experience the styles of representative regional and national music in China, make appropriate judgments or reactions... and understand other basic knowledge of Chinese traditional music". How to help students understand and recognize the unique value and beauty of national music culture in primary school music classrooms is an important topic of aesthetic education in the compulsory education stage. Due to the single and repetitive traditional teaching mode, students in this school stage have a certain degree of boredom in learning, resulting in teaching being difficult to stimulate their learning interest and deep cultural identity. This has found a solution in the field of artificial intelligence. Teachers can use AR technology to reproduce the production site and technology of national musical instruments, and use VR technology to lead students to "visit" the scene of ancient music performances. Students can sit in the classroom and "immerse" themselves in the real experience of appreciating and perceiving different traditional music cultures. This

immersive experience goes beyond the pale language description and single and boring picture and video display in the traditional classroom, making the more abstract and deep cultural experience and music perception more intuitively displayed in front of each student, which greatly expands the inheritance path and appeal of traditional culture. In terms of practice and innovation, artificial intelligence plays a more important role. In the music classroom of the Second Experimental Primary School in Shangluo, Shaanxi, students use software such as Amper Music to drag and drop note modules to create their personalized music melodies. In the game, students complete the creation and adaptation of music, and even children with no musical background can obtain the experience and fun of creating music. Therefore, in the modern music education classroom, the teaching content is no longer limited to the cultivation of singing practice, but pays more attention to the improvement of students' comprehensive quality. This change in learning concepts also provides an opportunity for the combination of AI technology and primary school music education.

### 2.3. Policy background

In recent years, with the introduction of a series of educational informatization policies and strategic deployments in China, it marks that the in-depth integration of AI technology and primary school music education has specific guiding opinions and directions. For example, relevant documents such as the Education Informatization 2.0 Action Plan and the Opinions on Comprehensively Strengthening and Improving School Aesthetic Education in the New Era issued by the Ministry of Education all clearly point out that the future development direction of education is to work together with technologies such as artificial intelligence and big data. The promulgation of these policies not only provides policy guidance for the mutual influence and role of AI technology and primary school music education but also shows the determination and attitude of the development of art education informatization and digitization at the national level. In 2022, the Ministry of Education officially launched the action deployment of education digitization and proposed the concept of "smart aesthetic education" strategically, which was included in the key projects of compulsory education. In the specific implementation, the government has also invested a large amount of special funds to develop and build various AI software and learning platforms. With the continuous deepening and promotion of these strategies and policies, the in-depth integration of AI and primary school music education has obtained extremely convenient conditions and soil [2].

## 3. Value exploration of introducing artificial intelligence into primary school music education

The integration of AI technology and primary school music education is gradually developing from technical theory to educational normalcy. This trend not only corresponds to the requirements and direction of educational digital transformation but also coincides with the core concept of "student-oriented development" in primary school aesthetic education, providing a brand-new reference and vitality for updating educational teaching contents and means. In teaching, the introduction of AI technology has greatly broken through the "unity" characteristic of the traditional teaching model, so that students can obtain the opportunity of personalized learning. The primary school music textbook emphasizes respecting students' differences and adopting the teaching method of suits students in accordance with their aptitude. Through AI analysis, it can effectively and accurately analyze and summarize students' mastery of music common sense and music skills, and at the same time, assign suitable learning content to them in a targeted manner. For students with a weak sense of rhythm, games such as rhythm checkpoints can be used to help them gradually improve their sense of rhythm;

for students interested in music creation, more in-depth music creation tasks can be pushed. In the process of learning and practice, AI technologies such as voice recognition and facial recognition are used to monitor and provide feedback on students' singing pitch and rhythm in real time, and a visual report is generated immediately after the study to help students check for omissions and make improvements. In the practical link of "composition and activities" required in the primary school music course, the traditional teaching is often difficult to take care of every student and difficult to fully implement due to technical thresholds or restrictions, such as insufficient equipment, such as Orff percussion instruments. The introduction of AI technology effectively reduces the creative threshold in learning. Students can independently compose and adapt music melodies through software, and at the same time, they can combine interdisciplinary elements such as ancient poetry and history, which also deepens the design intention of the connection between music and sister arts in the textbook.

Therefore, introducing AI technology into primary school music education has very important value. In addition to the innovation of teaching methods and technology, it also sublimes the brand-new concept of modern primary school music education. Students obtain extremely personalized learning scenarios, which greatly stimulate their music creativity and perception. Whether it is cultural inheritance or education popularization, AI technology is constantly expanding and optimizing the new form of primary school music education.

## 4. Teaching optimization strategies

### 4.1. Organically integrate artificial intelligence with teaching materials and curriculum standards

In the process of AI-assisted teaching, teachers should closely combine teaching materials and curriculum standards, and improve the existing problems and deficiencies in teaching in a targeted manner. For example, in the singing practice session, when teaching the song do re mi, teachers can use the assistance of an AI voice recognition system to provide real-time feedback on students' pitch problems in singing. This is widely used in the Quanmin Karaoke software. Students can observe the up and down fluctuations of the singing pitch in real time while singing the song and adjust the pitch to keep it as close to the melody line as possible, which can effectively solve the problem of inaccurate pitch in singing. In traditional teaching, this requires continuous teaching and training by teachers to gradually achieve the teaching goal. In the appreciation session, teachers can use VR technology to reproduce the ancient scenes of music works, such as the guqin performance of Boya and Zhong Ziqi's High Mountains and Flowing Water or the performance scene of the Ni Shang Yu Yi Qu in the palace, making the abstract music and music theory knowledge such as the guqin reduced character score visible and audible. In the composition session, students can use AI to generate a melody framework and then adapt it through the composition required in the textbook, such as selecting suitable percussion instruments for arrangement in the melody, to achieve the intercommunication between technology and art [3].

### 4.2. Innovate teaching models through artificial intelligence

Teachers can use AI technology to build an interactive music classroom. Through AI software, teachers can use gestures to control virtual notes, and students can intuitively feel the "change of pitch" through observation and experience. In addition, AI software can also create different versions of the same musical work. Students' learning and appreciation of different versions of the same work can greatly improve their music understanding ability and emotional expression ability. This modern and diversified teaching model has greatly broken through the single-output teaching method in traditional teaching, helped students establish an immersive learning

experience, and thus greatly stimulated their learning interest and enthusiasm. Teachers can also create growth portraits for students from different angles based on the learning data summarized by AI software for students, such as rhythm grasp, emotional expression, singing skills, etc., and use the teaching method of teaching students in accordance with their aptitude to provide students with personalized growth plans based on this.

## 4.3. Upgrade Teaching Resources through Artificial Intelligence

In the teaching process, teachers can use AI technology to create a digital audio-visual resource library for a certain teaching unit, helping students to appreciate the same type of music works in a wide range and from multiple angles when learning the music works of a certain nation or style. At the same time, it can also effectively solve the problem of instrument shortage in teaching, so that students can experience the characteristics and fun of playing through virtual instruments such as piano, bamboo flute, guzheng, and national drum. In addition, AI can greatly improve the work efficiency of teachers in lesson preparation. Teachers can collect relevant teaching resources of different courses through intelligent teaching and research platforms such as Smart Primary and Middle Schools, provide diversified learning materials and resources for students with different learning conditions and abilities in the actual classroom, and finally generate intelligent learning stratification plans [4].

## 4.4. Improve instrumental performance teaching

The shortage of teaching equipment has always been a problem in the implementation of primary school music education, especially in terms of musical instruments. Even the hulusi and eight-hole clarinet required in the textbook cannot meet the use needs of students in some areas. Therefore, in order to put the intelligent application scenario of instrumental performance in primary school music teaching into actual teaching, teachers can use AI technology to assist students in the instrumental teaching link. Compared with traditional instruments such as piano, guzheng, and guqin, intelligent instruments are more convenient, clear, and simpler to operate. In the classroom, students can simulate the performance of different instruments such as jazz drums, guzheng, and erhu through AI software, and there are corresponding training plans for problems such as playing posture, sitting posture, and fingering. Coupled with the combination of online and offline interactive methods, it can help students learn more happily. The use of intelligent musical instruments to a certain extent reflects the trend of education changing from informatization to intelligence. While exercising, students' playing practice it can also greatly reduce the teaching pressure of teachers and the problem of insufficient equipment resources.

## 4.5. Optimize the evaluation system through artificial intelligence

In the process of optimizing the traditional evaluation system, teachers can use AI technology to conduct phased and process-oriented comprehensive evaluations for students. For example, use AI software to transform students' learning trajectories and development processes into text-based visual data, and replace the score evaluation system in traditional evaluation through linear records. This evaluation model can more comprehensively, deeply, and in line with the actual situation of students, show their specific performance and trends in physical and mental development in study and life, so that teachers can be more targeted and formulate different teaching contents according to the different situations of students. In addition, various problems that appear in students' evaluations, such as the balance, harmony, and unity of voices in a chorus, which are highly subjective, can be uniformly processed through AI software and finally help teachers guide students to learn in a more standard and scientific way. Students have obtained comprehensive records and feedback in the whole

teaching process of learning-training-improvement-complete performance, so that their learning achievements are more abundant and solid than those without the help of AI technology [5].

## 5. Conclusion

Introducing AI technology into primary school music classrooms reflects the current trend of educational reform and development. Under the influence of social needs, cultural values, policy guidance, and other aspects, primary school music education is experiencing a huge change. Although AI has a positive and profound impact on education, we should also clearly recognize that no matter how technology develops, it should ultimately serve the essence of education. In the future, AI in the field of music education should explore and develop towards truly stimulating children's musical potential and aesthetic taste, rather than simply replacing traditional teaching with tools. When the complex and diversified AI technology is removed, what remains should be children's more sincere feelings and love for music and life, which is the real yardstick to measure the value and role of AI technology in music education.

## Disclosure statement

The author declares no conflict of interest.

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