

Artificial Intelligence in Music Education

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Abstract—In order to overcome the shortcomings of traditional music teaching methods, this paper proposes a music teaching method based on artificial intelligence. The new method combines the characteristics of traditional music education and artificial intelligence to improve the quality of music teaching. The experimental results show that artificial intelligence can effectively improve the quality of traditional music teaching and effectively promote the development of music education

Keywords—Artificial Intelligence; Music Education; Application

I. INTRODUCTION

Artificial intelligence (AI) is a concept first put forward at Dartmouth society in 1956. It belongs to the interdisciplinary subject of natural science, social science and technical science. It is a new science and technology that simulates, develops and extends machines or software by studying human intelligence, and finally applies it in different fields. The combination of music education and artificial intelligence can be said to be a breakthrough innovation, which is a new shining point in Contemporary Music Education (Figure 1). First of all, the application of artificial intelligence in music education has played an auxiliary role in teachers' teaching. Secondly, for students, artificial intelligence can show the course content in a more vivid form, so that students can better concentrate. Thirdly, in the development of science and technology, music teaching should also keep pace with the times and constantly innovate. It is not wise to be complacent about previous achievements and cease to advance. Finally, as a new media of art communication, the network has played a positive role in promoting the dissemination of art education.

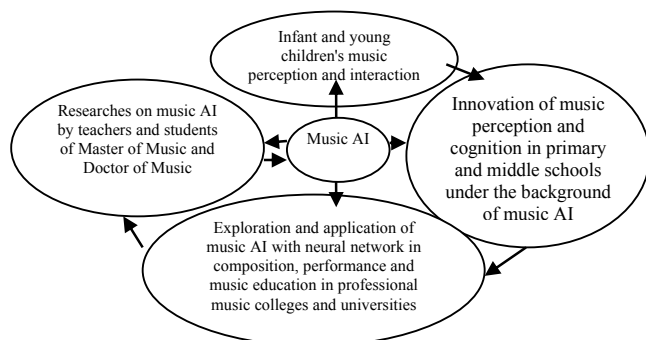


Figure 1

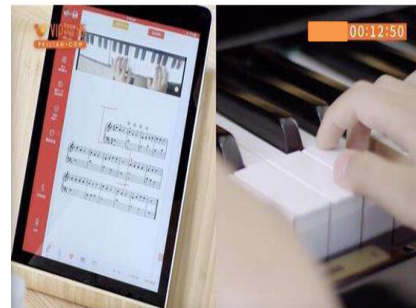


Figure 2

II. APPLICATION OF EARLY ARTIFICIAL INTELLIGENCE IN MUSIC EDUCATION

Artificial intelligence first appeared in the field of music education in the 1960s. At first, people applied intelligent technology to keyboard instruments and developed electronic keyboard instruments and electronic synthesizers, such as electronic organ, keyboard type electronic synthesizer and so on. This kind of instruments can simulate the timbre of other musical instruments, and store the fixed melodies and rhythms. It is easy to operate and has a certain intelligent function. In music education, electronic keyboard instruments play an important role in enriching class content and developing various teaching methods. For example, in appreciation class, one keyboard instrument can simulate the timbre of all musical instruments in a symphony orchestra, which greatly stimulates students' interest in learning and helps to cultivate students' aesthetic standards. However, artificial intelligence technology at that time was not perfect, and teachers and students were not familiar with this kind of electronic instruments. It is noted that more schools still adhere to the traditional teaching mode and have not introduced such electronic keyboard instruments. Therefore, the early application of artificial intelligence in music education is more of an exploration and attempt. But it is not difficult to find that artificial intelligence has great potential and development space in the field of music education.

III. APPLICATION OF MODERN ARTIFICIAL INTELLIGENCE IN MUSIC EDUCATION

A. Combination of Guzheng (A Chinese Zither with 25 Strings) Teaching and Artificial Intelligence

Zhiyuan Sun, the founder of guzheng, put forward a new teaching method, which combines artificial intelligence with guzheng teaching. Yiguzheng Intelligent Music Classroom, together with domestic experts in guzheng education, artificial intelligence, audio recognition and many other fields, combines Chinese traditional art with modern science and technology, and combines traditional guzheng culture with the development characteristics of modern children.

Through the intervention of artificial intelligence technology and world-class recognition technology, Yiguzheng has achieved the goal of creating "zheng sound recognition" technology without changing its structure, so as to accurately identify the playing situation. The teaching mode of "human-zheng interaction" realizes that one teacher can teach eight students collectively. Through the intuitive data in the teaching platform provided by Yiguzheng, the teacher can comprehensively grasp the learning situations of eight students in the classroom, and give targeted guidance accordingly. Children can also cultivate the ability of unison and ensemble while learning to play.

B. The Development of Online Training

Today's development of the Internet can be said to be changing with each passing day. Through the network one can access the latest first-hand information, and understand all kinds of global information. The application of artificial intelligence technology also promotes the learning and application of network in music teaching¹. For music education, the network has a very important function, which is incomparable with the traditional music teaching means. That is the exchange function of long-distance timing. This timing performance is reflected in two aspects: the timely transmission of audio data files and MIDI data files². For example, VIP training is software for online one-on-one tutoring, which can help teach a variety of musical instruments, including piano, violin, guzheng, etc. Teachers and students interact with each other through the simulation class established in the software, and communicate through circle drawing and voice on the spectrum of "classroom" to achieve two-way interaction (Fig. 2). Parents can also sit in and communicate with teachers in time so that students can better practice after class. It is different from the training of Yiguzheng. Yiguzheng takes the recorded sound as the standard and helps students correct the wrong sound through sound recognition, while VIP training is conducted manually through the accompaniment software as the media.

IV. PROSPECT OF THE COMBINATION OF ARTIFICIAL INTELLIGENCE AND MUSIC EDUCATION

The successful combination of guzheng and artificial intelligence is a good example for students to learn musical instruments. Yiguzheng combines artificial intelligence with guzheng teaching to help teachers rationalize the course, especially through online training after class, which also improves the efficiency of guzheng learning. Yiguzheng's after-class training system can play a positive role in promoting the students' practice after class. Audition recognition system in artificial intelligence can correct the wrong sound and rhythm for students. This kind of practice after class can lay a foundation for students to learn guzheng. On the basis of traditional guzheng playing and teaching, Yiguzheng has promoted the development of traditional guzheng teaching.

As a new way of accompany training, online training provides convenience for teachers, students and parents. Teachers give their own time to arrange the course, and the software background staff will arrange the course for the teachers' open hours, so teachers don't have to worry about the situation of "class collision" due to improper arrangement. With the help of software, students can find

and solve problems under the guidance of professional teachers without going out of their homes. In addition to saving time to accompany their children, parents do not have to worry about the safety of their children on the road. More and more teachers and students begin to understand and use the software.

As a new teaching mode, MOOC has unique advantages. Due to the online teaching, the location of the class is not limited. Students can watch the live broadcast or watch the playback. The time of each class will not be very long, so students will have enough time to digest and understand the content of this class. In addition to providing convenient learning conditions for students, it has also become a medium for music promotion and inheritance. Compared with the traditional media, it has a wider range of dissemination, which enables more people to understand music related works, history and genres.

In this era of rapid development of information, education should be in line with the times and cannot exclude new things. The purpose of using artificial intelligence is to help teachers for better teaching, not to let artificial intelligence replace teachers. Artificial intelligence technology is still developing. At present, artificial intelligence is to assist teachers for better teaching. However, in the future, how to grasp the relationship between artificial intelligence and teachers is worth further thinking and exploring. Under the promotion of artificial intelligence, the online teaching content is diverse and various. Whether the online course can achieve the learning purpose that students want, this also needs online courses to keep pace with the times, constantly update and improve.

V. CONCLUSIONS

"Science and technology is people-oriented, and let it serve art."³ At present, "Internet+" education mode has already shown a certain scale. AI teaching methods have been used in many educational fields, which is also the main trend in the development of international education. Artificial intelligence education needs the support of cloud computing, mobile network, big data, Internet of things and other technologies⁴. With the progress of science and technology, artificial intelligence will get better development in the field of music education, and play a more significant role in promoting the development of music education.

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