Construction of Intelligent Classroom of Distance Music Teaching under Modern Information Technology

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Abstract: People began to emphasize music education gradually. Music teaching can cultivate a person's quality and sense of beauty. Therefore, it is of great significance to develop music teaching, which is conducive to better learning music. High quality music teaching can achieve better teaching results, so developing music teaching is something that contemporary people need to seriously study. In the traditional music teaching, music teaching ignored the aesthetic characteristics of music, and only single tuned theoretical knowledge, which made the quality of music teaching poor. This paper aimed to study the construction of distance music teaching intelligent classroom under modern information technology (IT). By studying how to integrate the wisdom classroom into teaching, an innovative remote intelligent classroom mode of music teaching was constructed. In this experiment, five classes were selected from the traditional teaching school and the remote intelligent classroom music teaching school under the modern IT for the examination of each subject. The results of the experiment were that in the vocal music test, instrumental music test, solfeggio test, ear training test and written music knowledge test, the average score of the vocal music test of the five classes under the music teaching of the remote intelligent classroom under the modern IT was 82.4, and the average score of the vocal music test of each class in the traditional music teaching was 72.2. The average score of instrumental music test of the five classes under the music teaching of the remote intelligent classroom under the modern IT was 82.2, and the average score of instrumental music test of each class in the traditional music teaching was 71. The average score of the five classes' solfeggio examination under the music teaching of the remote intelligent classroom under the modern IT was 82.8, and the average score of each class's solfeggio examination under the traditional music teaching was 73.2. The average score of the ear training test of the five classes under the music teaching of the remote intelligent classroom under the modern IT was 82.4, and the average score of the ear training test of each class in the traditional music teaching was 72.8. The average score of the written examination of music knowledge in the five classes under the music teaching of the remote intelligent classroom under modern IT was 84.4, and the average score of the written examination of music knowledge in each class of traditional music teaching was 73.6. It can be seen from

these data that the school class music examination results under the music teaching in the distance intelligent classroom under the modern IT were better than those in the traditional teaching. It can be concluded that the construction of the distance music teaching intelligent classroom under the modern IT really has a positive help students develop quickly music to learn.

1. Introduction

There are still many teachers who continue the traditional single music teaching method to carry out music teaching, which ignores the feelings of students and makes students completely lose their dominant position in the music process of teaching. Therefore, it is the point that recognize the importance of the student's place in the teaching of music. Teachers should think about what students need from the perspective of students, and let students take the initiative to learn knowledge, so that students can return to the dominant position in the music classroom. The teacher only acts as a guide and gives guidance to students when they need teachers. Only in this way can music teaching be reformed and innovated. This would help to help students' music literacy and help the overall character music to teach, so that students can receive a better quality of music class.

Music class has always been the focus of attention. Li L believed that music has a very good cultural and educational value because of China's vast territory, rich country, rich culture, long history, A lot of cultures and rich History of music. From the perspective of music teaching effect, he analyzed the direction of music development. He demonstrated the value of music education in universities, and then analyzed the questions in college music teaching [1]. Daubney A discussed how British schools and teachers suddenly switched to online music teaching mode, as well as the impact on music teaching. He raised the issue of music teaching curriculum and music score evaluation, especially about the fact that British classroom teachers have to use their professional judgment to provide scores for external music examinations, which so far have all come from the Music Examination Commission [2]. Bath N discussed the school offers music help in the United Kingdom, and believed that get to music education was the good of every child, so high-quality and continuous courses must be provided in schools funded by all countries. Although music education is a part of the national curriculum, in the UK, people generally believe that music education is marginalized in public schools [3]. Smith G D listed the practice, methods and fields of pop music education in front of the members of the board of directors of the Association for Popular Music Education. He believed that pop music education should be understood in the current environment, which is mainly based on English. The field of pop music education has matured and intersected with pop music research, Music education in schools research, music communication education. Pop music education is diversified and inclusive. It is also deeply connected with business and industry, including music education in schools. Its academic and practice are expanding [4]. Hess J thought that in the 21st century, many music educators try to redefine music education as social justice, and the critical teaching way is at the forefront of this transformation. However, when the goal of teachers is to achieve fairness through the use of critical teaching ways, the use of such teaching methods may have some adverse effects [5]. Rolle C believed that people live in an era of social and cultural change. Like other disciplines, the foundation of music education is increasingly challenged. Therefore, it is impossible to reliably determine that the goals and contents of music education can be implemented in schools simply by establishing the goals and contents of music education on the basis of music tradition and unchanging teaching forms [6]. Music teaching is

highly valued in the contemporary era. If music teaching and modern IT would be combined, it is believed that the quality of music teaching can be taken to the next level.

The group of modern IT and music teaching is already an inevitable trend, and more and more people have a beautiful vision for combining IT and music to teach. Crawford R pointed out that in a world increasingly driven by modern IT, there are more discussions about the necessity of rethinking the relationship between government and education in the 21st century. The development of modern IT and its social needs and society are the core of the contemporary era. A new type of music teaching online and social network functions have sped up terms of universal. With the popularization of technology and equipment, the global music teaching curriculum documents and education policies are full of ICT (Information and Communication Technology) as a measure of success, which is understandable. It is reasonable to reveal the latent capacity of modern information technology in teaching and the necessary consideration of related teaching [7]. From the perspective of classroom music teachers, Eyles A M had a deep understanding of the current status of ICT implementation in music classes in Queensland, Australia, on the organizational practices that affect the application in music education. He used the interpretive sequential mixed method to conduct a survey on time and collect music teachers' views on ICT use, teachers' confidence, current teaching practice, major development, and then conducted six qualitative and semi-structured interviews. Due to the lack of support, classroom music teachers limit their music teaching to the whole class activities, which rely on IT. Teachers' professional development opportunities are affected due to usability, knowledge well and dependability. In the case of insufficient communication technology resources, the benefits of professional development opportunities are considered to be short-term. Classroom music teachers pointed out that the most important obstacle to the indispensable of ICT is the need to obtain sufficient ICT resources and financial sustain [8]. Music education has a profound impact on students of all ages' learning of music and must be paid attention to. Therefore, it is essential to introduce modern IT into the classroom. It is believed that this is what all teachers and students are looking forward to. Teachers would teach better and students would learn better if they can use music education wisdom classroom.

Due to the improvement of standard modern IT, Mumin U A believed that IT is used as a tool in the modern digital world in terms of music education. The existence of this modern IT may solve the difficulties currently considered traditional music learning. He used qualitative methods to study the literature. Due to the influence of his research, the future music education would be more open and diversified. With the development of modern IT in the field of music education, it is now possible to connect students and lecturers through remote music teaching through network media, and to view students' scores online. The user can also view the lesson schedule and send the assignment files assigned by the instructor [9]. Dudar V L thought that different from traditional education, the wide use of distance music education is considered one of the priorities of education. Under the background of the times, almost all educational institutions are turning to distance learning mode. The key problem of distance music teaching mode is the quality and education level of teachers. The quality and education level of teachers greatly affect the effectiveness of the whole process of distance music teaching [10]. In the field of music teaching, it is necessary for the development of education to build a smart classroom for distance music teaching. This paper aimed to conduct research on the construction of the smart classroom of distance music teaching under the modern IT, and bring music teaching with higher teaching quality to more students. Through the comparison between the remote intelligent classroom music teaching under the modern IT and the traditional music teaching experiment in this paper, it can be concluded that the performance of the music teaching school class with the remote intelligent classroom music teaching under the modern IT in various music disciplines was better than the performance of the traditional music teaching,

which showed that the construction of the modern information-based remote music teaching intelligent classroom is of great significance and is worthy of careful study.

2. Use of Modern IT in Smart Classroom of Distance Music Teaching

2.1. Problems in Traditional Music Teaching

In traditional music teaching, teachers often blindly teach students music knowledge, and the teaching methods are simple and procedural. Teachers neglects the communication with students, which limits the students' initiative and also limits their enthusiasm. Traditional music teaching is dominated by teachers, and students passively accept it under the platform, which makes the classroom atmosphere very solid and makes students think music is a boring subject. The core of music is aesthetics. Traditional music teaching does not give students time and space to imagine and think. Their perception of beauty would decline and their understanding of music would not be in place, which deviates from the original intention of music teaching and makes teachers unable to achieve great success in music education for students.

2.2. Application of Cloud Computing in Smart Classroom of Distance Music Teaching

Cloud computing is an efficient and practical data transmission mode innovated in the big data environment. By expanding the single and private computing mode to the parallel mode, the stability and efficiency of computers are improved. Cloud computing provides basic support for solving the challenges of shared computing resources including computing, storage, network and analysis software [11]. Cloud computing has the characteristics of centralized computing and centralized storage [12]. After cloud computing is added to music teaching, students can improve their independent learning ability and acquire new knowledge in the process of music teaching. Students can also enjoy music on the cloud computing platform, which is undoubtedly of great benefit to the improvement of students' music level. Cloud computing also has the function of resource sharing and remote desktop that can provide the client system of the cloud platform, which is very convenient for teachers and students. Genetic algorithms are used to deal with optimization problems [13]. The automatic architecture design method of genetic algorithm can effectively solve the image classification task. The biggest advantage of this algorithm is its "automatic" feature. Users don't have to professional knowledge when using this algorithm, and can still obtain the given architecture image [14]. This paper used the task scheduling algorithm based on Genetic Algorithm (GA) in cloud computing to build a smart classroom for distance music teaching. The genetic algorithm needs to use the fitness function. Individuals with higher fitness are more likely to inherit the next generation, while individuals with lower fitness are less likely to inherit the next generation, because the fitness function can affect the speed of find the best way convergence. In this paper, the number of genetic algorithm subtasks is represented by A, the number of computing resources is represented by B. The cost of computer resources per unit time is RCU (i) (Resource Cost per Unit), and the load factor responsible for balancing in tasks is represented by p. The calculation methods of the time required to complete the task:

$$sumTime(i) = \sum_{j=1}^{n} Time(i,j), \ i \in [1, B] \tag{1}$$

$$finishTime(i) = max(sumTime(i)) \tag{2}$$

Among them, n represents the number of subtasks, and Time (i, j) represents the time required for the j-th subtask to execute on the i-th computer resource; The maximum value of the calculated total time is the completion time.

$$\text{finishCost(i)} = \sum_{i=1}^{B} \text{sumTime(i)} \times \text{RCU(i)} \tag{3}$$

The total time sumTime and RCU (i) obtained by Formula (1) can be used to calculate the cost required to complete the subtask.

Task scheduling algorithm needs to consider time and cost, and the calculation method of fitness function representing time is:

$$p = \frac{\sum_{i=1}^{B} \text{sumTime（i）}}{B \times \text{finishTime(i)}} \tag{4}$$

$$F_{\text{time}}(i) = \frac{p}{\text{finishTime(i)}} \tag{5}$$

The higher the value of load factor p, the higher the use of computer resources, and the time for subtasks to complete would be shortened. The shorter the run completion time, the higher the fitness.

The calculation method of fitness function representing cost is:

$$F_{\text{cost}}(i) = \frac{1}{\text{finishCost(i)}} \tag{6}$$

The fitness function representing time cost is calculated as:

$$F_{\text{tc}}(i) = C \times F_{\text{time}}(i) + D \times F_{\text{cost}}(i) \tag{7}$$

Among them, C and D are two constant parameters, where C+D=1, and C, D∈[0,1]. When C=1 and D=0, the algorithm is the shortest time task scheduling algorithm for subtasks and also the least cost task scheduling algorithm.

3. Construction of Smart Classroom for Distance Music Teaching

3.1. Introduction to Smart Classroom of Distance Music Teaching

A lot of work on music teaching smart classroom has spanned a wide range of research fields, Including machine learning, ICT, mobile computing and hardware, and sensor networks [15]. Modern IT can stimulate students to generate more musical thinking, and students constantly improve their wisdom in thinking. Therefore, the construction of an attractive and open smart classroom platform for distance music teaching would help students to analyze classroom content and constantly improve their thinking. Teachers can guide students to find their own knowledge deficiencies and make up for them through the smart classroom platform of distance music teaching. The smart classroom of distance music teaching can provide students with an operable interactive environment and help students communicate with each other. Students can also build a knowledge framework according to their own needs to enrich their knowledge. The smart classroom of distance music teaching is more open than traditional teaching. Students can communicate on the network even at different times and in different spaces, and teachers can correct homework for students online and guide them online. Students can find and correct their mistakes in learning in time, which is impossible for traditional music teaching.

3.2. Smart Classroom Teaching Mode of Distance Music Teaching

The smart classroom teaching mode of distance music teaching is shown in Figure 1.
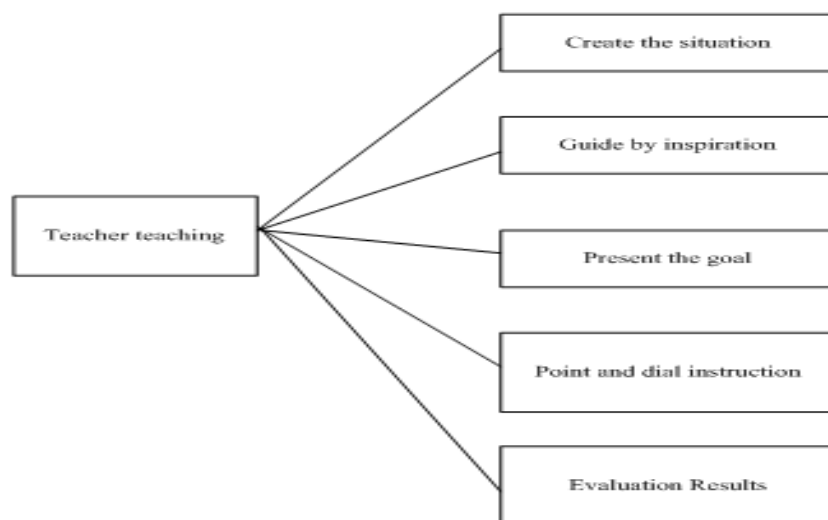
Figure 1: Intelligent classroom teaching mode of remote music teaching

It can be seen from Figure 1 that the smart classroom for remote music teaching can only be built by using Internet of Things technology, cloud computing visualization technology, big data and other technologies, which ensures the powerful functions of the smart classroom for remote music and the diversity of ways students receive knowledge.

3.3. Smart Classroom Interaction Mode of Distance Music Teaching

The mode of intelligent classroom interaction in distance music teaching is shown in Figure 2.
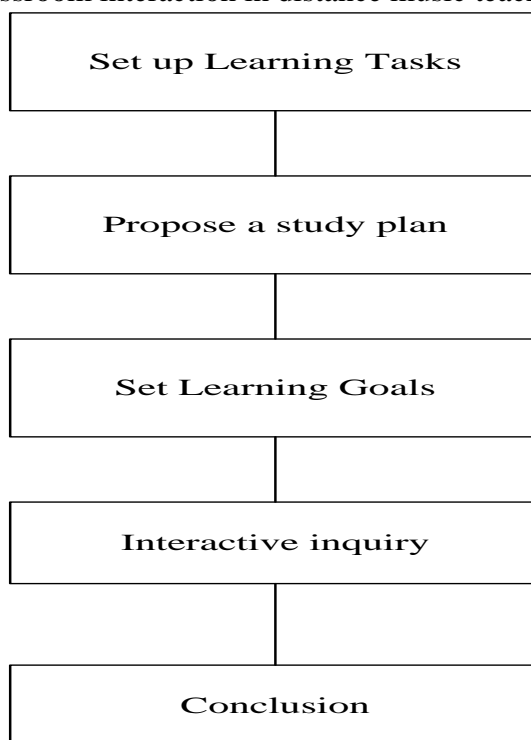
Figure 2: The interactive mode of intelligent classroom in remote music teaching

It can be seen from Figure 2 that the interaction mode of distance music teaching attaches great

importance to connecting students' new knowledge and old knowledge. Teachers and students can interact. Through interaction, students can review old knowledge while learning new knowledge, which can help students better absorb previous knowledge. The interaction between students can make a discussion and analysis of the knowledge learned by everyone, so as to make greater progress.

The specific role of interactive teaching mode is shown in Table 1.

Table 1. The role of interactive teaching model

Teaching link	Role of teaching
Set up Learning Tasks	Find the direction
Set learning Goals	Effect of stimulation
Interactive inquiry	Train students to think
Conclusion and conclusion	Summarize and consolidate knowledge in time

3.4. Intelligent Classroom Inquiry Mode of Distance Music Teaching

The intelligent classroom inquiry mode of distance music teaching is shown in Figure 3.
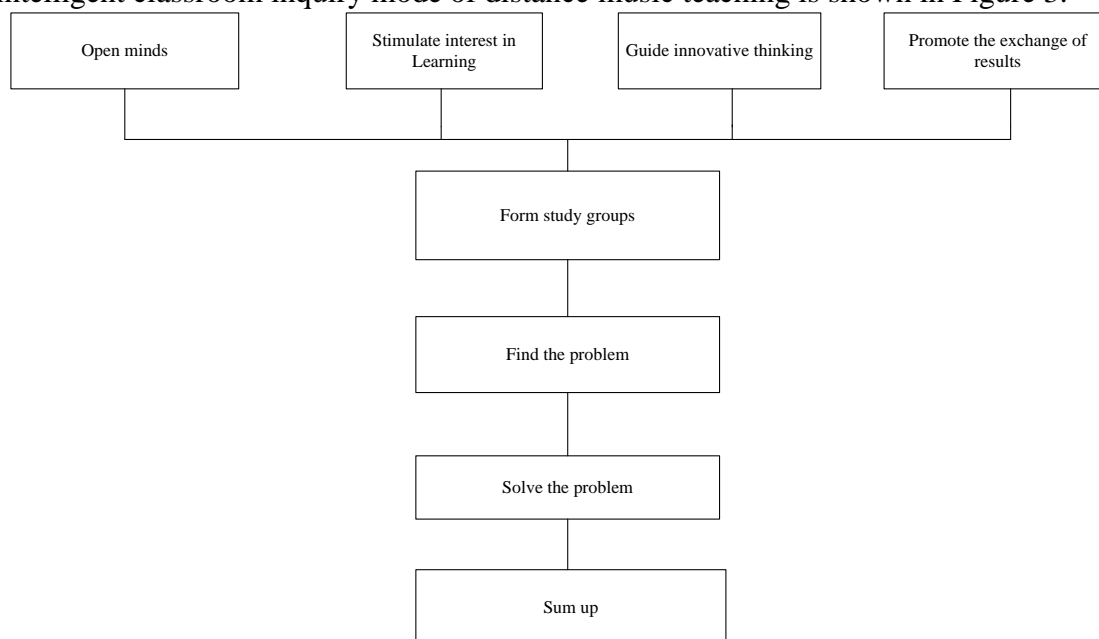

Figure 3: The exploration mode of intelligent classroom in remote music teaching

The inquiry mode in the smart classroom of distance music teaching is to take students as the core, so that students can explore the knowledge of learning independently and experience the fun of learning. Although the teacher sets a theme for students to explore, the teacher plays a guiding role in the inquiry mode and can help students when they encounter problems that cannot be solved. The inquiry mode maximizes the enthusiasm of students and cultivates their innovative thinking, which lays a solid foundation for their innovative ability and exploration ability. At the same time, it is beneficial for students to further improve their music level after learning basic music knowledge, which is of great significance for students to make breakthroughs in music.

3.5. Comparison of Students' Music Scores between Remote Intelligent Classroom Music Teaching and Traditional Music Teaching under Modern IT

In order to test the practical effect of the smart classroom of distance music teaching under modern IT, this experiment selected five classes from two different schools to organize a music test to test their music level. The examination contents included vocal music examination, instrumental music examination, solfeggio examination, ear training examination and written music knowledge examination. One school used traditional music teaching, and the other school used remote intelligent classroom music teaching under modern IT.

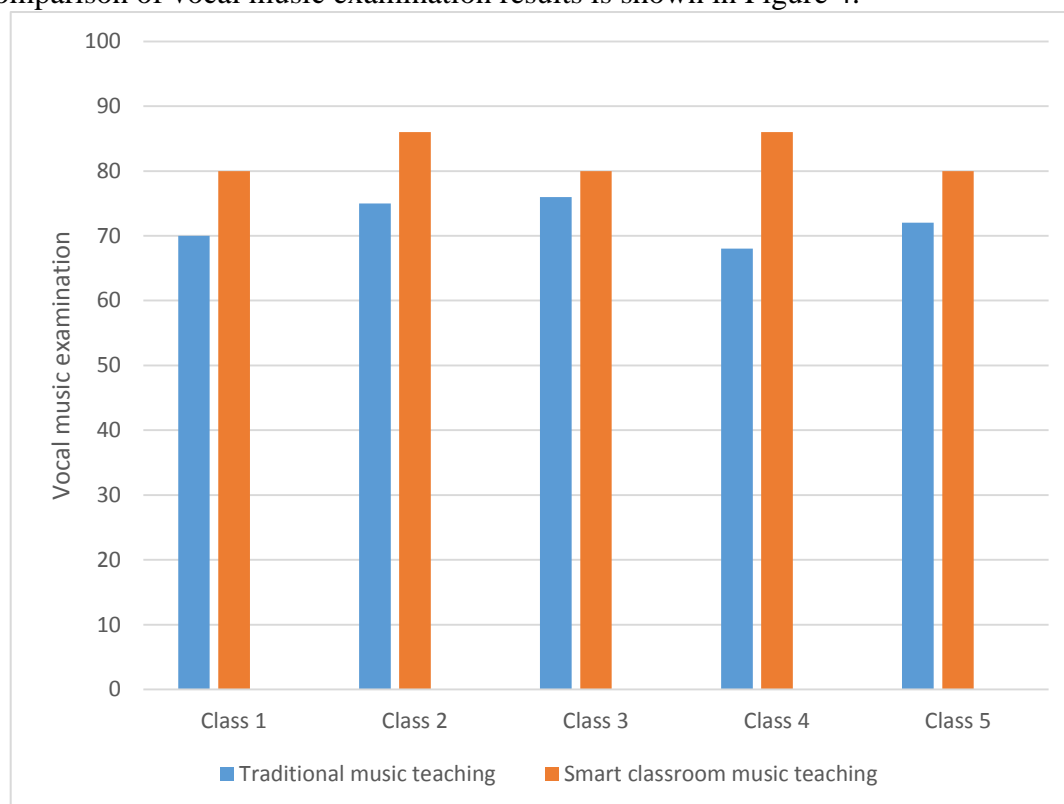The comparison of vocal music examination results is shown in Figure 4.

Figure 4: Comparison of vocal music test results

It can be found from the experimental data in Figure 4 that, on the whole, the score of traditional music teaching in vocal music examination was not as good as that of music teaching in remote intelligent classroom under modern IT. The average score of the vocal music test of the remote intelligent classroom music teaching under the modern IT was 82.4, and the average score of the traditional music teaching vocal music test was 72.2, which proved that the remote intelligent classroom music teaching under the modern IT can improve the quality of vocal music education.

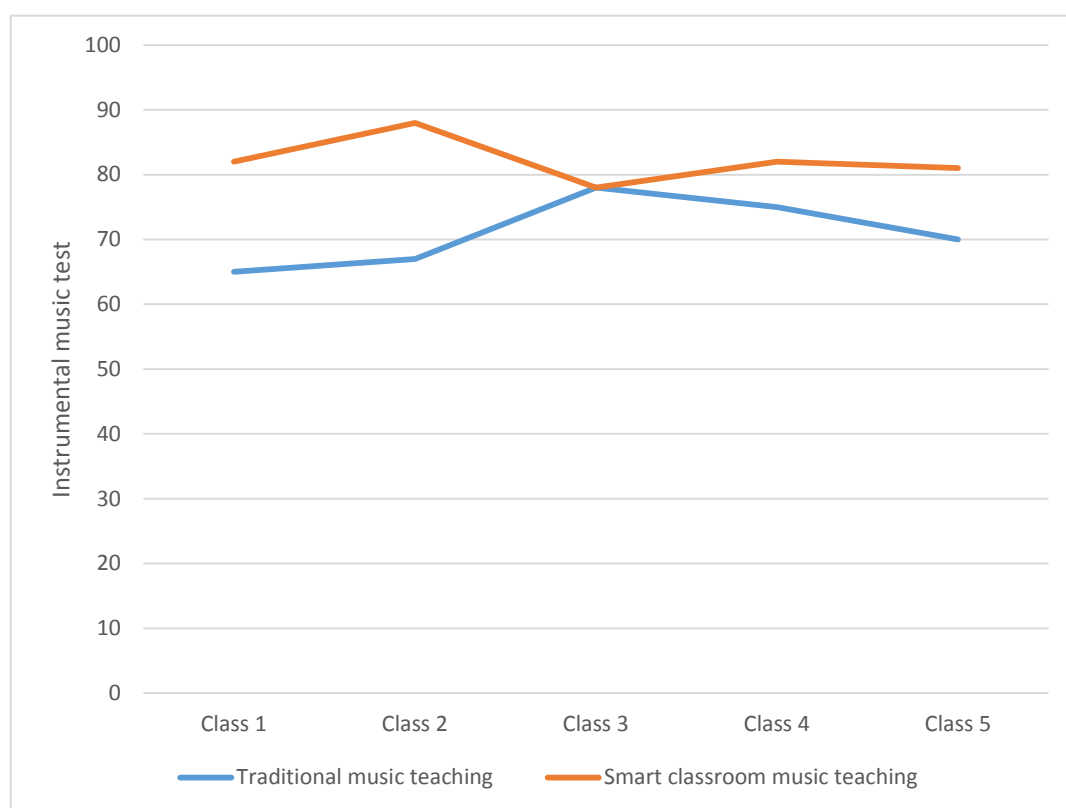The score comparison of instrumental music test is shown in Figure 5.

Figure 5: Comparison of instrumental music test results

It can be found from the experimental data in Figure 5 that, on the whole, the score of instrumental music test in remote intelligent classroom music teaching under modern IT was generally higher than that of traditional music teaching in instrumental music test. The average score of instrumental music test in the remote intelligent classroom music teaching under modern IT was 82.2, and the average score of the traditional music teaching in the instrumental music test was 71, which proved that the remote intelligent classroom music teaching under the modern IT can improve the quality of instrumental music education.

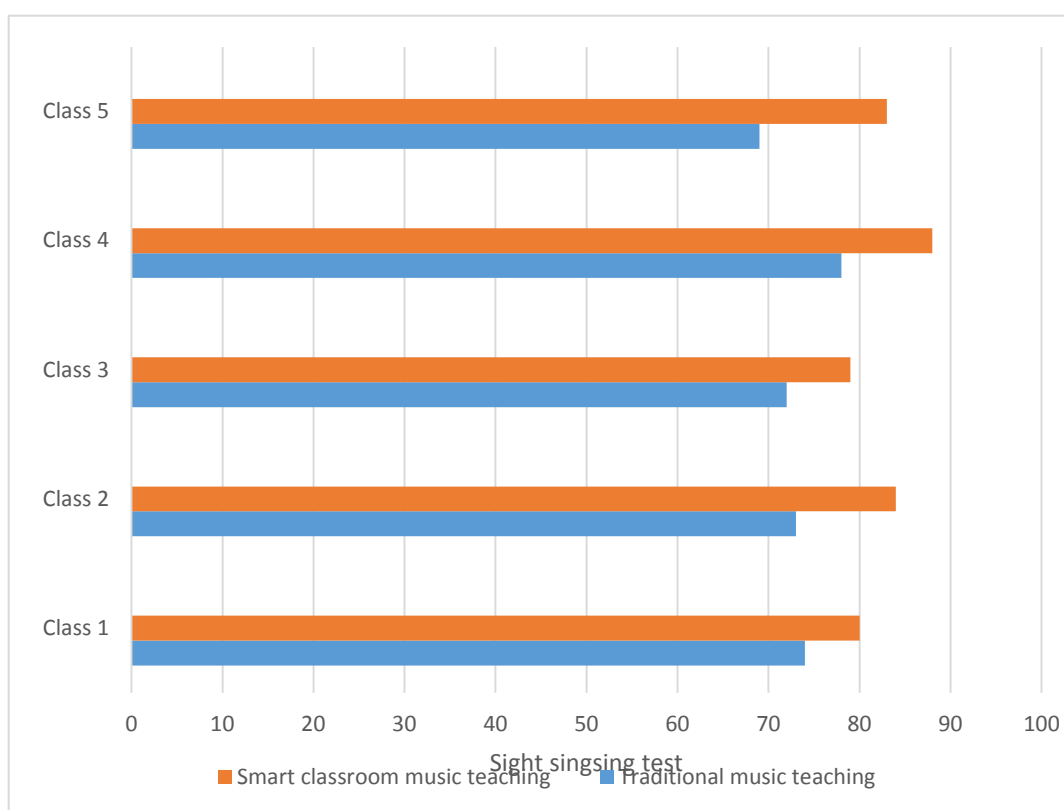The comparison of the results of the solfeggio examination is shown in Figure 6.

Figure 6: Comparison of scores in solfeggio test results

It can be found from the experimental data in Figure 6 that, on the whole, the result of the solfeggio examination of music teaching in the remote intelligent classroom under modern IT was generally higher than that of traditional music teaching in the solfeggio examination. The average score of the audiovisual singing test for music teaching in remote smart classrooms under modern IT was 82.8, and the average score of the traditional music teaching in the solfeggio test was 73.2, which proved that the remote intelligent classroom music teaching under the modern IT has a role in improving the quality of the solfeggio education.

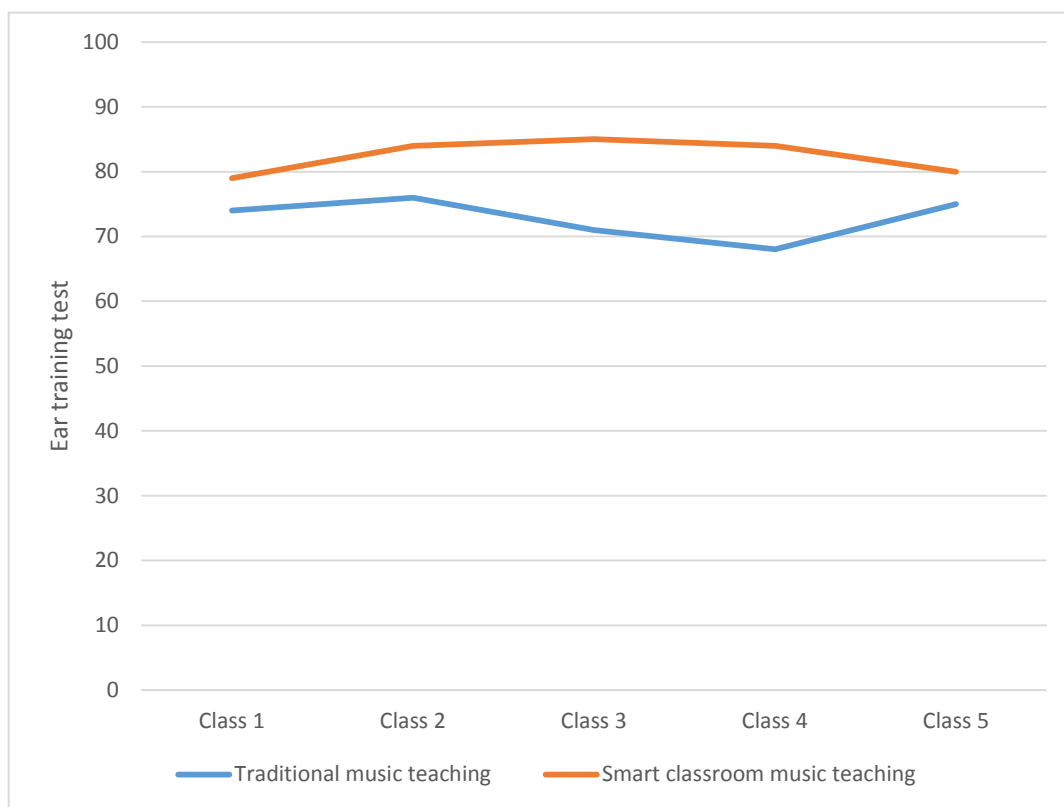The comparison of ear training test results is shown in Figure 7.

Figure 7: Comparison of test results for ear training

It can be found from the experimental data in Figure 7 that, on the whole, the score of the ear training test of music teaching in remote intelligent classroom under modern IT was generally higher than that of traditional music teaching in the ear training test. The average score of the ear training test for music teaching in the remote smart classroom under modern IT was 82.4, and the average score of the traditional music teaching in the ear training test was 72.8, which proved that the music teaching in the remote intelligent classroom under the modern IT can improve the quality of the ear training education.

The comparison of written examination results of music knowledge is shown in Figure 8.

It can be found from the experimental data in Figure 8 that, on the whole, the score of the written examination of music knowledge in remote intelligent classroom music teaching under modern IT was generally higher than that of traditional music teaching in the written examination of music knowledge. The average score of the written examination of music knowledge in the remote intelligent classroom music teaching under the modern IT was 84.4, and the average score of the traditional music teaching in the written examination of music knowledge was 73.6, which proved that the remote intelligent classroom music teaching under the modern IT can improve the quality of music knowledge education.

This experiment compared the scores of various subjects of music teaching in traditional music teaching and remote intelligent classroom music teaching under modern IT, and found that the scores of school classes under remote intelligent classroom music teaching under modern IT were higher than those under traditional music teaching. From this, it can be concluded that modern information-based remote intelligent classroom music teaching is helpful to improve students' music scores, as well as to improve the quality of music education.
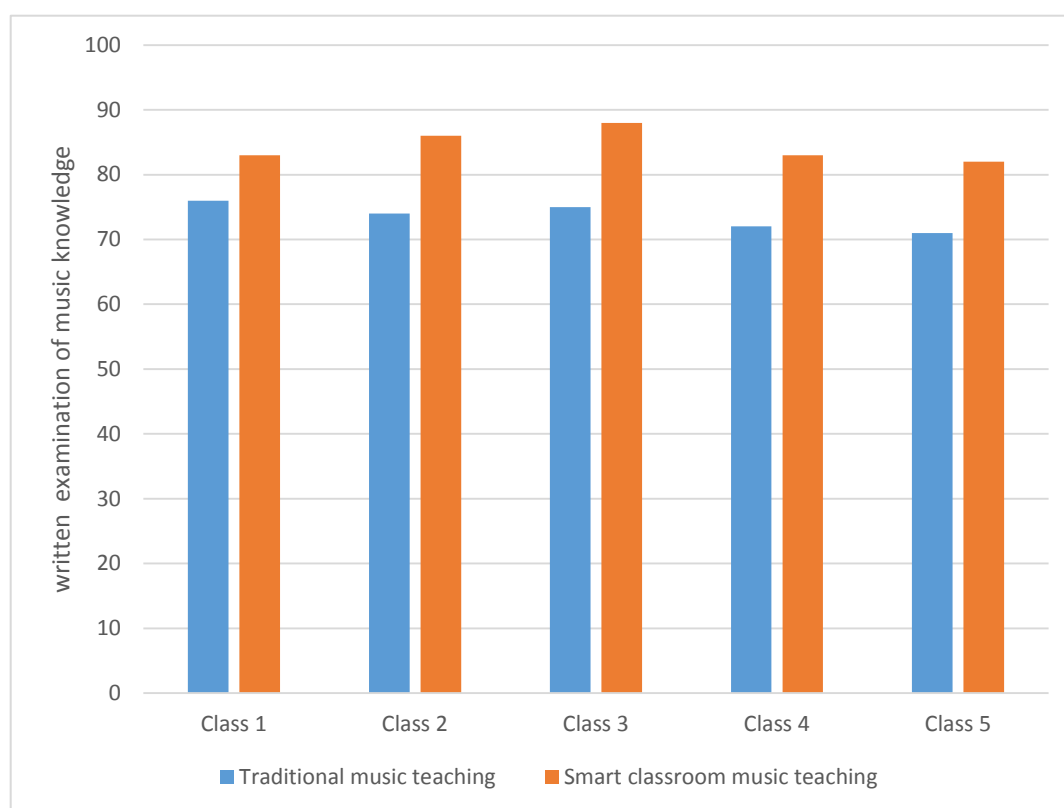
Figure 8: Comparison of scores in written examination of music knowledge

4. Conclusions

The improvement of music teaching quality is very important for the contemporary era. In order to make up for the shortcomings of traditional music teaching, this paper constructed a smart classroom for distance music teaching based on modern IT. The introduction of the smart classroom for distance music teaching adapts to the development trend of contemporary music teaching, and provides a better platform for students and teachers to teach and learn. In this experiment, due to many problems encountered in the research, the amount of experimental data is insufficient. In the future, more in-depth research on music teaching would be carried out to make every effort for the contemporary music education.

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Data Availability

Data sharing is not applicable to this article as no new data were created or analysed in this study.

Conflict of Interest

The author states that this article has no conflict of interest.

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