




## Design and Realization of Computer Aided Music Teaching System Based on Interactive Mode

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**Abstract.** The charm of multimedia itself is endless, which can improve students' thinking ability, cultivate their thinking quality, and greatly stimulate their curiosity and creativity. By making use of the vivid function of C An I courses, we can transform abstract and static content into dynamic and intuitive perceptual materials, provide students with materials for thinking, establish representations and guide and inspire students to analyze, synthesize, induce and reason on perceptual materials, promote the development of students' thinking, and effectively cultivate students' imagination and creative spirit. We should see clearly that the wide application of computer-assisted learning in the field of teaching and learning will lead to a profound change in the content of teaching, the teaching of hands, and the mode of teaching and learning. In the end, it led to the birth of new thought of teaching and education, the concept of teaching and education, and the theory of teaching and education.

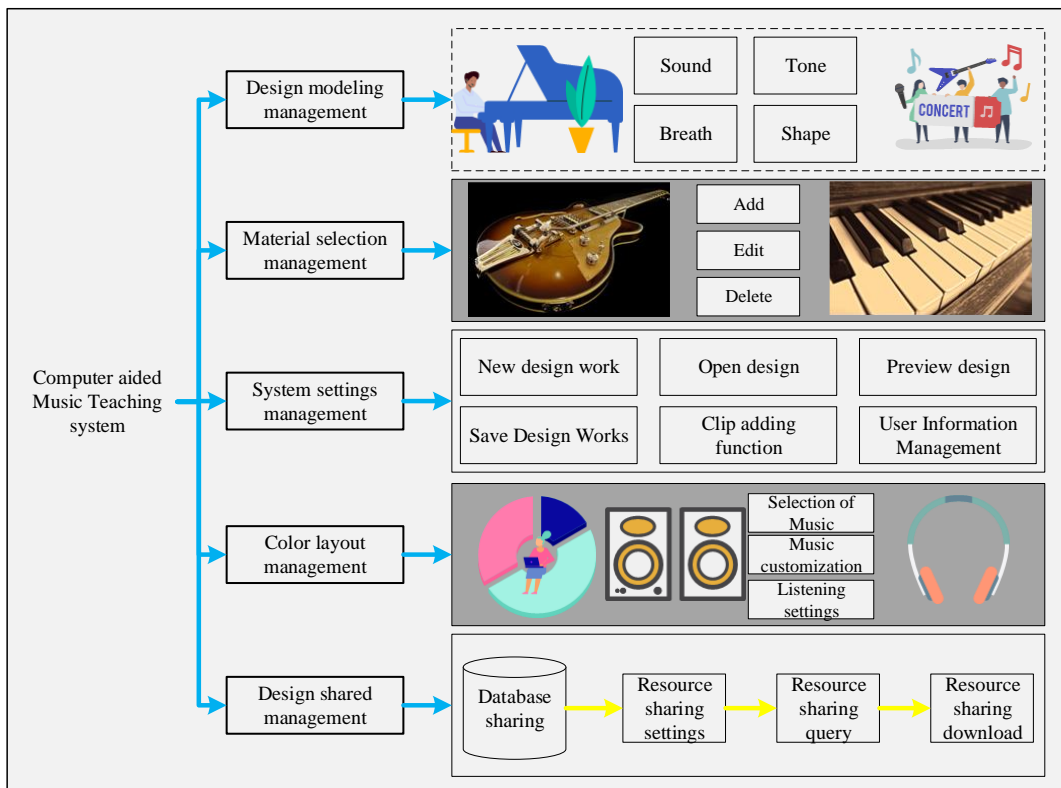
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### 1 INTRODUCTION

Computer technology has a significant influence on the concept of education, educational content, or curriculum format sit in the course of music education and education. As people pay more and more attention to education, the use of technology in computer-based music education practices has become a hotspot of today's education [1]. Computer-based education not only promotes students' interest in learning but also develops creative thinking skills and improves the content and format of classroom instruction [2]. The following is based on an analysis and basic understanding of the technologies in the practice of computer-based music education, Alghamdi, A. A understand the value and strategy of computer-based training in the process of music education. al [3]. Computer assistance can effectively cure this problem because there are many ways to input notes, some can be directly inputted with the computer's keyboard, while others use the professional MIDI keyboard to input the notes faster and more conveniently, but no matter what kind of method is used, the ultimate goal is to enable the future music teaching to develop for a long time, so computer assistance has played a vital role in music teaching by Larregay, G. et. al [4]. The application of computers in music teaching can not only make the classroom more colorful but also expand the amount of information about classroom teaching knowledge. For example,

when explaining some western musical instruments to the students, we can use the computer-assisted instruction mode to play the video, so that the students can directly feel the timbre contrast between a variety of western musical instruments. so that students can directly learn the specific contents and understanding of the use of a variety of Western musical instruments. From Werby, S. H et. al [5], we can see that computer-assisted music teaching can not only expand students' understanding of music knowledge but also improve the efficiency of classroom teaching. The computer-assisted teaching method is conducive to the creation of situational teaching, can make students feel the charm of music, to improve students' interest in learning [6]. Computer-assisted instruction can also stimulate students' imagination and creative ability, make students invest in the situation set by teachers imperceptibly, and arouse students' resonance with music. In music teaching, teachers can use computer assistance to play videos or watch pictures, so that students can fully understand the stories behind the music. for example, the story of the songwriter, the thoughts and feelings he wants to express, the mood at the time of creation, etc. so that students can communicate with the author's thoughts and works, to construct a complete emotional model [7,8]. And resonate. In this way, computer-assisted teaching can not only shorten the distance between students and music works but also reduce the difficulty for students to learn music with intuitive teaching mode as shown in Figure 1 [9].



**Figure 1:** Interactive teaching strategy.

General score playing software can be used to assist harmony teaching by Lima-Serrano, M. et. al [10]. Overture software can type harmony music, as long as we create a new document in piano mode, enter the main melody in the treble score table, set this melody as the first part, set the stem up after all selection, and then set the other line of music as the second part, all selected, set

the stem down, set the tenor part as the third part in the bass score table, and then play the score. After all selection, the symbol is set to face up, and finally, the bass part is set as the fourth part in the bass table, and the symbol is set to face down after all selection by Giannopoulou, G. et. al [11]. A problem worth noting is that after setting, the default color of each sound note is different, so you must find the "parameter setting" in the "options", and then set the "default color of each voice part" to black [12, 13]. As long as students master the operating steps, students can combine their knowledge to configure harmony, students can try a variety of chord connection methods, can avoid talking on paper, and they can listen to each part of the sound in the process of doing their homework. you can also listen to the four-tone part together and change it while listening to it until you are satisfied. With the constant advancement and development of science and technology, various software in computers has appeared endlessly, and the emergence of these technologies has brought many conveniences for music education, where singing plays an important role in music education. During the computer-aided consultation process, teachers can evaluate and record the singing of students using a variety of appropriate recording software, so that they can objectively and in detail directly detail their vocal results. it is also helpful for students to adjust their shortcomings. The emergence of this software can enable students to improve their ability to master vocal music knowledge and music literacy, realize the deficiency of their singing level through the recording and broadcasting form of the software, and thus make some adjustments. you can also make up for your shortcomings by communicating with peers and consulting with teachers. These are the benefits that the development of computer brings to music teaching, so the application of science and technology in computer-assisted music teaching practice is very important, which can not only bring teachers the convenience of fair and fair testing of students' vocal music learning but also enable students to find their shortcomings and correct them in the process of listening and singing repeatedly, to lay a solid material foundation for music majors in the future.

## **2 THE ADVANTAGES OF THE AUXILIARY TEACHING MODE**

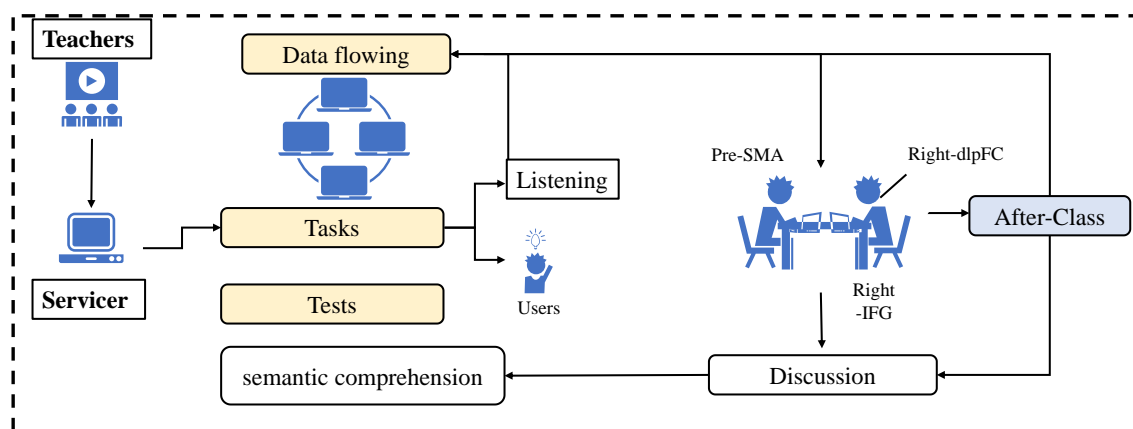
### **2.1 Intuitive Music Teaching**

Music education is more difficult to describe and generally an external song [14]. Music appreciation is a practical activity to teach music teachers, to perceive, experience, and understand the art of music, Ding, S. Is an important part of music education through such. al [15]. The most basic requirement of music appreciation course is to cultivate aesthetic taste with rich emotional experience so that students can feel and express music. Music is the most emotional art, and music education is the most typical emotional teaching. The embodiment of emotion comes from the environmental stimulation, C An I can hold a large amount of information, and can quickly reflect students with sound, color, light, and picture as a whole, and provide students with a three-dimensional perception space with their specific sense of shape and sound, so that students' various senses are stimulated at the same time, to promote the rapid interaction of emotional thinking information in transmission and feedback, thus stimulating the rapid germination of association and imagination. Make abstract music easy to understand, visualize, and materialize music, and create a new experience environment for students.

### **2.2 Content Expanding of Music Teaching**

By using digital music guidance, you can understand the rhythm and style of the music well by preparing the accompaniment of the music in advance. Also, digital teaching methods can introduce multicolored music lessons that enable pupils to learn multicolored music. Music education has no high environmental requirements. If the school is in relatively good condition, it can be equipped with many advanced educational institutions and facilities, but the educational needs of the school are too sample. In the world of audiovisual media, students who increasingly come into contact with modern media are no longer satisfied with the traditional educational model, and pupils gradually feel that learning music is a heavy burden. The use of CAI teaching

instruments visualizes abstract music theories, identifies fantastic musical images, simplifies complex musical knowledge, makes boring book knowledge a clear teaching material, and compensates for the shortcomings of past music education. For example, if you enjoy the violin solo "Bee", you cannot explain the background knowledge of the music, the structure of the form, and the melodic features at the same time, and the students lose interest in listening to the music. The use of multimedia can make the artistic image of musical works more distinct. First of all, introduce the violin of musical instruments and the content of brief music, and then play the courseware made. In the fast and rapid music, there are beautiful pictures, in turn, vividly depicting the dexterous and light image of bees. In this way, watching the picture while listening to music can provide students with both visual and auditory stimulation, and turn the music appreciation environment into a loose learning scene in which the picture echoes with the sound. When students hear the sound and see it, it will greatly activate the learning atmosphere in the classroom, and the students' aesthetic experience can also be pushed to the most wonderful part. For example, when introducing western musical instruments, to make students understand the performance characteristics of various musical instruments and their timbre, sound-picture synchronization technology can be used to combine hearing and vision, so that students can not only hear the timbre of this musical instrument but also directly see the shape and posture of the instrument, as shown in Figure 2. This can increase students' ability to distinguish and remember, and avoid teachers' time-consuming talk about musical instruments and students' rote memorization of knowledge points. The abstract teaching content is "revamped" due to the intervention of multimedia, which pays reasonable and proper attention to the combination of audio-visual experience, which makes the difficulties easier to solve. Students will also take an active part in learning with a happy mood.

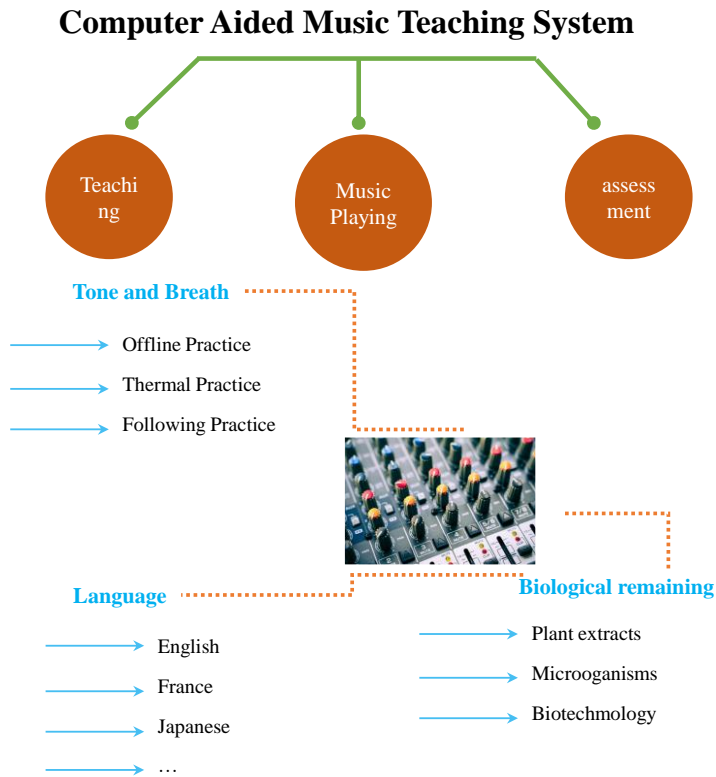


**Figure 2:** The first computer-assisted music teaching project.

### 2.3 Network Teaching System

Record the entire process, including music student practice, competition, and singing in detail. By storing data and information on the same platform, you can provide details, find different characteristics of students, help develop a sustainable and perfect training plan for students and compile qualification training rules in combination with empirical validation. to make training more scientific and systematic. Create a teacher training system for the perfect music course and turn your computer and the corresponding equipment and equipment on your music major learning and training skills. This has changed the traditional learning process accordingly. This is why the teaching assistant training process for music courses is designed based on traditional education and training, as shown in Figure 1. The system training process consists mainly of two closed loops, with internal loops with traditional training mode loops and external loops. A loop belongs to a self-

modifying loop, a combination of two. The internal loop only adds two function modules. The feedback loop has databases and computer-based analyses. The database contains details of parameters such as the content and efficiency of student histories, and computer-based analysis is based on databases using data indexing. The ability to analyze a student's physical condition instead of a teacher. The outer ring is a newly added loop, and traditional training methods are unclear concepts that contain related elements of musical performance such as training plans, methods, and technical movements. After receiving the data and information, the system performs a comparative analysis and the student achieves the purpose of modifying training elements and self-correction by interaction with the system, as shown in Figure 3.



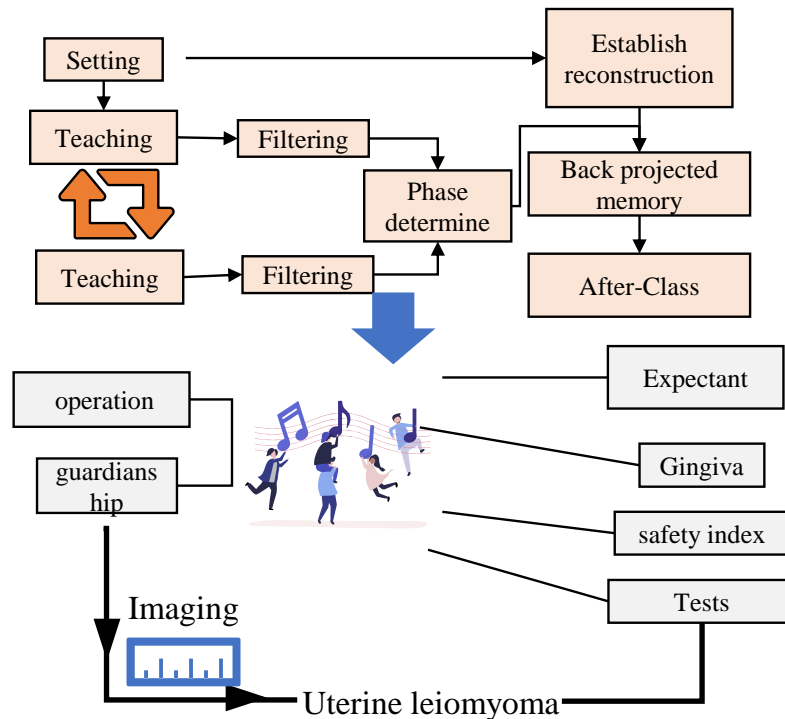
**Figure 3:** The establishment of the computer-aided music teaching system.

### 3 DESIGN AND REALIZATION OF TEACHING ASSISTANT SYSTEM

#### 3.1 System Function Analysis

As shown in Figure 4, the correct debate is formed by the co-action of several elements such as breathing, debate, resonance, and language, but they are contained within each other and must be co-operated. The additional training promotes the accumulation of the best singing condition in the whole singing body from every perspective. Therefore, the application of this system to vocal music training takes into account two main elements of physiology and acoustics that require appropriate external equipment and equipment and computers to connect to collect. The acoustic module consists mainly of recording equipment, recording software, and speech analysis software, and the physiological module consists of laryngoscope, vital signs monitoring devices, image processing, analysis software, etc. The system establishes a student database and analyses

quantitative educational content at all levels based on traditional educational experiences. Numerous statistical data analyses and results can provide stronger reference data for teacher and pupil education. The students checked the corner of the number where the little bird was compared on the Kinson audio page by providing multimedia software. The little child took the funny and amusing leap with the music, but also the synthesizer showed the first, produced multimedia material in front of the students. At night the master, the master, the master, the other, the other, the other, the toy box, and the time-like toy box, the end of the reticence. At Mongling in another destination detrimental to-go, the empress or heaven, the hero wakes up, and the toy soldier sat back the toy box children's village in a hurry. In this song, in which the broad color, the picture, and the gripping student are heroic, the other person moves along the sound surface, and the atmosphere of the whole hall becomes very active, and the student's academic abilities are demonstrated.

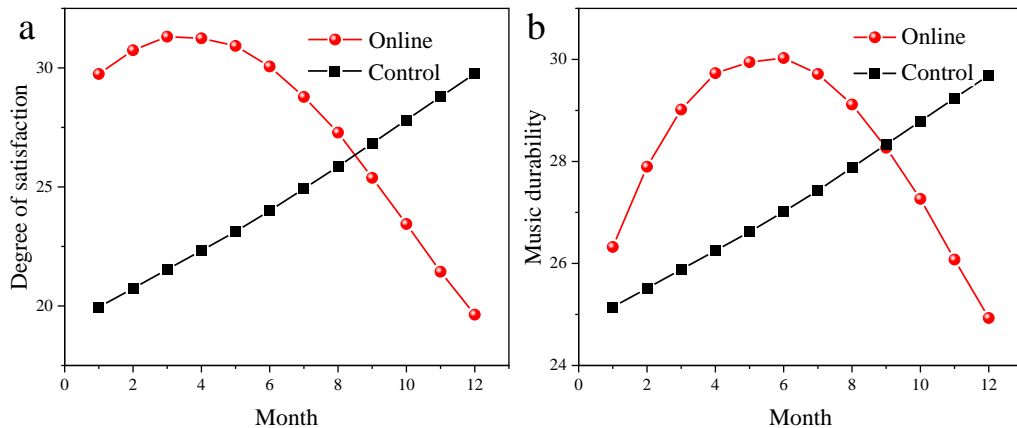


**Figure 4.** Data collection, storage, analysis of the teaching system.

### 3.2 System Performance Analysis

The sound function of the system allows the teacher to analyze the student's sound in detail and provide effective guidance to the student according to the displayed image data. The sound subsystem has three main functions. First, sound and music signals are processed scientifically in real time. Second, comparison of audio and music signals. The third is a real time feedback based on the difference. Generally speaking, the system receives the student's audio signal and determines the student's voice capability comparing data information to the standard. If the system detects that the student is mistaken, the particular place and type of error are pointed out. The system can display data information correctly and provide a strong reference to elementary school students. If an error occurs, the system can analyze a specific cause and propose a corresponding improvement. Students can learn how to sing through the ongoing test. In music demonstration, we use computer to prepare various teaching materials, develop singing physiology

knowledge based on the computer, and introduce oral cavity and vocal fold. In addition, we can use the facilities and institutions as a carrier to monitor students' oral organs in real time, and to compare and analyze students' voice organs with the knowledge written in the teaching materials. Structure of organs. In the analysis of singing voice data, the physiological monitoring function is mainly used to monitor the motion state of respiratory muscles and respiratory muscles. As shown in Figure 5, after systematically analyzing data and information, the students will fully understand the state of their breathing movements, and make appropriate adjustments in accordance with the actual situation to prompt the best breathing status.



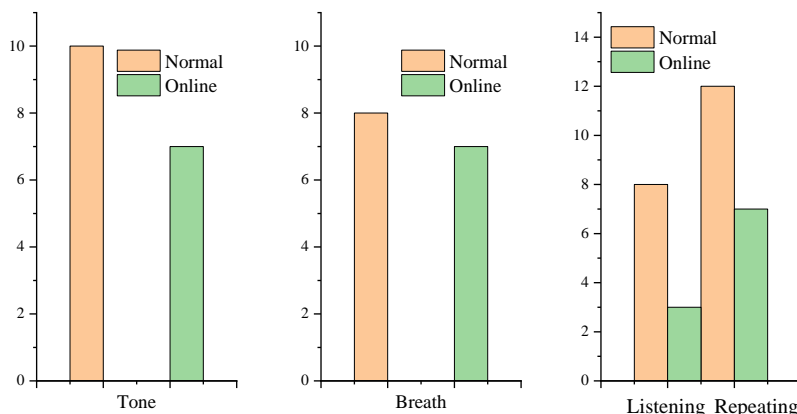
**Figure 5:** The degree of satisfaction for users.

### 3.3 Evaluation of Auxiliary Software for Music Teaching

In the traditional teaching of music theory, if you want to give a vivid lesson, you have to prepare more equipment, such as magnetic tape, videotape, tape recorder, video recorder, TV set, projector, piano, etc., which is not only troublesome to operate but also increases with the increase of modules. With the popularity of computers, computer multimedia teaching can effectively integrate text, graphics, sound, animation, and film and television, and has a strong interaction. A good music teaching assistant software should meet the following characteristics: in line with the scientific nature of music teaching; in line with the general law of teaching; give full play to the characteristics of strong computer interaction and strong storage capacity. Nowadays, there is much special auxiliary software for music teaching as shown in Figure 6. What is worth recommending is EarMaster, which is a world-famous listening and ear training software. It has two versions: Pro version and School version.

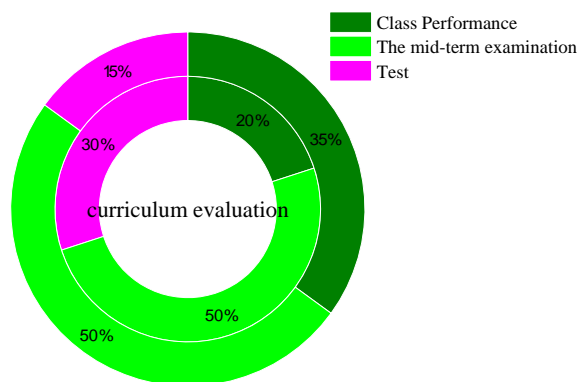
From scaling and melody dictation to rhythm dictation and correction we offer a variety of musical practices. Practice can be displayed in the form of a keyboard or staff. EarMaster allows users to adjust and save the progress of exercises, define a complete training course, and save each training. It is very good for LAN leadership. In addition to professional computer music education software, music workers can also create educational material for individuals. There are many user-friendly tools to create course documents that help non-computer professionals to create course documents with images and text, such as Authorware, Founder Oz, Courseware Master, and Flash. Over time, learning, acquiring, and applying pedagogical skills to education has become a necessary professional quality for music teachers, as shown in Figure 7. Computer-Aided Education (CAI) promoted the modernization of education in a variety of areas. Teachers of the new century must broaden their horizons, be courageous in their innovation, advance science and technology, and improve their teaching methods with the help of computer software. With the help of powerful memory functions, multimedia combination functions, and powerful logical evaluation

functions of the computer, music education is an unprecedented attraction. In general, the system receives the pupil's sound wave signal and the data information is compared to the standard to determine the pupil's vocal capacity.



**Figure 6:** The attitude towards computer-assisted teaching of tone, breath, and listening.

If the system finds that a student sings incorrectly, it points to a specific place and the type of error. The system can also play out the correct data information and provide strong references to pupils. In case of errors, the system can analyze specific reasons and present corresponding improvements. Students can learn how to sing through ongoing tests. Causality: "Perception power is more important because perception is limited and memory power is generalized around the world, progress is driven, and it is important to partially change sound quality. For example, imagination can stimulate pupils' sensibilities and make pupils' imaginations more effective. The student made a noise, exposed the surface of the water, and sometimes jumped into the water. In addition to the sounds they heard, the students explained the following in their own words based on the screenshots they saw. Iketo was a joyful toy, and the toys were very much in my heart while other people chanted and jumped. Even if the rain passes, the little blue frog is still a pleasant toy. Even if the rain falls, the little blue frog may not have been struck by the storm. The blue frog, who had been beaten, understood the storm, jumped again, and the singing voice of joy spread on all sides. Using the elements of the sound, he demonstrated the student's imagination and nourished the student's thoughts of modeling.



**Figure 7:** The curriculum evaluation for the music teaching system.



## 4 CONCLUSIONS

In summary, this paper designs teaching assistant systems for music courses teaching in the future course, which can be described as application technology, similar to intelligent expert systems. The system makes abstract concepts and skill training clearer and more intuitive displays ambiguous concepts through computer data or images and encourages students to study aggressively. In addition to the application of the system of teaching assistants for music courses in education and training, students can also be tested in real-time to promote the scientific basis of music evaluation and to submit effective proposals for further training. In addition to professional computer music education software, music workers can also create educational material for individuals. There are many user-friendly tools to create course documents that help non-computer professionals to create course documents with images and text, such as Authorware, Founder Oz, Courseware Master, and Flash. The realization of system functions has shown that the practical value of the system is high and that it has spreading and use-value.

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