



Analysis of Computer Aided Teaching Management System for Music Appreciation Course Based on Network Resources

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Abstract. With the continuous development of science and technology, more and more technologies such as computers have been put into actual teaching work. Li's computer-assisted music teaching model can just make up for the single teaching model of exam-oriented education. Based on computer-assisted teaching technology, this article carries out the design and development of a digital music course teaching system. The system can easily digitally process the recorded sound and present it in the form of sound waves on the computer. It can visually edit the audio and save the specific training status in the database comprehensively, providing more information for teaching and training. Intuitive visual information and all parameters transform the theory and methods of skills into vivid image data information. At the same time, analysis and discussion on computer technology are carried out. Using computers, music production can be operated in an intuitive and visual environment, clarifying the theme of music, developing the structure, and post-production. It has been proved through practice that this system can not only provide for teaching and training More intuitive and vivid visual information and all parameters, which transform skill theory and methods into vivid image data information, can also significantly expend efficiency of music learning and the training of professional skills, which is worthy of vigorous promotion and practice.

Keywords: Computer-assisted; music teaching; network resources; technology application

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1 INTRODUCTION

With the development of information technology, computer music technology emerges endlessly, and there are many notation and music editing software on the market, bringing unprecedented

convenience to the learning of music knowledge. Due to its unique advantages, computer-assisted system methods have been gradually used in practical teaching, namely, fast, convenient, and efficient. Arici [1] showed that Under the traditional teaching mode, there are still many problems that need to be solved urgently. Digital teaching and information teaching will inevitably become the inevitable trend of development. Based on the theoretical knowledge and practical skills to be used, the concept of computer-assisted music skills training has gradually attracted research. Furthermore, in the teaching process, through the extensive use of music skill elements and input of digital music information, an information computer-assisted music course teaching system can be formed. Kaleli [2] and other studies have found that in college music teaching, we should pay attention to the application of computer music technology to stimulate students' interest in learning, and at the same time enable them to better understand the knowledge they have learned, and be able to use computers for training to continuously improve music Teaching quality and efficiency.

At present, there are few courses that use computer music technology in music teaching. Most music courses use computers (or computers) to play music or slides to assist music classroom teaching. Most of those who really use computer music technology to teach Some of the more targeted courses in professional colleges [3]. Huang [4] believe that major advances in the use of computers for teaching can only be achieved through major breakthroughs in information and computer science such as artificial intelligence, natural language processing, speech recognition, and stronger programming languages. Although these scientists are typically more interested in their own field or related fields than in educational methods and educational practice topics, the tools and methods they develop can also be used in other fields. Yin [5] found through research that the emergence of artificial intelligence in the field of music education can be traced back to the 1960s in the 20th century and appeared in the form of electronic products. At that time, some developed countries in the world applied artificial intelligence technology to electronic keyboard instruments, and produced electronic synthesizers with a certain degree of intelligence. Its most prominent feature is that it has a wealth of timbre samples, which can store and play multiple musical instruments. A variety of musical instrument timbres, and computer science research may become an important source of reasonable models for teaching strategies, information structure, and knowledge representation. However, Zhou [6] and other studies have shown that in the process of setting up music professional courses in many universities, many teachers have to undertake dozens of students' scientific research tasks, and need to pass one-to-one guidance to continuously optimize the overall teaching. Quality can meet the needs of most students, and the overall teaching efficiency is relatively low. When the digital music system is used in music classroom teaching, it means that the teacher's teaching has a powerful teaching aid system, and it also means that the learning of music knowledge and the practice of music skills have undergone a fundamental change. And through the promotion of computer music teaching mode, it can be more effective through the innovation of computer music teaching mode to meet the growing demand for talent training [7].

This paper designs a method of using computer software to assist music teaching, which involves the computer field. It mainly solves the problem that the teacher needs to be taught in the teaching of musical instruments and singing, and the students cannot be given one-to-one guidance. This device includes construction Software synthesizer, editing music notes, making waterfall scores, designing a piano with special keys, designing a piano with adjustable height, switching modes, voice recognition, etc., integrate the screen hardware such as televisions, computers, and projectors in thousands of households. The equipment is fully utilized as much as possible to realize the functions of automatic teaching and symphony accompaniment. The beneficial effect is that the computer software cooperates with the hardware to teach automatically, does not require teachers to teach, and can also achieve one-to-one guidance. The learning efficiency is higher and it is easy to arouse students' interest. Under the computer-assisted music teaching system based on network resources, in the music teaching classroom, teachers not only get rich teaching resources, but also get a quicker, effective and in-depth understanding of

students' learning feelings and behavior habits; students not only get personalized You can also summarize and reflect on the learning content based on your own learning progress and degree.

2 MODEL OF COMPUTER AIDED MUSIC TEACHING SYSTEM BASED ON NETWORK RESOURCES

2.1 Computer-Assisted Music Teaching System Level Classification

Use computers to create situational teaching. Computer-assisted teaching methods are conducive to the creation of contextual teaching, enabling students to experience the charm of music in person, thereby increasing their interest in learning. Computer-assisted teaching can also stimulate students' imagination and creativity, so that students can subtly invest in the situation set by the teacher, and arouse students' resonance with music [8]. When teachers are teaching music, they can use computer-assisted teaching methods such as video playback or picture viewing, which can enable students to fully understand the stories behind the music, such as: the story of the composer before his death, the thoughts and feelings he wants to express, and the creation The mood of the time, etc., enable students to have an inter-communication relationship between the author's thoughts and the work, thereby constructing a complete emotional model and arousing resonance [9]. In this way, computer-assisted teaching can not only shorten the distance between students and music works, but also reduce the difficulty of students learning music with an intuitive teaching mode [10]. At the same time, the use of computers for assisted teaching, first playing music to students, and then the teacher introducing the author, this kind of situational paving method can make it easier for students to feel the author's thoughts and feelings and the song itself during the next lectures by the teacher. The understanding of music knowledge can deepen the impression of music knowledge in students' minds, enhance their interest in music learning, and gradually improve the learning efficiency and educational practice of music classrooms [11].

Set up information feedback and evaluate the learning effect. The intelligent teaching system can analyze and process relevant information of teachers, teaching, and students, so as to select learning content suitable for students' level and interest, and carry out continuous analysis and effect feedback on students' classroom performance. Music teaching emphasizes the feelings of students more than the learning of other subjects. Music teaching is a teaching activity based on the characteristics of music art, while music art is essentially the art of hearing. The interactive relationship between teachers and students is not a negation of the teacher's guiding role, but a generalization of the relationship between people with more teaching characteristics. To enable teachers and students to truly establish a special relationship between characters in the teaching process, it is necessary to treat the teaching activities of teachers and students as an organic whole, instead of treating teaching and learning as separate parties; the teaching process must be regarded as teachers and students. In order to achieve the teaching tasks and objectives, centering on the teaching content, through a series of activities such as joint participation, dialogue, communication and cooperation, interactive influences are generated, and the process of teaching activities is promoted in a dynamic way. Teachers are no longer the authority of knowledge; they need to think about their position in classroom teaching and their value to students' professional development.

2.2 Signal Input and Output of Music Teaching System based on MIDI Control

1) MIDI console structure principle

MIDI (Musical Instrument Digital Interface) musical instrument digital interface was proposed in the early 1980s to solve the communication problem between electroacoustic musical instruments. MIDI is the most widely used music standard format in the arranger world, and it can be called a "musical score that a computer can understand". It uses digital control signals of musical notes to record music. The music course teaching aid system based on computer

application technology can provide massive amounts of data and has a very powerful storage capacity. It can record in detail the entire process of music majors' exercises, competitions, and singing. As shown in Figure 1, MIDI communication occurs between the sending device and the receiving device. All devices must be set to the same MIDI channel before MIDI communication. If the number of channels is 16, it will generally be displayed as CH1 to CH16 on the device. . Devices with different numbers of channels will not respond to corresponding MIDI signals. The receiving device can sometimes be set to receive all channels, so that all MIDI signals in channels 1 to 16 can be received and performed. On the same platform, by digitizing the music information and storing the information in the database, it can be found in detail that for the different characteristics of different student groups, a feasible and complete student training plan should be formulated and verified accordingly. So as to make the learning effect more scientific and systematic.

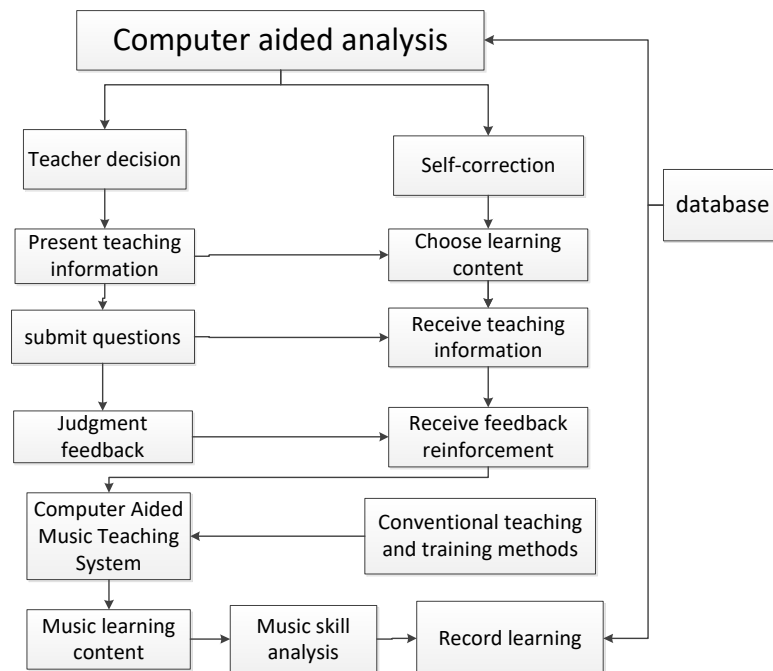


Figure 1: Flow chart of music course teaching aid analysis.

Accordingly, based on the traditional teaching and training design of the music course teaching aid training process, as shown in Figure 2. The system training process mainly consists of two closed loops. The inner loop retains the traditional training mode loop, and the outer loop is a self-correcting loop, combining the two. The inner loop simply adds two major functional modules: database and computer-aided analysis to the feedback loop. The database records in detail the parameters of students' historical training content and efficiency. Computer-aided analysis is based on the use of data index analysis of the database to replace teachers' functions on students' bodies. Status and so on for analysis. The outer loop is a newly added loop, and the conventional training method is a vague concept, including training plans, methods, technical movements and other relevant elements of music performance skills. For continuous control, the value of the detailed parameter represents the size of the controlled parameter. For example, in volume control, 0 to 127 directly correspond to the volume. For example, the position of a certain knob, 0-127 represents 0 to 100% range. For digital control, we usually use detailed parameters of 0 to 63 to

represent the off state, and 64 to 127 to represent the on state. For example, MIDI Commander sends 0 or 64 when controlling the switch value to correspond to the two states of off and on. After the system obtains the data and information, it performs comparative analysis, and the students interact with the system to achieve the purpose of changing training elements and self-correction.

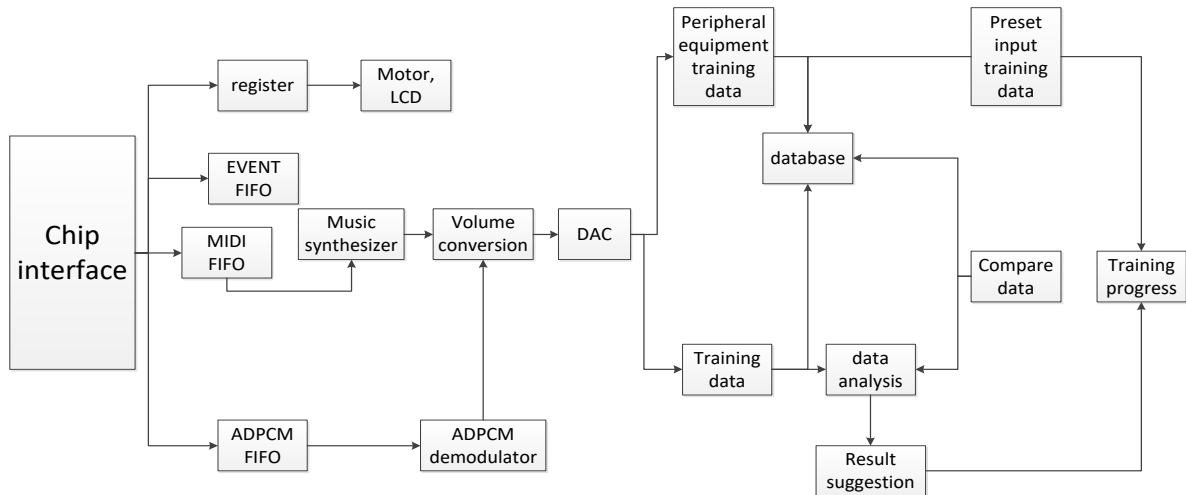


Figure 2: Flow chart of auxiliary data processing for music teaching based on MIDI control.

2) MIDI basic function design

System design should analyze music skills and elements in detail, based on vocal music teaching and training, and in-depth exploration through the physiological mechanism of singing. Vocal music is a singing skill, and vocal music training should focus on this skill. Proper vocalization is a combination of multiple elements such as breathing, pronunciation, resonance, and language, but they also restrict each other and must cooperate in vocalization. In assisting teaching and training, starting from any angle will promote the accumulation of the entire singing body into the best singing state. Therefore, when the system is applied to vocal music teaching and training, it will take into account the two major elements of physiology and sound, and it needs corresponding external facilities and computers to connect to each other for collection. Among them, the sound module mainly uses recording equipment, recording software, audio analysis software, etc., while the physiological module is composed of laryngoscopes, vital signs monitoring instruments, and image processing and analysis software. The system builds a corresponding database for students, based on traditional teaching experience, quantitative analysis of teaching content at all levels, a large number of data statistical analysis and results can provide more powerful reference data for the teaching training of teachers and students. The framework of the system's external facilities and equipment is shown in Figure 3.

The sound function module is realized. According to the sound function of the system, the teacher can analyze the students' training sound in detail, and provide students with targeted and effective teaching guidance based on the displayed image data. The sound subsystem has three major functions. One is to process sound signals and musical instrument signals scientifically in real time; the other is to compare sound signals and musical instrument signals; and the third is to provide real-time feedback based on differences. Under normal circumstances, the system receives the student's voice waveform signal, and compares and analyzes this data information with the standard to judge the student's singing skills. The system judges that the student has made an

error in singing, and will clearly indicate the specific location and type of the error. The system can also play correct data information, so as to provide students with a strong reference basis. Regarding the errors, the system can analyze the specific reasons and propose corresponding improvement methods. Students will be proficient in singing methods through continuous testing.

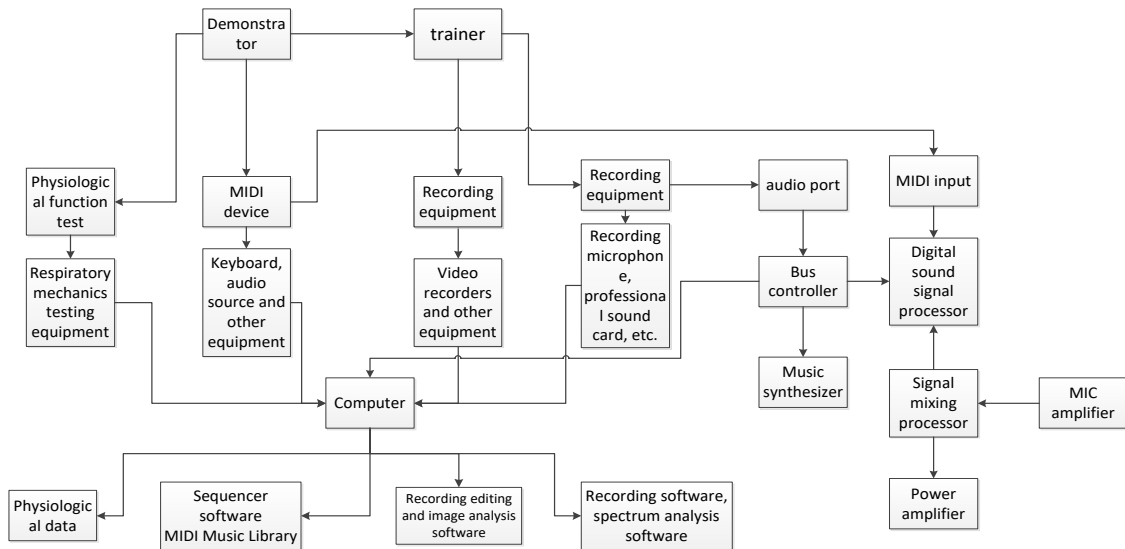


Figure 3: Frame of external facilities in computer aided music teaching system based on MIDI.

In the teaching of music course, the physiological function structure can be realized, based on the system of computer aided teaching, some computer aided teaching courseware has been generated in advance, which can get some effects, such as conveying the physiological knowledge of singing for students, and especially introducing some theories related to music physiology. In addition, with specific facilities and equipment as the platform, the computer-aided music teaching system can also observe students' oral cavity in real time, and compare and analyze students' musical physiological organs by using the knowledge stored in the courseware in advance, so as to stimulate students' interest in understanding physiology. The system shows unique advantages when discussing the need for singing and breathing data, mainly in the use of physiological monitoring equipment to monitor the movement of breathing and breathing muscles throughout the process. Through a comprehensive analysis of the data and information obtained, students can fully understand their real-time music learning state, and make appropriate adjustments according to the actual situation, so as to make themselves in the best learning state.

3 APPLICATION AND ANALYSIS OF COMPUTER AIDED MUSIC TEACHING SYSTEM BASED ON NETWORK RESOURCES

3.1 Design of Music Course Teaching System Based on Overture Software

The realization principle of Overture software in computer-assisted music teaching system. Overture is a professional notation software branded by GenieSoft, which can provide various notation on the staff, organize the chart surface and output and print. When writing the score, you can of course modify it while listening, and the printing effect is much stronger than the picture format. Xml format files need to be imported into Overture5 version. The software is relatively small, but its functions are very practical. Overture can correctly read the Xml format files

exported by Finale2010. At this stage, only the software version of Overture5 can read Xml format files. During the application of Overture software, any track in the score can be played, and the intensity of music performance can be changed at will. At the same time, it has the function of modifying the notes, you can modify the notes to various desired timbres, and edit any bar in the score. Using this function, the teacher can repeatedly play the syllable part that is difficult to understand in the teaching, so that the student can practice the part repeatedly until the student fully grasps it. In the piano teaching practice, teachers can use computer software to adjust the piano playing speed to a speed suitable for students' understanding, and perform repeated practice; at the same time, they can play a piece of music for students to practice repeatedly, and practice simple parts first. And then learn the more difficult part. This step-by-step approach can make it easier for students to master relevant music knowledge.

The application of MIDI musical instrument digital interface technology has made it possible for a large number of MIDI teaching software and music materials, which has enriched the teaching resources of teachers to a large extent, and students can enjoy the MIDI music they need more conveniently. At the same time, when it is necessary to repeatedly evaluate and analyze the music, it can be easily played back. When appreciating the music played by different national musical instruments in the world, you can see the appearance and performance of the instrument at the same time through the music production software. Accompanied by the music played by the instrument, the students can get the visual and auditory experience as if they were physically present. The experience of its environment, deepen the comprehensive understanding and understanding of musical instruments 2 The application of computer-aided system based on Overture software in music teaching. In response to this problem, many related teaching principles have been proposed. For example, in the teaching practice of the harmony course, parallel 8th and 5th degrees are forbidden. In the process of harmony teaching, the three tones cannot be repeated. Sight-singing courses belong to the skills of reading music and are one of the main contents of music teaching. Under the guidance of teachers, students use hearing, vision and musical sense to train their own spectrum thinking.

In the teaching process of the harmony course, you can use general notation software to assist in the teaching of the synthesis course. For the key signature (such as 1 = F), this is relatively simple, just enter it directly. Beat input: For beats (such as four or four beats), it is best to use fields to enter: click the combination key, enter a field mark, and then enter the following field code in the field mark: EQ \ F (4, 4), the input is complete Then, press the key combination once and the beat will be displayed. Note input: For the 7 notes of multi(1), come(2), m(3), fat(4), shuttle(5), pull(6), west(7), you can use the numbers on the keyboard Key to enter directly. For example, the Overture teaching software can be used to produce harmony scores, and the teacher is using the piano mode in the computer software to create a new document. Input of long and short notes: "whole note" and "half note" are input with note plus and minus signs; "quarter note" is input directly; "eighth note" and "sixteenth note", first input ordinary notes, and then respectively Select the corresponding note, press the drop-down button to the right of the "Underline" button on the "Format" toolbar, and select "Single underline" or "Double underline". Note: If you need to enter a "thirty-second note", you can use the form of "double underscore" plus a short line. Input of decorative sounds: "Decorative sounds" look like superscripts: press the key combination to switch to the superscript input state, after inputting "Decorative sounds", press the key combination again to switch to the normal input state. After that, the teacher can input the main melody of the musical composition that needs to be taught in the general table of high music, and set it as a part. Then set the stems of the music symbols to all face up. After that, set another line of score as a two-voice part, and set the stems of its music symbols to all face down, as shown in Figure 4. With the help of the voice and video coding capabilities of the computer music multimedia system, the sight-singing repertoire needed for class is coded in advance to facilitate repeated practice in the classroom. In group training, the teacher can provide close tutoring for each student. Including the sight, singing, listening, and comparison of intervals; the sight, singing, listening, and comparison of scales; the sight, singing, listening, and comparison of complex scales. It should be noted that in the process of setting the note of each part, the default note color of the

software is different. The teacher must find the relevant options in the parameter settings and adjust them to black settings.



Figure 4: Music score renderings of computer-assisted music teaching system based on Overture software.

In a key, there are a total of 7 triads (root + third + fifth) composed of 7 notes in the key. The chord progression is distinguished according to the roll name of the root, for example, in C major, Grade I chord is C chord, its component notes are 1(C), 3(E), 5(G), and Grade II chord is Dm, and its component notes are 2(D), 4(F), 6(A)), the third-level chord is Em, and its constituent notes are 3 (E), 5 (G), and 7 (B). By analogy, each chord and its constituent notes are obtained. In the process of inputting chord progression with computer software, it is not good to input only with notation software alone, and some notation software cannot even find the option of this function during the use of some notation software. In the traditional teaching process, the teacher mainly displays the relevant content on the blackboard, but this method is relatively slow, and it is difficult to pass all the teaching content to the students in a limited time.

In contrast, Overture is an excellent natural sound simulation software, which can make it easier for students to master the ability of listening and discerning sight and singing parts, and master the multi-directional stereo music perception including rhythm, timbre and music emotion in a short time. Ability, gradually realized the important role of sight-singing software in music teaching activities. Therefore, teachers can use the following methods in the teaching process: in-situ and chord progression input. Teachers should use the notation software to type the chords they teach, make them into a PDF format file, export the PDF file, use the capture software to complete the screenshot of the required area, and save it in the reinforcement picture. After that, import the saved picture into the created Word document, and select the "Insert" option to insert special symbols into the score.

3.2 Optimization Analysis of Music Course Teaching System Based on Overture Software

Computer-aided harmony learning performance analysis. As shown in Figure 5, by comparing the music scores of the set experimental group and the control group, it can be found that the experimental group trained by the computer-assisted teaching system showed better scores in the three tests. Correspondingly, corresponding to harmony analysis, that is, the analysis of harmony processing methods in musical works, computer-aided systems are a new and important way to master the actual knowledge of harmony and writing skills. It helps to link the theoretical knowledge of harmony, writing exercises with the practical application in the work, understand the relationship between chords, music structure, content expression, etc., and helps to gradually grasp the overview of the harmony development in each period and the various genres, Harmony style characteristics of each writer. It is an integral part of harmony teaching and a content of music analysis. Harmony analysis includes: Description of harmony materials, including tonality,

mode, chord, chord position, voice progress, etc.; Describe the structure of the music and analyze the relationship between the harmony and the structure of the music; point out the logic of the harmony, the main chord, the combination of the harmony and the rhythm of the harmony, etc.; the mutual relationship of each converging style; the layout of the tonal development; the composition Methods of orgasm, etc.; Contact the era, genre and the author's own style characteristics, and explain the harmony writing characteristics of the work. The teaching of the harmony analysis part is a difficult point in the teaching of the harmony course. In the process of learning this part of the knowledge, due to the existence of a lot of up and down signals, there will be a situation where the more they learn, the more chaotic they become. Therefore, in the process of teaching, teachers can adopt the following method: first input the music score into the computer, and then adjust it to the C key, so that students who are not familiar with the staff can observe the harmony part more intuitively. In addition, teachers can also use the professional notation software Finale2010 to complete the analysis of the chord part.

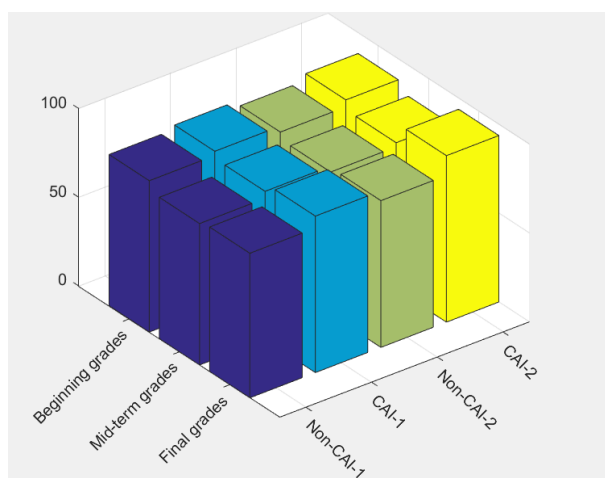


Figure 5: The influence of CAI system design on students' music achievement.

Satisfaction analysis of computer-assisted music practice. In traditional teaching, students practice mainly through handwriting, so that students repeatedly hand-write the content of harmony. Now, teachers can use Overture software to assist students in completing related exercises. The Overture software can automatically recognize and rotate the situation, and complete operations such as variations, so that students can avoid false harmony practice in the learning process, and affect their learning thinking and learning efficiency. The computer-assisted system has shown good results in various assessments of music course learning efficiency and expanded thinking styles, as shown in Figure 6.

You can complete the production of difficult spectrum examples before class to avoid mistakes in class. On the other hand, with the help of a good window interface of music software, small games can be used to assist the learning of boring music theory knowledge. For example, in the small game of learning staff, the keyboard and the score are displayed in the display window to realize the function of playing the sound of the designated keys. At the same time, different difficulty levels are set in the software, which can adapt to students of different levels to consolidate and advance. Level training, so the use effect is generally satisfactory, as shown in Figure 7.

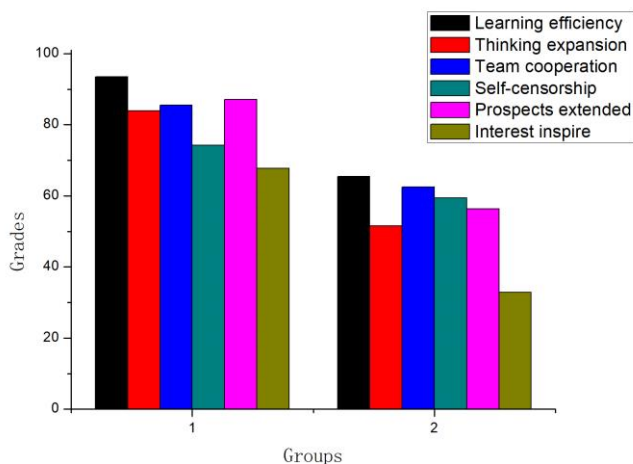


Figure 6: The effect evaluation chart of music course teaching system based on Overture software.

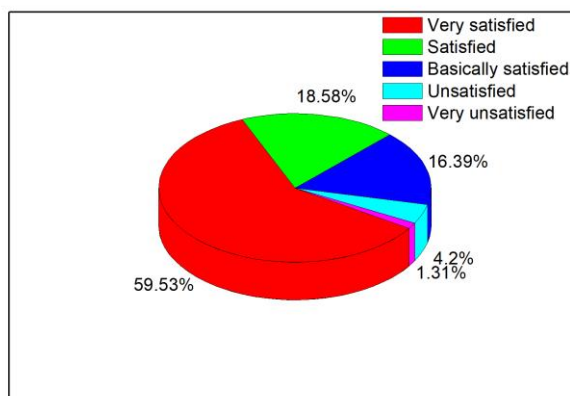


Figure 7: A satisfaction survey of harmony course teaching system based on Overture software.

4 CONCLUSION

To sum up, this article designs a computer-controlled music course teaching system. The computer-assisted music teaching system can be compared to an intelligent music teacher scoring system. Its core is to use a computer network instead of manual teaching. Through the use of computer-assisted systems, students feel more relaxed and intuitive when learning abstract concepts and theoretical knowledge. At the same time, the theoretical concepts can be displayed through computer data and voice and other multimedia means, which can achieve the effect of encouraging students to learn actively. At the same time, computer-assisted teaching can improve students' practical ability and innovative spirit in music classrooms, thereby making music classrooms rich and colorful, realizing diversified forms of music education and teaching, and enabling music teaching to have a broader development in the future. Therefore, computer-assisted music teaching is the only way for modern education and teaching, and an important teaching method in the development of modern information society. In the field of music teaching, computer music technology has demonstrated its powerful processing and presentation capabilities, and is applied to music. The process of education must be accelerated. Finally, through the specific

practical application and analysis of the computer-assisted music teaching system, it is shown that while improving students' music skills, it can also cultivate students' music quality, help them shape a sound music character, and gain valuable creativity in the field of music education. thinking. In addition, the music judgments have a scientific basis, and then provide effective targeted suggestions for follow-up training. The realization of system functions proves that the practical value of this system is good, and it is worthy of vigorous promotion and application.

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