Research Article

Interactive Music Instructional Mode Based on Cloud Computing

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The interactive music education in cloud computing environment is designed to address the disadvantages of traditional music instructional mode. The content of interactive music education is investigated using cloud computing technology. The database of interactive teaching automation grouping platform is generated based on the basic learning information of learners in the data, and it is used to provide instructional resources and basic technical support. On this foundation, the automatic grouping algorithm is introduced to enable interactive teaching to be automatically grouped. The new music instructional mode, which incorporates IT into interactive music education, not only aids students in better understanding instructional content and mastering the inherent laws of the knowledge they have acquired but also significantly improves upon the traditional music instructional mode’s flaws. The results of the tests show that this method is extremely precise. And the designed platform has a better learning effect on students, indicating that the designed interactive music education platform has some practical application value.

1. Introduction

Due to the continuous progress of IT, the construction of instructional platform is also in full swing. Instructional platform provides a virtual learning environment for teachers and students and promotes the reform of educational technology [1]. “Instructional mode” refers to the relatively stable structure framework and activity procedure of instructional activities established under the guidance of certain teaching ideas or instructional theories [2]. After integration and optimization, it has advanced technologies in system administration, data administration, data storage, programming mode, and concurrency control, such as mass distributed storage technology, data administration technology, distributed resource administration technology, and cloud computing platform administration technology [3]. At present, many instructional platforms are designed with complex functions, and the pursuit of comprehensiveness leads to inconvenient use or complicated operation process of many teachers and students, which has hit the enthusiasm of teachers and students in using platforms. In addition, some functions of the platform fail to meet the teaching requirements, such as online marking of students’ homework. Many platforms only provide document uploading function but do not have online marking function [4]. Interactive music teaching is one of the key professional directions of music universities. In some aspects, it reflects the comprehensive instructional quality and personnel training level of the university, and in some aspects, it affects its social service ability of developing regional culture.

Under the background of information age, due to the continuous progress of technology and the Internet, people have a higher demand for the computing power, storage capacity, and service forms of computers [5]. Cloud computing, as a new technology that enables computing power to circulate as a commodity, has been increasingly applied to various projects, providing a choice for optimizing resources for the current situation that educational resources are generally lacking and unevenly distributed. “Educational cloud” has been increasingly applied and promoted in the education field [6]. Cloud computing will help to bring about a revolution in education and will have a significant impact on the field. High-quality program resources, network program resources, instructional hardware facility resources, books and documents, and electronic information resources are all examples of instructional resources in universities [7].
The number of instructional resources in universities is increasing geometrically as a result of continuous IT advancement, severely limiting university teaching and administration [8]. As a result, a thorough examination of the cloud computing-based music curriculum model is required. In order to provide better information services for schools, teachers, and students, this paper makes effective use of information means such as databases and education clouds and investigates the interactive music instructional mode based on cloud computing.

Computer technology [9] is developing with each passing day, which greatly promotes the progress of education. Cloud computing is the product of new changes in computer technology, which impacts the development of education and teaching ideas [10]. In learning, the use of cloud computing can promote the development of collaborative learning, and it is easier for students to share reference materials, software, learning content, and other items, all thanks to cloud storage services; and online editing, comment, and sharing are also possible, which also encourages the interaction between teachers and students, teachers and people and resources, and promotes multimode blended learning [11]. Due to the continuous progress of society and the enhancement of students’ cognitive ability, students not only demand the enrichment of learning resources but also hope that the instructional platform can provide personalized learning support services [12]. Good platform design can effectively improve students’ learning efficiency, and the choice of application mode directly determines the learning effect of the instructional platform. The interactive music instructional mode based on cloud computing is a new music instructional mode closely surrounding the technical guideline of “learning with technology”, based on the educational cloud architecture integrated by multimedia music program resources and integrating IT into interactive music education. This paper makes full use of the advantages of cloud architecture deployment environment to realize an interactive instructional platform integrating resource sharing and learning interaction. It also demonstrates the rationality of applying cloud computing to the instructional platform. This study is based on cloud computing technology and aims at interactive teaching and building an interactive platform for music teaching.

2. Related Work

The interactive teaching automation grouping platform in the IT environment is studied in literature [13]. The instructional platform based on cloud computing, according to literature [14], provides a new means for centralized administration of instructional resources due to its innovation in service mode and technology. Build an interactive instructional platform that integrates resource sharing and interaction, according to the literature [15]. Use the public cloud platform’s openness to deploy the instructional platform in the cloud. According to literature [16], the majority of educational scholars are concerned about how to effectively integrate Internet educational resources to reduce additional educational expenses, as well as how to maximize educational data and apply it to teaching. According to literature [17], cloud computing will effectively reduce end-customer pressure. Literature [18] proposed a cloud computing and data mining-based music curriculum model. The trinity interactive instructional mode is proposed in literature [19], which discusses the flaws of the current interactive instructional mode. Furthermore, it discusses the basic concepts, core ideas, and methods and tools needed to apply the trinity interactive instructional model. Literature [20] has carried out the research on the application of network instructional resources sharing and interactive teaching based on cloud platform, focusing on solving two kinds of problems: poor organization efficiency, low utilization rate of most network instructional resources, poor interaction of classroom teaching links, and difficulty in effectively controlling and evaluating students’ learning effects. Literatures [21, 22] study and analyze the resource administration and service in cloud computing environment, embody the sharing of resources, emphasize the high efficiency of service, and attach importance to learning interaction and cooperation. Literature [23] comprehensively expounds the learning theories such as collaborative learning, group intelligence, computer-assisted instruction, and cloud computing-assisted instruction.

Based on the in-depth study of related literature, this paper proposes an interactive music instructional model based on cloud computing. The interactive music education platform based on cloud computing technology can break the limitation of time and space and realize the high sharing of learning resources and the diversification of teaching methods. Through comparative experiments, it is concluded that the designed interactive music education platform is more practical than the traditional platform, which greatly improves the teaching effect of interactive teaching.

3. Methodology

3.1. Cloud Computing Model. At present, with the rise of the revolutionary wave with “internet plus” as the core, it promotes the deep integration of emerging Internet IT and traditional industries. Cloud computing is a new term put forward in the field of IT [24], which has a very wide range of meanings, and there are various introductions to the concept of cloud computing. Cloud computing is a metaphor. The predecessor of cloud computing can be traced back to grid computing, and they share the same idea, which is a distributed computing technology centered on the Internet about how computers work together [25].

The basic principle of cloud computing is that it consists of hundreds of thousands or even millions of computers in the Internet. Users process data, not locally, but through server clusters on the “cloud” side. All users’ data is stored in the data center of the Internet. Cloud computing mode breaks the tradition, and users can process data anytime, anywhere without restriction. For example, the popularity of mobile learning makes it convenient for users to use resources anytime, anywhere for learning. From the perspective of sharing high-quality resources, the main characteristics of cloud computing are as follows: the services provided
by cloud computing technology have low requirements on the equipment of the client, and users do not need to buy high-end configuration equipment to run programs, because these applications run in the cloud rather than locally [26]. Users can reduce the input cost of using resources and ensure the use of user terminals. Private cloud provides cloud computing services in firewalls for specific organizations. Public cloud provides services and infrastructure to organizations and enterprises and provides public cloud computing services and storage. Hybrid cloud is somewhere in between [27].

Resource content creation and resource platform creation are two of the most important aspects of educational informatization. An important part of educational informatization is maximizing the benefits of technology and effectively building resources. Cloud computing is the newest IT development trend, and it comes with its own set of benefits [28]. Cloud computing provides a more secure and reliable data storage center. Data on desktop computers is vulnerable to virus infection or hard disk failure, but in the cloud, there are thousands of desktop computers, and the data storage center is managed and maintained by professional businesses [29]. Ensure that high-quality resources are stored in a safe and secure manner. Unlike traditional architecture, which requires the maintenance of a computing center, cloud architecture uses anomaly detection and can recover and reconfigure itself without disrupting the application’s normal operation.

Cloud computing technology can easily realize data sharing between different terminal devices. Students are no longer holding books or sitting in a fixed place to study. In the cloud environment, all learning resources are in the cloud. Students can use the network to connect to the cloud to obtain learning resources whenever they want to. The smooth switching of cloud computing technology enables learning resources to be shared without loss. Therefore, the learning types supported by cloud computing can be summarized as follows: anyone can learn seamlessly anytime, anywhere [30]. Cloud computing mode fits well with interactive teaching. Therefore, under the cloud computing environment, an interactive teaching automation grouping platform is designed, which can realize and meet the requirements of students with different classes and different foundations. The interactive teaching automation grouping platform based on cloud computing technology can break the limitation of time and space and realize the high sharing of learning resources and the diversification of teaching methods. The content collected by the interactive teaching automation grouping platform is shown in Figure 1.

Against the backdrop of cloud computing, various schools’ teaching reform and innovation have been pushed to the forefront of development in the new era by cloud computing. Cloud computing-based teaching, learning, and administration have gradually made their way into various schools and have become the new trend in school information development. Cloud computing technology gives users an almost limitless number of options for accessing high-quality resources. It has super computing power for storing and managing data. The desired information can be obtained as long as a computer or electronic terminal device is connected to the network. Traditional architecture uses a single computing node, whereas cloud architecture uses flexible cloud services that can dynamically scale and allocate computing nodes based on application needs, avoiding application service and quality issues caused by server overload.

Cloud computing service mode is an Internet-based computing mode, which can provide users with software and hardware resources and data according to their needs. In the construction of high-quality educational information resources, with the help of resource administration and services in the cloud computing environment and the advantages of cloud computing technology, the coconstruction and sharing of resources can be fully realized. Teaching applications are deployed on the cloud platform, and the cloud-friendly operation interface, strong security, and good maintainability will make it easier to manage teaching applications, and the corresponding managers will be reduced accordingly.

Cloud computing has the powerful advantages of optimizing computing resources, including virtualization, on-demand service, distributed computing, low operating cost, easy scalability, good manageability, and on-demand self-service. The advantages of high-quality resources of education informatization based on cloud computing are also strongly demonstrated. The cloud platform provides a software store, which can be applied to the instructional platform with mature technical tools at a lower price. Therefore, the instructional platform no longer needs to purchase expensive software copyright and rent suitable software products according to the teaching needs, effectively reducing the cost of software development and enjoying high-performance software.

3.2. Interactive Music Instructional Mode. The society’s requirements for participants are constantly improving, the learning curve of participants is constantly increasing, and the learning cycle is also constantly increasing, thanks to the continuous advancement of technology in various fields. Education, on the other hand, is lagging behind other fields in terms of development, instructional modes, and methods. Some schools have adopted the form of interactive automatic grouping for teaching in the process of continuous progress in the field of education and have achieved certain results. However, as the number of students in schools grows, the accuracy of traditional interactive teaching grouping platforms decreases, resulting in inconsistent student progress and large differences in foundation after grouping, which reduces the interactive instructional platform’s teaching effect to some extent. The architecture of the interactive information administration system is shown in Figure 2.

Interactive teaching is the process of interaction, influence, and communication between the teacher and the learner in the teaching process. Under the background of information-based education, today’s music instructional mode has been greatly developed and innovated. Cloud computing and data mining technology have integrated technical knowledge of many professional disciplines and
built an information-based music instructional platform. Collect the teaching tasks, determine the teaching tasks in groups in the form of whole class teaching, and collect the teaching tasks. In order to accurately collect the platform content, the platform content is analyzed by literature analysis, and the calculation formula is

\[ G_{xzd} = \frac{b}{E_r \times g}. \] (1)

In the formula, \( G_{xzd} \) represents the content of the instructional platform. \( E_r \) represents the basic information of the student. \( g \) stands for instructional content.

The core of the interaction is to create an effective and benign feedback system in which the implementer performs specific actions or interventions on the target, the target responds to these actions or interventions in a series of responses, and the monitoring system measures, analyzes, and communicates these responses to the target. The implementer makes the next action or intervention decision. This cycle continues until the task is finished. The data has been cleaned, and the formula for the calculation is as follows.

\[ D = \sum_{i}^{e} i \times \frac{m}{f + n}. \] (2)

In the formula, \( D \) represents the student data. \( \sum_{i}^{e} \) represents the data cleaning factor, and \( m/f + n \) represents the student indicators.

Interactive teaching aims at engaging students in learning activities. Lectures, questions and answers, and other forms of operation or interference are used. Students will have corresponding reactions to whatever method of instruction is used, whether it is blind listening, following
suit, or playing alone, all of which are manifestations of students’ reactions. Teachers must observe and analyze students’ reactions in order to develop and revise teaching methods and make timely progress, creating a virtuous circle. Calculate the vector similarity as

$$\cos \theta = \frac{X \cdot Y}{|X||Y|},$$

where $X = (X_1, X_2, X_3, \ldots, X_n)$ and $Y = (Y_1, Y_2, Y_3, \ldots, Y_n)$ represent the knowledge breadth vectors of students and resources, respectively. The larger the included angle and the smaller the cosine value, the lower the matching degree between students and resources. Quantify the knowledge depth of students and data resources as

$$F(M, N) = \frac{1}{\sqrt{2\pi}\delta} \exp \left( -\frac{(M - N)^2}{2\delta^2} \right).$$

In the formula, $M$ is the knowledge depth value of students, $N$ is the knowledge depth value of resources, $M - N$ is the independent variable, and $F(M, N)$ is the dependent variable.

The information age makes it easier for students to enjoy a variety of electronic education resources, but too many information resources bring a lot of trouble to students. A large number of information resources on the Internet have many different styles and characteristics, which need to be classified reasonably. Cloud computing has powerful interactive functions, and students fully realize autonomous learning in cloud + terminal “interactive” learning. Teachers also change from the promoter of learning to the leader of learning and guide students by observing their learning. The student-resource knowledge breadth vector matching model is calculated as follows.

$$kw = \{a_0, a_1, a_2, a_3, a_4, \ldots, a_n\}. \tag{5}$$

Interactive teaching promotes the integration of doing and learning, as well as creating an interactive learning environment. The general method is to finish learning and do it again, then finish learning and do it again, and so on, but different disciplines employ different learning and doing techniques. This model can only be described as a mix of doing and learning on the surface. This paper proposes a three-in-one teaching, learning, and doing model, in which teaching, learning, and training are all integrated from the start of the curriculum design process. It ensures active participation of teachers and students, as well as barrier-free communication, constructing knowledge meaning, independently completing learning tasks, and collecting feedback information from multiple dimensions, in order to cultivate students’ innovation, by using the instructional mode of cloud desktop+intelligent terminal. The spirit of cooperation can improve practical ability, allowing for more effective teaching reform and improved teaching effectiveness.

Sort students according to their comprehensive abilities and select students with higher abilities as group leaders based on the cleaned data. The calculation formula is

$$Q = \sqrt{X_1 + X_2 + \cdots + X_n},$$

where $Q$ is the comprehensive ability of students. $X_i$ is the vector of students’ comprehensive ability. This formula is used to analyze the comprehensive level of each student. Then, automatic grouping is completed by automatic grouping algorithm:

$$M = \log \left( \frac{v}{vC \ast b} \right). \tag{7}$$

where $M$ is the automatic grouping factor, and $log$ is the basic information of students. $vC \ast b$ stands for Similarity Ranking of Students, thereby promoting the development of music professional ability of teachers and students. This new music curriculum model will directly affect the teaching effect of music curriculum and the quality of training music professionals.

4. Result Analysis and Discussion

Taking the cloud platform as the breakthrough point, we can effectively supervise every process of students’ course learning. Students’ homework, experiments, daily tests, and so on can only be done independently on the cloud virtual desktop and cannot be copied. Reform the composition system of course achievement, including homework, attendance, quizzes, engineering training, experiments, and final exams. From the whole implementation effect, students’ learning enthusiasm and ability have been greatly improved.

Due to the continuous progress of IT in all aspects of teaching, the instructional mode is also changing. For example, in order to meet a variety of experimental learning needs, students require a personalized computer desktop environment, and teachers must be able to quickly switch between various teaching environments during the normal teaching process. Traditional decentralized administration, on the other hand, has been unable to meet the customized and rapid teaching requirements. The use of cloud desktops can fully meet this demand and help to create a “university without walls” to meet the needs of modern university students who want to learn freely over the Internet. Because of the rapid advancement of various technologies, such as mobile/Internet, virtual environments, cloud computing, machine learning, and other fields, it is now possible to propose a more ideal instructional model based on interactive teaching.

Content administration includes publishing articles, inquiring articles, tag administration, and comment administration. Queries can be made according to the creation time, title, classified catalogue, etc., of the article content, and the results of queries can be displayed in pages in reverse.
chronological order. Query results can be edited, deleted, and published. To add the article content, you need to fill in the title, keywords, content, upload pictures, etc., and the fixed links can also be customized and changed. The newly added article content can really be displayed on the website after being published. In this paper, experiments are conducted to compare the grouping accuracy of this method with that of traditional methods. The experimental comparison results are shown in Figure 3.

By analyzing Figure 3, we can see that the accuracy of interactive teaching grouping is low for the students in the control group who use the traditional grouping platform. The experimental group students using the platform designed in this paper have higher grouping accuracy.

There are some limitations in building the laboratory cloud computing platform by ourselves. From the objective point of view, the number of laboratory cloud platforms is a little insufficient, and there is no real cluster, so the high performance is only relative. Due to the continuous progress of the mobile Internet era, teachers and students are not satisfied with enjoying the cloud mode in a specific place for a long time. Instead, they want to receive any necessary teaching services at any time and any place. Therefore, it has become a trend for teachers and students' tablets and smart phones to connect to the cloud through the client software of mobile devices. The establishment of instructional platform is a long-term continuous process, and cloud services can dynamically adjust the use of software and hardware resources in real time, so as to avoid the waste of resources or the shortage of resources caused by insufficient predesign. To verify the effectiveness of this method, the scores of students in the experimental group and the control group are compared, and the comparison results are shown in Figure 4.

It can be seen that the students who are grouped through this platform have a good learning effect. However, the students who are grouped by the traditional grouping platform have a large number of unqualified average scores, because the grouping method has low accuracy, which leads to poor learning effect of students. The public cloud service platform not only reduces the focus on platform development but also moves a large number of algorithms and running programs to the cloud, providing users with a real, efficient, and convenient cloud service platform network-based instructional resources for courses. Provide a detailed teaching calendar and syllabus so that students are aware of the instructional content, teaching implementation mode, and course schedule in a timely manner. Teachers can use the instructional platform to create and modify teaching plans, instructional content, and other materials at any time and from any location. The instructional design tools of virtual experimental environment and other technologies are included in the teaching plan and content, which includes not only the text description of the syllabus, questions and answers, and experimental steps but also the instructional design tools of virtual experimental environment and other technologies. Data clustering and information fusion are carried out using the statistical results of big data and the index parameter of music ability evaluation, as the research object. The comparison between the clustering analysis method and this analysis method is shown in Figure 5.

The analysis shows that the method in this paper has higher accuracy of ability evaluation and higher utilization rate of instructional resources. Music courses should be set...
According to the specific situation and psychological characteristics of students, and the learning needs of music courses should be combined with other disciplines. Music curriculum evaluation should change the current way of focusing only on results, and pay more attention to the development of students’ creative thinking and the cultivation of innovative ability.

In the cloud, teachers can monitor each student’s learning trends in real time and provide learning guidance to students. After the teaching design is completed, the teacher can release it to all students at any time, and the result of the teacher’s design is what the students see, without the need for transformation and other work. This is very demanding in the traditional virtual experiment environment, because the traditional virtual experiment environment has higher requirements and restrictions on the computer environment of students’ experiments. Through the collation and collection of school questionnaires, the application survey of teaching interactive platform is studied and analyzed. The survey results of students’ usage are shown in Figure 6.

Change the traditional teacher-centered classroom model to one that is truly student-centered. Teachers have transitioned from knowledge providers to learning organizers and instructors on the cloud instructional platform; however, students now have their own learning initiative, can learn independently at their own pace, and truly become the protagonists of the entire classroom, significantly improving the efficiency of university classroom teaching.

Integrated learning, question and answer, simulation experiment, and training are all examples of integrated learning. The instructional platform not only allows students to design, study, practice, and train but also collects data from them as they complete their assignments. Teachers must customize the majority of these data items during the design stage. The study of teachers’ use of instructional platforms focuses on the following aspects: whether it meets instructional habits, whether function configuration is feasible, whether it incorporates instructional materials knowledge points, and how difficult it is to choose topics. The survey results are shown in Figure 7.

From the chart, it can be seen that teachers are satisfied with the function of the platform, which basically covers teachers’ teaching methods and basically conforms to instructional habits. And distinguish the difficulty level of the topic, so that teachers can complete multi-effect homework design.

According to the characteristics of students’ curriculum content and interest tags, the related data are positively matched with the music works stored in the cloud platform by means of the student model, and then, the electronic resources that meet the requirements are screened out by adjusting the threshold, and then, the music works with high relevance are fed back to the students. When a large amount of data is accessed, cloud computing can expand the computing resources to meet the computing needs. When the amount of data access decreases, the computing resources are automatically recycled for other applications in the cloud platform to use the computing resources.

Through the analysis of the test data, it can be concluded that the cloud platform can effectively balance the load and improve the interactivity of teaching application when
teachers and students access a large amount of data; Compared with the overall interactive speed of teaching application, it is basically acceptable to sacrifice the stability of a small number of users using teaching application. The interactive music instructional mode based on cloud computing advocates the establishment of a benign feedback system in the curriculum, and at the same time, it is considered that to achieve this goal, it is necessary to take cloud computing as the center and establish a unified instructional platform combined with other technologies.

5. Conclusions

Whether cloud computing can be widely used in teaching mainly depends on the attitude orientation of teaching institutions and teaching designers. The interactive instructional platform under cloud computing can effectively break the current problems of regionalization and segmentation of online instructional resources, help small-scale teaching institutions to enjoy more advanced online instructional resources services, and help to realize the sharing of instructional resources. At the same time, the good interactivity of the platform can also enhance the enthusiasm of learners and improve the efficiency of teaching managers in managing the instructional platform.

This paper proposes an interactive music instructional model based on cloud computing. This paper puts forward the basic concepts and ideas of interactive teaching and then advocates the establishment of a benign and effective feedback system in teaching, so that students can truly become the main body and teachers can act as observers, analysts, and interveners. Practical research on instructional resource sharing and interactive teaching in cloud platform is carried out, which mainly takes advantage of cloud computing technology to serve teaching informatization technology and subverts the traditional instructional mode reform. From “teaching before learning” to “learning before teaching.” Traditional classroom teaching links are “classroom information transmission, digestion and absorption after class,” while classroom teaching based on cloud platform is “information transmission before class, digestion and acceptance in class, summary and improvement after class.” In this study, the information platform architecture of music education of education cloud is effectively used, and the three advantages of the platform, namely, unity, openness, and flexibility, are brought into full play. I hope this article can be a valuable reference and become a positive force for the reform of music teaching.

Data Availability

The data used to support the findings of this study are included within the article.

Conflicts of Interest

The author does not have any possible conflicts of interest.

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