The Application of Long-Distance Music Education Platform in University Instrumental Music Teaching

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Abstract: Modern music education in colleges and universities must make full use of multimedia technology to support learning and provide students with a multimedia music world with voice and feel to learn music. However, there are still many drawbacks in music appreciation courses. One is that the way of appreciation is single and backward; On the other hand, the exchange of valuable audiovisual resources is relatively low. Through a questionnaire survey of music teachers, there is an urgent need for a music teaching auxiliary platform. With this in mind, the purpose of this article is to explore the application of a distance learning music platform in the teaching of instrumental music at the university. This article first analyzes the existing problems and shortcomings through the discussion of the current situation of music teaching at home and abroad. And made an in-depth analysis of the needs of the distance music education platform; made a detailed description of the technology required for the development of the platform; and carried out a rigorous demonstration of the design of the functional modules and user entities. Based on multi-party investigations, the development direction of the system was discussed, and the basic prototype of the platform design was finally obtained. This article uses comparative analysis and the interview method to conduct a pilot study on the research topic of this article. The study shows that compared with the traditional university mode of instrumental music teaching, university music teaching based on the distance music teaching platform studied in this article is better in many respects, in particular learning efficiency is more than 20% higher, which fully reflects this article Feasibility study.

1. Introduction

In recent years, the development of computer software technology has greatly changed the way people work and live. In education as well, the way knowledge is acquired is changing dramatically [1-2]. The original form of learning in the traditional classroom is changing. In particular, with the rapid development of Internet technology in recent years, the original form of learning, B/S-based online learning, has become richer and more diverse, and is gradually being adopted by people. People are taking advantage of this opportunity to solve various learning tasks online [3-4].

As early as 1999, the Ministry of Education of my country put forward the goal of establishing a network-based distance education platform on the "Action Plan for Educational Rejuvenation Facing the 21st Century" [5-6]. To achieve this goal, our nation's institutions and universities have invested a great deal of hardware and software resources in online education. One of the most

obvious examples is that most universities in our country have established distance learning systems that offer a full package of services to some online learners. For professional study, learners pass the study, take the test offline, and finally complete the course, and the school will issue the corresponding study certificate or certificate [7-8]. Some education and training institutions have also established fee-based online learning systems. By purchasing learning resources by paying, you can complete the learning of paid resources as many times as you want. This learning model has become a useful supplement to campus education to a certain extent, allowing more the learners who can go to school acquire professional knowledge and receive professional training [9-10].

The purpose of this article is to improve the efficiency of music teaching in colleges and universities, and to put forward the application research of distance education platform in the teaching of instrumental music in colleges and universities. By comparing the traditional instrumental music education in colleges and universities with the distance-based music education platform-based college instrumental music teaching studied in this article, we can judge the feasibility of the research content of this article.

2. University Instrumental Music Teaching Research Based on Distance Music Education Platform

2.1 Design of Distance Music Education Platform

(1) Feasibility analysis

1) System technical feasibility analysis

This educational platform is developed in LAMP, a very good website creation software, and the technology used is relatively advanced. The operating system is Linux, the programming language is PHP, and the database is the MySQL management system [11-12]. LAMP is the first choice for developing a support platform for music education for many reasons. First, its performance is sufficient to meet platform requirements; second, it has significant advantages in terms of resource abundance; third, using this software is a reasonable choice in terms of system development cost; and finally, its unbeatable advantages in cross-platform capabilities. Listed below are some of the major advantages of this software.

2) System economy and cost feasibility analysis

The entire platform process is divided into two phases. The first phase is the initial construction of the platform. In this phase, teacher-users have not yet been involved, and the software development department has completed the initial build. In this phase, a very complete database construction is not necessary. The second phase is the construction of the platform enhancement process. Currently, teachers and users need to participate by continuously uploading teaching repertoires and materials, enriching the content of the database more and more. This first phase of building the platform does not need to be very complex and does not require building a huge database, so a platform with basic functions and basic classifications is sufficient and the cost of building a platform to support music teaching is relatively low .

3) Feasibility analysis of system operation

To ensure the normal operation of foreground and background and the performance of user functions, two types of users must be present at the same time. The first type is the system administrator who manages the background, and the other is the teaching user (the question of whether the student user should join, is still to be practiced and studied). The three main tasks of the administrators are to manage the website and make information available to the public, review materials uploaded by teachers, and remove comments that are not in compliance with the law. Website administration and publication of information is done through a user interface. To review materials uploaded by teachers, the administrator only needs to first understand the classification of

repertoires. The third task of the administrator is to remove illegal content, which can be done easily. Teachers can upload and share relevant teaching materials, and only need to learn simple Internet technology. In short, this platform is practical.

(2) Analysis of functional requirements

1) Upload and download management of teachers

Teacher upload and download management includes operations such as teacher user login, uploading teaching music and other teaching materials, and downloading teaching music and other teaching materials.

2) Teaching audition management for teachers

The teacher's teaching audition management includes several operations such as teacher user login, download, and playback.

3) Management of teacher comments

Teacher comment management includes operations such as user login, selection of teaching songs, and submission of teaching opinions.

4) Teaching resource management

Teaching resource management includes operations such as searching, selecting and moving to personal lists of teaching resources.

5) Directory management

Directory management includes two operations of system administrator's directory entry and directory modification.

6) Audit management

Audit management includes two operations: approved and failed and deleted.

7) Search management

Search management searches for music based on the creation time, author, music category, performer, content search criteria, etc. of the track.

(3) Overall system architecture design

Users of the system are divided into two categories: Administrators and Teachers, all of whom can log into the system via the network. The system administrator's responsibilities include entering and modifying the classified catalog, reviewing repertoire and other materials uploaded by teachers, and reviewing system feedback to ensure the quality of files in the system. Teacher users can log into the system by entering their account, password, and authorization code. They can enjoy their repertoire and upload their teaching pieces and other teaching materials. After being verified by the administrator, they will be automatically entered into the system and shared with other teachers. The teaching repertoire uploaded by each teacher-user is stored in the system, and the teacher-user can download repertoire and other teaching materials uploaded by other teachers. Teacher-users can express their own opinions about specific repertoires. Teacher-users can share classical and useful repertoire and other teaching materials with other music teachers.

The system must first ensure stability and then efficient operation. Therefore, two servers are required in the database cluster, which are used for cold backup and loading of the library, respectively. The operation of the whole architecture is that the operation requests from the system users are sent to the reverse proxy servers through the network and to the database cluster through the web cluster. The construction of such an architecture ensures not only stability, but also high efficiency.

(4) Design of main functional modules of the system

1) Login management

Both system administrator users and ordinary teacher users have their own login accounts. Only the user enters the correct user name and password to log in to the home page of the system, which is different from many application-based websites.

2) Teaching repertoire catalog management

After the initial design of the system has been successfully completed, the system administrator is responsible for completing the initialization of the system. System initialization is primarily based on the current general music curriculum, and the existing classification of instructional music and corresponding representative works and representatives are entered into the system. Subsequently, if the classification criteria change, the corresponding contents of the classification catalog and catalog can be modified, deleted, or added.

3) Appreciation management of teaching repertoire

Remote music teaching must at least ensure that the audio data of the music track can be played during the teaching process of the music teacher. With the support of this platform, music teachers can choose from two playback formats. The first is to find the teaching repertoire and teaching materials needed for teaching in the system and download them to the mobile hard disk or personal computer, and use any one of them to play MP3 format. The playback software to play. The second is to directly play online after finding the required teaching audio materials.

4) Teaching repertoire sharing management:

When music teachers recognize that a particular teaching repertoire has special meaning for the classroom or that a particular teaching repertoire has a unique focus, they can share it with colleagues around them and invite other music teachers to discuss how they teach that repertoire. There are many ways to share. One is to share with a specific teacher using a sharing tool so that the teacher receiving the material can see what has been shared. Another way is to share with a specific group of music teachers so that all teachers in the group can see the shared content.

5) Audit management

When teaching a typical teacher, the user uploads several instructional repertoires, depending on the status of the music library in the system and his/her own teaching needs. The repertoire is accompanied by staves, notes, and other materials, and at the same time, commentaries and feedback are uploaded depending on the situation. These must be checked by the administrator. The uploaded titles are checked to see if they belong to a particular directory. For example, if Pavarotti's "My Sunshine" is uploaded under "Songs" in the folk song catalog, the check will not pass. For example, if Pavarotti's "My Sun" is uploaded to the Bel Canto catalog under songs, the check will not pass. This feature ensures the correctness of the repertoire and material in the system and a good environment for the system. Repertoire and materials uploaded by teacher users must be checked for teacher user comment information before approval.

2.2 Application of genetic algorithm in online testing of distance music teaching platform

Suppose d_j, o_j, r_j (j=1,2,3,...,z, z are the difficulty levels) respectively represent the score error of the question with difficulty z, the score attributable to the question with difficulty z required by the user, and the score of the question of difficulty z in the actual generated test paper. The degree to which the generated test paper satisfies the user's requirements for the difficulty score segment can be evaluated by the following formula:

$$f_3 = \sum_{j=1}^{z} S_j \tag{1}$$

among them

$$s_j = \begin{cases} 0, |r_j - o_j| \le d_j \\ |r_j - o_j| - d_j, |x_j - o_j| > d_j \end{cases} \tag{2}$$

The smaller the value of f_3, the closer the generated test paper is to the user's requirement for the difficulty of the test paper.

Regarding how to make the number of questions of various question types in the generated test paper meet the requirements of users, the questions in the question bank can be indexed by question type, which means that as long as the number of question banks is sufficient, it is easy to meet this requirement.

In summary, the objective function for solving the test paper problem is obtained:

$$\min f = f_1 + f_2 + f_3 \tag{3}$$

3. Experimental Research on University Instrumental Music Teaching Based on Distance Music Education Platform

3.1 Experimental Protocol

In order to make this experiment more scientific and effective, this experiment went deep into the performance major of the Music Department of the College of Art of a certain university and practiced teaching for students. A total of 75 questionnaires were distributed this time, 73 questionnaires were returned, 70 valid questionnaires were analyzed and summarized. On this basis, through the comparison analysis with the teachers on the university instrumental music teaching system based on the distance music education platform studied in this article and the traditional teaching mode to judge the feasibility of the research content of this article.

3.2 Research Methods

(1) Questionnaire survey methodology.

In this study, the relevant experts were asked to prepare a targeted questionnaire, and a semi-closed survey was conducted to promote the correct response of the questionnaire by the students under study.

(2) Interview survey method.

In this study, face-to-face interviews were conducted with teachers in the relevant departments, the data were recorded, and the recorded data were organized and analyzed. These data not only provide the theoretical basis for the selection of the topic of this paper, but also provide the data basis for the final research results in this paper.

(3) Mathematical statistics

Relevant software is used to conduct statistics and analysis on the research results in this thesis.

4. An Analysis of College Instrumental Music Teaching Experiment Based on Distance Music Education Platform

4.1 Survey and Analysis of Students on the Music Teaching Platform

In this experiment, a questionnaire survey was issued to students of the performance major of the Music Department of the Art College of the local university. The data collected are shown in Table 1. (A: Learning music through the online teaching platform; B: Practicality of course content; C: Reasonable course structure; D: Improving the effect of music learning; E: Helping to complete the learning goals; F: Attitude to use the platform music teaching system; G: Re Open new courses)

Table 1: Investigation and Analysis of Students on Music Teaching Platform

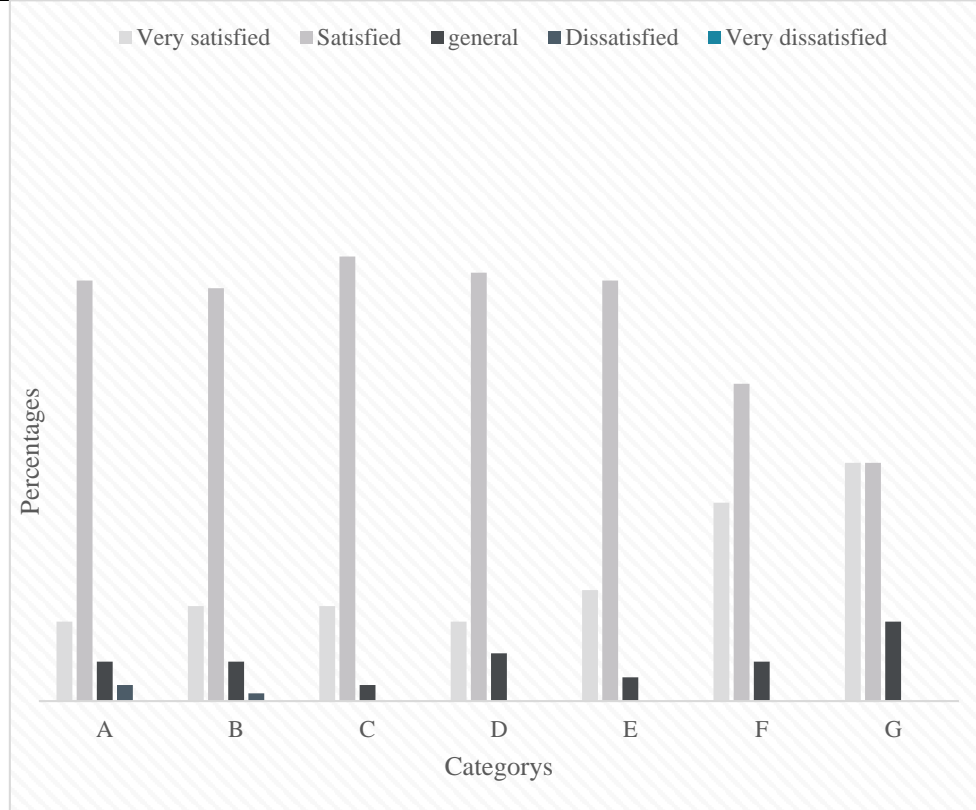|	Very satisfied	Satisfied	general	Dissatisfied	Very dissatisfied
A	14.3%	75.7%	7.1%	2.9%	0.0%
B	17.1%	74.3%	7.1%	1.4%	0.0%
C	17.1%	80.0%	2.9%	0.0%	0.0%
D	14.3%	77.1%	8.6%	0.0%	0.0%
E	20.0%	75.7%	4.3%	0.0%	0.0%
F	35.7%	57.1%	7.1%	0.0%	0.0%
G	42.9%	42.9%	14.3%	0.0%	0.0%

Figure 1: Investigation and Analysis of Students on Music Teaching Platform

It can be seen from Figure 1 that most of the students said that through the use of the remote music platform music teaching system, they can better master the knowledge points in the learning of basic music knowledge and professional music skills. 90% of the students can teach through the Internet Platform, among which up to 92.8% of students think that the application of music teaching system through the remote music platform. It can improve their learning effect and promote the realization of their learning goals.

4.2 Comparative Analysis of Instrumental Music Education in Colleges and Universities Based on Distance Music Education Platform

In order to further research and analyze this experiment, this paper conducts face-to-face interviews with teachers in the music performance department of colleges and universities, and compares and analyzes the college instrumental music education model based on the distance music education platform and the traditional teaching model. The results are shown in Table 2.

Table 2: Comparative analysis of instrumental music education in colleges and universities based on distance music education platform

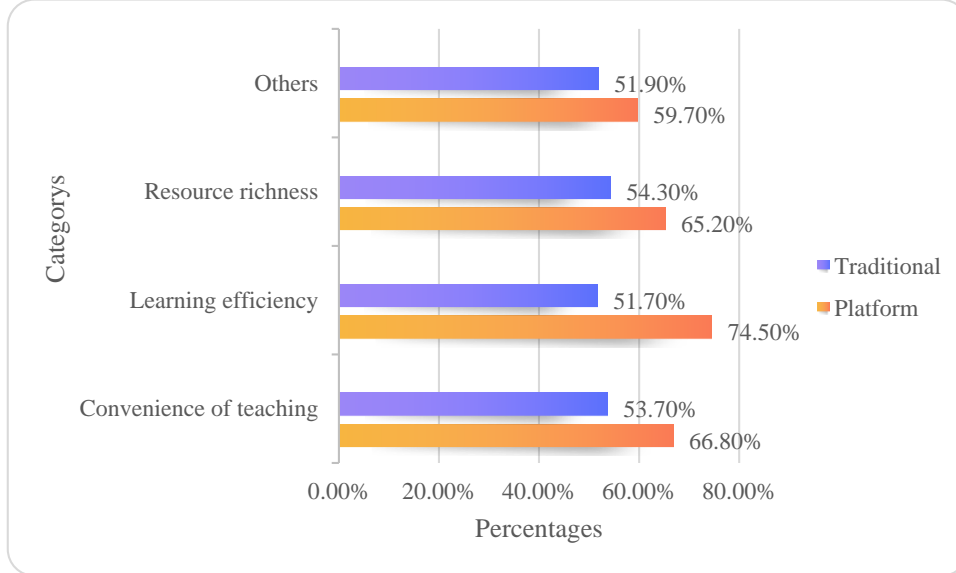|	Convenience of teaching	Learning efficiency	Resource richness	Others
Platform	66.8%	74.5%	65.2%	59.7%
Traditional	53.7%	51.7%	54.3%	51.9%

Figure 2: Comparative analysis of instrumental music education in colleges and universities based on distance music education platform

It can be seen from Figure 2 that compared to the traditional university instrumental music teaching mode, the university music teaching based on the distance music education platform studied in this article is more excellent in many aspects, especially the learning efficiency is more than 20% higher.

5. Conclusion

This paper takes the music teaching needs of a music distance teaching unit as the goal, and analyzes the needs of the teachers, students, system administrators and other users involved in the teaching, and obtains the music teaching function. The paper completes the system analysis from the software engineering process. System design, system modules involve basic information management, student music homework management, music practice management, online classroom management, information notification management, etc., which involve a wide range of areas. The system is put into use to provide a distance teaching platform for music distance teaching.

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