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Retraction

Retracted: Design of Online Music Teaching System Based on B/S Architecture

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope
(2) Discrepancies in the description of the research reported
(3) Discrepancies between the availability of data and the research described
(4) Inappropriate citations
(5) Incoherent, meaningless and/or irrelevant content included in the article
(6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

References

[1] D. D. Dai, "Design of Online Music Teaching System Based on B/S Architecture," *Scientific Programming*, vol. 2021, Article ID 1297019, 6 pages, 2021.

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Research Article

Design of Online Music Teaching System Based on B/S Architecture

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Under the global epidemic situation, offline face-to-face teaching has not adapted to the current teaching environment. Using computer technology to carry out online assisted teaching has become an inevitable choice for music teaching in colleges and universities. Offline teaching also has many disadvantages, such as single and backward teaching methods, poor sharing of audio-visual resources, and inconsistent teaching contents. The survey found that music teachers urgently need an online teaching platform to enable teachers to obtain effective, standardized, and comprehensive teaching resources anytime and anywhere so that students can enjoy high-quality music teaching resources as much as possible. Based on these requirements, the development of online music teaching system under B/S architecture has an important practical significance.

1. Introduction

In the 1990s, China had officially put systematic music and art education on the agenda, and all regions of the country have increased music courses in senior high school, which is also inseparable from the promotion of quality education. Meanwhile, the financial investment of art colleges and universities is also gradually increasing. There is no difference in the technical level between domestic music websites and developed countries, and the content is still dominated by pop music websites. According to the survey, 63.2% of China's music websites are pop music websites and classical, ethnic, and other types of music account for a relatively small proportion, but they basically meet the needs of nonart professional audiences. However, there are four deficiencies in domestic music websites. First, the audience group is small. Because most of China's music websites focus on pop music, the audience group is mostly young people. Second, the attention of music websites is one-sided. Most music websites are driven by interests and actively cater to public tastes. Third, the role of "gatekeeper" of network media is missing. Fourth, the construction of network laws and regulations is not perfect, and piracy and infringement are common. There are few people studying the music teaching assistant platform in China for three reasons. First, the use of the platform is small. The platform mainly serves music teachers, and music teachers are a small group. Second, the platform cannot bring economic benefits and needs the investment of colleges and universities. Third, the R&D of the platform requires comprehensive talents with certain music attainments and professional knowledge such as computer network and database. Such talents are very few. In 2008, Liaoning Normal University made an attempt to assist research in music teaching, mainly using VFP visual programming to make a teaching music database management program. Due to the lack of special personnel to maintain its database, fewer and fewer teachers are used in the program. In 2011, Shenyang Conservatory of music began to study the music teaching auxiliary platform based on C/S architecture. The teaching content of this auxiliary platform meets the needs of vocal music teachers. Each track included in the platform contains the detailed information of the author of the track and the detailed information of the representative singer, the staff, and other information. However, because the platform based on C/S architecture needs to install and configure software on each computer and the software upgrade is very troublesome, only some young teachers use the platform [1–6].

With the development and application of multimedia and Internet, music appreciation course has also produced revolutionary development. Music lessons have expanded from a single piece of chalk, a book, and a mouth to more and more colorful forms, such as the application of a variety of music scores in the teaching process, simple score and staff score, the tour broadcasting of multimedia teaching materials, and the comparison of different performance forms of the same track. Therefore, multimedia music teaching is an epoch-making milestone in improving the quality of music teaching. However, there are still single and backward ways of appreciation in the music appreciation course, such as a piece of chalk, a book, and a small speaker in the music class, so that students often only know it but do not know why, so they are more at a loss when appreciating works [7–9]. Moreover, in the current stage of music appreciation teaching, teachers often download the works to be appreciated and put them on the USB flash disk, which can be appreciated by students through audio-visual equipment. Different teachers will choose different works to enjoy. The sharing of audio-visual appreciation resources is relatively weak, the classification of appreciation works is chaotic, and the choice of appreciation works is not unified. Third, in the process of preparing lessons through the network, due to the particularity of some music, such as less creative background, music style, simplified staff, and staff resources, teachers create obstacles in the process of preparing lessons and reduce the depth of students' appreciation of music [10, 11]. In online teaching, students' autonomous learning is stronger, and the arrangement of their learning tasks can be determined according to their own needs.

In view of the current teaching difficulties, a music teaching system based on B/S structure is designed. It has the characteristics of convenience, resource sharing, openness, and professionalism. It provides more choices for the teaching of music teachers and allows students to experience a more convenient teaching environment.

2. B/S Architecture Introduction

2.1. B/S Tertiary Structure Concept. B/S structure is an improved model of the previous traditional C/S structure after the rise of the Internet. It has no independent client, but depends on the browser. All users operate through the browser, the maintenance and use of the system become simple, and the development process can be simplified [9, 12]. The client only needs to install any type of browser, and all databases are installed on the server. This can greatly simplify the client computer review, and the system maintenance and upgrade do not need to be completed by installing the upgrade package like the C/S structure. Users no longer need to install a separate client login working interface, but log in to the browser. The detailed B/S architecture diagram is shown in Figure 1.

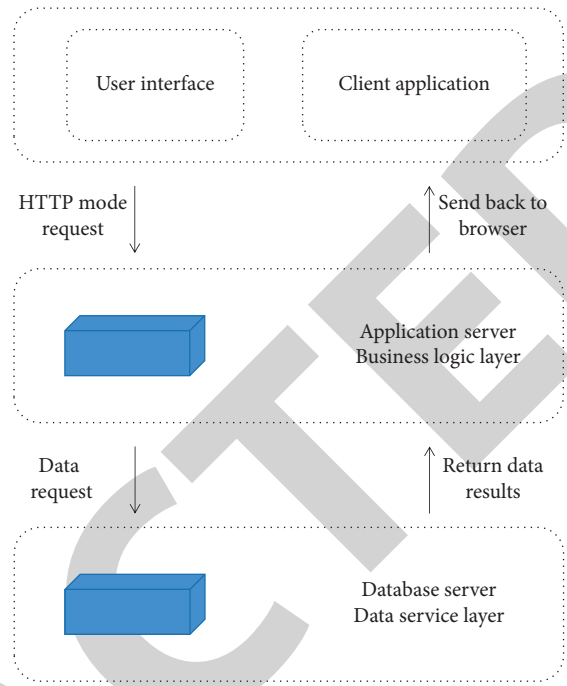

Figure 1: B/S architecture.

2.2. Characteristics of the Three-Layer Structure of the B/S Architecture. Postmaintenance and upgrade simplification, during the use of the software, are necessary to continuously upgrade to meet the use needs of users. Compared with the C/S structure, the B/S structure shows strong convenience in upgrading and maintenance. In order to meet the functional needs, the software system needs to be continuously improved and upgraded. If the C/S architecture is adopted, hundreds of computers need to install the upgrade package, resulting in huge workload and low work efficiency. If the B/S three architecture is adopted, the software engineer can maintain the server. All users can log in to the browser after unified maintenance and enjoy the upgraded service. Meanwhile, since the upgrade and maintenance are only for server operations, the B/S architecture enables the system to support remote maintenance operations [13–16]. Therefore, the mainstream direction of the current information development is that the server is becoming more and more "fat," while the user machine is becoming more and more "thin." Under such software and hardware conditions, the system upgrade and maintenance will be easier and easier, and the user operation will develop to simplification, which can greatly save the user's human, material, and financial resources.

Cost reduction: Windows has almost become the mainstream of PC operating system, and almost every PC is equipped with browser, but Windows is not the mainstream operating system of the server. For security reasons, most B/S applications are installed on Linux servers. There are many options for the server operating system, but no matter which option, users can safely use windows as the PC operating system [17]. In addition to being free, the database of Linux operating system is also free, so the choice of Linux as a server operating system has become very popular.

The load is concentrated on the application server. The databases of this structure mode are concentrated on the server, and the logical things are reflected in the browser. It

does reduce the pressure on the users of the system, but the pressure reduced by the users is passed on to the server. In this mode, the backup management of the database must be done well [18–21]. Generally, the regular backup work is done by a separate large memory to prevent the system collapse and all data loss.

3. System Design

3.1. Overall System Architecture Design. The schematic diagram of B/S architecture is shown in Figure 2. System users are divided into two categories: one is an administrator and the other is a teacher, who can log in to the system through the network. The responsibility of the system administrator is to input and modify the classified directory, review the teaching tracks and other teaching materials uploaded by teachers, and review the system feedback, so as to ensure the quality of documents in the system. Teachers log in to the system by entering their own account, password, and verification code. They can enjoy teaching tracks and upload teaching music and other teaching materials online during teaching. After being approved by the administrator, they will be able to automatically enter into the system to share with other teachers. The teaching tracks uploaded by each teacher are entered into the system, and teachers can freely download the tracks and other teaching materials uploaded by other teachers. Teachers can express their own unique opinions on a teaching track. Teachers can share classical and helpful tracks and other teaching materials with other music teachers. Firstly, the system needs to ensure stability and realize efficient operation on this basis. The database cluster requires two servers for cold backup and database reading. The operation mode of the whole architecture is that the operation request of the system user is sent to the reverse proxy server through the network and then sent to the database cluster through the Web cluster. The design of such architecture can not only ensure stability but also ensure efficiency [22–25].

3.2. Frame Construction. Stability is the premise of framework implementation. This framework adopts MVC mode (action, model, and view). The most important is action. The user's request is completed through the action controller, either directly processed or forwarded. Each action of the user needs to pass through the action controller first, that is, it is the core of the whole structure. For example, after the user clicks the course material under the personal user and sends this request, the action controller first determines whether the user has this permission. If so, call the data in the database cluster, and view displays the course material interface.

3.3. System Function Module. Teachers log in, upload and download teaching tracks and other teaching materials, enjoy teaching tracks online, and share teaching tracks and other teaching materials, and teacher comments, teacher feedback, and advanced search are all concentrated on the front desk. The foreground function of the system is mainly to serve teachers and users, and most of the key functions of

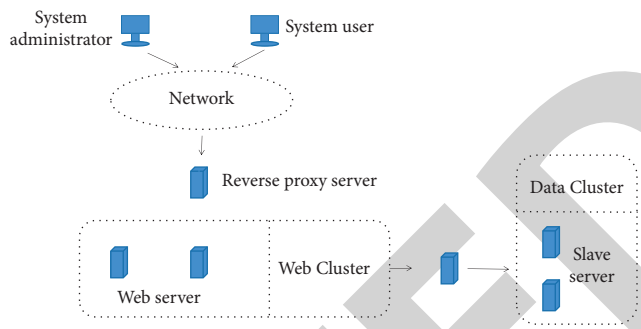

Figure 2: Schematic diagram of the B/S architecture.

the system are reflected in the foreground. After logging into the system, teachers can browse the classification of teaching music, the corresponding representative works under each classification, and authors and other teaching materials related to works. Teachers can upload tracks and other teaching materials required for teaching and can also share classic teaching tracks with other music teachers through SNS. In the teaching process, teachers have their own unique ideas about a teaching track and can comment. In the course of teaching, teachers will sort out the inconveniences of the system into feedback and brainstorm and make the system function more perfect.

The operation of the system administrator is mainly concentrated in the background. The system administrator is responsible for the creation of classification directory when the system is just launched and the maintenance of system directory in the later stage. The system administrator reviews whether the teaching tracks and other teaching materials uploaded by teachers are suitable for music teaching and whether they belong to correct classification. The system administrator reviews whether teachers' comments comply with relevant regulations. To ensure that the teaching tracks and other teaching materials in the system are classified correctly, the sound quality is clear and conducive to teaching. When teachers find the defects and deficiencies of the system in the process of teaching and using the system, they can feed back their opinions to the system, and then, the system administrator will uniformly deal with the information fed back by teachers, for example, timely reply to teachers' feedback information and opinions and feedback problems to system developers. The system background function structure is shown in Figure 3.

3.4. Main Module Design of the System. The system mainly has the following functional modules: login management, teaching track directory management, teaching track management, teaching track sharing management, audit management, teacher comments, user feedback, teaching material upload and download, and search (advanced search).

Login management: both system administrators and ordinary teachers have their own login accounts. Only users who enter the correct user name and password can log in to the home page of the system, which is different from many application-based websites.

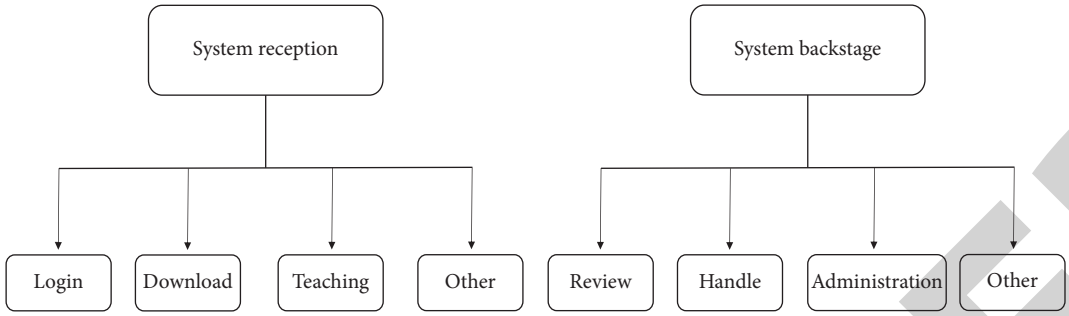

Figure 3: System reception and background function diagram.

Teaching track directory management: when the preliminary design of the system is successful, the system administrator is responsible for completing the system initialization. The initialization of the system is mainly to input the existing teaching music classification and corresponding representative works and representatives into the system according to the current general music syllabus. If the classification standard changes in the later stage, you can modify, delete, or add the classification directory or the corresponding content in the directory.

Management of teaching tracks: multimedia teaching should at least ensure that music teachers can play audio materials of teaching tracks in the process of teaching. With the support of this platform, music teachers can choose from two kinds of playing forms. The first is to find the teaching tracks and teaching materials needed for teaching in the system, download them to the mobile hard disk or personal computer, and play them with any playing software that can play MP3 format. The second is to find the required teaching audio materials and play them online directly.

Teaching track-sharing management: when music teachers think that a teaching track has special teaching significance or have their own unique indirect on the teaching method of a teaching track, they can share it with their colleagues so that other music teachers can discuss the teaching method of this track together. There are many ways to share. One is to share with designated teachers through sharing tools, and teachers who receive sharing materials can see the shared content. However, to share in the group designated by the music teacher, the teachers in the group can see the shared materials. Third, share in your own space. Friends on the sharing tool can see the shared content.

Audit management: during the teaching process, ordinary teachers will upload some teaching tracks according to the situation of the teaching song library in the system and their own teaching needs, and the corresponding teaching tracks need to be equipped with staff, simplified music, and other materials; At the same time, some comments and feedback will be uploaded according to the specific situation, which will be reviewed by the administrator. Review whether the uploaded tracks belong to a directory. For example, the Folk Song Directory uploaded by Pavarotti's my sun to the song cannot pass the review. If my sun is uploaded to the directory of Bel Canto under the song, it can pass the review. This function ensures the correctness of teaching tracks and other teaching materials in the system and the good use environment of the system. For music teaching tracks and other teaching materials uploaded by teachers, the comments of teachers and users can be passed only after review.

Upload and download of teaching materials: when the system was just built, there were few tracks in it. Teachers can gradually add teaching tracks under a subdirectory or upload other teaching materials corresponding to teaching tracks, such as staff, simplified music, and creative background. The teaching materials uploaded by music teachers are not included immediately after uploading, but need to be reviewed by the system administrator. After approval, it can be used and downloaded by other music teachers.

If the correctness and rationality of teaching tracks and other teaching materials pass the examination, they will be employed. If it is correct and reasonable, it will be entered into the system, and other teachers and users can enjoy or download teaching tracks and other teaching materials online. If the approval fails, the system administrator will directly delete the uploaded teaching tracks and other teaching materials and send a notice to the teacher user. The uploaded teaching tracks and other teaching materials are incorrect or unreasonable, and the upload fails.

Search: when music teachers need to view a specific teaching resource, searching one by one in the directory list is inefficient and cumbersome, so the search function is particularly important. For general teaching resources, teachers can directly enter the resource name in the upper right corner. In addition, advanced retrieval can be carried out according to the creation time, author, music category, performer, content search conditions, and other keywords of the track.

4. Feasibility Analysis

4.1. Technical Viability. The teaching auxiliary platform is developed by lamp. Lamp is a very good group of software on the production website, and the application technology is also relatively advanced. The operating system is Linux, the programming language is PHP, and the database uses MySQL management system. Lamp is the first choice for the development of music teaching system for many reasons. First, its performance can fully meet the requirements of the platform. Second, it shows great advantages in the richness of resources. Third, from the perspective of system

development cost, it is wise to adopt this software. Finally, it has unparalleled advantages in cross-platform features.

4.2. Economic Viability. The whole construction process of the platform is divided into two steps. The first step is the initial construction of the platform. At this time, teachers have not participated in it, and a software development department has completed the initial construction. At this time, a very complete database construction is not required. The second step is the construction of the platform improvement process. At this time, teachers and users need to participate in it and constantly upload teaching tracks and teaching materials in the process of use, so as to enrich the content of the database day by day. Because the first step of the construction of this platform does not need to be too complex, it does not need too large database construction. It only needs a platform with basic functions and basic classification. Therefore, the establishment cost of music teaching platform is relatively low [26, 27].

4.3. Operation Viability. In order to meet the normal operation of the foreground and background and realize the functions of users, two types of users must exist at the same time. The first is the system administrator managing the background, and the other is the teacher (whether to join the students needs further practice and research). The managers have three responsibilities: website management and information release, reviewing the materials uploaded by teachers and users, and deleting remarks that do not comply with laws and regulations. Managers realize the management of the website and the release of information through the operation interface. Managers only need to have a preliminary understanding of the classification of teaching tracks to complete the task of reviewing the data uploaded by teachers and users. The third responsibility of managers is to delete illegal remarks, which can still be operated simply. Teachers and users can upload teaching tracks and share relevant teaching materials. They only need to master simple Internet technology.

5. Conclusion

Online music teaching system based on B/S architecture has many advantages. Teachers can quickly find teaching resources through the system and share resources with students through simple operation. Multiple teachers can share resources through the system to reduce offline resource allocation. During use, teachers and students can discuss and communicate in relevant chapters of the course to reduce offline communication and notes in class and build an online teaching platform in B/S architecture to increase the diversity of teaching and bring more choices for music teaching under the epidemic situation.

Data Availability

The dataset can be obtained from the corresponding upon request.

Conflicts of Interest

The authors declare that there are no conflicts of interest.

Acknowledgments

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