Retraction

Retraction: Development and Innovation of Music Course Teaching Mode Based on Big Data (J. Phys.: Conf. Ser. 1744 032018)

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This article has been retracted by IOP Publishing following an allegation that raises concerns this article may have been created, manipulated, and/or sold by a commercial entity. In addition, IOP Publishing has seen no evidence that reliable peer review was conducted on this article, despite the clear standards expected of and communicated to conference organisers.

The authors of the article have been given opportunity to present evidence that they were the original and genuine creators of the work, however at the time of publication of this notice, IOP Publishing has not received any response. IOP Publishing has analysed the article and agrees there are enough indicators to cause serious doubts over the legitimacy of the work and agree this article should be retracted. The authors are encouraged to contact IOP Publishing Limited if they have any comments on this retraction.

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Development and Innovation of Music Course Teaching Mode Based on Big Data

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Abstract: The development direction of online teaching is personalized and customized teaching based on user needs. Applying big data technology to the online network teaching platform can effectively solve the problems of the huge and chaotic number of teaching resources, the difficulty of user selection, the weak management of the network learning process, the inefficient use of teaching resources, and the lack of user role sense. The purpose of this article is to explore the development and innovation of music curriculum teaching models based on big data. This paper studies the modern network music teaching platform based on big data, realizes the user demand discovery of music teaching platform and optimizes the push of music teaching resources, and realizes the full use of music teaching resources. Starting from five dimensions of user attributes, learning roles, learning process, learning objects and learning tasks, this paper analyzes the user portraits of modern online music teaching platforms based on big data and expresses them based on ontology technology. This article is based on current scholars' theoretical foundation and practical application research on education big data and smart classroom model, through the previous literature review and analysis, research on the popularization of smart classroom model and actual observation of existing smart classroom models. For the verification of the practical effects of music teaching cases using this model, the author used questionnaire and interview methods to investigate teachers and students, and conducted investigations on teachers from basic information, classroom application and effects, and classroom satisfaction. Research shows that 29% of teachers are very satisfied with the application of this model, and 16% of teachers are generally satisfied. It can be known that most teachers are quite satisfied with the "smart classroom" teaching model under the big data environment.

Keywords: Big Data Environment, Network Teaching, Education Informationization, Comprehensive Evaluation Method

1. Introduction
The emergence of big data technology provides a method to solve the information found and perceive user needs from the massive online music teaching resources, and provides a basis for real-time data acquisition, data analysis, demand discovery and recommendation decision-making for online music teaching [1-2]. With the progress of society and the development of science and technology, the application of information technology in the field of education has also become widespread. The development of smart education is a new form and new requirement for the development of information technology, education information and education reform in my country's modern society [3-4]. The advent of the era of big data has driven the development of all walks of life [5-6], and the education field is also deeply affected. The penetration of advanced big data technology into the education field is the future development trend of education informatization, which is bound to the profound changes in the education field have a huge impact [7-8].

The emergence of big data is promoting innovation in the field of education, and many schools and education scholars at home and abroad are exploring the application of big data in the field of education. For example, Reyes found on the basis of researching the infrastructure of online education and teaching platforms in many colleges and universities that it is necessary to strengthen the connection and communication of various online music teaching platforms, make full and reasonable use of current resources, and improve the quality of online platforms. Only those who pay attention to online teaching platforms Quality can ensure the healthy development of online music teaching [9]. Prinsloo P can quickly capture learners' learning data through the application of big data-related technologies in education, and then provide data basis for learners, and discover learners' learning patterns and learning patterns [10].

Based on the study of the limitations of traditional short text tags, this paper proposes a decision tree-based network music teaching platform user demand discovery and perception technology, so as to realize users' accurate learning on the network music teaching platform, and expand artificial intelligence and large the practice of data technology in online music teaching. This article completes the preparation of the relevant questionnaire content, uses the questionnaire star on the Internet to automatically generate the questionnaire URL link and some paper questionnaires in two ways, collects the survey data, analyzes the survey results in detail, and draws the application practice of the model effect.

2. Teaching Mode of Music Courses Based on Big Data

2.1 Design of Modern Online Music Teaching Platform Based on Big Data

(1) Overall platform architecture design

When designing a modern online music teaching platform based on big data, it is necessary to refer to the following standard principles to ensure the normal operation of the system.

1) The principle of system robustness. In the system development process, the current mainstream technology and stable system architecture as well as related development and auxiliary tools must be adopted to ensure that the system is efficient, flexible, easy to use, and easy to maintain.

2) Safety principles. The security principle of the system is an important principle that a big data system must consider. The system design process strictly follows the requirements of big data protection specifications and user privacy data protection protocols, and evaluates and risks possible threats and security vulnerabilities in the system. Prevent, strengthen data protection and security reinforcement measures.

According to the above principles, combined with the big data platform's data storage, data cleaning and statistics, data analysis and clustering association, etc. may have performance blockage or reliability problems, and the big data network music teaching platform adopts a Hadoop-based distributed system architecture.

1) Adopt a cloud-based architecture, use a unified cheap X86 cluster server, and have horizontal and dynamic scalability. In order to guarantee the cost, public cloud servers such as Alibaba Cloud, Tencent Cloud or AWS can be used.
2) Performance guarantee. The Hadoop-based distributed system architecture is equipped with concurrent access and fast access support for massive amounts of big data, and real-time database technology and relational databases can be compatible.

3) Provides an interface in the form of SQL, supports dynamic expansion of clusters to achieve linear performance improvement, and has the ability to parallel complex calculations, statistics and analysis.

(2) Demand discovery algorithm based on decision tree

This paper chooses decision trees to match the similarity of user portraits. Decision trees are a common non-linear decision-making method in the field of machine learning. The decision tree algorithm is to establish a series of tree rules to approximate the decomposition function of the sample.

Node similarity calculation, if the learning result node is denoted as \( U \), the attribute set it contains is denoted as \( P \), \( P = \{ p_1, p_2, ..., p_n \} \), and its corresponding node in the customer profile model tree \( UC_2 \) is \( U' \). The similarity calculation formula of two nodes is:

\[
sim(U, U') = \sum_{i=1}^{n} w_i \cdot \sim P_i(U, U')
\]  

(1)

In expression (1), \( \sim P_i(U, U') \) represents the similarity between the node \( U \) and the corresponding node \( U' \) in the \( i \)-th attribute, and \( w_i \) represents the weight value of the attribute.

Character attributes are expressed as CHP, numerical attributes are expressed as NP, object attributes are expressed as OP, category attributes are expressed as CP, and the calculation formula for the similarity of single-valued character attributes is:

\[
\sim P_{\text{CHP}}(\text{chp}_1, \text{chp}_2) = \begin{cases} 
1 & |\text{chp}_1, \text{value} - \text{chp}_2, \text{value}| \\
0 & \text{otherwise}
\end{cases}
\]  

(2)

The calculation formula for the similarity of single-valued numerical attributes is:

\[
\sim P_{\text{NP}}(\text{np}_1, \text{np}_2) = \frac{|\text{np}_1 - \text{np}_2|}{|\text{np}_1|}
\]  

(3)

The calculation of the similarity of single-valued object attributes is equivalent to the nested calculation between user portrait elements, so the calculation formula is:

\[
\sim P_{\text{OP}}((\text{op}_1, \text{op}_2) = \sum_{i=1}^{n} w_i \cdot \sim P_i(\text{op}_1, \text{op}_2)
\]  

(4)

Single-value category attribute similarity calculation, single-value category hierarchical attribute is based on a tree of edge weights composed of node set \( A \) and edge set \( E \). Therefore, the weight of the edge is determined by the distance to the root node.

2.2 Big Data Technology Assists Smart Classroom

With the arrival of the characteristics of convenience, wisdom, efficiency, and big data, the construction of a smart learning environment has gradually matured, and has gradually formed a cloud remedial learning platform, interactive whiteboard, interactive music teaching system, instant feedback system, and electronic Schoolbag learning system, smart teaching assistants, and physical reminders, etc.

(1) Cloud diagnostic analysis service

Using cloud computing technology for learning and diagnostic analysis services, teachers can automatically upload students’ answers and collect and analyze data, generate diagnostic reports in real time, analyze the performance of all students in depth, analyze horizontally and vertically, and accurately point out students’ weaknesses. Master the overall and individual students’ learning situation, teachers can adjust the music teaching content and remedial strategies in time, students can understand their own strengths and weaknesses based on the personal diagnosis analysis report, and improve the learning progress and strategies.

(2) Smart assistance system

Teachers conduct music teaching in a smart classroom composed of interactive whiteboards, tablets or smartphones, instant feedback systems, smart assistants or physical reminders, which also include remote controls, receivers and other smart devices for assisting music teaching, using music teaching
interaction. The system collects, counts, processes, and analyzes student learning data, improves students' personal learning behavior in the classroom, and improves classroom music teaching. Relying on technical assistance means, it provides the possibility for smart education and provides a guarantee for the development of efficient classrooms. By referring to other models, the author refines the efficient classroom model with technical assistance.

3. Experimental Research on Music Course Teaching Mode Based on Big Data

3.1 Infrastructure Modules of Modern Online Music Teaching Platform Based on Big Data

The system adopts a distributed architecture based on Hadoop. According to the cost principle, the system is deployed on a public cloud server to ensure flexible expansion when business expansion or performance is insufficient. From the perspective of minimizing the workload of system deployment projects, big data-based the modern network music teaching platform has completed the deployment of the Hadoop architecture by means of task scheduling and status monitoring. Through the big data infrastructure module, system administrators can manage and configure all nodes in the Hadoop cluster. At the same time, using a unified management and control platform, administrators can create the open source project environment used in the big data analysis and management process and configuration, such as joining or removing the cluster, automatic deployment and status monitoring of each node, etc.

3.2 Investigation and Analysis of Model Application Effects

In order to test whether the application effect of this model is accepted by teachers and students, whether there is a satisfactory classroom effect, and whether it produces a good music teaching effect, the author designed two questionnaires, one is a survey from the perspective of teachers, and a total of 100 copies are collected Questionnaire; the other is a survey from the perspective of students. 204 questionnaires were distributed and 200 were recovered, with a recovery rate of 98.04%.

4. Music Course Teaching Mode Based on Big Data

4.1 Performance Test

This paper conducts a key performance test on the modern network teaching platform based on big data from two performance indicators: data loss rate and data processing rate.

(1) Data loss rate.

Table 1. Data loss rate test data table of modern music network teaching platform based on big data

| Data volume (G) | Loss rate (%) |
|----------------|--------------|
| 100            | 0.07         |
| 300            | 0.13         |
| 500            | 0.21         |
| 700            | 0.29         |
| 900            | 0.34         |

As shown in Table 1, under the condition of 900G data volume, the current system's data loss rate is within 0.34%, which can ensure the accuracy of data analysis and meet the stability requirements.

(2) Data processing rate.

Table 2. Data processing rate test data table of modern network teaching platform based on big data

| Data volume (G) | Data processing rate (MB/s) |
|----------------|-----------------------------|
| 100            | 44.55                       |
| 300            | 45.39                       |
It can be seen from Table 2 that the data processing speed of the current modern network teaching platform based on big data will not be significantly different within 900G, and the current processing speed can meet the platform's real-time performance requirements.

### 4.2 Analysis of Teacher Questionnaire

Whether the model can be better promoted and applied depends on the teacher's satisfaction with the application of the model. Based on this, the question of whether teachers are satisfied with the "smart classroom" teaching model under the big data environment is raised. The survey results are shown in Figure 1.

![Figure 1. Model satisfaction](image)

It can be seen from Figure 1 that 49% of teachers are satisfied with the development of this model, 29% of teachers are very satisfied with the application of this model, and 16% of teachers are generally satisfied, only 6% of teachers are dissatisfied with this model. Comprehensive factors and data analysis show that most teachers are quite satisfied with the "smart classroom" teaching model in the big data environment. There may be some soft obstacles such as hardware and classroom network problems caused teachers to be dissatisfied with this model.

### 4.3 Analysis of Student Questionnaire

Through the implementation of the smart classroom teaching model under the big data environment in the elementary school mathematics classroom, the author took the fifth grade students of a certain elementary school as the survey object and distributed a total of 204 questionnaires. According to statistics, 200 questionnaires were recovered. Statistics on the overall evaluation of teachers using the "smart classroom" teaching model, the results of data analysis are shown in Figure 2.
Figure 2. Analysis of student survey results

It can be seen from Figure 2 that 69% of the students are satisfied with the "smart classroom" teaching mode, and only 2% of the students are neutral. It can be analyzed that most students have a high evaluation of this mode of teaching, which fully reflects the advantages and popularity of this mode.

5. Conclusions
In this paper, platform design or logical flow design of modern music network teaching platform based on big data, combined with user portraits, researches how to realize user needs discovery, expressing user needs from three dimensions: query conditions, screening rules and sorting rules. And use the decision tree algorithm to complete the design of the matching algorithm for user portraits and teaching resources. Using the current mainstream open source technology, the development of a modern online teaching platform based on big data has been realized. Through the analysis of the learning time and conversion rate of online users on the teaching platform, the current user time and satisfaction have been significantly improved.

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