Design and Practice of Cloud Platform for Online Music Courses Based on the Mobile Internet Era

Yajie Peng*
Xianyang Normal University, Xianyang, Shaanxi, 712000, China

*Corresponding author e-mail: pengyajie@xync.edu.cn

Abstract. Music is a subject of humanities and arts. It uses practice, observation, and exploration as the main learning methods to cultivate students' music literacy through independent or cooperative learning. In music teaching, the application of the mobile Internet-based personalized learning teaching model can not only optimize classroom teaching, but also increase students' interest in learning music. The theoretical value and practical significance in classroom teaching in middle schools. This paper uses the cloud algorithm of the learning platform and the in-depth mining algorithm to initially construct a personalized learning model for music courses based on the mobile Internet, sort out the basic process of personalized teaching based on the mobile Internet, and establish a music curriculum based on the mobile Internet. Evaluation methods, including the evaluation of students, the evaluation of problems and the evaluation of teachers, can get the views of all walks of life on the online music course learning platform. The experimental results show that this article conducted interviews and questionnaire surveys on experimental class students, and found that more than 90% of the students recognized and liked personalized learning and teaching methods based on mobile Internet.

Keywords: Mobile Internet, Personalized Learning Mode, Online Music Course Learning Platform

1. Introduction
At present, the rapid development of the modern mobile Internet era with computers as the core has had a serious impact on traditional teaching and will cause great changes in classroom teaching [1]. Some teachers in our country have consciously carried out the exploration and practice of teaching reform. However, due to the lack of correct theoretical guidance, there are still widespread concerns about the external forms of technology and the content system and logical structure of the music discipline itself, while ignoring students' learning. Psychological characteristics and physical and mental development status [2-3]. Therefore, how to carry out experiments and diversified exploration or learning with the aid of technological means in the age of mobile Internet on the basis of students' learning psychology to expand students' learning space is still a rather weak aspect [4-5]. Therefore, in order to respond to the call of the new curriculum standard concept, change the traditional music education thought and teaching mode, and naturally integrate the network music course learning cloud...
platform technology in the mobile Internet era into music teaching on the basis of a deep understanding of students' music learning psychology. Will be the dominant course learning method in the current information age, and will surely become the main method of school teaching in the new century [6-7].

In the current background of our country's active promotion of education modernization and informatization, the most effective way to achieve the organic integration of the online music course learning cloud platform and teaching is to build a network music course learning cloud platform, through the online music course learning cloud platform New ideas combined with mobile Internet technology [8]. Chinese scholar Zhao believes that this move has effectively enhanced students' interest in learning music, developed students' "information literacy", and cultivated students' innovative spirit and practical ability, which has very important practical significance [9]. Foreign scholar Colakoglu believes that vocal music teaching is a course that integrates technology and artistry. In addition, music learners must also cultivate their own musical abilities. For example, the singer's pitch, rhythm and voice will affect the effect of his singing. [10]. In addition, these factors belong to the singer's musical ability, and besides being affected by innate factors, this skill also requires a certain amount of acquired professional training to reach scientific standards.

This article analyzes some of the drawbacks of traditional classrooms by analyzing the psychology of students’ learning and constructing a cloud platform for learning online music courses from the perspective of students’ learning. "Humanism" theory-based online music courses learn a series of advantages of students under the cloud platform. This shows that the combination of advanced teaching theory and rich teaching experience with network multimedia technology will definitely produce the best teaching effect different from the traditional classroom teaching in the past.

2. Technical Research on the Cloud Platform of Online Music Courses in the Era of Mobile Internet

2.1. Learning Cloud Platform Algorithms

Association rule data mining is to discover all strong association rules from the source database, and the strong association rules must satisfy that the support is greater than or equal to the corresponding minimum support and the confidence is greater than or equal to the corresponding minimum confidence, that is, \( \text{conf}(A \Rightarrow B) \geq \min \text{conf} \) and \( \text{Support}(A \cup B) \geq \min \text{sup} \), then \( A \Rightarrow B \). This mining process includes the following two steps:

(1) Search for frequent itemset: To search for itemset whose support degree is not less than the specified support threshold, to obtain frequent itemset, it needs to scan the transaction source database. This is the main step of association rule data mining, according to the scope, target, and direction of the search data format, different search algorithms can be constructed.

(2) The generation of strong association rules: For any frequent item set \( L \), detect each non-empty subset \( X \) in it, and generate the rule \( L \Rightarrow L - X \), the corresponding support is recorded as \( \text{Pr}(L) \), and the confidence is recorded as \( \text{Pr}(L) / \text{Pr}(X) \), delete those rules that do not meet the confidence level set by the user, and the rest are strong association rules.

Based on the nature of support calculation, the process can be simplified to find the largest subset of \( L \) first, and only when the confidence of its generation rule meets the conditions, other subsets are tested. For example \( L = \{A, B, C, D\} \), if the confidence of rule \( A, B, C \Rightarrow D \) does not reach the confidence threshold, then \( A, B \Rightarrow \{C, D\} \) also does not meet the confidence threshold (because of \( \text{Pr}(\{A, B\}) \text{Pr}(\{A, B, C\}) \) ).

2.2. Deep Mining Algorithm

(1) Data mining technology

Using data mining technology to deeply mine for item set \( X, X \subset I \), the support degree of item set \( X \), the frequency of item set \( X \) appearing in \( D \), denoted as
\[ \text{Support}(X) = \frac{\text{count}(X \subseteq T)}{|D|} \]  

(1)

Where \( \text{count}(X \subseteq T) \) is the number of \( X \) contained in the transaction database \( D \).

Association rule \( R: X \Rightarrow Y \), the confidence of rule \( R \) refers to the ratio of the number of transactions where \( X \) and \( Y \) appear at the same time to the number of transactions that only appear, denoted as

\[ \text{confidence}(X \Rightarrow Y) = \frac{\text{Support}(X \cup Y)}{\text{Support}(X)} \]  

(2)

The credibility reflects the probability that \( Y \) appears in the transaction if \( X \) is included in the transaction. The minimum confidence threshold is denoted as \( \text{min}_\text{conf} \).

(2) Data Fusion Technology

Data fusion technology, this technology is established on the basis of mankind's own information processing ability, and can use data combination to obtain more resources, so as to realize the collaboration of network information resources. The application of artificial intelligence in the management of computer network security technology can enable multiple sensors used to coordinate with each other during operation and play their due role together, so that the capabilities of each sensor system can be effectively improved. Then ensure the integrity and accuracy of intrusion detection results.

The main problem that the fusion function solves is how and what algorithm the data will be fused. The simplest methods include the average method, the maximum (small) value method, and the intermediate value method. Of course, there are also more complex algorithms. It depends on the specific integration requirements. Assuming that there are \( n \) sensor nodes in a multi-sensor data fusion system, and their output data are \( X_1, X_2, \ldots, X_n \) respectively, then the fusion function of the system can be expressed as:

\[ F(X_1, X_2, \ldots, X_n) = y \]  

(3)

In the above formula, \( F \) represents the fusion function, and \( y \) represents the result of the data fusion of these \( n \) nodes. The fusion function should have the three properties of commutative and idempotent functions.

The tolerance function, as the name implies, describes the degree to which the data collected by two or more touch sensor nodes can be fused, which means the degree of similarity of the node data. The higher the similarity of the data, the closer the data is, the value of the tolerance function. The bigger it is. The value of the allowable function is specified in the interval \([0,1] \). When multiple data are waiting to be merged, the tolerance function is defined as follows:

\[ R: X \times X \times \ldots \times X \rightarrow [0,1] \]  

\[ R(x_i, x_2, \ldots, x_n) = \min\{|R(x_i, x_j)|\} \]  

(4)

\( R \) represents the tolerance function, \( R(x_i, x_j) \) represents the tolerance result of two sensor nodes, and \( R(x_1, x_2, \ldots, x_n) \) represents the total tolerance result of the data of \( n \) sensor nodes. It can be seen that the tolerance of multiple sensor nodes value of is obtained by comparing the tolerances of the two-node data and then taking the minimum value. After analysis, the essence of the fast mining model is to save time and space complexity by dividing and sampling while sacrificing some accuracy, and then intercept a balance point between the two. The advantages and disadvantages of this fast mining model are obvious. The advantage is that it does not need to mine the entire database, it may not be able to Searching for a complete set of frequent items is also the place to improve the model.
The fast mining model is suitable for massive dense databases, but it has certain requirements for precision and is not high enough for mining.

3. Experimental Research on the Cloud Platform of Online Music Courses in the Era of Mobile Internet

3.1. Experimental Data
The research object of this paper is a random selection of 400 music college students in the Art college, among which 240 are male students and 160 are female students. They were evenly divided into groups A and B. Group A is the experimental group, and Group B is the control group.

3.2. Experimental Process
First of all, this paper conducts a questionnaire survey on randomly selected college students to obtain the understanding, like and awareness of online digital multimedia vocal music teaching among 400 college students, so as to get a more true understanding of contemporary college students' views on online music learning platforms. Then use the online music learning platform based on the mobile Internet platform proposed in this paper to teach group A students for one month of vocal music, and under the same conditions, use the traditional vocal teaching resource library for group B students to also conduct one month of vocal teaching. Finally, conduct a questionnaire survey and compare experimental data.

4. Experimental Analysis of the Cloud Platform for Online Music Courses in the Era of Mobile Internet

4.1. Students' views on the Cloud Platform for Online Music Courses in the Mobile Internet Era
This article uses the questionnaire method to conduct a questionnaire survey on 400 randomly selected college students. In order to obtain contemporary college students' understanding, like, and awareness of the cloud platform for online music course learning, so as to more truly understand their views on the cloud platform for online music course learning. The purpose of the first questionnaire survey is to understand the professional level of music students and their interest in vocal music learning, and the second questionnaire survey is to understand college students' views on the traditional teaching mode and online music course learning cloud platform teaching proposed in this article. The survey results are shown in Table 1 and Figure 1.

|                  | Understand resource pool | Used resource library | Like resource pool | Think resource pool is very important |
|------------------|--------------------------|-----------------------|-------------------|--------------------------------------|
| Boys             | 156                      | 106                   | 42                | 128                                  |
| Girls            | 108                      | 90                    | 36                | 78                                   |

Figure 1. College Students' attitude Towards Two Kinds of Resource Banks
It can be seen from the survey data that most of the music students know very little about the online music course learning cloud platform teaching, do not know much, and rarely have contact with them.
Therefore, only a few students express their love for it. On the other hand, students cannot realize the importance of online music course learning cloud platform teaching for their future music learning. Therefore, everyone is not very fond of traditional music teaching, nor are they aware of the importance of learning cloud platforms for online music courses.

After using two music teaching methods to teach two groups of college students A and B for one month, most of the college students in group A think that the network digital multimedia vocal teaching proposed in this article is more effective, more interesting, and interactive for learning music. Very good, richer resources, and improved students' enthusiasm for learning music. However, group B college students who used the traditional music resource library generally gave low evaluations. This is mainly because the online music course learning cloud platform teaching proposed in this article uses multimedia and network analysis technology, which can focus on the parts that students like and are interested in, so that students can acquire the knowledge they want. At the same time, the use of multimedia makes learning vocal music more efficient and interesting for music students.

### 4.2. Changes in Music Students' love for Music

This article asks the A group of college students to use the online music course learning cloud platform to teach vocal music for one month. Under the same conditions, let the B group of college students use traditional teaching methods to also conduct one month of music teaching. During the experiment, the college students were surveyed every 5 days, and the changes in their love for vocal music were counted. We visualized the changes in the degree of preference for vocal music learning among college students in groups A and B, and performed curve fitting respectively according to the mean. As shown in Table 2, Figure 2.

| Time       | After 5 days | After 10 days | After 15 days | After 20 days | After 25 days | After 30 days |
|------------|--------------|---------------|---------------|---------------|---------------|---------------|
| Group A    | 50%          | 55%           | 63%           | 75%           | 81%           | 86%           |
| Group B    | 50%          | 51%           | 54%           | 60%           | 63%           | 69%           |

![Figure 2. Changes of College Students' liking for Music Learning](image)

From the experimental results, it can be seen that the A group of students who have used the online music course learning cloud platform teaching and learning proposed in this article are gradually increasing their love for vocal learning, and the increase speed is faster than that of the B group of students using traditional teaching methods. Moreover, the students in group A like vocal music much higher than those in group B. This once again verifies that the online music course learning cloud platform teaching proposed in this article has a positive effect on music students' learning music, and
greatly promotes the enthusiasm of music students to learn music. Therefore, online music courses play an important role in learning cloud platform teaching.

5. Conclusions
This article studies the influence of music teaching in the context of the cloud platform for learning online music courses. Starting from the actual situation, this article first sorts out the current situation of vocal music teaching in my country by consulting relevant materials and questionnaires. The diversified vocal teaching using modern multimedia teaching techniques is ultimately aimed at improving the efficiency of music teaching as much as possible. So that students can learn as many scientific and standardized vocal methods and skills as possible within the limited classroom vocal learning time, correctly understand basic music related theories, accurately master music skills and techniques, and accurately master different different eras, different composers, and different The singing style of national works. Regardless of whether it is traditional vocal music teaching mode or contemporary multimedia teaching technology, they have the same ultimate goal and the same nature.

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