Research on College English Teaching in the Context of Big Data Technology

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Abstract

In the era of big data, it has become a general trend to optimize and innovate college English teaching. Therefore, it is a feasible approach to build a new college English teaching system platform based on big data technology. Based on this, in order to meet the needs of teachers, students and teaching administrators in the new era, this paper explores the design and construction of a college English teaching platform model based on big data technology. Through architecture design, database design, cloud platform construction, the integration of cloud computing technology and other methods has realized the design of this platform model. The actual test results show that the performance of the system has reached the expected requirements, which shows that the designed college English teaching platform model based on big data technology has achieved initial success.

Keywords: *big data; college English; English teaching*

1 INTRODUCTION

In today's era of big data, college English teaching has undergone profound changes. Based on this change, teaching workers have also begun to apply various new technologies to improve the level of English teaching, and big data technology is one of them. But from the current point of view, the application of big data in English teaching is usually limited to online teaching interaction, lacking more in-depth research. Therefore, in this study, a comprehensive study will be carried out based on the different needs of different users to solve the limitations of previous studies. It is expected that this research will provide more theoretical basis and empirical reference for college English teaching under the background of big data..

2 USERS' REQUIREMENTS ANALYSIS

In the mode of college English teaching platform based on big data technology, there are three types of users, including students, teachers and administrators. Each type of user has different needs as follows. Firstly, it analyzes the needs of student users. Students are the main users of the system. They can log in to the platform by inputting their personal accounts and passwords, and then choose the corresponding module to study. Therefore, the system should meet the following requirements in this aspect.

- In the learning process, it can actively push learning content to students according to their learning progress. According to the students' learning status, the system can develop the corresponding learning plan.
- Homework submission: students take the initiative to complete the homework and modify them according to the comments.
- Students can communicate online through this platform.
- Teachers can conduct an online test after students complete the progress of a chapter.
- Students can download a variety of English education resources on this platform.
- Students can submit their own learning experience and external high-quality learning resources to the database of the system.

The second is to analyze the needs of teachers. The system should meet the following requirements.

- Manage existing course teaching resources.
- Upload teaching resources.

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- Assign and correct homework, and give corresponding evaluation.
- Interact with other users to answer questions in time. Test and evaluate students' learning.

The third is the demand analysis of the administrator. Administrators can carry out teacher management, student management, class management, curriculum management and question bank management, maintain and update all kinds of information and system database, view, add, update, delete related information.

3 PLATFORM SYSTEM ARCHITECTURE DESIGN

Considering the actual needs of platform construction, it is convenient for later expansion, management and maintenance, etc. In the construction of this system platform, the B/S architecture used by most of the previous platforms is selected as the system architecture. Meanwhile, this architecture is mainly divided into three layers, and each layer and its corresponding functions are shown in table 1.

TABLE 1. CLASSES AND FUNCTIONS OF THE SYSTEM ARCHITECTURE

No.	Class	Major functions
1	Users	Interactions between learner / manager and systems
2	Business	Realize the core business of the system
3	Data	Provide data storage services, and ensure the security on the data

On this basis, combined with the cloud computing technology in the big data technology, a new college English teaching system platform can be preliminarily constructed and gradually realize the expected functions. At the same time, in the development process of the system platform, spring open source framework is used to complete the target task with basic Java beans, and C++ language is used to write.

In addition to cloud computing technology, the following two technologies are also applied in the construction of platform architecture. One is data mining technology. The main role of this technology in the system is to mine potentially valuable information from the user learning data recorded by the system through the support of intelligent algorithms. The technology can analyze and calculate these information to find the rule of these information to provide the user's learning resources to seek the corresponding basis. In data mining, TF-IDF algorithm is used to mine and integrate similar resources, and its calculation formula is as follows.

$$w(i,j) = tf \times idf = \frac{Count(i,j)}{Size(j)} \times \log\left(\frac{N}{Docs(i,D)}\right) \quad (1)$$

After calculation by this formula, relevant words of calculation result greater than 0.01 will be uniformly summarized and eventually form a feature set of similar learning materials and information to achieve effective arrangement of multiple learning resources [1-2].

The second is the cloud log parsing technology, which can process the logs in the system platform in a structured way, and then extract the template of the log comparison tree to realize the mining of useful information in the logs [3].

4 SYSTEM OVERALL DESIGN CONCEPT AND METHOD

4.1 *Building of Cloud Platform*

Since cloud computing technology is introduced into the college English teaching system in this design, the construction of the system platform needs to follow the concept and method of cloud platform. On the cloud platform, users can easily share resources, learn, and manage resources. Comparatively speaking, the interactive, independent and intelligent characteristics of cloud platform are more prominent, and it can dynamically realize the expected functions [4].

In order to achieve the expected functions, the following aspects are mainly designed in the construction of the cloud platform.

- Determine teaching resources and teaching function module design according to users' needs.
- Formulate a scientific, comprehensive and perfect teaching resource evaluation system by using algorithms.
- After the initial completion of the functional modules of the cloud platform, teachers and student users will test the actual use of the modules and collect the feedback to further improve the cloud platform. At the same time, in this design, taking into account the balance between operation capacity and operation cost, the platform is constructed with virtualization technology.

4.2 *Database Design*

In the database design of the system platform, it is mainly designed based on MySQL2019, and a more detailed database design is conducted for the three types

of users under the system platform. The specific data table design work is shown in tables 2 and 3.

TABLE 2. TEACHER / STUDENT USER DATA SHEETS IN THE PLATFORM

Field	Chinese name	Data type
zhID	Account ID	Int
zhmc	Account name	varchar
zhmm	Account password	varchar
yx	Mailbox	varchar

TABLE 3. THE ADMINISTRATOR USER DATA TABLE

Field	Chinese name	Data type
zhID	Account ID	Int
zhmc	Account name	varchar
zhmm	Account password	varchar

On the other hand, all the information used for learning in the system platform are stored in the cloud, and the data information table is shown in table 4.

TABLE 4. MATERIALS AND INFORMATION DATA SHEET

Field	Chinese name	Data type
zlID	Datum ID	Int
zlmc	Data name	varchar
bcdz	Save the address	varchar
jj	Brief introduction	varchar

4.3 *Design of the Cloud Computing Analysis Module*

In order to realize the cloud computing analysis of the data, the C4.5 algorithm is used to mine the data information, and the basic code is as follows.

```
def majorityCnt(classList):
classCounts = {}
for value in classList:
if(value not in classCounts.keys()):
classCounts[value] = 0
classCounts[value] +=1
sortedClassCount=sorted(classCounts.iteritems(),key=operator.itemgetter(1),reverse =True)
return sortedClassCount[0][0]
```

This algorithm has been greatly improved on the basis of previous algorithms. It uses information gain rate to select properties, overcome the previous shortcomings, and can take more effective processing of data. Based on cloud computing technology, it can quickly deeply process and analyze various aspects of the collected big data of target users, and realize the target of intelligent analysis [5].

5 SYSTEM PERFORMANCE TEST AND ANALYSIS

After the preliminary design of the system is completed, the interface test is carried out first. It mainly tests the system platform interface function module layout, color collocation, control placement position, etc., to ensure that it can meet the use habits of operators. According to the survey feedback of some teachers and students in the target college, about 90% of the teachers and students think that the interface design of the system platform is reasonable and can meet their usage habits.

After the interface testing is complete, it can start performance testing. In the performance test phase, the tester not only needs to verify the performance of the system in the actual operating environment, but also needs to consider whether the actual performance of the system will be restricted by different hardware configurations and whether the system can maintain long-term stability when the traffic volume is large. Therefore, on the one hand, the tester deployed several different hardware environments to test the management system. The test results show that the system has a good performance in different hardware environments. There are no serious bugs, and it meets the requirements of use. On the other hand, the tester builds a virtual environment that simulates the response time of a system with 500 people accessing it simultaneously. It is estimated that under such high concurrency, the average response time of the system is maintained at about 4.1s. Although the response time is relatively extended, the smooth operation of the system can still be ensured. For the other performance tests, the results are shown in table 5.

TABLE 5. RESULTS OF THE PERFORMANCE TEST

Test item	Expected result	Test result
View learning records	Study records are displayed correctly	Show
View test analysis	Display the analysis results correctly	Show
View communication	Display the interactive	Show

interactive information	information correctly	
Check the utilization rate and effect of the test questions	Data are all displayed correctly	Show

6 THE ACTUAL APPLICATION EFFECT OF THE SYSTEM

In order to evaluate the application effect of the platform, according to the statistical method, 10 students with similar levels are selected from two classes of a college, and a total of 20 students are divided into two groups. It is divided into two groups, one of which is a control group, still using the conventional teaching mode. The other group is the experimental group, which uses the big data English teaching platform of this study to carry out teaching. The test is conducted after one semester, and the test results are shown in table 6.

TABLE 6. TAVERAGE ENGLISH SCORES OF THE TWO GROUPS AFTER THE EXPERIMENTAL TESTING

Test items	The average score of the experimental group	Mean score of the control group
Listening-up	73.1	64.8
Speaking	61.2	44.9
Translation	82.7	64.5
Reading	79.2	72.2
Cooperative learning ability	9.2	4.4

From the data in table 6, it is not difficult to see that after the application of the English teaching system platform under big data technology. Students' learning effect in many aspects has been significantly improved, proving that the effect of the English teaching platform is relatively significant. In the future teaching work, it is necessary to further promote the application of the system platform.

7 CONCLUSION

In a word, under the background of big data technology, college English teaching has undergone significant changes. Therefore, it is necessary to build a new college English teaching platform based on big data technology and optimize and innovate English teaching to be more accurate and efficient. Learners can really apply what they learn to effectively improve the effect of learners' English learning. The actual situation shows that the progress of learners under this platform is also quite remarkable. Obviously, since the platform is still in its early stages of operation, there must be a lot of room for expansion. Taking into account the actual needs of English learning, in the future research work, it should focus on the development of learning resources for professional English, and expand the function of this platform from basic college English teaching to professional teaching.

REFERENCES

[1] Li Yanli. The Construction and Application of Interactive Model of College English Mobile Teaching under big Data Environment [J]. Journal of Beijing Institute of Graphic Technology, 201,29(06):125-129.

[2] Ma Lan. Discussion on College English Teaching Mode under the background of big Data Technology [J]. Chemical Industry Journal, 201,72(01):629.

[3] Zeng Jiangxia. Multi-modal Big Data Information Retrieval Strategy in Chinese-English Paragraph Translation of CET [J]. China Education Informatization,2021(02):48-52.]

[4] Ruan Yali. The Construction of College English Online Learning Platform Based on Big Data [J]. Application of microcomputer,2020,36(12):76-78.

[5] Zhang Guifang. Construction of College English Intelligent Teaching Mode Based on Big Data [J]. Comparative research of cultural innovation, 2020, 4(28):127-129.