Design of College English Halving Classroom Teaching System Based on Big Data

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Abstract. With the development of big data and the continuous advancement of education informatization, the single lecture-based classroom teaching model no longer meets the development requirements of the society for the development of talent education and training. Under the environment of big data technology, how to innovate teaching models and talent training models becomes the focus of the current classroom teaching reform. This article aims to study the design of the college English bisection classroom teaching system based on big data. On the basis of introducing the bisection classroom, the basic theory of teaching system design and the design principles of the bisection classroom teaching system, the theoretical analysis and top-level design of the system login module and the teaching system that adaptively integrates teaching resources according to the status of college students are carried out. Finally, an experimental test of the college English split-class teaching system based on big data has been carried out. The test results show that the system can realize the core of system management, teaching resource release and dynamic configuration.

Keywords: Big Data, College English, Bisection Classroom, Teaching System Design

1. Introduction

The popularization of English is a testimony of the new era and a product of the process of internationalization. English is a necessary skill that qualified young people need to master [1-2]. In our country, English has become more and more important and has gradually become a second language. It has gradually penetrated into all stages of education in our country. The importance of English subject education is self-evident. How to purposefully make teaching methods full of interest and effectively improve students' English proficiency, develop listening, speaking, reading and writing skills, not only accomplish the goals of academic examinations, but also exercise students' ability to explore independently and master skills has attracted more and more attention [3-4].
However, the English teaching method under the test-taking background is inevitably not flexible enough. Many teachers only attach importance to the explanation of English content or grammar knowledge, and cannot adjust the classroom flexibly according to the situation of each student. In the traditional model, teachers dominate the classroom, ignoring that students should be used as classrooms. The status of the subject, the students' English experience, analytical ability and acquisition of skills are not paid attention, which makes students' interest in English learning and enthusiasm for further exploration of knowledge will be greatly reduced [5-6].

Based on the introduction of the basic theory of split-classroom, teaching system design and the design principles of split-class teaching system, this paper conducts theoretical analysis and top-level design of the system login module and the teaching system that adaptively integrates teaching resources according to the status of college students. Big Data College English has conducted an experimental test on the classroom teaching system. The test results show that the system can realize core functions such as system management, teaching resource release and dynamic configuration.

2. College english bisection classroom teaching system based on big data

2.1. Divide the classroom

Facing the new situation of education and teaching in the information age, various elements of teaching are changing at any time, and the call for curriculum reform is becoming stronger and stronger. The emergence of split classroom teaching mode provides a new exploration method for classroom teaching reform. Splitting the classroom is the first analysis and put forward after the practice in the university classroom, through the adjustment of the core relationship between teaching and learning, the classroom teaching can realize the transformation from lecture-based teaching to teaching with equal emphasis on learning and teaching. In the bisection classroom, the teaching time is clearly divided into three links: lecture, internalization and absorption, and discussion, and it can also be adjusted flexibly according to the specific implementation situation. The core feature of the bisection classroom is the "delayed discussion", that is, the students will start the discussion after they think about the content of the teacher's teaching alone. The purpose is to cultivate students' independent learning habits in class, and at the same time, to internalize and absorb the teaching content of teachers to a certain extent before conducting group discussions to improve the effectiveness of classroom discussions [7-8].

On the one hand, the "division" in the dichotomy classroom teaching model refers to the halving of the teacher's lecture and the students' absorption of discussion time. The teaching time in the split classroom is relatively reduced, and the teacher's teaching content should be macroscopic and instructive, and highlight the meaning and value of the content, so that students can complete after-class learning more effectively [9-10]. Another important aspect of "division" is the division of rights and responsibilities between teachers and students-the teachers and students in the division classroom have the control of teaching activities. The teacher decides what to say and how to say in the lecture link, and the students decide how to learn and what level of learning in the autonomous learning link. The class collectively decides how to discuss and what to discuss in the discussion link. The teacher decentralizes the power in this process and allows the students to undertake their own duties. Responsibility assumed [11-12]. Teachers and students in bipartite classrooms are a learning community. Teachers are more responsible for systematic main knowledge, while students are more
responsible for independent and individualized development. The final effect of teaching is jointly responsible for both teachers and students. The dual classroom teaching model aims to create a new classroom ecology of democracy, science, openness, equality, consultation, and cooperation by innovating the classroom teaching structure, and to train students to gradually move towards autonomous learning.

2.2. The basic theory of college English halving classroom teaching system design based on big data

(1) Constructivist Theory.

Constructivist teaching strategies generally include scaffolding teaching strategies, anchoring teaching strategies, random entry teaching strategies, self-feeding strategies and so on. The construction of meaning is an active process. The big data environment supports the creation of simulation scenarios. In the classroom teaching, teachers and students can jointly explore certain problems in a certain situation, exchange and question each other, and guide students to learn from their original experience. "Develop new experience, innovate in cognitive transfer, and learn to learn independently. When designing a teaching strategy for splitting classroom discussions, attention should be paid to the use of technologies such as the network and multi-device projection to enable the interaction between the learning community to occur at any time. In addition, students have abundant, open, and targeted resources through information technology in the process of internalization and absorption, and continue to construct themselves between the new and old knowledge to achieve personalized learning, which is helpful to the cultivation of innovative ability. Constructivism plays a macro guiding significance in the integration of the big data environment and the dichotomy classroom, and penetrates into all links of teaching activities.

(2) Humanistic theory.

The information environment provides the possibility for learners to master their own learning ability and continuously support the formation of personality. Students can use data analysis technology to master their own learning process, and make targeted internalization and absorption for the formulation of classroom teaching strategies. For example, the homework is presented in the form of multimedia in the teaching platform to form process data, which provides a basis for process evaluation: teachers can also find problems based on data analysis, analyze the reasons, and reflect on the adjustment of teaching methods. Among them, personal terminal equipment can be personalized in a big data environment. In the classroom, mobile phones can also become a field that supports learners' self-realization. Big data helps to achieve online and offline interconnection, sharing online and offline resources, teaching platforms and learning tools to connect different learning places (schools, homes, other off-campus places, etc.), so that formal learning and informal learning can be integrated.

(3) Effective teaching theory.

Effective teaching focuses on whether students can connect systematic knowledge with their own original cognition in the learning process, so as to internalize and absorb them to form their own cognitive structure. Therefore, in the specific application of the classroom teaching strategy, we should help establish the connection between students and existing knowledge. On the one hand, create a situation based on the original knowledge, understand knowledge, and conduct targeted absorption.
On the other hand, use peer interaction to expand knowledge, construct reflection.

2.3. Design principles of bisection classroom teaching system under big data environment

(1) Generative principle.

Classes that have not been preset are too divergent, and it is difficult to guarantee the completion of the basic teaching content, but the learning content is completely in accordance with the preset regulations, so that there is no room for students to explore, knowledge is still taught as a fixed content, and most of the students’ cognition and understanding remain shallow level, it is difficult to meet the needs of big data for the cultivation of innovative talents. Moreover, in the specific teaching of sub-classes, teachers’ prediction of the teaching process will change relative to the teaching activities, especially in the big data environment, there may be an impact on teaching due to equipment failures and other problems. Therefore, when formulating teaching strategies in a big data environment and split classrooms, it is necessary to pay attention to the dynamic aggregation of the teaching process, based on the principle of generativeness, and on the basis of the preset basic framework, allowing students to personalize absorption and expression, through collaboration and conversation, Students' initiative and creativity are brought into play reasonably.

(2) The principle of gradualism.

Student development is a complex and long process. Teachers should combine the requirements of the logical framework of each discipline when guiding students to build their own, and arrange course content and teaching activities in accordance with the development of students' cognitive ability. The purpose is to gradually form rigorous logical thinking on the basis of knowledge through progressive teaching. Therefore, teachers should use reasonable teaching design to guide students to gradually and gradually complete the construction of knowledge meaning, and to enhance their independent learning ability, so as to inspire innovative thinking and improve on a good foundation.

(3) The principle of autonomy.

The characteristic of the bisection classroom is the division of power and responsibility, which requires teachers and students to share responsibilities in the teaching process. In the big data environment, students have greater learning autonomy. Students should be able to clarify their self-learning responsibilities, manage and control their learning independently, and give full play to their learning initiative. Teachers, as guides and organizers, should pay attention to mobilizing their learning initiative, guiding them to consciously master scientific knowledge and the ability to analyze and solve problems in an information environment, so as to improve the quality of teaching more effectively. Therefore, in the big data environment, teachers need to pay attention to that they must be able to cultivate students’ autonomy through reasonable instructional design so that they can move from passive learning to active learning, and can make full use of and integrate existing information resources to initiate, evaluate, and adjust your learning process.

(4) The principle of comprehensive development.

The principle of all-round development is to pay attention to the all-round, healthy, and individual development of students. The "Opinions on Accelerating the Construction of High-Level
Undergraduate Education and Comprehensively Improving the Ability to Cultivate Talents" takes "promoting the all-round development of students" as one of the target principles for the construction of high-level undergraduate education. In the teaching process, teachers are guided to concentrate on cultivating people, pay attention to the physical and mental health of students, encourage students to study hard, establish patriotic, inspirational, truth-seeking, and practice ideological characters, and enhance students' sense of social responsibility, innovation spirit and practical ability.

2.4. Algorithm analysis

The bisection classroom teaching system based on big data needs to recommend teaching resources with moderate difficulty based on students' cognitive level. After receiving feedback from students, the teaching system transmits the data to the resource recommendation system. The recommendation system retrieves the best resources based on the feedback results and recommends them to student users.

Reasonable resource recommendation methods can be realized by using project response theory. When designing the system's adaptive test question bank, the system can evaluate students' cognitive level based on the ability value according to the test situation of the student. When the ability value is the largest, the amount of information is also the largest. The ability value evaluation results can be used to match the difficulty of resources, and the recommendation of teaching resources can be realized by comparing the difficulty of resources and the ability of students. The single-parameter project information function is:

\[ I_j(\theta) = e^{\frac{1.7^2}{e^{1.7(\theta-k_{tuned})}} \left[ 1 - e^{-1.7(\theta-k_{tuned})} \right]^2} \]  \hspace{1cm} (1)

\[ \theta_{k+1} = \theta_k + \Delta \theta \]  \hspace{1cm} (2)

3. Experiment

3.1. System login module

The program flow chart of the system login module is shown in Figure 1. When logging in, the user enters the user name, password, selects the user identity information, and clicks to log in. If the password is incorrect, it will return to the login page. If the password is correct, confirm whether you are an administrator. If you are an administrator, you will be redirected to the administrator page to log in successfully. If you are not an administrator, you will be redirected to the student or teacher page to log in successfully. After successfully logging in, you can manage your own learning and problems.
3.2. Adaptive organization of learning resources

The learner randomly selects and tests the system to understand the learner's mastery of the knowledge points. Through the test results to evaluate the learner's ability, it can be considered that the evaluation value of the learner's ability can be estimated. According to the results of the system evaluation, suitable learning materials for learners are recommended, so that the learners' abilities can be further improved. In the existing experiment, the researcher tracked and recorded the learning situation of a learner, as shown in Figure 2 is the relationship between the change of the ability value and the material recommendation during the learning process. From the perspective of the development and change of the learner's ability, the system can improve the learning efficiency and cognitive ability of the learner, and it can be considered that the construction and organization of the learning materials by the system can adapt to the trend of the development and progress of the learner's ability.

From the curve diagram of student ability and material difficulty, it can be found that the lower the student's ability, the simpler the learning materials the system will recommend to learners. When the student's ability value increases, the difficulty of the learning resources recommended to the learner by the system also increases.

Figure 1. System login module program diagram
4. Discussion

4.1. System implementation

The system server parameters are configured by installing IS components, and the core database of the network teaching system is constructed with Windows SQL server 2008 software. In the terminal browser, system users only need to enter the address of the server to access the Internet teaching system and use various services provided in the system. Compared with the traditional network teaching system that requires additional plug-ins such as the client, the function realization process is more convenient and faster.

4.2. System function test

The purpose of testing the network teaching system based on big data is to verify the feasibility of the system's various functions and the stability of operation. In the process of system verification, the various functions of the system are verified by writing test cases.

(1) Test process.

As an indispensable link, testing occupies more than 70% of a software life cycle, indicating that testing is essential in the entire process of software development, and software testing fully reflects the reliability of software. Through the test link, find out the errors that have been ignored in the software development process. In all aspects of the software development process, the system must be tested periodically to find problems in time and repair them immediately.

First of all, unit testing is required, that is, to test whether the various components of the system are complete. This step is a test of the most basic module, which is generally done by the programmer independently of the tester during the system development process. The complete test process needs to be completed by checking the grammar of the software source code, discovering data anomalies, and detecting the basic algorithm of the program. Here, a test case needs to be constructed and imported...
into the tested module to detect the running status of the module. Software testers need to use the software as a user, test the input of the software through various situations, and check whether the output of the software is normal.

(2) Test case design.

Take the login module of the multimedia network teaching system as an example to illustrate how to use orthogonal design test technology to upgrade to effective test cases. According to the orthogonal method, effective test cases can be generated and the number of use cases can be reduced. The test example is shown in Table 1:

Table 1. Test case table

| Serial number | user  | password         | Desired result     |
|---------------|-------|------------------|--------------------|
| 1             | empty | empty            | Prompt error       |
| 2             | empty | qwerty           | Prompt error       |
| 3             | student | 123456         | Log in normally    |
| 4             | qwerty | qwertyuiopasd    | Prompt error       |
| 5             | qwerty | 111111           | Prompt error       |
| 6             | qwertyuiopasd | empty       | Prompt error       |
| 7             | qwertyuiopasd | qwertyuiopasd | Prompt error       |
| 8             | student | empty            | Prompt error       |
| 9             | student | qwerty           | Prompt error       |
| 10            | empty  | 111111           | Prompt error       |

1) First, let's determine the factors. The factors in this article are clear at a glance, namely "username" and "password".

2) Next, determine the value range of the factor. According to the requirements specification, the set of values are: Username: is a character field, and its length is [5,10], student is a legal user password: a character field, and its length is [5,10], 123456 is the initial password of the legal user student

3) Determine the level of each factor. The two fields of "username" and "password" are entered by the user using the keyboard. For this type of factor, different software testing techniques should be used, such as dividing equivalence classes to determine the level of the factor. The factor levels determined in this example are as follows:

Username: 1. Empty (illegal input) 2. qwerty (legal input, illegal password) 3. student (legal input, legal user) 4. qwertyuiopasd (illegal input, overlength)
Password: 1. Empty (illegal input) 2.qwerty (legal input, illegal password) 3.123456 (legal input, legal user password) 4.qwertyuiopasd (illegal input, too long)

4) Select the orthogonal table. Choose the orthogonal table shown in the following table as the test case.

(3) Test conclusion.

After testing and evaluating all aspects of the bipartite classroom teaching system based on big data, it can be considered that the system runs stably, with complete functions, clear interfaces, meeting demands, and achieving the goal of system design.

5. Conclusion

The learning process of classroom professors and students is originally an interlocking and closely connected process. The teacher in the classroom is the leader of the classroom, the control of the class process, the design of the teaching link, and the overall class from the overall situation to the detailed arrangement are particularly important. Important, this process is also a concentrated manifestation of teachers' professional knowledge, professional abilities and professional attitudes under the new curriculum standards. The performance of teachers' professional literacy is also the basis for the effectiveness of the classroom. The bisection classroom model takes students as the main body of learning, and completes the transformation from traditional classrooms to modern classrooms under quality education. As an important participant in the learning process, students' independent learning ability, summarizing ability, active performance in the classroom, and good learning habits will not only affect their own learning results, but also affect others. Therefore, The process of improving students' abilities is also a process of more accurate knowledge absorption and skill mastery.

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