



Application of Data Mining in Computer-Aided Bilingual Teaching System

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Abstract. In order to understand the significance of computer-aided bilingual teaching systems, this article proposes a study that utilizes data mining technology to enhance computer-aided bilingual teaching systems. Firstly, the structure of the computer-aided teaching system was analyzed, and the advantages and benefits of data mining technology in computer-aided teaching were elaborated in detail. Through repeated experimentation and testing, we have found that compared to traditional teaching systems, the total resource utilization of computer-aided bilingual teaching systems has decreased by 50%, indicating that the system has lower resource utilization and certain advantages. Applying data mining technology to the constituent modules of computer-aided teaching systems can improve the intelligence of the system and provide personalized learning assistance to students in a targeted manner. Therefore, the application of data mining technology in computer-aided bilingual teaching systems is of great significance and value.

Keywords: data mining · Computer-aided · teaching system

1 Introduction

With the rapid development of computer technology and information technology, all walks of life have gradually entered a period of information development, and college education is no exception. Due to the rapid development of social economy and culture, people's pursuit for the quality of education is rising day by day, and the traditional teaching methods and models can no longer meet this rapid growth demand. Teaching links are gradually combined with information technology, such as computer-aided bilingual teaching system. However, the traditional computer-aided instruction system still has many disadvantages, such as insufficient personalization and intelligence. With the rapid rise of data mining technology and artificial intelligence technology, people apply data mining technology to computer-aided teaching, which realizes personalized and intelligent application and greatly improves the performance and efficiency of computer-aided teaching. Therefore, many schools began to infiltrate computer technology in the process of classroom teaching, with the help of computer technology to assist the classroom to carry out more efficient and higher quality classroom teaching activities. However, due to some deficiencies in the design of related teaching systems, the computer has not

played its due role and effect in the process of classroom teaching. In order to improve and solve this problem, we must actively seek and explore the methods and measures of innovative classroom teaching system design [1, 2].

2 Computer-Aided Teaching Technology

2.1 Computer-Aided Instruction System Structure

As shown in Fig. 1, the structure of computer-aided instruction usually includes three main parts: knowledge base, teacher module and student module [3, 4].

(1) Student module

Student module records students' mastery of knowledge and students' own information, which is the reflection of students' knowledge structure and learning basic data. It is mainly used to express students' actual cognitive status, current students' knowledge level, etc., and to get his mastery of domain knowledge and skills by explaining students' activities. The information provided by the student module is the basis of the teaching decision made by the teacher module.

(2) Teacher module

The teacher module is the inference engine and driving module of the whole system. It is used to describe teachers' teaching behaviors such as preparing lessons, teaching and answering questions, and to take effective actions to guide learning according to the situation reflected by the student model. Through diagnosis and evaluation, combined with existing teaching experience, we can adjust teaching methods, teaching strategies and knowledge modules, choose the best teaching strategy, evaluate students' behavior and give targeted individual guidance to students, that is, solve the problem of how to teach.

(3) Knowledge base

Knowledge base consists of static knowledge and dynamic knowledge. Static knowledge refers to professional knowledge, assessment knowledge, teaching objectives, teaching process and teaching strategies. Dynamic knowledge is temporary knowledge generated during the operation of the system, which is the prerequisite for the further operation of the system, including intermediate data obtained in the reasoning process, intermediate results of problems, records of problem solving process and other data.

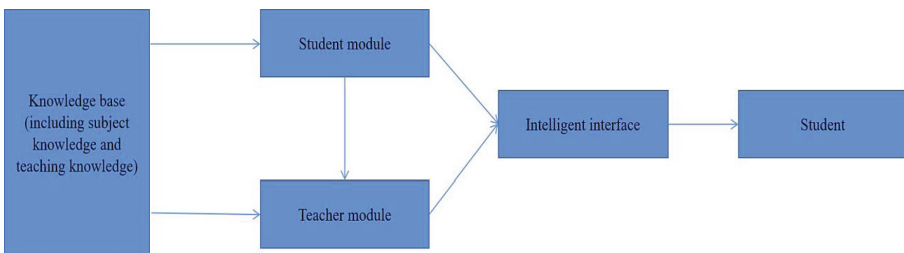


Fig. 1. Structure block diagram of computer aided system

(4) Intelligent interface

Understanding natural language, including dialogue and using good man-machine interface design to organize the knowledge to be taught, makes the information exchange between students and computers unimpeded.

3 Data Mining Is Applied to Computer-Aided Instruction

3.1 Application of Data Mining in Knowledge Base

The application of data mining in knowledge base is mainly manifested in the following aspects: forming knowledge representation and improving teaching mode and strategy.

- (1) Form a knowledge representation. In this process, the course information and skill information in the knowledge base are mainly analyzed, disassembled and modeled to form a certain knowledge system, and then these knowledge bases are transformed into recognizable expression patterns of computer-aided instruction systems by using artificial intelligence technology, thus forming a knowledge representation.
- (2) Improve the teaching mode and strategy. Conduct sample training on the data in the student information base, classify the students' learning of knowledge points as the classification basis, mark each student, and describe the classification characteristics of students. According to these classified data, we can improve the teaching mode and strategy, such as controlling students' learning progress, and we can also give students learning suggestions directly. As shown in Table 1:

3.2 Application of Data Mining in Student Module

The connotation of student information is rich, including basic information, personal college entrance examination score information, personal resume information, personal preference information, etc., which enriches the knowledge base information. This information can be classified and the correlation analysis of these groups is of guiding significance for comprehensively evaluating students' comprehensive ability. In addition, there are many factors that affect students' learning ability and grades, so it is necessary to explore and classify the potential factors. Decision tree algorithm and correlation analysis method in data mining technology can be used to establish examples of influencing factors, analyze them, and then form a correlation model. For example, personal preference indicates a person's special preference for certain things and knowledge, which reflects the person's mastery of knowledge in this field to a certain extent and directly affects the identification result of students' comprehensive ability. By grouping students' abilities, the relationship between student class grouping and other knowledge bases is established, which is convenient for teachers to effectively coach students.

Table 1. Application of Data Mining in Knowledge Base

knowledge base	Student management module	Intelligent management interface	Student users
	Teacher management module		Teacher users

4 Design Methods and Measures of Computer-Aided Classroom Teaching System Based on Data Mining

4.1 Pay Attention to the Application Effect

Based on the background of data mining, we must pay attention to the application effect in the design of computer-aided classroom teaching system. The design and main purpose of the system is not only to assist classroom teaching, but more importantly, to be able to generate certain teaching rules. At the same time, personalized teaching information can be transmitted to it, so as to realize personalized teaching. Only by paying attention to the application effect of the teaching system can we design relevant teaching software in the process of realizing the design of the teaching system, and use the design of relevant teaching software to achieve the teaching effect, thus promoting the development and implementation of teaching work. For teachers, we should not only learn how to apply the computer teaching system, but also pay full attention to the application effect. Teachers should keep learning and trying before applying it, so as to promote the use of the teaching system [8].

4.2 Trial and Error and Modification

After realizing the design of computer-aided classroom teaching system, the next thing to do is to experiment and compare repeatedly. For example, you can choose two experimental classes with the same number of classes (both 60 students). One class uses the original teaching system and the other class uses the newly designed teaching system to carry out teaching activities respectively. After a semester, the two classes were compared and analyzed. If the newly designed teaching system can surpass the original teaching system, it will have certain significance. In addition to testing the application effect of the teaching system, we should also test the resource occupancy rate in this teaching system. In the process of using computer system to carry out related teaching activities, manual teaching will involve the occupancy rate of resources in the teaching system. If the occupancy rate of resources is too high, the fluency of the system will be reduced a lot, which will affect the quality and effect of use. Therefore, before using the relevant teaching system, we must first test its occupancy rate. In the process of testing the resource occupancy ratio, we know that compared with the traditional teaching system, the total resource occupancy rate of this teaching system is 36%. Compared with the traditional teaching system, it is reduced by 50%, so the system takes up less resources and has certain advantages. As shown in Table 2:

4.3 Strengthen Teacher Skills Training

Realizing the design of high-quality teaching system is only the first step to ensure the good development of teaching activities. Teachers are the core of the whole teaching activities, and the teaching system only plays an auxiliary role. Therefore, if you want to maximize the role and effect of the teaching system. In addition to ensuring the quality of the teaching system itself, it is also necessary to strengthen the training of teachers

Table 2. The CPU, memory and hard disk occupancy of different users when using the teaching system

User	CPU occupancy rate	Memory occupancy	Hard disk occupancy
User 1	20%	30%	15%
User 2	15%	25%	12%
User 3	18%	28%	14%
User 4	22%	32%	17%
User 5	16%	26%	13%

and ensure their understanding and application of the new teaching system. Computer-aided instruction is a new teaching method and mode for teachers. And different teachers are different in both learning ability and computer level. As a result, the application of teachers to the teaching system is also different [9, 10].

5 Conclusion

To sum up, it can be seen that the use of computer-aided classroom teaching system to carry out classroom teaching activities has certain advantages. With the assistance of computer teaching system, information can be realized for the development of teaching work, so as to fully ensure the quality of teaching and improve teaching efficiency. In addition, the design of related teaching system can realize the mining, personalized sorting and distribution of teaching information, and then achieve the purpose of personalized teaching. At the same time, combined with the design of computer-aided classroom teaching system, this paper further puts forward methods and measures to promote the design of computer-aided classroom teaching system, hoping that with the help of a series of corresponding suggestions and measures in this paper, more people can master the methods and measures of computer-aided classroom teaching system design based on data mining.

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