

# Function Design of College Student Management Information Platform Based on Data Mining Technology

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**Abstract**—Data mining technology is a new information processing technology. Its purpose is to extract potential and valuable data rules or data models from massive data. The analysis and processing of college teaching data by data mining technology can form real valuable knowledge, provide information support to decision makers, and promote the all-round development of school teaching reform and construction. In the teaching management of colleges and universities, it is often necessary to deal with a large amount of data. These data relate to the basic situation of teachers, students' basic situation and training plan, curriculum arrangement, performance assessment, teaching evaluation and so on. They have some relations with each other, and some important information is also implied. This paper puts forward a new mode of modern university student management, and designs the function of the information platform for the management of college students. Thus, the purpose of optimizing student management is realized by improving the level of students' scientific research and promoting the development of teaching.

**Keywords**—Data mining, Student management, Information platform

## I. INTRODUCTION

With the promotion of modern science and technology, the teaching management in colleges and universities is developing in the direction of "standardization, informationization and networking". Its functions have changed from transaction-oriented, management-oriented to learning-oriented, research-oriented, service-oriented and innovative, and it provides detailed data support for the decision-making, management, reform and construction of schools [1]. College student management is an important part of college management. With the advent of the network era and the rise of information technology, the traditional management of college students can not meet the needs of "people-oriented management", that is, the needs of students' own development under the management concept of service-oriented colleges and universities [2]. In view of the social demand for the development of colleges and universities and the current situation of data management in colleges and universities, it is very important to use these data to rationally analyze the achievements of various aspects of school work and the gains and losses in the process of student training [3]. Applying data mining technology to teaching management, collecting and analyzing the contents of various data representations and their interrelationships will help to find problems in teaching and management in time, thus enhancing the pertinence of

work and improving the quality and efficiency of teaching and management [4]. Applying data mining technology to the field of college student management, we can find out important relationships and some potential rules from a large amount of original information accumulated before, which can provide more valuable information and provide an important basis for decision-making, thus improving the scientific, targeted and efficient management of college students [5-6].

At present, the working style of college students is changing greatly towards the direction of network information. However, although the distance education means based on computer technology and modern communication technology has been widely used in colleges and universities, it provides new means and new ways for modern education [7]. However, the vast majority of colleges and universities are only used for students' teaching, while relatively few are used in college students' management. Data mining technology with poor comprehensive data analysis and prediction function can effectively help colleges and universities to dig out the important contents hidden behind students' trust and data, provide help for practical work, provide the basis for making correct decisions, and better manage students [8]. How to develop and utilize these data and rationally analyze the gains and losses in all aspects of teaching is a common concern of teachers. If we can find out the factors that affect students' academic performance, it will be beneficial to improve the teaching quality [9]. The analysis and processing of college teaching data through data mining technology can form truly valuable knowledge, provide information support to decision makers, and promote the all-round development of school teaching reform and construction [10]. This paper puts forward a new model of modern college student management, and designs the functions of college student management information platform. So as to promote the development of teaching by improving students' scientific research level, and achieve the goal of optimizing students' management.

## II. CONSTRUCTION OF INFORMATION PLATFORM

In order to manage students and realize the educational management function of "educating people first", colleges and universities must update their management concepts, change their management methods and seek the unity of students' educational management objectives and students' management tools. In order to seek this kind of unification,

it is necessary to make clear what the goals, foundations and tools of college students' education management are. Data mining is a process of extracting potentially useful information and knowledge from a large number of incomplete, noisy, fuzzy and random data that people do not know in advance. People-oriented management mode is people-centered. On the basis of determining students' dominant position, all management activities are carried out around mobilizing students' initiative, enthusiasm and creativity. From the perspective of college student management, this management mode is the inevitable orientation of the development of college student management mode. By analyzing the relationship between test scores and employment data, we can objectively analyze the relationship between courses and employment from the perspective of scores, and find out which courses have the greatest influence on which employment quality, so that teachers can provide scientific data support for education and training programs, teaching programs and teaching reform. At the same time, the analysis of the results can help teachers understand their own teaching and students' learning, find out the teaching rules and find out the problems in teaching and learning.

People-oriented student management information platform is an inevitable trend of student management, an important part of the construction of management information system, and a key link to improve the quality and efficiency of student management. "Managing and educating people" is one of the main differences between higher education management and other social organization management. Therefore, in order to embody the core concept of "educating people-oriented", college student management should change its management mode from "material-based management" to service-oriented student management with "people-oriented management" as its goal. The knowledge gained from the analysis of scores and employment data will be fed back to students' learning activities. Students can prepare for courses with strong relevance to their employment goals in advance through the rules between courses and employment, and learn about their weak links through the relationship between courses. In the management of students' behavior, if students want to know the relationship between students' behaviors, they can use this method to calculate the behavior data sets that frequently appear in the related data of students' behaviors [11]. These data sets constitute frequent data groups, which describe the interrelation between students' behaviors. Nowadays, human society has entered the information age. Facing the new situation of leaping development of higher education, on the basis of inheriting the fine tradition of school education management, we must actively explore the new mode of college students' education management under the new situation. The construction of college students' management information platform is based on modern information technology, relying on campus network, reforming around the people-oriented education management mode of college students, realizing the construction of integrated management system of college students' management network information step by step, and comprehensively promoting the construction of digital campus.

### III. APPLICATION OF DATA MINING TECHNOLOGY IN TEACHING MANAGEMENT

#### A. Timely Grasp and Guide Students' Learning Behavior

Data mining can be said to be an interdisciplinary subject, involving computer application, statistical analysis of data and database technology, which promotes people's application of data from low-level simple query to the height of mining and forecasting information from data. Data mining systems often need to traverse and scan the entire data table and massive data, and put as many overall data conversion processes and processing processes in the database system as possible, which is generally more efficient than putting them in the application server layer. If student workers want to know the students' ideological trends, they should set up a database by collecting the students' ideological trends, and find the largest sequence in the given ideological dynamic sequence with minimum support. Each largest sequence represents a student's thought dynamic sequence pattern, and it is said that a sequence satisfying the minimum support limit is a large sequence. This large sequence's thought dynamic pattern is the student's thought dynamic that the student workers want to know, and provides decision-making basis. The common information management mode can be described as a "catalytic reaction", as shown in Figure 1.

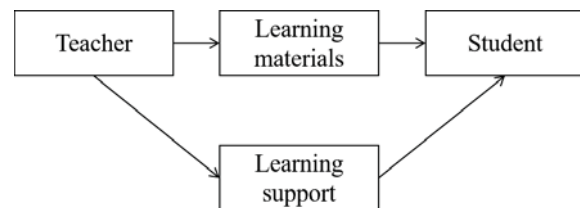


Figure 1 The catalytic reaction mode of information management

When traversing massive data, it is usually centered on application server, which leads to a lot of unnecessary data exchange between application server and database. These large-scale data processing architectures are in progress in the database system, and many optimized processing functions and stored procedures in the database system can also be utilized. In the aspect of student behavior prediction, colleges and universities will set up a huge database system for students' trust and management, and store students' information in it, which is essentially a data warehouse for students' management. Including all students' study, reward, punishment, etc., through correlation analysis, we can find the internal connection from all kinds of credit and cooperation related to students [12]. By using the method of association analysis and evolution analysis of data mining, some rules can be mined from a large number of past data in the database of teaching management system. For example, after analyzing a large amount of data in the past, it is found that boys generally have poor mastery of English grammar. After comprehensively analyzing the reasons, measures are taken from various aspects.

#### B. Analysis of Curriculum Relationship and Optimization of Curriculum Setting

With the rise of mobile Internet and the popularity of mobile terminal devices such as smart phones and tablet computers, college students are getting used to getting all kinds of information and knowledge by using clients to surf the Internet. This also brings challenges and opportunities to the management of college students. Knowledge structure

describes the learner's mastery of the knowledge being or to be learned, mainly including the learner's initial skills, current skills and target skills. Using data mining technology to analyze learners' characteristics, the purpose is to help learners correct their learning behavior [13]. The "internet plus" is the basis for colleges and universities to realize their student management functions, and the student management information platform is a necessary tool for service-oriented college students management in the era of big data. Nowadays, with the rapid development of science and technology in the world, knowledge is updated more and more quickly. Therefore, in the content and structure of teaching materials, we should fully consider the relationship between knowledge and ability, and timely screen and supplement the new content that keeps pace with the times. In teaching methods, heuristic, discussion and interactive teaching are adopted, and experimental teaching reflecting "openness, exploration and research" is actively set up, and case teaching with engineering examples as the carrier is strengthened. The structure diagram of the college student management system is shown in Figure 2.

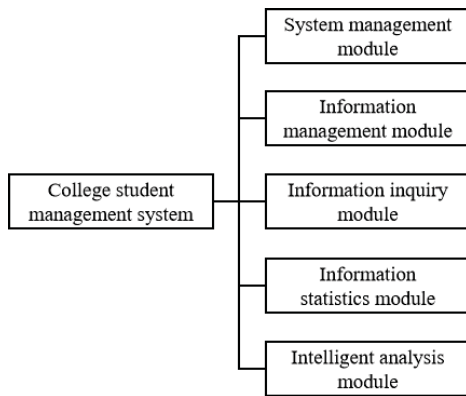


Figure 2 System structure

At present, distance education has been widely used in colleges and universities, and the system can automatically record students' history information during school and establish corresponding databases. Management departments and counselors only rely on this way to transmit information, which not only increases the workload, but also hinders the direct communication between students and student management departments. As long as any one of the student counselors and the staff of the student management department neglects or neglects, it is likely to miss the data requests that students or their parents need to deal with in time, thus delaying the progress of student management. Anomaly detection in educational administration is suitable for students' score analysis, curriculum analysis, teachers' workload, teachers' teaching quality and so on. Expanding the functions of network and digital service in colleges and universities can inspire people and boost morale internally, and promote their own image and open up students' internship and employment markets externally.

A three-layer BP network can be used to complete any n-dimensional to m-dimensional mapping. The number of neurons in the hidden layer  $S = \sqrt{n + m} + a$ , where n and m are the number of nodes in the input and output layers respectively. The activation function of the hidden layer neurons is selected as the hyperbolic tangent function, and the function form is:

$$f(x) = \frac{e^x - e^{-x}}{e^x + e^{-x}} \quad (1)$$

The activation function of the output layer uses the Sigmoid activation function, and the form of the function is:

$$f(x) = \frac{1}{1 + e^{-x}} \quad (2)$$

The induced local domain of a certain neuron j in the hidden layer is:

$$v_j(p) = \sum_{i=1}^n w_{ij} x_i - \theta_j \quad (3)$$

The induced local domain of a certain neuron k in the output layer is:

$$v_k(p) = \sum_{j=1}^s w_{jk} v_j(p) - \theta_k \quad (4)$$

Where n and s are the number of neurons in the input layer and hidden layer, respectively.

When students have sudden conflicts or events that threaten or potentially threaten the survival and development of colleges and universities, the advantages of digital network services, such as quick processing and real-time publication of results, are conducive to driving the situation to develop in a benign direction. In order to train qualified and outstanding engineers, we must further strengthen the construction of engineering education teachers, build a team of excellent quality, reasonable structure and outstanding ability, especially strengthen the training of young teachers' engineering design ability, and create conditions for the improvement of young teachers' engineering design ability. At the same time, it is necessary to employ engineering technicians and management personnel with rich engineering practice experience from enterprises as part-time teachers to undertake professional course teaching tasks. In order to formulate advanced management measures for students' work and improve the effect of educating people, it is necessary to establish a new management mode for students, integrate all students' history information, use the main functions of data mining, analyze and extract valuable information and knowledge, and provide decision-making basis for practical work.

#### IV. CONCLUSIONS

As a tool, data mining is applied to the teaching management of colleges and universities, which can help teaching management workers find hidden rules or patterns in the massive data they come into contact with daily, provide information support for decision-making, and continuously improve the quality of teaching management. With the rapid development of computer technology, especially database technology, the amount of data is increasing, which contains a lot of important information to be discovered. Using data mining technology can make better use of these data, at the same time, it can analyze

them at a higher level, discover the relationship and rules between data from existing data, and predict the development trend. By using the method of association analysis and evolution analysis of data mining, some rules can be mined from a large number of past data in the database of teaching management system. In order to formulate advanced management measures for students' work and improve the effect of educating people, it is necessary to establish a new management mode for students, integrate all students' history information, use the main functions of data mining, analyze and extract valuable information and knowledge, and provide decision-making basis for practical work. Reasonable and effective use of the existing data in schools can play an auxiliary role in the management of relevant aspects of schools, which is also the significance of applying data mining technology to the decision-making system of colleges and universities.

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