Application of Computer Information Processing Technology in Teaching Management Information System of Colleges and Universities

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Abstract. Human beings have entered a new era —— information age, with the rapid development of information technology with network communication technology and multimedia technology as the core, which has caused various profound changes in many fields and accelerated the progress of human beings to the information society. At the same time, with the acceleration of the pace of global economic integration, the level of informatization has become an important symbol to measure the international competitiveness, modernization, comprehensive national strength and economic growth ability of a country and a region. The demand of social development for informatization is becoming more and more intense, and the development of informatization has received unprecedented attention in all countries of the world. As the front position of educational informatization, the process of higher education informatization has had an unprecedented impact on college teaching. Campus, classroom, library and other traditional teaching environment and space-time concept has been adopted and quietly changed. Statistics from the Science and Technology Development Center of the Ministry of Education show that some schools in colleges and universities have built their own campus network, and other schools are under construction, and 98.4% of the colleges and universities with campus network have realized office automation and scientific research networking.

Keywords: Computer, Information Processing, Teaching Management, Information Systems

1. Introduction
With the popularization of higher education, the connotation and extension of teaching management are expanding, and teaching management is becoming more and more complex. In order to further improve the work quality and efficiency, improve the management level and meet the needs of teaching management in the information age, it is necessary to speed up the pace of teaching management informatization.

The application of computer information processing technology in teaching management information system in colleges and universities has attracted the interest of many experts and has been
studied by many teams. For example, some teams have found that in the decades from the rise of educational informatization to the present, the construction of educational and teaching management informatization in colleges and universities has made remarkable achievements. Such as Tsinghua University "Taishan Project" and Renmin University of China "Digital people's Congress" five one "digital campus project. These achievements have expanded the vision of education and teaching management in colleges and universities, updated the concept of education and teaching management, reformed the operation mode of education and teaching management, and greatly promoted the development of education management and the improvement of teaching quality. In the process of training outstanding talents for the society has achieved excellent benefits [1]. Some teams found that at present, the infrastructure construction in the information construction of colleges and universities in China is developing rapidly, and the construction of China's educational and scientific research network has connected many colleges and universities throughout the country. The construction of modern distance education network makes the next generation Internet provide services for many colleges and universities. Besides, the construction of scientific research network in China has made great progress, with more than 16 trillion total computing capacity and more than 180 TB storage capacity [2]. Many scholars have found that in the process of constructing and studying the teaching management data analysis system, Medini Khalid takes the mining and management of teaching data resources as the center, and under the premise of realizing the sharing of data resources effectiveness of data mining and management from the point of view of data management and information analysis [3]. Other teams found that Liu Fengnian's application in the development of teaching quality evaluation system based on data mining technology is based on data mining technology, which is improved from the angles of teaching information resource management, information control and data resource depth mining. On the basis of emphasizing the management and control of teaching resources, the practical application effect of data resources is improved [4]. In the design of network information filtering system based on data mining technology, Yu E mainly studies from the angle of information filtering, data information mining and analysis, and manages the data information mining, extraction, storage and application under the analysis of the information, and improves the practical application effect of communication data in teaching management [5]. Other teams found that the development of computer network is very rapid, and the application of network-based operating system is more and more extensive, which makes colleges and universities begin to change from single machine management to file server teaching management information construction. However, because the network is too small, departments are still using single-machine management software, only some data is placed in the file server for sharing. Each time, we need to import or export according to a certain data format, which can realize resource sharing, can not build a smooth teaching management information system, and most of the time the teaching management information software is data format conversion service [6]. Due to the limited development of computer software, hardware and computer network, most of them buy computers, only use computers to make documents and simple software applications, or develop a single teaching management software according to their work needs. This kind of teaching management software can only run on a single machine, simple and practical, mainly for student status and achievement management management of student status and achievement, but because of the short period of software development, the development of more or more basic database software, the software has poor fault tolerance, poor compatibility, easy to lose data by computer virus, and can not meet the needs of massive data processing, because of the increasing scale of colleges and universities. These teaching management software become the bottleneck of teaching management [7]. Although their research results are very rich, but there are still some shortcomings.

At present, there are new situations such as information explosion, transparency increase, interactivity increase, virtualization increase, humanization increase in teaching management informatization in colleges and universities. This study attempts to explore how to deal with new situations and problems, how to run quickly and effectively, and how to integrate modern education management and focus on the methods and strategies of teaching management informatization to solve
the problems existing in current teaching management practice in order to improve the efficiency and reliability of teaching management. Taking the informatization of teaching management in colleges and universities as the research theme, this paper chooses the informatization of undergraduate teaching management as the research scope, and analyzes the theory and practice of the new mode of teaching management informatization.

2. Method

2.1. Calculation of Fitness Values

Suppose that with the improvement of Apriori algorithm, based on the establishment of database D, it is easy to use these frequent predicates to generate strong association rules. Here, the strong association rule can be understood as the association rule that can satisfy the minimum support threshold and the minimum confidence threshold. For the confidence degree of the association rule, it can be defined by the conditional concept of the corresponding predicate support degree in the rule. In pseudocode form, can be expressed as [8]:

\[
\text{conf}(A \Rightarrow B) = \frac{\text{support}(A \cup B)}{\text{support}(A)} \quad (1)
\]

Let S=1 denote all non-empty subsets and satisfy all r, for this non-empty subset:

\[
I = \frac{\text{confidence}(X \Rightarrow Y) - \text{support}(X \Rightarrow Y)}{\max\{\text{confidence}(X \Rightarrow Y), \text{support}(X \Rightarrow Y)\}} \quad (2)
\]

When the value of the I is greater than the minimum interest threshold, the T can be expressed as:

\[
T \leftarrow (T = \frac{1}{\text{interest}}) \quad (3)
\]

The above formula represents the determined output rules and the corresponding degree of interest, repeating the above process until the cycle conditions are no longer satisfied. Based on Apriori for the improvement and application of the algorithm, we need to analyze the emphasis of the algorithm from the point of view of data parameters, information processing and so on. Based on the control and perfection of data constraints, it is necessary to improve the practical application effect of Apriori algorithm through data mining and hierarchical control. To realize the application and control of Apriori algorithm improvement, it needs to be improved from the angle of different constraints and data association rule analysis, and then improve the practical application effect of Apriori algorithm in teaching data management.

2.2. Regression Equation

The regression equation shows that, TOM2" establishment of specialized technical departments for system development and maintenance ", TRM6" Colleges and universities will regularly conduct professional training for technical personnel ", TFM1" the funds raised by colleges and universities can satisfy the information construction, Don't limit the development of information because of lack of funds ", TRM2" teaching management department with professional and technical personnel ", A significant positive correlation with TIM, An increase of 61.6 per cent in TOM2 unit information, A 52.6% increase in TRM6 unit information, A 51.6% increase in TFM1 unit information, TRM2 unit teaching management information level increased 41.3. See formula for regression equation [9]:

\[
TMI = 0.616TOM2 + 0.526TRM6 + 0.516TFM1 + 0.413TRM2 + 3.363 \quad (4)
\]

2.3. Regression Variance

The regression variance shows that there is a significant positive correlation between the level of teaching management information and resource management and technical organization management. When TRM and TOM add one unit, the TMI increases 7.3 units and 10.1 units, respectively. It can be seen that colleges and universities can improve the level of teaching management information by
improving the level of teaching management technology human resources management, among which
the effect of technical organization management on the improvement of teaching management
information is more obvious. The formula can be expressed as [10]:

\[ \ln(TMI) = 0.073TRM + 0.101TOM + 1.468 \]  \hspace{1cm} (5)

3. Experiment

3.1. Source of Experimental Data
Based on the background of teaching management informatization in Huanggang normal University
and the implementation and effect of teaching management informatization in colleges and
universities in China, this study starts from the study of the present situation of teaching management
informatization, and on the basis of consulting a large number of documents, This paper analyzes the
development trend and existing problems of teaching management informatization. In the long-term
research and practice of teaching management informatization, hundreds of information management
papers have been browsed with the help of network electronic journals, and more than 100 articles on
the research and construction of teaching management informatization have been downloaded.

3.2. Experimental Design
The method used in this study is literature retrieval and comparative study. Literature retrieval method
is to analyze the problems and challenges faced by the informatization of teaching management in
colleges and universities by consulting relevant documents, and to explore the connection point
between the theory of informatization of education management and the reform of teaching
management.

4. Result

4.1. Age Distribution

![Figure 1](image)

**Figure 1.** Statistics on the number of papers published 2010-2020

The urgent need of information construction of teaching management in colleges and universities in
China is closely related to the leapfrog development of colleges and universities. Therefore, I chose
2010-2020 as the time period to summarize the research results of teaching management information
in domestic colleges and universities, and downloaded and consulted more than 110 university teaching management information papers with the help of network information retrieval of academic journals and dissertations. More than 60 papers and 8 dissertations are published in academic journals.

Based on the year of publication, Download over 110 academic papers, It is concluded that the number of related academic papers published in these 10 years is increasing. Less than 5 papers (4 in 2010) were published before 2016, 3 in 2012, 4 in 2014), From 2010 to 2020, 16, 10, 16, 20 and 11. On the one hand, The number of papers published above reflects the gradual growth of information research on teaching management in colleges and universities in the past 10 years, on the other hand, it also shows that the introduction of relevant national policies and documents has brought guidance and promotion to the development of information construction of teaching management in colleges and universities.

4.2. New Generation of Information Technology

In this paper, teachers and students need to understand what is cloud computing or Internet of things to confirm teachers and students' understanding of the new generation of information technology. The results of the analysis are shown in figure 2. From the analysis results, the number of teachers who know cloud computing is only 1/8; the number of people who know the Internet of things is only 10; and the number of students who know cloud computing is less than 1/20, and the number of people who know the Internet of things is only 3.5. It can be clearly seen from the results that the information consciousness of teachers and students in colleges and universities is very weak and the understanding of the new generation of information technology is very little, which fully shows that the information consciousness of colleges and universities is weak and the attention to information construction is not enough.

![Figure 2. Analysis of the new generation of information technology by teachers and students in colleges and universities](image)

4.3. Data Mining

At present, many educational resources in our country are not rich enough, and some teaching and educational resources have the problems of repeated construction and limited level. Because of the
application of network technology, there are many teaching information resources on the network, but many of these teaching information resources are repetitive, much the same, and the high quality teaching information resources that can be applied to college education and teaching are seriously scarce. Some college teachers choose high-quality educational resources in a large number of repetitive information resources. The present situation of the questionnaire is shown in Table 1. Through the data collation of the questionnaire and the analysis of the data, we can clearly see the use of information technology in three colleges and universities. The proportion of teachers using the new generation of information technology (distance teaching, electronic teaching, video teaching) is lower than that of students through the new generation of information technology.

Table 1. Details of the questionnaire

|   | SWUFED | Sichuan University | Chengdu University of Technology |
|---|---------|--------------------|----------------------------------|
| B | Questionnaire distribution | 237 | 123 | 132 |
| C | Recovery of questionnaires | 219 | 45 | 73 |
| D | Student survey number | 177 | 33 | 54 |
| E | Number of students studying using IT | 135 | 28 | 45 |
| F | Number of teachers surveyed | 42 | 12 | 19 |
| G | Number of teachers using information technology | 13 | 4 | 5 |

4.4. Logic Structure Design

Nowadays, information systems generally use relational DBMS to manage their own databases. An important advantage of relational DBMS is that the relationship between entity data itself and entities is stored in relational tables. When implementing relationships, each relationship corresponds to a table. For example, the course type table is used for basic information such as course type, such as course code, course type, etc. The relational pattern of the course type table is shown in Table 2.

Table 2. Structure of the course typology

| Field name | Field type | Field description | Length of field | Is the primary key | Is it empty |
|------------|------------|-------------------|-----------------|-------------------|-------------|
| KCDM       | varchar    | Course code       | 8               | yes               |             |
| KCLX       | varchar    | The type of course| 4               |                   |             |
| BZ         | varchar    | Remarks            | 200             |                   |             |

5. Conclusion

With the development of computer network information technology and the in-depth research and wide application of information integration management, modern integrated management theory and application technology gradually appear in the theoretical development and practical application of modern management. The integrated management system is based on modern management theory and takes network information technology and information integration technology as the core and means to realize the integrated mode management of modern organizations in order to realize the high efficiency and high benefit of management. The management of education and teaching in colleges and universities is the most basic link of university management, the indispensable operation link and process of normal development and orderly operation of teaching activities in colleges and universities, and the important symbol of national education informatization.
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