Construction of Student Education Management System Model Based on Big Data Mining Technology

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Abstract

Student education management in higher vocational colleges is a process in which students' education managers formulate management systems according to the laws of education and teaching management, and plan, control, lead and organize student activities, which can ensure the smooth development of students' learning and belongs to one of the core management contents in the management of colleges and universities. In the new era, there are higher requirements for the students in higher vocational colleges in terms of quality level. When higher vocational colleges implement student education management, there are still many problems due to many factors, resulting in the failure to achieve the expected management goals. Data mining technology can effectively help higher vocational colleges to dig out the important contents hidden behind students' information data, provide help for practical work, provide the basis for making correct decisions and better manage students. This paper puts forward the use of data mining technology in the decision-making of student management in higher vocational colleges, and analyzes the effective ways to improve and innovate the educational management system of students in higher vocational colleges, aiming at comprehensively strengthening the quality of educational management and promoting the development of vocational education.

Keywords: Education management, Data mining, Vocational education

Ⅰ. Introduction

The development of society is inseparable from the accumulation of high-quality talents, and the social demand for high-quality talents has also spawned many higher vocational education institutions [1]. Higher vocational education has the functions of vocational college education and college education. Its fundamental task is to cultivate practical, technical, quality and innovative technical talents facing enterprises and production [2]. Although Chinese vocational colleges have accumulated a lot of educational experience in student education and teaching, there are many problems in the educational management of Vocational Colleges due to the short educational history and complex student structure [3]. Student education management in higher vocational colleges is a process in which student education managers formulate management systems according to the laws of education and teaching management, and plan, control, lead and organize student activities. It can ensure the smooth development of students' learning, which is one of the core management contents in the management of colleges and universities. For higher vocational colleges, how to cultivate the so-called high-end technical professionals and how to ensure that the trained talents will be used by the society are the main problems that should always be focused in the development of higher vocational colleges at present and in the future [4]. In the new era, there are higher requirements for higher vocational college students in terms of quality level. This requires higher vocational colleges to constantly explore and innovate, explore a more efficient education management mode, so that students can learn how to study independently and strengthen their comprehensive quality and ability in the process of classroom education in Higher Vocational Colleges [5].

With the maturity of computer technology and the popularization and application of database and Internet technology in finance, production, marketing, education and other fields, human accumulation of data is also increasing [6]. Huge data fills people's lives, and there is a lot of rich information in these huge data. Under the background of social development and progress, how to innovate and improve the teaching quality of vocational colleges is a problem that many vocational college managers need to think about [7]. Education is not only the

teaching of knowledge content, but also the strengthening of various practical abilities. Therefore, in the process of developing discipline education, higher vocational colleges need to analyze the social demand for students and explore a new educational management mode of Higher Vocational Colleges Based on the social demand for high-quality talents under the current social background [8]. Data mining technology can effectively help higher vocational colleges mine the important contents hidden behind students' information data, provide help for practical work, provide the basis for making correct decisions, and better manage students [9]. When innovating the management of vocational colleges, it is necessary to adopt appropriate management methods according to the actual characteristics of students, conduct a comprehensive analysis of these management methods, actively explore innovative methods of educational management of vocational colleges, and promote the development and progress of society [10]. This paper puts forward the use of data mining technology in higher vocational college student management decision-making, analyzes the effective path of improving and Innovating Higher Vocational College student education management system, in order to comprehensively strengthen the quality of its education management and promote the development of vocational education.

Ⅱ. Main Characteristics of Student Education Management in Higher Vocational Colleges

A. Complexity of Management Objectives

Higher vocational colleges have insufficient work experience in student education management, and it takes time to observe when the society fully recognizes and understands the educational conditions and social functions and influences of higher vocational colleges. According to the enrollment data of higher vocational colleges in recent years, it can be seen that all social enterprises still treat vocational college students with colored eyes and prefer ordinary undergraduate graduates. Because the concepts, systems and methods of implementing student education management in higher vocational colleges can't meet the actual needs of students at present, and the working experience of students' education management staff in higher vocational colleges is lacking, and all sectors of society prefer graduates from ordinary undergraduate colleges, students in higher vocational colleges are facing greater employment pressure, thus forming a unique background of student education management. Due to the popularization and application of information technology in life, teachers should encourage students to actively carry out knowledge expansion learning, and guide students to receive cultural knowledge while shielding bad information, and gradually cultivate students' ability to distinguish right from wrong [11]. Compared with ordinary colleges, higher vocational colleges have a lower threshold for admission scores, so students can enter higher vocational colleges relatively easily. However, compared with ordinary higher vocational colleges, the admission scores of these students represent that the students' cultural foundation is relatively weak, so it is inevitable that there will be a certain gap in their hearts, and they will also have a strong sense of inferiority in their study and life.

Many students lack self-confidence in their own learning ability, so they simply choose to abandon themselves and not concentrate on their studies without the control of teachers. This also makes the atmosphere of some higher vocational colleges worse and worse, and teachers in higher vocational colleges have also increased the difficulty in managing students' education. Teachers in higher vocational schools should fully understand each student's psychological state, communicate with students with poor psychological state in time, and go deep into students' hearts to better understand them. On this basis, effective classroom teaching methods and hierarchical teaching activities are adopted to promote the healthy development of students' psychology. With the increasing employment pressure of graduates, the competition among talents is becoming more and more fierce, and various fields pay more attention to graduation qualifications and put forward higher requirements. These factors together, no doubt, have a great impact on the spirit and psychology of higher vocational students, which will lead to their inferiority complex, and then increase the difficulties of students' education management [12]. Higher vocational college students have already had mature physiological and psychological characteristics, but due to the failure of college entrance examination, competitive pressure and many other aspects, students' psychology will be unbalanced. Therefore, teachers should regard mental health education as the key content in students' management, and only when students achieve mental health development can classroom teaching be carried out efficiently.

B. Manage Content Taskability

Compared with other ordinary undergraduate colleges, the specialty setting of higher vocational colleges corresponds to students' future work, and the task and purpose of teaching are very clear. Therefore, education administrators should pay attention to the cultivation of basic quality education and strengthen the cultivation of professional quality in the process of work. Compared with ordinary undergraduate colleges, the majors of higher vocational colleges correspond to the jobs of students after graduation. Its teaching task and teaching goal are clear, that is, to train students' quality education and vocational skills education at the same time. In the actual classroom teaching process, if the teacher's education management is more than loose, it will lead to students with poor self-determination ability wasting their studies because of their loose character. If teachers' education management is strict, students' individualized development and potential stimulation will be severely restricted. The education of higher vocational colleges needs to actively change the educational thought, teaching methods and management system, and take it as a task to implement. Therefore, it has formed the task of student education management in higher vocational colleges. With the improvement of economic level and the popularization of information technology, many unhealthy trends have impacted the campus learning environment, which has made the work of honesty education more difficult. Moreover, some students have grown up under the care of their parents, which makes it of great significance for higher vocational colleges to carry out hard-working education.

Students' ideological education should effectively solve students' ideological and practical problems, not only be able to convince students, but also pay attention to the emotional art of education, so as to improve the effectiveness of ideological education. The future career development of students is a practical problem faced by higher vocational college students. Higher vocational colleges should take this as a starting point to fully implement this work, not only to solve the problem of students' work, but also to send more professionals with high quality and strong skills to the society. The main purpose of education and teaching in higher vocational schools is to make students better serve the society and get recognition from all walks of life. Therefore, higher vocational schools should understand what kind of talents are needed for social development, so as to better carry out the education and teaching work in higher vocational schools. In classroom teaching, teachers should consciously bring students into enterprises for practical study, so as to let students know the development direction, internal culture and employment requirements of enterprises, or invite enterprises to give educational lectures in schools, so as to help students understand the differences between themselves and their needs for talents and improve their cognitive ability.

Ⅲ. Innovation of Student Education Management System Based on Big Data Mining Technology

For modern society, high-quality talents mean higher innovative ideology and stable practical operation level. That is to say, higher vocational college students have a better foundation in the development of comprehensive quality and ability than ordinary higher vocational college students. As long as the students in higher vocational colleges can actively participate in classroom teaching and enhance their basic knowledge level, combined with certain social practice courses, they can be closer to the social requirements for high-quality talents. For contemporary vocational college students, they have distinct personality, pay attention to individual subjective thoughts, make public their personality, be independent, and don't like to be asked, controlled or bound [13]. They are very clear about their own needs and know their actual needs. Therefore, when students are educated and managed in higher vocational colleges, various problems often arise, and it is difficult to achieve ideal work results. At present, the demand of enterprises for talents is not only professional theoretical knowledge and practical operation ability, but also requires talents to have high sense of responsibility, good working attitude, dedication and cooperation spirit and personality quality.

With the popularization of education, the scale of running schools is increasing day by day, and more and more students can enter schools to receive education. However, with the increase of the scale and the number of students, all kinds of new problems have been brought about, which makes the school management face enormous pressure and new challenges. The architecture of interactive cloud platform for teaching resource management is shown in Figure 1.
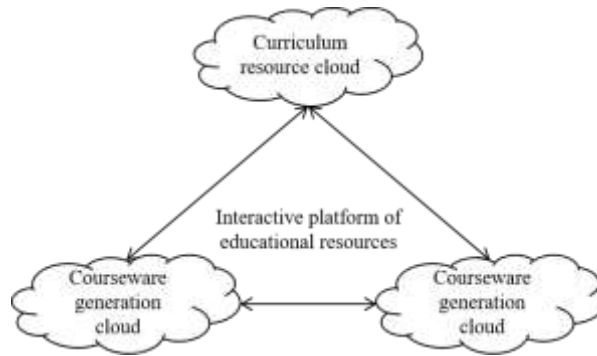
Fig.1 Interactive Cloud Platform for Teaching Resource Management

Students' education management institutions in higher vocational colleges should be composed and led by principals and corporate presidents of partners, and be responsible for policy formulation, work-study combination planning and management of students' education management. In addition, the responsible persons of students' education management should be elected, their tasks should be implemented, and the normal progress and quality of supervision and management should be assessed. The educational management process based on data mining technology is shown in Figure 2.
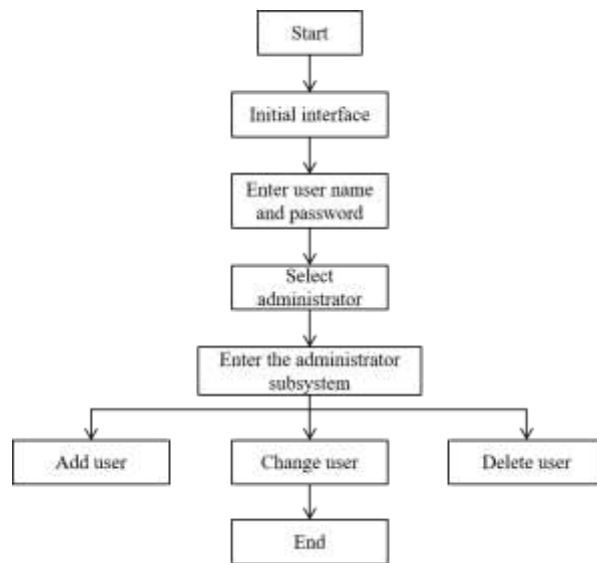

Fig.2 Education Management Process Based on Cloud Computing Technology

Suppose $x_i \in R^n$ is a factor that affects education management, and y_i is the value of education management.

The education management model based on data mining is to find the relationship between x_i and y_i:

$$f : R^n \rightarrow R \qquad (1)$$

$$y_i = f\left(x_i\right) \qquad (2)$$

In the formula: R^n is a factor that affects education management. According to data mining theory, the establishment of an education management model seeks to establish the following expression:

$$f\left(x\right) = \sum_{i=1}^{k}\left(a_i - a_i^*\right)K\left(x, x_i\right) + b \qquad (3)$$

Where: x is a factor that affects education, x_i is the i-th sample among k samples, and $K\left(x, x_i\right)$ is the kernel function. The kernel function adopts the radial basis function, as shown in the following formula:

$$K\left(x, y\right) = \exp\left|-\frac{\|x - y\|^2}{2\sigma^2}\right| \qquad (4)$$

The basic task of higher vocational education is to cultivate comprehensive talents that meets the needs of social development. The future development of students in higher vocational colleges is facing the practical problems of career development. Therefore, higher vocational colleges take employment as the breakthrough point and implement management work comprehensively. While solving the employment problems of students, they also need to provide high-quality and strong skilled talents for the society. In the education and teaching work of higher vocational colleges, students' lack of learning autonomy and behavior self-discipline leads to their poor learning effect, which requires teachers to guide education and management. Students' education and management are systematic education and teaching projects, which require the participation of all employees and the coordination and cooperation of multiple departments. When constructing the system, higher vocational colleges should fully combine the characteristics of current students, and let students feel that they are fully respected and understood in terms of language and specific content, and reflect their fairness. After the establishment of student education management institutions, in order to ensure the normal operation of their work, it is necessary to improve the rules and regulations of student education management. The formulation of student education management system in higher vocational colleges should not only consider students' growth and career development, but also consider the necessity and principle of formulation and implementation, so that students can be well educated and managed while respecting them. The implementation process of the hybrid education management platform based on data mining is shown in Figure 3.
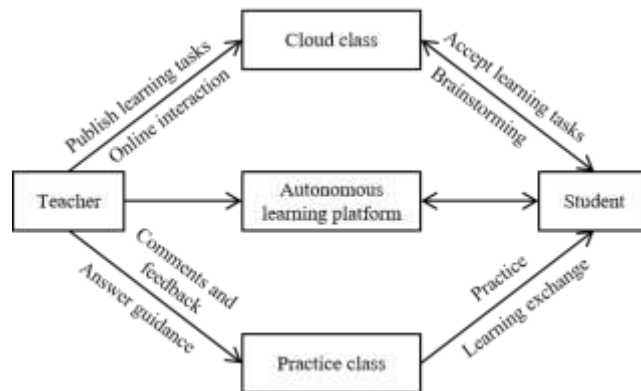

Fig.3 Hybrid Education Management Platform

The ultimate goal of higher vocational colleges is to deliver more effective and excellent technical talents to the society. Therefore, colleges must not only provide students with services for future growth and career development, but also implement the necessary level of education and management. Students should be fully clarified about their own responsibilities and the rules that must be followed, and they should be clearly aware of the boundaries that should not be violated or crossed, and they can be given full freedom within the scope of specific regulations. In the process of establishing a specific system, we should not only pay attention to the enrollment education of freshmen, but also strengthen the education and management of daily learning, not to mention employment counseling. If

graduated students can fully affirm the colleges and universities, if the relevant companies that accept graduates believe that the overall quality of the college students is good, the professional skills are strong, and the comprehensive literacy is high, they will be widely disseminated in the society, thereby improving the colleges and universities. The influence and reputation of the company have been well received by the public. Under the student management organization, various departments can be set up according to majors, which are mainly responsible for the implementation of education management policies in majors, including the formulation of training programs, the construction of training bases, and fund management. The student education management institutions of higher vocational colleges organically integrate the requirements of the enterprise and the current society on students, and can cultivate more practical, innovative and professional talents.

Ⅳ. Conclusions

The student education management system of higher vocational colleges has its own characteristics. For college leaders and education administrators, they should be deeply aware of the current deficiencies in education management work, pay full attention to them, and explore effective measures in an all-round way. Data mining can provide important and extremely valuable information or knowledge for the management and education of student workers, which has an immeasurable effect. It is of practical significance to popularize and apply in the management of students in higher vocational colleges. The education management of students in higher vocational colleges can only ensure the perfection of the education management system when the people-oriented concept is truly implemented and the content of education management is refined, the social ideology of the star ring is established, and the management system construction is continuously strengthened. If graduated students can fully affirm the colleges and universities, if the relevant companies that accept graduates believe that the overall quality of the college students is good, the professional skills are strong, and the comprehensive literacy is high, they will be widely disseminated in the society, thereby improving the colleges and universities. The influence and reputation of the company have been well received by the public. In order to effectively improve the quality of education, the educational management model innovation of higher vocational colleges has become the main way to promote the development of higher vocational colleges. We hope that our higher vocational colleges will seize the opportunities of historical development and combine their own reality and student reality to innovate Some new models that are more conducive to the development of education management in higher vocational colleges.

Ⅴ. Acknowledgment

References

[1] Guo Haizhao. Research on University Educational Administration Management Based on Data Mining Technology. Digital World, vol. 176, no. 6, pp. 213-213, 2020.
[2] Chu Zhitao. Application of Association Rules Mining in Open Education Teaching Management. Journal of Nanjing Radio and TV University, vol. 94, no. 1, pp. 67-69, 2019.
[3] Mi Baoquan. Application of data mining technology in teaching management of higher vocational colleges. Software Guide, vol. 190, no. 8, pp. 182-185, 2018.
[4] Liu Shuli. Research on the Management System of the Student Union in the Educational Management of College Students. Heilongjiang Science, vol. 166, no. 3, pp. 136-137+141, 2020.
[5] Xiu Lijuan. Research on the Normalization System of College Student Party Member Education Management in the New Media Era. Journal of Liaoning Agricultural Vocational and Technical College, vol. 114, no. 6, pp. 52-53, 2020.

[6] Xu Lingjun. Constructing and optimizing the clean education management system for kindergarten teachers. Times Finance, vol. 715, no. 33, pp. 377-378, 2018.

[7] Zhao Cairu. Strategies to improve the management system of ideological and political education for college students. Industry and Technology Forum, vol. 16, no. 17, pp. 277-278, 2017.

[8] Wang Yuandong. Research on the Labor Safety Risk Management Legal System of Vocational Education Internship Students. Vocational and Technical Education, vol. 37, no. 16, pp. 41-45, 2016.

[9] Lu Yunting, Zhang Defen. Research on multi-dimensional teaching data mining based on adjoint data collection. Science Education Journal (mid-day issue), vol. 419, no. 8, pp. 129-130, 2020.

[10] Zhou Yan, Li Feng, Huang Wei. Research on University Teaching Management Based on Graduate Employment Data Mining. Western Quality Education, vol. 5, no. 7, pp. 101-102, 2019.

[11] Wan Yangyang. Talking about the application of data mining in campus informatization. Strait Science and Technology and Industry, vol. 242, no. 9, pp. 31-33, 2019.

[12] Shi Quan, Qian Yuan, Sun Ling. Research on Online Learning Process Supervision Based on Educational Data Mining. Modern Educational Technology, vol. 26, no. 6, pp. 87-93, 2016.

[13] Chang Junlin, Zhang Zhen. Application of Data Mining in Teaching Evaluation of Colleges and Universities. Journal of Zhongzhou University, vol. 33, no. 2, pp. 105-107, 2016.