The Construction of Problem Discovery of Students' Ideological Education and Its Management Platform in Universities Based on Data Mining

Xi LI[a,1]

[a]*Guangxi Vocational Normal University, Nanning 530012, China*

Abstract. In order to cultivate the sound personality of college students, the problem discovery and management platform of ideological and political education for college students based on data mining was proposed. Rely on the relevant technologies of data mining and database, establish a prevention platform for ideological and political education problems of college students. It aims to overcome the limitations of time and space, analyze the ideological and political education problems of all college students with accurate data, and find and solve problems in time. The system test results show that the average score index standard, based on a score greater than 1.5, calculates the number of students with abnormal symptoms. The Apriori algorithm of association rules is used to mine the relationship between 10 ideological and political factors in the selected dataset. Conclusion: To better help higher colleges carry out prevention and treatment of ideological and political education problems.

Keywords. Colleges and universities; Civic and political education issues; Data mining; Database

1. Introduction

As the saying goes, "the paper is not as shallow as it should be", many students in the learning knowledge, just learning and accepting book knowledge, and in the actual workplace needs of professional comprehensive ability, not just the theoretical knowledge on the books, more inclined to the students' practical ability. Therefore, if colleges and universities do not educate students on the ideological education of professional quality and planning, students will be exposed to the defects of professional moral quality in the process of internship, which not only affects the students' self-occupational development, but also hinders the advancement of the enterprise [1]. At present, the domestic universities in the use of work-learning combination teaching mode, in the lack of talent and other phenomena in the civic education, resulting in the slow development of civic education in universities [2]. When students in school during the civic education can barely cope, once students leave school in the enterprise internship, there is no sufficient resources to be allocated, resulting in students' civic education work cannot be timely and in-depth development [3].

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[1] Corresponding Author. Xi Li 269578903@qq.com

In fact, during the period of students' internship, it is still necessary to carry out their ideological and political education, therefore, it is necessary for colleges and enterprises to jointly establish a student ideological and political education organization or department to carry out students' ideological and political education, so that the students can gradually form a healthy, positive and correct values in the process of self-growth. However, at present, the development of many enterprises is not mature, and they only focus on economic benefits or production efficiency after hiring talents, but ignore ideological education [4].

It brings certain difficulties to the development of ideological education in universities. First of all, the change of thinking level. Due to the difference in learning ability of each student, coupled with the different nature of work in different environments, will directly affect or even change the behavior of students, therefore, if students with different levels of thinking continue to take the same way of civic education, the effect will certainly be extremely poor [5]. Secondly, the time and place of ideological education are scattered. Students in colleges will be assigned to different places during their internship, which makes it impossible to unify the time, place, method and focus of civic and political education. The society defines universities as schools for students with poor grades, which makes many students in universities have an inferiority complex at the psychological level, coupled with the fact that most of the jobs they are engaged in are technical jobs, which makes it even easier for them to have many psychological barriers during the internship period, such as loss, anxiety, boredom and frustration, which largely determines the direction of the development of the career development of university students [6]. Therefore, strengthening the psychological quality education of students in universities can improve the level and quality of ideological education from the side. In the process of psychological quality education, it can help students to carry out timely psychological guidance, so that students gradually form a strong self-thought system, positive, optimistic and upward growth [7].

This paper is based on the idea of data mining and database to establish a platform for preventing and controlling problems in civic education in order to help students cope with psychological problems in a more timely and effective way and to promote their healthy growth.

2. The research methodology

2.1 Problems of university students' political thinking

2.1.1 Overview of the problem of university students' political thinking

All kinds of political and behavioral abnormalities are considered political problems. Depending on the degree of severity, they can be categorized as ideological problems, ideological disorders and mental illnesses. The study found that among all the factors, the self-induced factors accounted for the highest proportion. As a matter of fact, most of the college students are in the category of general ideological disturbances, but if they are not regulated and channeled in a timely manner, the continuous development will lead to ideological disorders or mental illnesses [13].

2.1.2 Problems and Countermeasures for Civic Health Prevention and Control in Higher Education

At present, although the problem of students' ideological and political education has been paid attention to by colleges and universities, there are still problems in the prevention and treatment of students' ideological and political education in colleges and universities. The failure to prevent and control students' ideological and political problems is mainly attributed to both subjective and objective aspects.

Subjective is the aspect of college students themselves. Most of the students think that it is a shame to have political problems, and they don't want to be known by others that they have gone to political counseling [8].

The objective aspects are: (1) the lack of professional teachers in schools; (2) the insufficient efforts of schools to prevent and monitor the ideological problems and the lack of data support, objectivity and effectiveness through subjective observation. In order to solve these problems, an online platform based on data mining and database should be established to prevent and control students' ideological and political education problems, and the prevention and control work should be carried out through the combination of online and offline [9]. First of all, the platform can be used as an intermediary system to communicate between college students and the team of ideological and political consultants, to realize the sharing of ideological and political consultants in different regions, and to solve the phenomenon of the lack of teachers' power in a practical way; secondly, the school can use the platform to regularly distribute the questionnaire on ideological and political health to all students, and the information and privacy of the students' information will be absolutely protected; at the same time, real-time monitoring and precise analysis can be realized by using data mining and database, to enhance the prevention and control work through the combination of online and offline methods [9]. At the same time, the use of data mining and database can realize real-time monitoring and accurate analysis, and enhance the prevention and monitoring efforts.

Next, the author will elaborate the specific use of data mining and database technology in building this platform.

2.2 Data mining techniques

2.2.1 The concept of data mining techniques

Data Mining (DM) refers to the process of correlating a certain special relationship from many data, and finding its rules through association and analysis of data.

2.2.2 The complete process of data mining

(1) Understand data and sources of data. (2) Acquire relevant knowledge and techniques. (3) Integrate and examine data. (4) Remove erroneous or inconsistent data. (5) Modeling and hypothesizing. (6) Actual data mining work. (7) Testing and validating mining results. (8) Interpretation and application.

2.2.3 Application of Apriori algorithm in data mining

Based on the design of the Civic Issues Prevention and Control Platform applying the mining of association rules in data mining, this design applies the association rules to

derive the links between different options in the Civic Questionnaire of different college students in the database, and find out the possible Civic Issues of the college students from these links, and we can automatically match the Civic Instructors of the college students with the Civic Tutors for the targeted Civic Counseling, and carry out the services such as Civic Counseling Test and Auto Associated College Students Information, etc. effectively. We can automatically match the tutors with the students to provide targeted counseling, effectively conduct the test for the students and automatically associate the students' information with the tutors.

Apriori algorithm is one of the algorithms using association rules in data mining. Mining association rules requires mining association rules that meet the minimum support and confidence defined by users from the transaction database. Generally, association rule mining is a 1 - 2 step process.

Step 1: Find out all the frequent itemsets in the transaction database.

Step 2: Generate strong association rules from frequent itemsets, i.e., rules that satisfy minimum support and minimum confidence.

Support is as follows (1):

$$\text{support}(X, Y) = P(XY) = \frac{\text{number}(XY)}{\text{num}(\text{AllSamples})} \tag{1}$$

Confidence is as follows (2):

$$\text{Confidence}(X \Leftarrow Y) = P(X|Y) = P(XY)/P(Y) \tag{2}$$

The degree of upgrading is given in equation (3) below.

$$\text{Lift}(X \Leftarrow Y) = P(X|Y)/P(X) = \text{Confidence}(X \Leftarrow Y)/P(X) \tag{3}$$

Elevated degrees indicate that in the presence of Y under the conditions of the X The probability that the event exists, and in the case of with, the X The ratio of the probabilities of events; the degree of lift is that the X Events and Y Reflect the law between events. If the lifting degree is greater than 1, X crucible Y is a valid law, and if the lifting degree is less than or equal to 1 then X earthen pot/jar Y It is the law of nullification. There is a special existence if X Events and Y events are independent of each other, then there are $\text{Lift}(X \Leftarrow Y) = 1$ And at this point $P(X \mid Y) = P(X)P(X \mid Y) = P(X)$。

2.3 Database technology

2.3.1 The concept of database technology

A database is a collection of data that is stored together in a certain way, that can be shared by multiple users, and that is independent of the program. Databases are usually categorized as hierarchical databases, network databases and relational databases. And different databases are linked and organized according to different data structures. The main application of this design is network database.

2.3.2 Network databases

Network database - Oracle database, also known as Oracle RDBMS, is one of the most popular network databases in the world at present. The database system has the characteristics of good portability, strong functions, etc. The database can be used in various large, medium and small computer environments, and is a database with high efficiency, reliability, and throughput. Oracle database can store more data with higher persistence. This design will use oracle database as the background database to provide data support for users.
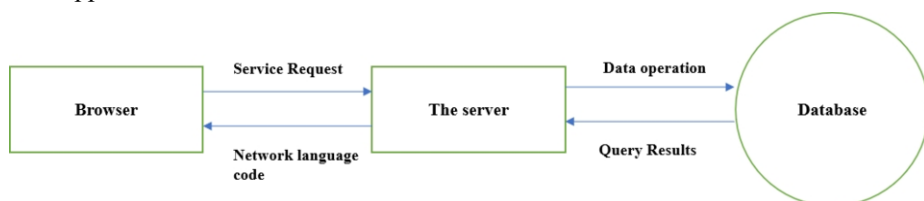
Figure 1 Database operation model

2.4 Building a platform based on data mining and database for the prevention and treatment of ideological problems

2.4.1 Web development framework of the platform

In order to effectively combine the algorithm processing of data mining technology with Oracle database, this design will be developed using the Laravel development framework. Laravel is an open-source PHP framework, which is powerful and easy to understand. The Larravel development framework follows the Model View Controller Design Pattern (MVC). Larave reuses existing components from different frameworks, which helps create Web applications. The Web application designed in this way is more structured and practical. Larave is completely open source. All codes can be obtained from Github.

The Larravel framework is MVC architecture, and its structure is shown in Figure 2. Users can send user requests to the controller through routing. The controller gets data from the database through the model, updates the data to the view, and the view responds to user requests.
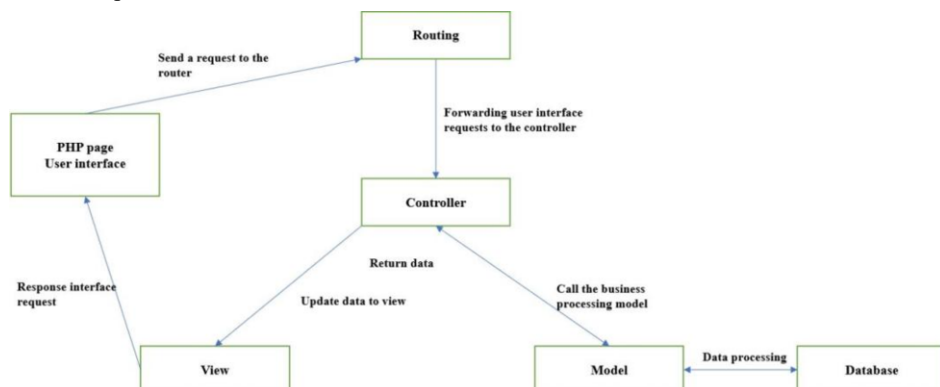
Figure 2 Laravel open source framework model

2.4.2 Application of the platform for the prevention and treatment of ideological problems based on data mining and database

The Civic Issues Prevention and Control Platform can effectively assess different college students' civic features, and analyze the data of different college students to come up with different categories, which include whether the college students have reached the standard of healthy civic issues, college students with possible civic issues, whether the college students need civic counselling, and match the most suitable civic tutors for the college students, and so on, and then summarize the reasons for the college students' civic issues through the correlation rules. Through the association rules, we summarize the reasons for the students' ideological problems, how to better guide the students' ideological status, and finally store them in the database. By analyzing the differences between different college students and the connection between individuals, we can dig out the law of the college students' ideological movement and make positive guidance according to the analysis of the college students' tutors' counselling and the test of ideological politics, and other factors.

3. Analysis of results

3.1 Management of assessment results

1. All measurement information
This function is mainly used to manage the Civic Health data submitted by students, and view the score and time of each student's assessment questions.
2. Viewing the results of the assessment
This function mainly realizes the analysis of the Civic Health Survey data of the students participating in the assessment, and predicts the students who have or may have Civic Health symptoms through the total mean score index and the score of Civic Health Factor. The analysis of the results of the Civic Health Assessment provides a good early warning of students' Civic Health.
3. To inquire about the results of the assessment
This function is mainly realized by department, major, name, student number and other fields, will meet the conditions of the data information to find the display.
4. Export the results of the assessment
All the ideological and political health evaluation results are exported to Excel through the system, which is convenient for later reference and printing, and also conducive to data import into other systems for analysis and use.
5. Overall analysis of the results
The number of students with anomalous symptoms was calculated based on the previous mean score index criterion, using a score greater than 1.5 as the basis for judgment. The overall analysis showed that 340 students, or 15.2%, were abnormal.
6. Component analysis results
The number of students with abnormal symptoms on the 10 factors was projected and counted based on the lowest mean score2 for each factor as a judgment criterion. Score

3.2 Data mining operations

1. Data preparation

Data mining operations use valuable data sources, which require pre-processing of the raw civic survey data collected. The administrator selects the appropriate mining fields through this page to prepare for the next step of analyzing the operation.

2. Generate a decision tree that

This operation uses the C4.5 decision tree algorithm to mine the preprocessed data, extract the classification rules from the generated decision tree model, and present them in the page.

3. Generate association rules

This function uses the Apriori algorithm of association rules to mine the relationship between 10 ideological and political factors in the selected dataset.

3.3 System testing

Data mining technology is applied to the data of students' civic and political health, by using students' basic information and civic and political measurement form data as the training set. Comparing the results obtained from the analysis of students' civic and political education problems with the data mining results in the civic and political health assessment system, the analytical rules obtained from the mining of the system are basically the same as the experiences in the civic and political counseling and the cognition in civic and political sciences, which confirms that the application of the data mining technology to the research and analysis of students' civic and political health data is implementable. Therefore, the development and application of this system plays a very good role in promoting the ideological and political health of students, and provides effective technical support for the informatization of ideological and political health management. Through the analysis and mining of the assessment information, we have obtained that many objective factors affect the students' ideological and political health. Therefore, in the future, in the consulting work of students' ideological health, we should target to improve the awareness of students' ideological health through various ways and help them to solve the problems in ideological health.

4 Conclusion

The purpose of this platform is to provide a real-time assessment of college students' ideological and political health prevention and treatment platform, the current college students are in the golden stage of life, is in the transition period of life, timely and appropriate to their correct ideological and political orientation is necessary, good ideological and political quality is an important guarantee for them to enter the community. It is hoped that the establishment of this platform will promote the prevention and treatment of the ideological problems of college students and positively guide the healthy ideology of the future high-end talents of the society. In this paper, the overall functional design of the system is described in detail, as well as the process of realizing the system's civic politics assessment module and civic politics data

management module, followed by the testing of the civic politics health system, and the results of the mining and analysis are in line with the expected requirements.

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