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# The Influence of Internet Environment Health on College Pupils' Ideological and Moral Education and Its Promotion

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## ABSTRACT

The internet, which is constantly advancing in technology, together with the rapidly changing internet communication technology terminals, has formed a new internet media, which has penetrated into all fields of human material life and spiritual life. This article proposes a design scheme for optimizing the impact of internet environment health on college pupils' ideological and moral education and the promotion path. It summarizes the influencing factors of contemporary college pupils' ideological and moral education through cluster analysis, optimizes the factors using Apriori arithmetic in data mining, and realizes the promotion of the path to solve problems. Finally, it carries out simulation testing and analysis. In order to promote the effective development of college pupils' ideological and political education, we should strengthen the internet management, purify the internet environment, strengthen the construction of "red websites," and enhance their attractiveness.

## KEYWORDS

Cluster Analysis, College Student, Ideological and Moral Education, Internet Environment, Mental Health

## INTRODUCTION

In the current information age, universities occupy an important position for creating and inheriting knowledge, and the internet is the main carrier for disseminating knowledge (Li & Zhu, 2017). With the acceleration of the global internet process, a brand-new virtual society has gradually formed. The internet society, social groups, and even individuals intertwined by the internet exist in the virtual technological world, and people's communication and behavior patterns differ from the real society (Johannisson, 2010). With its rapid speed, vivid forms, and vast capacity, the internet transmits information and knowledge to people, but it also brings challenges to humankind (Nan, 2021). Traditional means of production and ways of life, thinking, behavior, and knowledge dissemination are all facing great impact. Universities are the forefront of the development and utilization of new technologies. College students not only learn about human knowledge and civilization, but also receive ideological and moral education (Sallis et al., 2020). Therefore, the ideological and moral education of college students must respond to the challenges and opportunities created by new technology. The

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internet presents a prominent moral problem that seriously affects the healthy development of college students (Chen et al., 2022). In classroom teaching, especially ideological and political theory teaching, teachers should focus on the content of moral education. The systematic teaching of moral education includes moral cognition, moral emotion, moral will, moral belief, and moral habit. Teachers should have a solid knowledge foundation, scientific teaching methods, excellent teaching ability, and a diligent teaching attitude. Through continuous innovation of teaching concepts, the best integration point of content knowledge and moral education is explored. Moral education should be integrated into content knowledge, so that science and ideology can be naturally integrated in teaching, and good educational results can be achieved. Moral activities run through all areas of society. Schools should actively explore and innovate the educational methods and approaches that combine the theory and practice of moral education and are suitable for the characteristics of contemporary college students.

Vulgar information flows smoothly on the internet, which strongly impacts college students' ideas and moral concepts (Persin et al., 2021). Therefore, the moral values education of college students in the internet environment has also been affected, including positive and negative aspects (Guloksuz et al., 2018). The ideological and moral construction of college students should face these problems squarely, put forward countermeasures, and carry out reform and innovation in time, so as to continuously promote the ideological and moral education of college students to a new level (Kim et al., 2017). Using the behavior track data set of college students to mine the relationship between student behavior and ideology and morality is a classic application scenario of colleges and universities using big data in student training (Waitman et al., 2022). By integrating data on college students' behavior at school, using the association rule method to carry out data mining and building a model of college students' behavior at school, the behavior of college students at school can be predicted and the level of ideological and moral education can be determined. When using big data analysis of student behavior, the classic Apriori arithmetic is improved by integrating the practical experience of college student management.. On the basis of maintaining the effectiveness of the original arithmetic, the improved algorithm greatly improves the efficiency of association rule mining.

The internet can reveal college students' ideological trends and improve the pertinence of ideological education. Especially for some campus and social hot issues that have received widespread attention, college students are happy to express their own views and opinions on the internet, communicate, and discuss, which reveals college students' real thoughts (Miedema et al., 2022). Teachers can discover countermeasures by collecting, sorting out, and analyzing students' online posts. It is beneficial for ideological and political educators in universities to improve their understanding of how to use the internet to carry out ideological and political education, change educational concepts, and innovate educational ideas (Rong, 2021). Because college students lack the ability to correctly judge various social phenomena, there are deviations in their value orientations, mainly reflected in utilitarianism. In order to further evaluate and analyze this phenomenon, this article proposes a design scheme and promotion path to optimize the impact of network environmental health on ideological and moral education for college students.

The innovative contribution of this paper lies in its construction of the key characteristics of the image of the optimized design of college students' ideological and moral education. And the cluster analysis technology is used to realize the optimization design and identification of college students' ideological and moral education. The Apriori algorithm in association rules is used to reduce the execution cost of the algorithm. The model of the influence of network environment health on college students' ideological and moral education and the reconstruction of the promotion path is established. Through cluster analysis, this paper summarizes the influencing factors of college students' ideological and moral construction. The fuzzy features of the optimization design system of college students' ideological and moral education are extracted by using association rule technology. The results amply demonstrate that the Apriori algorithm is improved by transforming the set of transaction items, reduces the number of database scans during the process of solving frequent itemsets, reduces I/O consumption, and improves the operation efficiency by using the vector AND operation.

The structure of this article is as follows: The first section mainly describes the background and value of the topic, as well as the investigation objectives, approaches, and innovations of this article. The second section provides a literature review and proposes ideas for investigation. The third section addresses research methods, which mainly optimize the design methods for topics that combine cluster analysis and correlation rules. The fourth section presents experimental validation in the dataset to analyze the performance of the model. Section five concludes by reviewing the main contents and results of this article, summarizing the investigation conclusions, and pointing out directions for further investigation.

## RELATED WORK

The formation of internet society is accelerated by the birth of internet technology, which completely subverts the traditional social environment model (Li & Zheng, 2021).

Shokri et al. (2021) argue that the management and development of online ideological and political education is a pragmatic choice and essential value orientation for maximizing the functions and values of such education. Poulik (2022) believed that in traditional society, time and space are closely linked. However, internet time is virtual and has no space limit. Through internet moral education, moral education can be "wrapped" around college students anytime and anywhere. Basile et al. (2019) emphatically analyzed the influence of the internet according to its negative effects and put forward the countermeasures of internet moral education. He stated that long-term use of the internet will turn college students into cold-blooded people who only know how to manipulate the keyboard and control the machine. The internet hinders the development of college students' physical, mental, and social abilities, making them unable to extricate themselves. Therefore, integrating moral education with internet use should make students more humane and social. Some researchers concluded that ideological and political education carried out through the internet constitutes internet ideological and political education. Ding et al. (2019) proposed that internet ideological and political education is a modern form of education that takes the internet as modern form of education that views the internet as a means for political propaganda. Mukherjee et al. (2019) brought online moral education into the scope. Semple and others (2017) further explained the essence of online moral education and pointed out that online moral education should be a part of online ideological and political education. Bello et al. (2021) claimed that the openness and freedom of the internet have to a large extent created the relative equality of the status of participants on the internet, which has made it easier to transform the traditional subject-object relationship between teachers and students in moral education. The internet provides a larger and more open space for moral education.

Generally speaking, most of these investigation results regard the group of heavy internet users in the current cyberspace as a fuzzy concept aggregation and take it as the investigation object. However, there are few results that can be used for hierarchical investigation, especially for college students, and some questions often lose their pertinence, effectiveness, and practicality. This article proposes an optimization design scheme of the impact of the health of the internet environment on the ideological and moral education of college students and the promotion path. It uses cluster analysis and association rules to build evaluation indicators to optimize the ideological and moral education from aspects like moral self-image so that the ideology of college students can be further improved.

## METHODOLOGY

### Cluster Analysis and Evaluation of the Influence of Ideological and Moral Education on College Students

As college students with high scientific quality, they are important participants in the internet society. They absorb all kinds of useful information through the internet and constantly improve their abilities

in all aspects; on the other hand, the negative effects of the internet are also gradually emerging. The impact of bad information has led to the deviation of college students' thinking and behavior, and the resulting social problems are common, resulting in adverse social effects (Feng et al., 2019).

In clustering analysis, as a kind of unsupervised learning, the clustering arithmetic first divides the data without class labels into various clusters according to some means of similarity measurement, so as to achieve the effect of data grouping and obtain better clustering results. Therefore, similarity measurement is the premise and foundation of clustering analysis and the basis for dividing data. Only by adopting appropriate similarity measurement methods can we get better clustering results, which is more instructive for subsequent clustering analysis.

This paper takes students of different majors in actual schools as an example. From the five dimensions of academic performance, temperament type, psychological quality, family situation, and classroom performance, the average academic performance in school is selected as the academic performance. By designing tests to calculate the evaluation values of temperament type, psychological quality, family situation, and classroom performance, the statistical method Q-cluster analysis is used for cluster analysis. Class A students generally have a relatively comprehensive and high evaluation value. Class B students generally have moderate evaluation values, and their autonomy is not particularly high. Class C students did not perform well in all dimensions of the assessment. Class D students belong to special groups, which will form various special groups due to subjective or objective reasons. In view of the problems brought by the prominent characteristics of different categories of college students to education and teaching, this paper proposes a teaching mode optimization scheme of classified teaching and individualized teaching. That is, on the basis of knowing the teaching objectives and the teaching groups, we should carefully understand the teaching groups and analyze their category characteristics. Students are classified by category and by analysis, such as A, B, C and D students involved in this paper. Class A, based on the basic teaching mode, adopts the active exploration teaching method, which can take the form of classroom debate or keynote speech. It not only improves his subjective self-study ability, but also helps to foster divergent thinking and strengthen language organization and expression ability, further deepening the understanding of theoretical knowledge. On the basis of the basic teaching model, Class B students should adopt guided teaching methods to enhance their learning initiative. Class C and Class D are also based on the basic teaching methods to add attractive teaching and thematic teaching respectively. In this way of teaching students in accordance with their aptitude and targeted education, it is expected to comprehensively promote the cultivation of college students' ideology and behavior habits, their acquisition of knowledge and skills, and the improvement of their intelligence and ability.

The clustering arithmetic uses the distance in the feature space as a metric and determines the similarity between the two data objects $x_i$ and $x_j$ by calculating the distance $dis(x_i, x_j)$ between them. In the clustering analysis arithmetic, the function for calculating the clustering between data objects should generally meet the following requirements:

- Positive definiteness, $dis(x_i, x_j) \geq 0$, indicating that the distance between data is non negative; When and only when $i = j$, there are $dis(x_i, x_j) = 0$, indicating that the similarity of the data itself is the largest.
- Symmetry

$$dis(x_i, x_j) = dis(x_j, x_i) \tag{1}$$

- Diagonal triple equation

$$dis(x_i, x_j) \leq dis(x_i, x_k) + dis(x_k, x_j) \tag{2}$$

where $x_k$ is different from $x_i$ and $x_j$. There are many calculation methods to measure the distance similarity between the two data $x_i$ and $x_j$. The common methods are as follows:

- Mingshi distance

$$d_{ij}(x_i, x_j) = \left( \sum_{k=1}^{d} \left| x_{ik} - x_{jk} \right|^q \right)^{\frac{1}{q}}, q \geq 1, (i, j = 1, 2, \ldots, n) \tag{3}$$

When the Mingshi distance is used, the variables should adopt the same dimension. If they are different, the variation range of measured values is very different. Therefore, when the units of each variable are different or the measured values of each variable are greatly different even though the units are the same, the data of each variable should be standardized first and then the standardized data should be used to calculate the distance.

When $q = 1$, the first-order Mingshi distance is as follows, that is, the absolute distance.

$$d_{ij}(x_o, x_j) = \sum_{k=1}^{d} \left| x_{ik} - x_{jk} \right|, (i, j = 1, 2, \ldots, n) \tag{4}$$

When $q = 2$, the second-order Mingshi distance is as follows, that is, the Euclidean distance.

$$d_{ij}(x_i, x_j) = \left( \sum_{k=1}^{d} \left| x_{ik} - x_{jk} \right|^2 \right)^{\frac{1}{2}}, (i, j = 1, 2, \ldots, n) \tag{5}$$

When $q = \infty$, the Mingshi distance is expressed as follows, which is the Chebyshev distance.

$$d_{ij}(x_i, x_j) = \max \left| x_{ik} - x_{jk} \right|, (i, j = 1, 2, \ldots, n) \tag{6}$$

- Mahalanobis distance

Represents the covariance distance of the data. It is expressed as follows:

$$d_{ij}^2(x_i, x_j) = (x_i - x_j)' S^{-1} (x_i - x_j) \tag{7}$$

where, $S^{-1}$ represents the inverse matrix of the sample covariance matrix, and $(x_i - x_j)'$ represents the transposition of the matrix.

- Langevin distance

$$d_{ij}(x_i, x_j) = \left[ \sum_{k=2}^{d} \frac{\left( \sqrt{x_{ik}} - \sqrt{x_{jk}} \right)^2}{S_k^2} \right]^{\frac{1}{2}}, (i, j = 1, 2, \ldots, n) \tag{8}$$

Among them, $x_i$ and $x_j$ represent the $i$ and $j$ data respectively, and $d$ represents the data dimension.

- Oblique spatial distance

Since there are often different correlations between variables, the distance of orthogonal space can be used to calculate the variability of sample space, and the skew space distance can be used. The formula is as follows:

$$d_{ij}(x_i, x_j) = \left( \frac{1}{d^2} \sum_{h=1}^{d} \sum_{k=1}^{d} (x_{ih} - x_{jh})(x_{ih} - x_{jh}) r_{hk} \right)^{\frac{1}{2}}, (i, j = 1, 2, \ldots, n) \tag{9}$$

Among them, $x_i$ and $x_j$ represent the $i$ and $j$ data respectively, and $d$ represents the data dimension. $r_{hk}$ is the correlation coefficient between variables $x_h$ and $x_k$. When $d$ variables are complementarily correlated, $d_{ij}(x_i, x_j)$ degenerates into Euclidean distance.

## The Evaluation Way of College Students' Ideological and Moral Education

Research and practice show that the method of combining qualitative and quantitative evaluation and phased evaluation is effective. The effect of ideological and moral education is concentrated in three aspects: college students' moral character, school spirit, and school appearance and social evaluation. The improvement of college students' moral quality is the fundamental goal of ideological and moral education in schools, and its evaluation mainly includes political quality, ideological quality, moral quality, and psychological quality. The evaluation should be conducted from both vertical and horizontal aspects to see the extent of progress and position, as shown in Table 1.

After the indicator system framework is established, it is necessary to assign values to each indicator and calculate the weight. In order to make the calculation results more scientific and reasonable, repeated learning and testing of different calculation methods are conducted. In comparison, the relative scale standard is adopted to avoid the difficulty of comparison between factors of different properties as much as possible. At the same time, we should try our best to reduce the impact on the results caused by the subjective factors of the decision-maker according to the specific situation of the actual problem. The following examples will explain the basic principle of AHP. Suppose that the weight of a watermelon is recorded as 1, the chopped small pieces are divided into, $A_1, A_2 \ldots\ldots A_n$ and the weight of each small piece of watermelon is recorded as $Wl, W2 \ldots\ldots Wn$ respectively. The matrix is used to represent the correlation between the weight of each watermelon after comparison, and the following results are obtained:

$$A = \begin{bmatrix} W_1 / W_1, W_1 / W_2, \ldots, W_1 / W_n \\ W_2 / W_1, W_2 / W_2, \ldots, W_2 / W_n \\ \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \\ W_n / W, W_n / W_2, \ldots, W_n / W_n \end{bmatrix} \tag{10}$$

The goal of college moral education is both the starting point and the ultimate outcome of ideological and moral education for college students.The evaluation system of ideological and moral education for college students is shown in Figure 1.

**Table 1. Evaluation system framework of college students' iideological and moral quality**

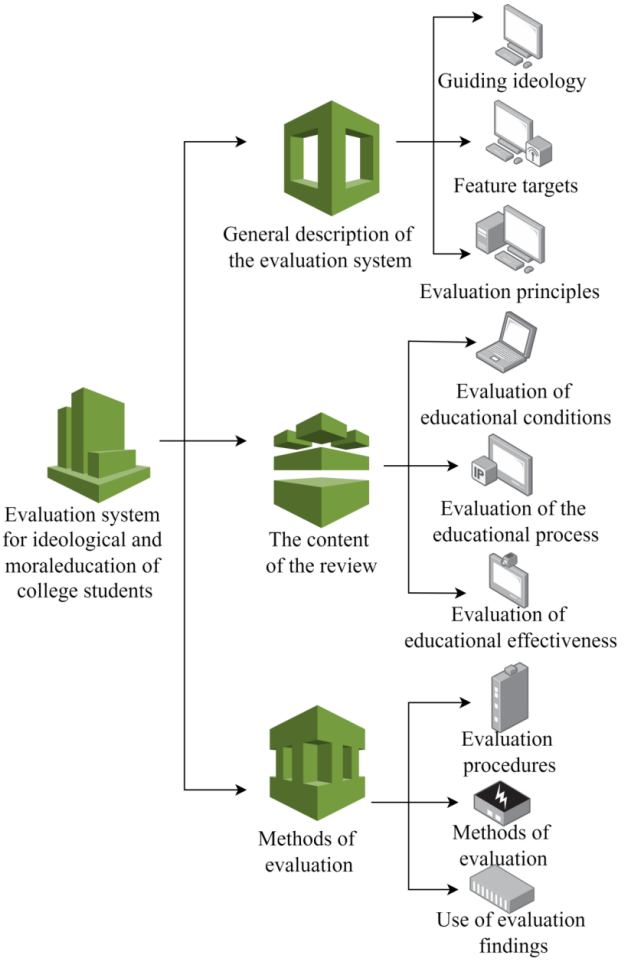
| First-Level Indicators | Second-Level Indicators | Third-Level Indicators |
|---|---|---|
| Ideological and political quality | Political quality | Political theoretical knowledge |
| | | Political capacity |
| | | Ideals and beliefs |
| | Ideological quality | Outlook on life and values |
| | | Ideological work style |
| | | Learning attitude |
| | | Labor concept |
| Moral quality | Moral character | Patriotism and collectivism |
| | | Civilization |
| | | professional ethics |
| | Social morality | Honest and trustworthy |
| | | Observe order |
| Law and discipline quality | Legal concept | legal knowledge |
| | | Exercise power correctly |
| | | Actively participate in management |
| | Observe discipline and law | Conscientiously study and consciously abide by the law |
| | | Consciously perform obligations |
| | | Dare to fight against illegal phenomena |
| Physical and mental quality | Physical quality | Extreme exercise and sports reaching the standard |
| | | Sports health knowledge |
| | Psychological quality | Self-perception |
| | | Positive and enterprising spirit |
| | | Self-coordination and control |
| | | Positive attitude towards life |

## Influence of Ideological and Moral Education Based on Apriori Algorithm and Optimization of Promotion Path

The traditional ideological and moral education in universities mainly takes "one piece of chalk, one blackboard, one mouth talking for half a day" as the teaching mode and directly transmits information to students.the educated. Despite its strong relevance, timely feedback, and ability to evoke emotional resonance.The "man-machine dialogue" function of the internet breaks the authority of teachers in classroom teaching and highlights the subjectivity of college students.

The main operations of the Educational Evaluation System (EES) include the school's instructional department, the Registrar's Office, and the Student Affairs Office, and most of the school's teachers and college students. The school's administration and academic departments can collect large amounts of evaluation data quickly and accurately. They can then complete statistical analysis of this data to make decisions on a scientific and reliable basis, find the shortcomings of ideological and moral education, and correct and improve those shortcomings over time. The system mainly needs to realize

**Figure 1. Brief diagram of the evaluation system of college students' ideological and moral education**




four major functions: information initialization, data collection, data preprocessing, data analysis, and mining. The most cumbersome part is the data acquisition. The steps of data acquisition are shown in Figure 2. The data collection methods applied by the education quality analysis and evaluation system include real-time online collection, timed online collection, offline collection, and manual input.

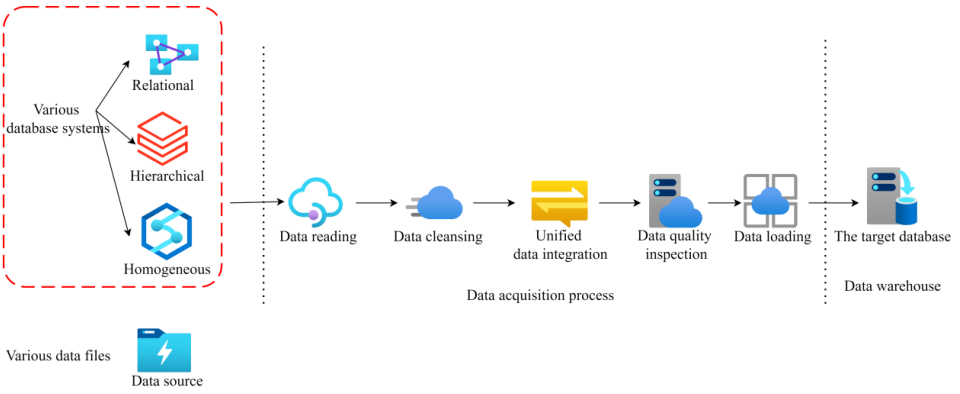
- Definition 1: The frequency of itemset *P*

The occurrence frequency of itemsets is the number of transactions that contain itemsets, which is called the frequency of itemsets for short. It supports technical numbers.

$$U = \left\{u_1, u_2, \ldots, u_k\right\} \tag{11}$$

$$U \subseteq I, U \neq \varphi, D = \left\{T_1, T_2, \ldots, T_n\right\} \tag{12}$$

**Figure 2. Data acquisition process**




$$Q = \left\{ T_i \middle| T_i \in D, U \subseteq T_i \right\} \tag{13}$$

Equation (11) represents the set of items, equation (12) represents all transaction sets in the database, and equation (13) represents the transaction set. Then the frequency of the itemset $U$ in the transaction set $D$ is:

$$P(U) = P\left(u_1 \wedge u_2 \wedge \ldots \wedge u_k\right) = \frac{\left|Q\right|}{\left|D\right|} \times 100\% \tag{14}$$

- Definition 2: Support of association rules

Let's assume that there are $X = \left\{x_1, x_2, \ldots, x_k\right\} \subseteq I, Y = \left\{y_1, y_2, \ldots, y_k\right\} \subseteq I$ association rules in $X \Rightarrow Y$, and their support is:

$$Supp(X \Rightarrow Y) = Supp(X \bigcup Y) = P(XY) \tag{15}$$

- Definition 3: Confidence of association rules

If the association rule $X \Rightarrow Y$ satisfies $X \subseteq I, Y \subseteq I$, the confidence is:

$$Conf(X \Rightarrow Y) = \frac{Supp(X \bigcup Y)}{Supp(X)} \times 100\% = P(Y \left| X \right.) \tag{16}$$

The confidence reflects the conditional probability of occurrence of $Y$ in the transaction containing $X$.

There are many algorithm for association rule discovery, but most of them are the deduction and improvement of the classical arithmetic Apriori (Agrawal & Srikant, 1994). Apriori is a width-first

algorithm, which finds all frequent itemsets through multiple scans of the database, and only considers all $k$ itemsets with the same length of $k$ in each scan. The key to the efficiency of the algorithm is to generate a small set of candidate items, that is, to generate and calculate those candidate itemsets that are as small as possible and are likely to become frequent itemsets.

The Apriori algorithm has the following properties:

- any non-frequent $(k-1)$ itemset cannot be a subset of the frequent $k$ itemset.
- generating frequent itemsets is composed of two steps: join and prune.

Figure 3 presents a flowchart of Apriori algorithm execution.

In order to more intuitively explain the mining steps of the Apriori algorithm, a specific example will be given. It is assumed that there are 5 records in the transaction database; the specific content is shown in Table 2, and the minimum support is 3.

The Apriori algorithm has two main defects. First, it requires repeatedly scanning the database to determine the support count for each candidate itemset. Second, it requires generating a large number of candidate itemsets. Currently, most of the improvements to this algorithm are mainly aimed at addressing these two defects. In this paper, a Boolean matrix is used to improve it. Scanning

**Figure 3. Apriori algorithm execution flow chart**

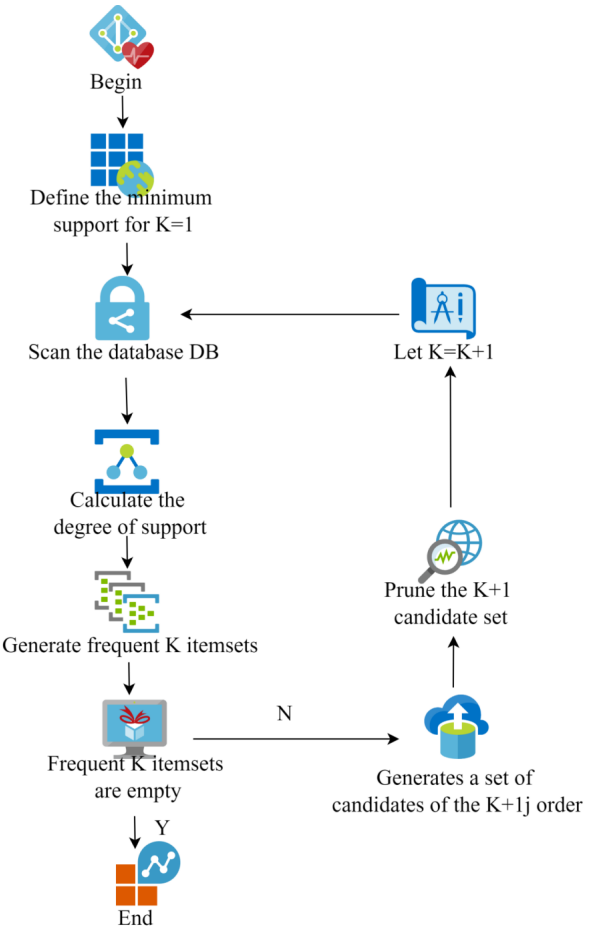


**Table 2. Content list of target transaction library**

| TID | Itemsets |
|---|---|
| 1 | A, C, G, F |
| 2 | E, A, C, B |
| 3 | E, C, B, I |
| 4 | B, F, H |
| 5 | B, F, E, C, D |

the transaction database $D$, the row vector is represented by the transaction, and the column vector is represented by the itemset. If there are $j$ itemsets in the $i$ transaction, the value corresponding to the $j$ column in the $i$ row is 1, otherwise it is 0. In this way, the Boolean matrix corresponding to the database can be constructed by scanning the database $D$ only once. According to the contents shown in Table 2, the Boolean matrix shown in Table 3 is constructed.

By the same token, when frequent $k$ itemsets are required, any two qualified items from the known frequent $k-2$ itemsets are connected, and the items in the connected itemsets are "and" operated. If the result is greater than or equal to the minimum support, the item belongs to the frequent $k$ itemset. The flow of column vector arithmetic is shown in Figure 4.

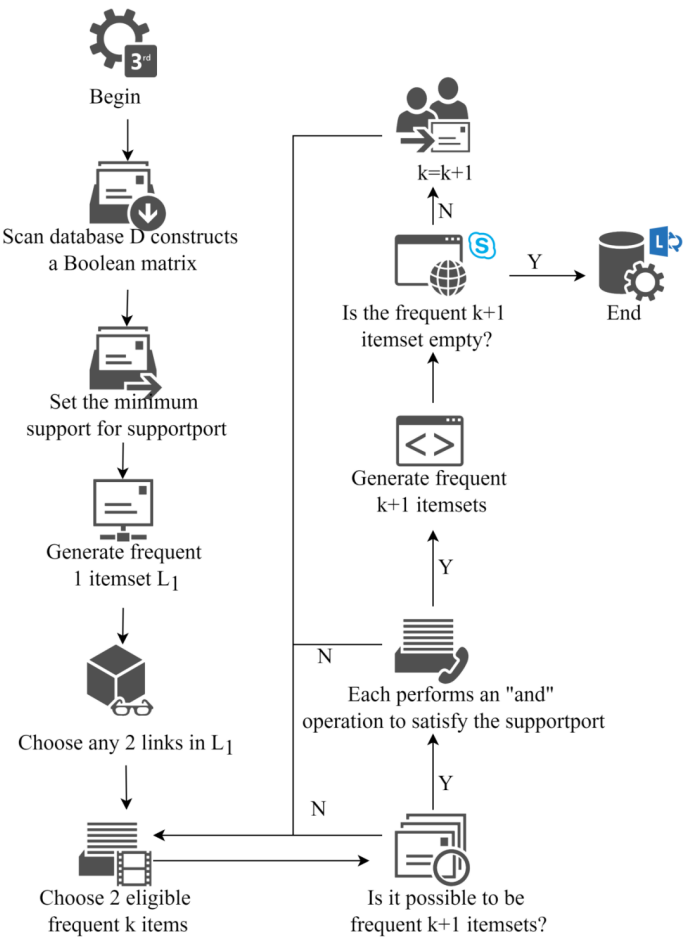
## RESULTS, ANALYSIS, AND DISCUSSION

The huge amount of information on the internet will inevitably make the ideological and moral education of college students rich, comprehensive, and selective. From the novel and superb technical features shown by the internet, the internet has brought a rare opportunity for the innovation of ideological and moral education. From the deep-seated changes in people's ideas brought about by internet technology, the open internet provides people with a lot of information and different cultures, promotes the renewal of their ideas, and thus lays a good foundation for carrying out ideological and moral education. In this paper, the improvement of the Apriori algorithm mainly starts from the database. Every time the Apriori algorithm executes, it scans the database. In fact, it can optimize this process. In the process of calculating CK support, all the things contained in the CK should be marked. When scanning, it is unnecessary to consider marking things. After optimization, the support of various databases in the actual candidate set must be smaller than the real database, With the increase of K value, the difference value naturally increases, which can effectively reduce the scanning time, reduce the calculation speed, and improve the efficiency.

**Table 3. Boolean vector matrix corresponding to database $D$**

| TID | I1 | I2 | I3 | I4 | I5 |
|---|---|---|---|---|---|
| T100 | 1 | 1 | 0 | 1 | 0 |
| T200 | 0 | 0 | 1 | 0 | 0 |
| T300 | 0 | 1 | 1 | 0 | 1 |
| T400 | 1 | 0 | 1 | 0 | 1 |
| T500 | 0 | 1 | 1 | 0 | 0 |
| T600 | 1 | 1 | 0 | 0 | 1 |
| T700 | 1 | 0 | 0 | 1 | 1 |

**Figure 4. Flow chart of column vector arithmetic**




According to the flow chart of the Apriori algorithm and improved Apriori algorithm, models are created respectively and different values of other parameters of the algorithm are simulated and analyzed, including support and confidence. Using the ideological and moral education data set, the algorithm before and after optimization is simulated and compared with the traditional algorithm, and the change of runtime with the two parameters of support and confidence is analyzed, as shown in Figure 5 and Figure 6.

In order to verify the effectiveness of the improved Apriori algorithm, the improved Apriori algorithm and original Apriori algorithm are used to analyze the association rules of the data set behavior data set under the same minimum support and confidence. Compare the algorithm execution time of the two algorithms under different support levels for the dataset, and the results are shown in Figure 7.

As can be seen from Figure 7, when the minimum support exceeds 0.2, the efficiency of the Apriori improved algorithm is basically the same as that of the original Apriori algorithm. This is because the Apriori algorithm needs to scan the database many times in the case of generating more frequent itemsets, resulting in excessive I / O burden and a large number of invalid transaction scans. The improved Apriori algorithm can obtain frequent itemsets by scanning the database once, which

**Figure 5. Minimum support curve before and after improvement**

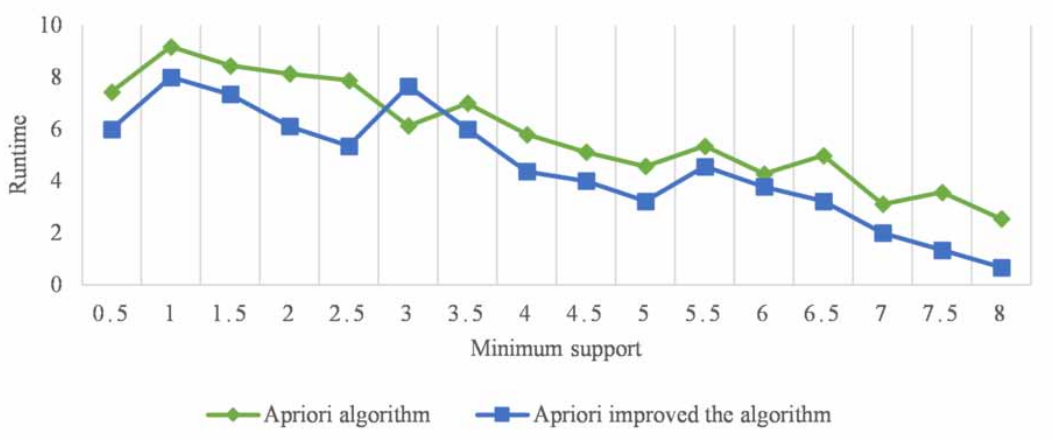
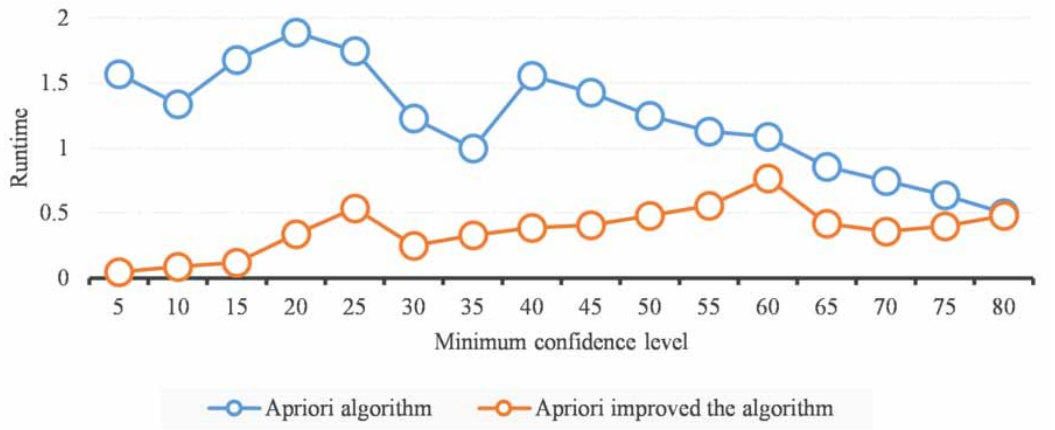



**Figure 6. Minimum confidence curve before and after improvement**




has obvious performance advantages when there are more frequent itemsets, which is in line with the expected goal of the improved algorithm in this article.

In order to test the performance of Apriori's improved algorithm, the algorithm performance is tested through the MATLAB platform. The operation results are shown in Figure 8 and Figure 9. Figure 8 shows a comparison of the time taken to mine the frequent itemset when the same number of transactions is set and the minimum support is different. In Figure 9, the same support is used, and the time taken to mine the frequent itemset is compared when the number of transactions is different. Experiments show that the improved algorithm only needs to scan the database once, and by compressing the frequent $k-1$ itemsets as much as possible in the process of mining using row vectors or column vectors, the mining efficiency of the frequent $k$ itemsets can be improved and the running speed can be improved. At the same time, the data in the dataset mushroom is highly correlated, and the improved Apriori algorithm can also mine frequent itemsets more effectively than the original Apriori algorithm.

For the proposed improved Apriori algorithm based on row vector, the a algorithm converts the database into a Boolean matrix after scanning the database once, which not only saves a lot of

**Figure 7. Comparison of experimental results of data sets**

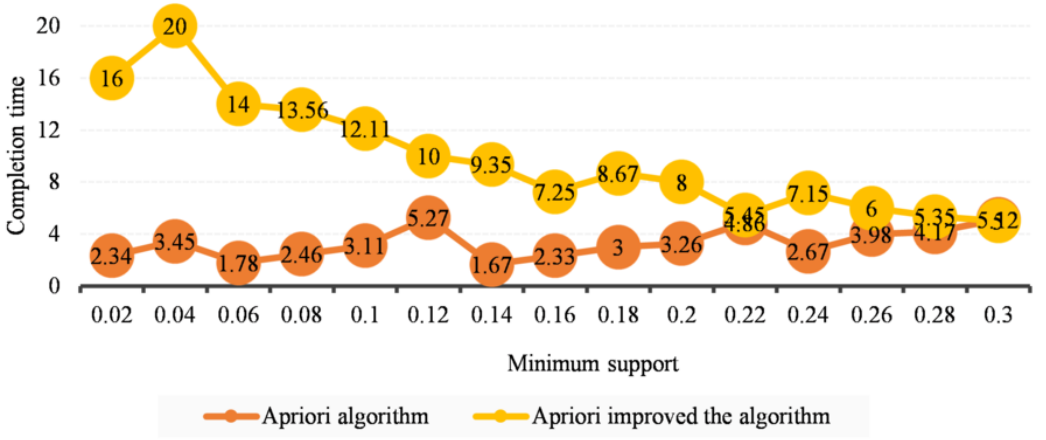



**Figure 8. Performance comparison of Apriori algorithm and improved algorithm under different support levels**

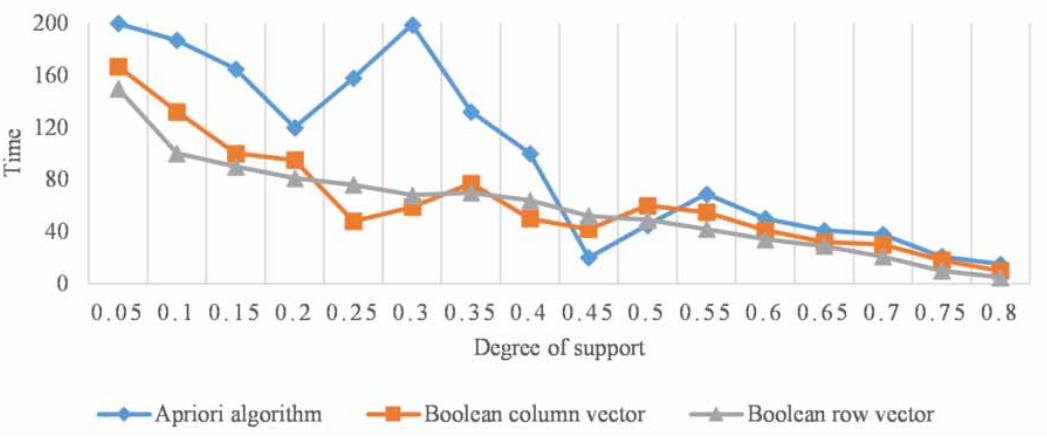
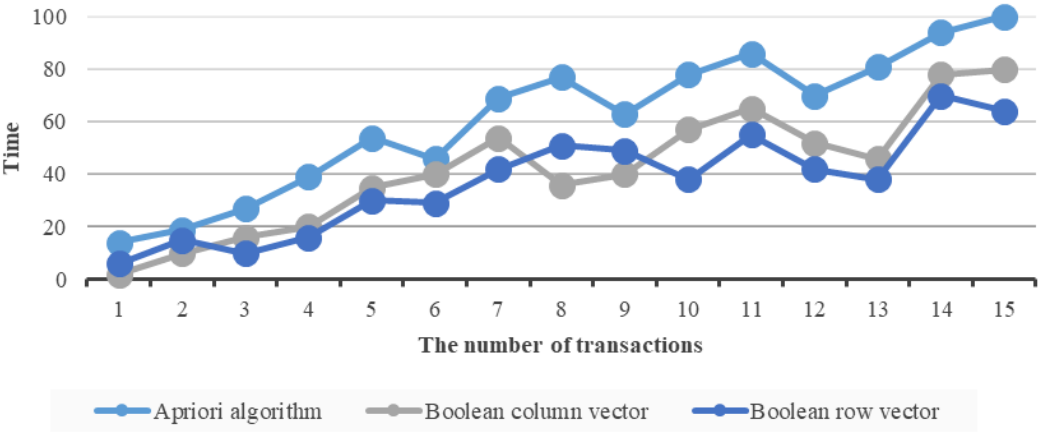



**Figure 9. Performance comparison of Apriori algorithm and improved algorithm under different transaction numbers**



memory, but also avoids the defect of the traditional algorithm that always scans the database many times. At the same time, before producing the frequent $k$ itemsets through row vector and column vector, the algorithm compresses the frequent $k-1$ itemsets and delete the infrequent $k-1$ itemsets as much as possible. The improved algorithm aims to solve the two main problems of the original Apriori algorithm, greatly saving the time of mining frequent itemsets and improving the efficiency of the algorithm.

## CONCLUSION

College educators must address the influence of the internet on college students' ideological and moral education and explore new ways to effectively carry out such education in the networked environment.

This paper summarizes the influencing factors of contemporary college students' ideological and moral education through clustering analysis and optimizes the influencing factors by using the Apriori algorithm in data mining to improve the problem-solving path. The results fully show that the improved Apriori algorithm enhances the Apriori algorithm by transforming the transaction itemset. It reduces the number of database scans in the process of solving frequent itemsets, reduces I/O consumption, and improves the operation efficiency by using the vector AND operation. The improved Apriori algorithm can obtain frequent itemsets by scanning the database once. When there are many frequent itemsets, it has obvious performance advantages, which is in line with the expected goal of the improved algorithm in this paper. However, the study still has some limitations. Although it saves time when there is a large amount of data—an improvement that has strong operability—new databases will be generated. These new databases require time and resources, so the improved algorithm still needs further development.

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## DATA AVAILABILITY

The figures and tables used to support the findings of this study are included in the article.

## CONFLICTS OF INTEREST

The author declares that they have no conflicts of interest.

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