International Journal of Computer Information Systems and Industrial Management Applications
ISSN 2150-7988 Volume 17 (2025) pp. 1-14

https://doi.org/10.70917/ijcisim-2025-0254
Article

Research on the Application of Data Mining Technology in the Construction of Collaborative Educational Mechanism of Party Building and Civic Education in Colleges and Universities

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Abstract: In the data related to the parenting activities of party building and ideological education in colleges and universities, there are association laws that cannot be judged intuitively. In order to promote the development of this nurturing activity, this paper constructs a data mining model to mine the comprehensive features of student activity data based on three dimensions: logistic regression, random forest and support vector machine. Then, using the dynamic association rule mining algorithm, we analyze the association rules between activities and students' comprehensive characteristics from the dimensions of party building activities and ideological activities to optimize the collaborative parenting mechanism. After the optimized parenting mechanism in practice, the average score of comprehensive literacy of students in the experimental group increased from 5.70-6.00 to 9.59-9.82, and there was a significant difference at the 0.001 level. Optimizing the mechanism of collaborative education through data mining has a promoting effect on students' party building and civic and political quality.

Keywords: party building and ideological education; data mining; logistic regression; random forest; support vector machine; dynamic association rules

1. Introduction

Higher education institutions, as the main position of the country to cultivate all kinds of senior talents, must strengthen the party building work and ideological education work in schools, which is the inevitable requirement of the development of education in the new era. At present, some colleges and universities party building work and ideological education work lack of synergistic nurturing mechanism, party building work and ideological education work can not be interlinked, mutual cooperation, complement each other, some colleges and universities appear to be unclear boundaries between the two responsibilities, mixed development, resulting in the result is that there are some colleges and universities party building work and ideological education each doing their own job, each singing their own tune [1-3]. By constructing a synergistic parenting system between party building work and civic education in colleges and universities, we can actively explore new ideas, new ways and new methods to solve the real problems, guide students to set up a correct worldview, outlook on life and values, pave the way for the growth and success of the students, cultivate qualified successors and reliable builders for the cause of socialism, and contribute youthful strength to the great rejuvenation of the Chinese nation [4-6].

With the current massive storage of educational data and the wide application of databases, the amount of data in the party building work and ideological education in colleges and universities is getting bigger and bigger. And there are a lot of potential laws behind the seemingly independent information,

and fully utilizing the mining of this potential information can provide decision-making help, thus playing a huge role in promoting the development of the whole college [7-9]. Data mining technology can automatically extract data models from the ocean of data, and analyze the features present in these data and find out the appropriate type and sample strategy, and then delete the abnormal data present in these data, and match the data mining process with the data model through methods such as downscaling and transformation [10-12].

Data mining technology has a variety of application values in the field of education, such as analyzing students' needs, constructing personalized learning programs and parenting programs, optimizing the allocation of educational resources, and realizing educational fairness and educational efficiency improvement. Literature [13] combines multimodal data fusion technology in the context of educational data mining to mine students' learning interests and abilities from data information such as students' academic performance, psychological state assessment, learning trajectories, physiological parameters, etc., and construct personalized learning paths and resource recommendations for students. Literature [14] uses fuzzy association rule mining technology to develop a hybrid personalized teaching system, which realizes personalized teaching recommendations for college students through multi-dimensional analysis of students, educational resources, and learning environment. Literature [15] states that educational data mining techniques and predictive models based on artificial intelligence analyze student data, provide personalized support and academic performance prediction for students, and help promote educational resource allocation and educational equity. Literature [16] highlights that educational data mining techniques develop personalized learning paths for students by revealing hidden trends in student data and instructional data, as well as student interests and learning styles, but issues such as privacy and security and technology ethics need to be considered. Literature [17] uses data mining techniques to downscale educational data, introduces principal component analysis to optimize data attributes, performs clustering under pseudo-statistical methods, and predicts jointly with machine learning classification algorithms, so as to achieve assessment, prediction, and visualization of students' learning behaviors.

In addition, in the field of data mining technology in the field of civic and political education, literature [18] used data mining technology to carry out the assessment of civic and political education, in which K-mean clustering algorithm was introduced to analyze the assessment scale, and the assessment results of the effectiveness of civic and political management of the counselor were obtained, which is of great significance for the work of approaching the party building. Literature [19] in order to construct the assessment system of teaching indexes of college civic education, using data mining as technical support, optimized the assessment of civic education and teaching, and assisted teachers to improve the quality of civic teaching. Literature [20] developed an intelligent online college party building system through the association rules in data mining technology, in order to assist the development of party building work in colleges and universities, and to promote the synergistic development of Civic and Political Education and party building work.

Students' comprehensive literacy is influenced by external parenting activities. In the cultivation of party building and ideological education in colleges and universities, this paper chooses to utilize data mining technology to study the association rules between activities and students' literacy, and to provide reference ideas for the improvement and development of related collaborative parenting mechanisms. In the first step, students' learning and activity data are collected, and missing and abnormal data are scientifically added and deleted, after which these heterogeneous data are normalized to facilitate subsequent feature and rule mining. In the second step, a data mining model containing three branches of logistic regression, random forest and support vector machine is constructed to classify and mine students' features, and then use multi-feature splicing operation and multi-layer perceptual machine to output students' comprehensive features and group portrait. In the third step, the dynamic association rule mining algorithm is utilized to mine the association between the two types of educational activities of party building education and civic and political education and students' comprehensive literacy at different time periods, and to adjust the mechanism of collaborative education between party building and civic and political education in colleges and universities according to the obtained association rules.

2. The basic research process of data mining

2.1. Research data sources and processing

2.1.1. Data sources

The data used in this paper comes from the learning data of 600 students in the Party History and Civics course in five faculties and 20 classes in the 24th grade of the University of H. It consists of four main modules: students' personal information and overall course evaluation data stored in the university's teaching system, students' classroom performance data recorded by teachers during the teaching process,

students' performance data when they take the mid-term and final exams of the course, and students' use of online platforms for auxiliary study The online learning data generated by students using the online platform for supplementary learning. These data objectively reflect students' learning attitudes, learning habits, academic performance, etc. in the course, and form the basis for exploring the analysis of students' learning behavior and performance prediction in Party History and Civics. However, due to the limited source of data samples, fluctuations in students' behavior and performance, and the influence of teachers' subjective evaluation, the results of the study have certain limitations.

2.1.2. Data processing

1) Handling of missing information and abnormalities

Since the selected data originates from the online teaching platform used by students to assist their learning, after merging the data, it is necessary to carry out a meticulous examination to find various problems such as missing information, type errors, data anomalies, duplicate content, etc., and identify and correct them through a series of ways and methods. For example, the midterm grades of students who did not participate in the midterm test were set to zero, and the data of students who missed the final exam were deleted. After all the processing, finally 550 valid data remained to participate in the study.

2) Data Conversion

Different features of the data due to its meaning and different references, which will result in differences in the length of the data, in order to further improve the performance and stability of the machine learning model, the means of normalization must be used in the scaling of the data feature values to a uniform scale. The data in this paper have relatively fixed maximum and minimum values, so it is appropriate to use the Min-Max normalization method, as shown in equation (1), all the data linearly scaled to $[0.0,1.0]$ range.

$$X' = \frac{X - X_{\min}}{X_{\max} - X_{\min}} \tag{1}$$

2.2. Data mining model construction

2.2.1. Data mining modeling process

In order to realize the portrayal of student portraits and accurate party and ideological evaluation of students, this thesis constructs a three-branch model, which contains three branches, namely logistic regression, random forest and support vector machine, and finally splices their outputs together through a multilayer perceptron layer. First is the logistic regression branch, which takes raw feature data as input and connects directly to the feature output layer, which uses a logistic regression model to map input features to binary classification probabilities. The Random Forest branch also accepts the raw feature data as input and performs voting of multiple decision trees by means of integrated learning of decision trees to get the final classification result. The Support Vector Machine branch, on the other hand, separates the data by finding a hyperplane so that the samples of different classes are as far away from the hyperplane as possible. Finally, the multilayer perceptron layer splices the outputs of the three branches to form the final prediction. This structure can fully utilize the characteristics of the three different models and improve the overall classification performance.

In this paper, the main data mining model of Fig. 1 is constructed, and the following will focus on the design and construction of each module in the research model.

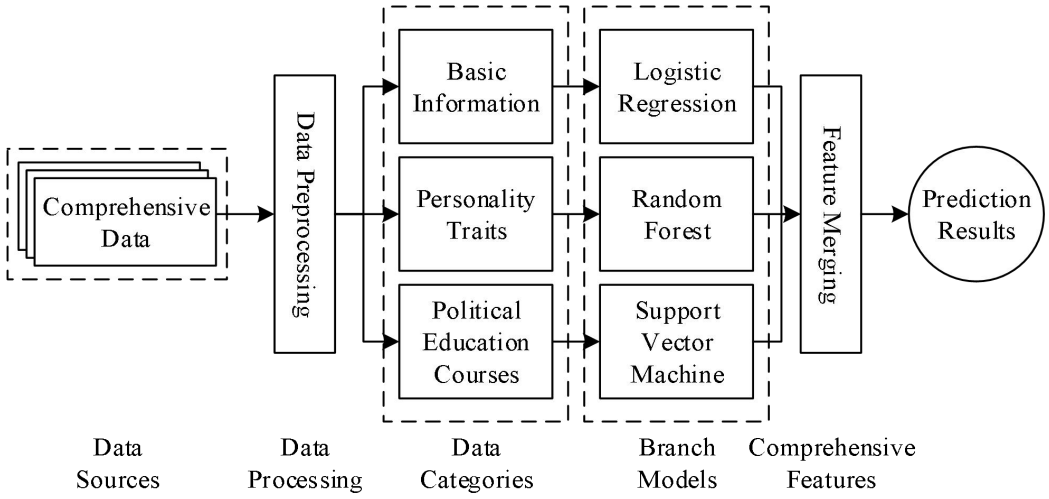

Figure 1. Model structure.

2.2.2. Analysis of model structure

1) Feature extraction based on logistic regression

Logistic regression is a statistical learning method used to solve classification problems. Despite the name "regression", logistic regression is actually used for classification tasks rather than regression tasks, and the main idea is to map data to a binary output by applying a logistic function to a linear combination of input features. Based on the consideration that age and major in the basic information may have an effect on the personality characteristics of students to some extent, the main background factors in the student data are extracted in parallel using logistic regression, and the related index data are used as inputs to extract the characteristics that are highly correlated with the composite scores of the students.

Logistic regression performs classification by applying the output of a linear function to a logistic function (Sigmoid function). Assuming an input feature vector $x = \{x_1, x_2, \cdots, x_n\}$, the logistic regression model can be expressed as:

$$z = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_n x_n \tag{2}$$

where z denotes the output of the linear function and $\{\beta_0, \beta_1, \beta_2, \cdots, \beta_n\}$ are the parameters of the model. Then, z is applied to the logistic function $\sigma(z)$ to obtain the classification probability $P(Y = 1 \mid x)$:

$$p(Y = 1 \mid x) = \sigma(z) = \frac{1}{1 + e^{\{-z\}}} \tag{3}$$

where Y denotes the classification result.

2) Random Forest Based Feature Extraction

Random forest is an integrated model consisting of multiple decision trees. Each decision tree is trained by taking randomly selected samples and features. For the classification problem, each tree in the random forest outputs a category and the final prediction is determined by voting or taking the average.

3) Support Vector Machine Based Feature Extraction

The basic form of SVM is a linear classifier whose decision boundary can be expressed as:

$$W \cdot x + b = 0.0 \tag{4}$$

where W denotes the normal vector and b denotes the bias term. For the binary classification problem, the decision function is:

$$f(x) = W \cdot x + b \tag{5}$$

For each sample (x_i, y_i) in the training data, where y_i denotes the category label, the goal of the SVM is to find the maximally spaced hyperplane such that the distances from all sample points to that hyperplane are maximized and the following constraints are satisfied:

$$y_i\left(W\cdot x+b\right)\geq 1, i=1,2,\cdots,n \tag{6}$$

where n denotes the number of training samples.

4) Integrated feature merging

After extracting various types of features from students' basic information, personality traits, and party history and ideology courses using logistic regression, random forest, and support vector machine, the study will realize the extraction of students' composite features through multi-feature splicing operation. After obtaining the comprehensive features, the mapping of different types of students will be realized using Multilayer Perceptron (MLP).

2.3. Association Rule Mining for Party Building and Civic Education

2.3.1. Logical modeling of the basic information management database for party members

The database involved in the management of basic information of party members participating in the Party Building and Civic Education Program is established, containing personal information, party member information, and introducer information. Figure 2 shows its database logic model.

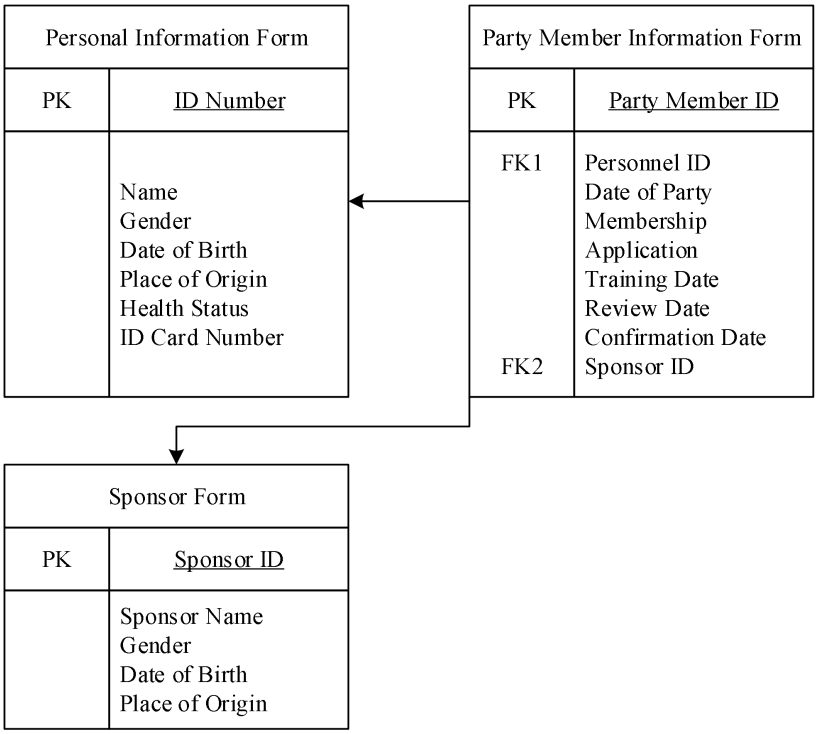

Figure 2. Logical Structure of the Database for Basic Information of Party Members.

2.3.2. Dynamic Association Rule Mining Algorithm

Most existing association rule algorithms are based on a given independent static dataset. In fact, in many cases, association rules change with the increase of the transaction set, which is a dynamic process over time and has different corresponding thresholds at different times. Therefore, in order to mine association rules with high scientific, reliability and rationality, it is necessary to observe the data sets at different time stages. For example, to investigate whether there is a correlation between the borrowing behavior of party history books and students' academic achievement in Civics and Politics, if the association rule analyzed according to the first semester of school enrollment has a high confidence level, but the researcher can not conclude that there is a strong correlation between the borrowing behavior and academic achievement, and it is necessary to continue to observe and analyze the correlation between the borrowing behavior and the academic performance of a few semesters, to determine whether the association rule is accidental or inevitable. Therefore, it is necessary to introduce the concept of time in the association rule mining algorithm, and then mine a specific set of association rules between each

comprehensive behavioral characteristic of students and their academic achievement over time.

Dynamic association rule in this study refers to an association rule that can show the change of association rules over time cycle and update them over time cycle, and can predict the development of the latter rules from the previous rules, which is defined as follows:

Let $D=\{D_1,D_2,\cdots,D_n\}$ be the set of plenary dynamic transactions collected in time period t, n denotes the number of time periods in the set of dynamic transactions, and t can be partitioned into time sequences with time step n and non-intersecting, i.e., $t=\{t_1,t_2,\cdots,t_n\}$, and the set of plenary transaction data of the subset D_n is the set of localized time series transactions collected during the n th time period.

where the localized transaction set D_n is the set of plenary transactions collected in the n th time period, i.e., $D_n=\{Z_{n1},Z_{n2},Z_{n3},\cdots,Z_{nm}\}$, where Z_{nm} denotes the m th transaction in the n th sub-transaction set, and m denotes the number of transactions contained in the transaction set.

And transaction Z is also a set of multiple items, i.e., $Z_{nm}=\{x_{nm1},x_{nm2},\cdots,x_{nmk}\}$, where x_{nmk} denotes the k th item in the m th transaction in the n th sub-transaction set, and k denotes the number of items present in a transaction. In this study, the number of items recorded in all transaction records is the same, but there will be differences in the values of items in different transaction records. The set of different items is known as the itemset, and the itemset containing k items is called the k itemset.

Let A and B be two itemsets, and the dynamic association rule is such that $A\Rightarrow B$ holds in the set of all transactions D with dynamic support $SV=[s_1,s_2,\cdots,s_n]$, dynamic confidence $CV=[c_1,c_2,\cdots,c_n]$, and dynamic lifting $LV=[l_1,l_2,\cdots,l_n]$ association rules.

where s_n denotes the percentage of transactions containing $A\cup B$ out of the total number of transactions in the transaction set D_n; c_n denotes the conditional probability $P_{D_n}(B\mid A)$, i.e., the conditional probability that a transaction in D_n containing the term A also contains B; and l_n denotes the degree of elevation of the rule $A\Rightarrow B$ in the transaction set D_n in the degree of lift, which captures how much the probability of the occurrence of the latter rule increases relative to the probability of the occurrence of the latter rule itself, given the consideration of the former term. In short, the degree of lift indicates whether there is a positive correlation between the two itemsets in the rule. The specific formulas for s_n, c_n and l_n are shown in equations (7), (8) and (9) below, respectively.

$$s_n=\frac{number_{D_n}(A\cup B)}{number_{D_n}(AllSample)} \tag{7}$$

$$c_n=P_{D_n}(B\mid A)=\frac{P_{D_n}(A\cap B)}{P_{D_n}(A)} \tag{8}$$

$$l_n=\frac{P_{D_n}(A\cap B)}{P_{D_n}(A)\cdot P_{D_n}(B)} \tag{9}$$

In summary, a complete dynamic association rule can be expressed as:

$$A\Rightarrow B(SV=[s_1,s_2,\cdots,s_n],CV=[c_1,c_2,\cdots,c_n],LV=[l_1,l_2,\cdots,l_n]) \tag{10}$$

3. Analysis of the rules of party building and civic education based on data mining

3.1. Student population profiling output with data mining

In this section, after normalizing the research data, the three-module data mining model is used to extract various types of features of the students under study, and then combined with multi-feature splicing and multi-layer perceptron, the students are mapped into three different types of classes, and the group portrait of each type of student is output. Figure 3 shows the group portrait of "comprehensive development" students. Figure 4 shows the group portrait of "to be improved" students. Figure 5 is the

group portrait of “steadily growing” students. Among the five evaluation indexes of party building quality, ideological quality, moral quality, rule of law quality and political quality, the scores of “comprehensive development type” students are all above 0.80, much higher than the average score of 0.70, and the development of all aspects is more balanced. On the other hand, the scores of the “to be improved” students are on the contrary, with the scores of all kinds of characteristics ranging from 0.58 to 0.66, and none of the scores reaching the average score, which is a large room for improvement and needs the attention of the Party building and ideology educators in colleges and universities. The party building quality and political quality of the “steadily growing” students scored 0.69 and 0.64 respectively, and the scores of these two indicators are below the average, while the rest of the qualities are above 0.70, and some of the qualities need to be improved.

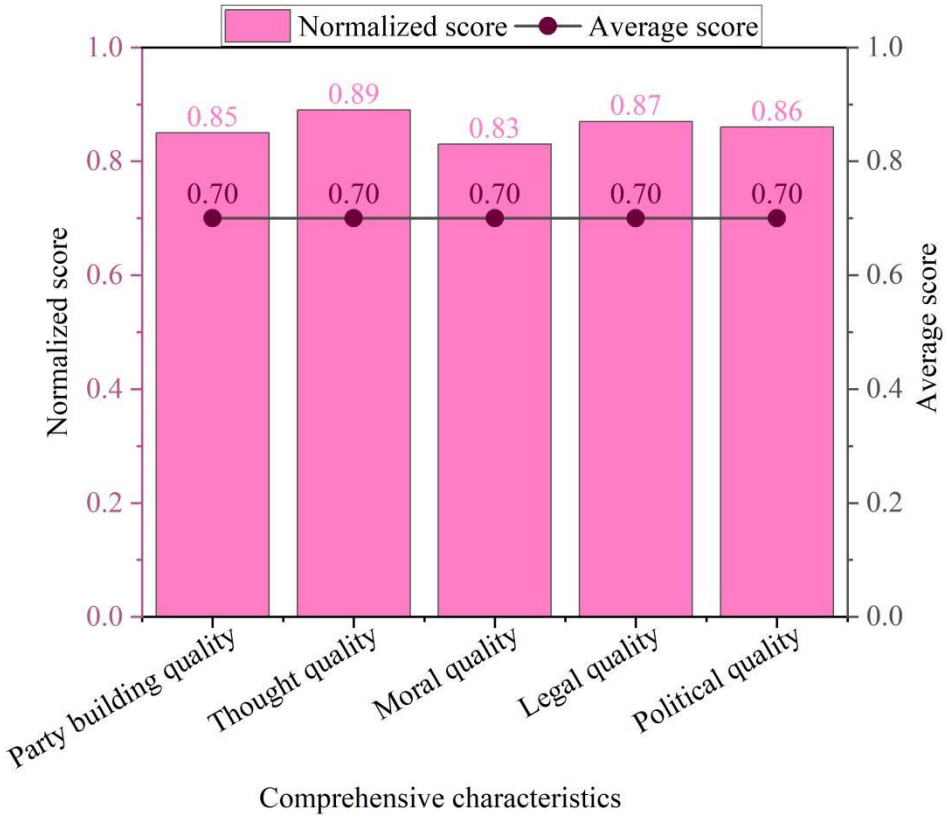

Figure 3. A group portrait of "comprehensively developed" students.

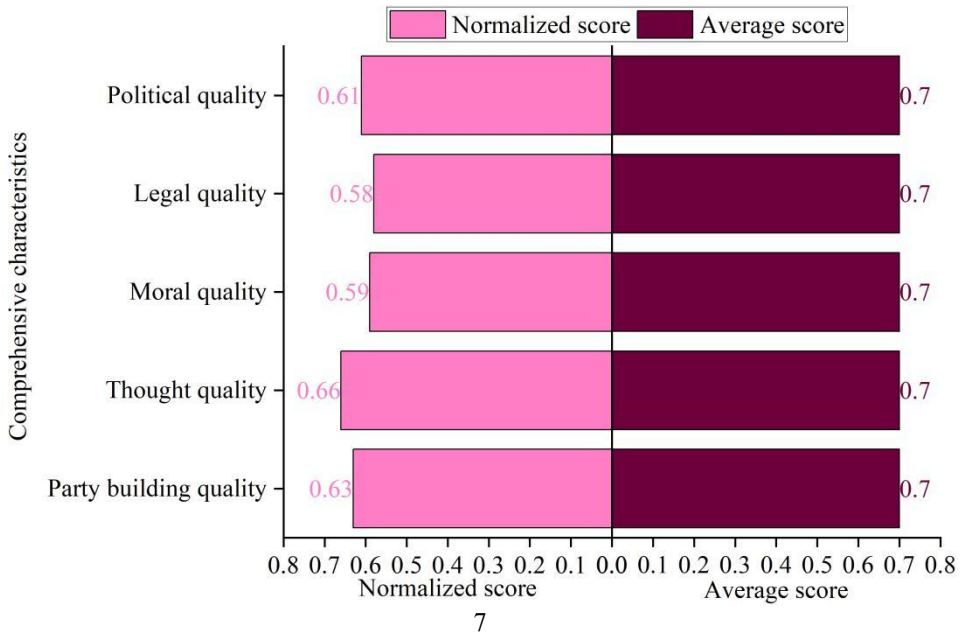

Figure 4. A group portrait of "areas needing improvement" students.

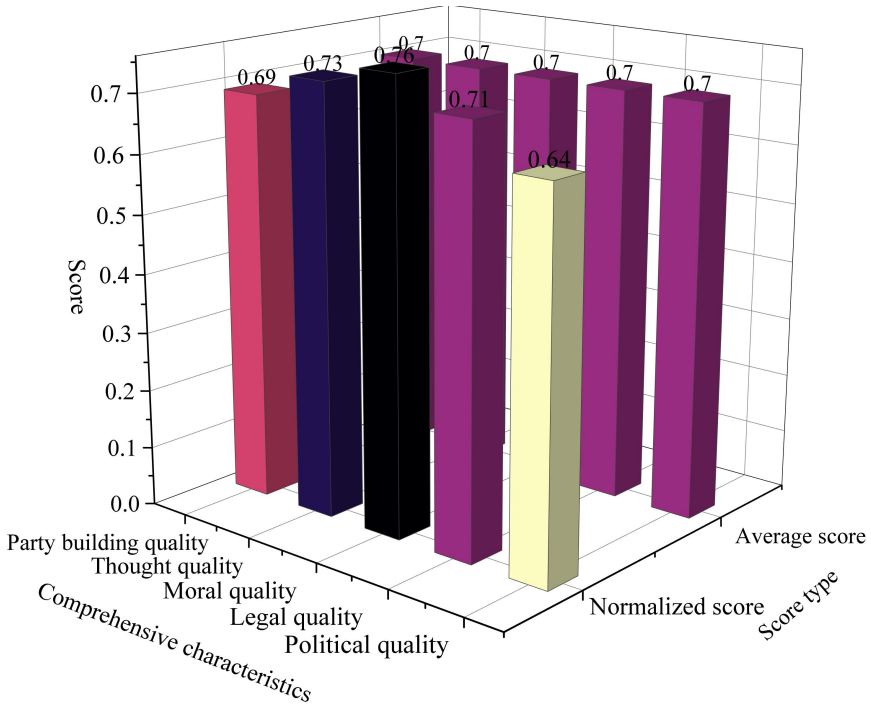

Figure 5. A group portrait of "steady growth" students.

3.2. Association rule mining results of party building and civic education in colleges and universities

3.2.1. Association rules between party education and students' comprehensive characteristics in higher education institutions

According to the data related to party building education and ideological education in colleges and universities and the mined comprehensive characteristics of students in various aspects, the dynamic association rule mining algorithm is utilized to mine the effects of various educational activities on the comprehensive characteristics of students and their association rules. Table 1 shows the partial association rule mining results of party building education and students' comprehensive characteristics in colleges and universities. Among the association rules with top 10 confidence level, the confidence level of the four party building education activities, namely, red education activity (0.88), retracing the party line activity (0.84), party building theory seminar activity (0.81), and party history book reading activity (0.80), are all ≧0.80.

Table 1. Relating rules related to Party building education (Top 10).

Serial Number	Association rules	Confidence level
1	Red education activities	0.88
2	Revisiting the Party's path activities	0.84
3	Party building theory discussion activities	0.81
4	Party Theme Day Activity	0.80
5	Group Reading of History Books	0.79

6	Party Building and Community Building Activity	0.77
7	Micro Party Lecture Competition	0.76
8	Party Building and Business Integration Activity	0.74
9	Volunteer Service and Practical Activity	0.73
10	Party Affairs Cadre Competititon	0.72

3.2.2. The rules of correlation between high school civic education and students' comprehensive characteristics

Table 2 shows some of the association rule mining results of the comprehensive characteristics of the university's civic education and students. Similarly, among the top 10 association rules with confidence level, those ≧ 0.80 are: sketching and social investigation (0.87), volunteering and research (0.86), Civic and Political Theory Course Teaching Competition (0.84), and Revolutionary Museum Visit (0.82). From the mining of the two types of association rules, it can be found that when the scale of party building and Civic and political education activities in colleges and universities is larger and involves more synergistic cooperation of relevant departments, the positive influence of the activities on students' comprehensive characteristics is stronger. For example, sketching and social investigation need to be carried out in cooperation with multiple departments, and in the process of the activities can not only learn about the knowledge related to Civic and Political Education, but also involve the content related to Party building. It can be seen that the in-depth optimization of party building and civic education in colleges and universities has a certain degree of necessity.

Table 2. Correlation rules related to ideological and political education (Top 10).

Serial Number	Association rules	Confidence level
1	Sketching and Social Investigation	0.87
2	Volunteer Service and Research	0.86
3	Teaching Competition of Ideological and Political Theory Courses	0.84
4	Visit to the Revolution Museum	0.82
5	Revolutionary Historical Story Telling Competition	0.79
6	Ideological and Political Theme Class Meeting	0.78
7	Flag-raising Ceremony	0.75
8	Memorial Ceremony for Fallen Heroes	0.73
9	Appreciation of Drama and Musical Theatre	0.72
10	Performances and Exhibitions in the Arts	0.70

4. Improvement of the operational mechanism for the synergistic development of student party building and ideological and political education

The work of students in colleges and universities is characterized by its generality and global nature, and the work is complicated and involves many departments of the school. In the process of the synergistic development of student party building and ideological and political education, colleges and school departments have their own focuses, and if they all work on their own goals, it is difficult to effectively utilize the advantages of both sides, and it is impossible to create synergies, instead, it may lead to the situation of relative independence and lack of contact. Therefore, it is crucial to improve the operation mechanism of the synergistic development of student party building and ideological and political education. It should be clear that the operation mechanism of the synergistic development of student party building and ideological and political education is not just a simple addition of the work of the propaganda department, the organization department, the Youth League Committee, the student work department, and the logistical support service department, not to mention that it cannot just rely on the work of the teachers of ideological and political courses and counselors. This means that on the basis of the presidential responsibility system under the leadership of the Party committee, it is necessary to emphasize the community consciousness of synergistic development, and establish a synergistic operation mechanism for each functional department based on sharing, communication, consultation, organization, deployment and cooperation, in order to more effectively play the role of each functional department, enhance the effect of cooperation, and ensure that all the main bodies can work together to make a positive contribution to the synergistic development of party building and ideological and political education of students in colleges and universities. The mechanism is designed to optimize the leadership's ability to build the party and ideological and political education. Such an operational mechanism is aimed at optimizing the leadership's decision-making, improving the management's efficiency, and forming a multi-dimensional communication path between the leadership and management, so as to realize the function of the Party building and ideological and political synergistic development of college students in the leadership and management and maximize the function, maximize the benefit, and strengthen the most effective way of operation. Such a synergistic development mechanism needs to be constantly improved and optimized to adapt to the changing environment and

needs in order to improve the level and quality of party building and ideological and political work of college students.

It is crucial to improve the operation mechanism of synergistic development, which is not only to build the work of college party committees and student party organizations into a three-dimensional network, but also needs to reflect the role of the operation mechanism in the daily management and specific details of the work, and effectively promote the development of synergistic work. Such a mechanism needs to make full use of the advantages and resources of each functional department to realize horizontal and vertical synergy, so as to promote the effective synergistic development of party building and ideological and political education of students in colleges and universities, and to provide solid support for the construction and growth of the student party. The party committee, functional departments and secondary colleges should work together to form a synergy of work on the basis of clarifying various responsibilities in the synergistic development of student party building and ideological and political education. At the level of work implementation, not only horizontal cooperation but also vertical coordination is needed, with synergy at every level, from the university party committee to the party organizations of the faculties (departments) to the grassroots party branches of the faculty and students. At the same time, it is necessary to find mutual connections in the already intertwined system operation network, each of them, to form a more orderly and scientific synergistic operation network, so as to enhance the effect of synergistic development of student party building and ideological and political education.

5. Practice of collaborative education between party building and civic education in colleges and universities

5.1. Comparison of Party Building and Civic Literacy between Pre-test Groups

In order to verify the effectiveness of the collaborative cultivation mechanism of party building and Civic and political education in colleges and universities, 600 students were evenly divided into 3 groups of 200 students each. The experimental group adopts the optimized mechanism of collaborative cultivation of college party building and civic education after data mining technology for cultivation. The control group adopts the mechanism of college party building and Civic and political education before data mining technology for cultivation. The control group does not carry out party building and ideological and political education cultivation outside daily teaching. Measurement of 5 types of comprehensive qualities of students in 3 groups before and after the experiment is conducted and compared. Figure 6 shows the results of the comparison of party building and ideological and political literacy between the pre-test groups.The average scores of the pre-tests of the three groups are all between 5.70 and 6.00, and the gap between the groups is not obvious, indicating that the three groups of students are at a comparable level before the practice, and they meet the requirements of the practice.

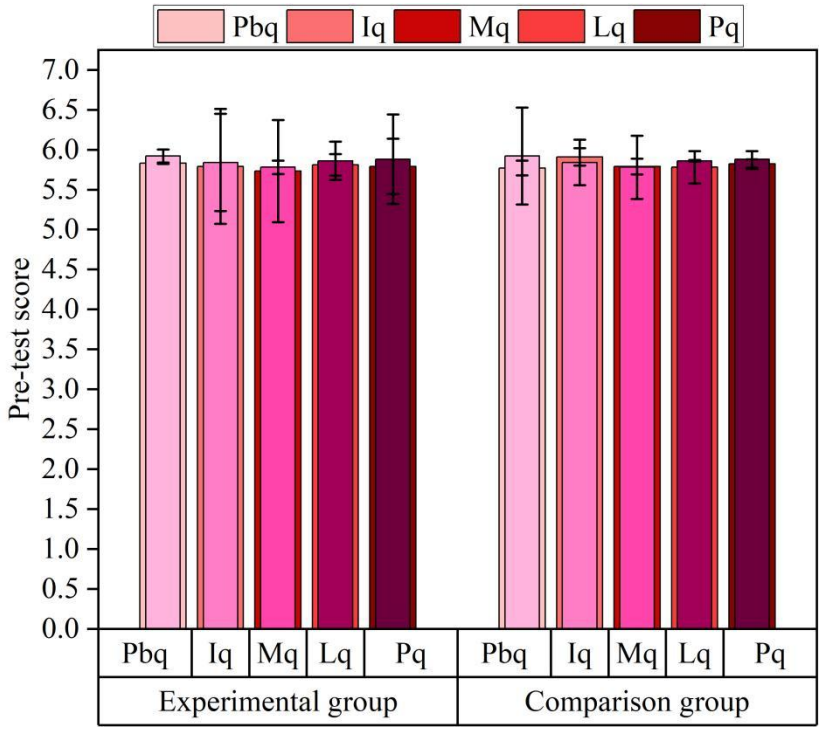

Figure 6. Comparison of literacy levels between the pre-test groups.

5.2. Comparison of Party Building and Civic Literacy among Posttest Groups

Figure 7 shows the results of the comparison of Party Building and Civic and Political Literacy between the posttest groups. After the completion of the practice, there was a large difference in the Party Building and Civic and Political Literacy scores of the 3 groups. The 5 literacy scores of the experimental group were 9.74, 9.82, 9.77, 9.76, and 9.59, which was an overall improvement of nearly 4 points from the previous scores of 5.70-6.00. In contrast, the control group's posttest literacy scores ranged from 6.09-6.83, an improvement of only about 1 point. The control group's posttest mean score improved by only about 0.1 points.

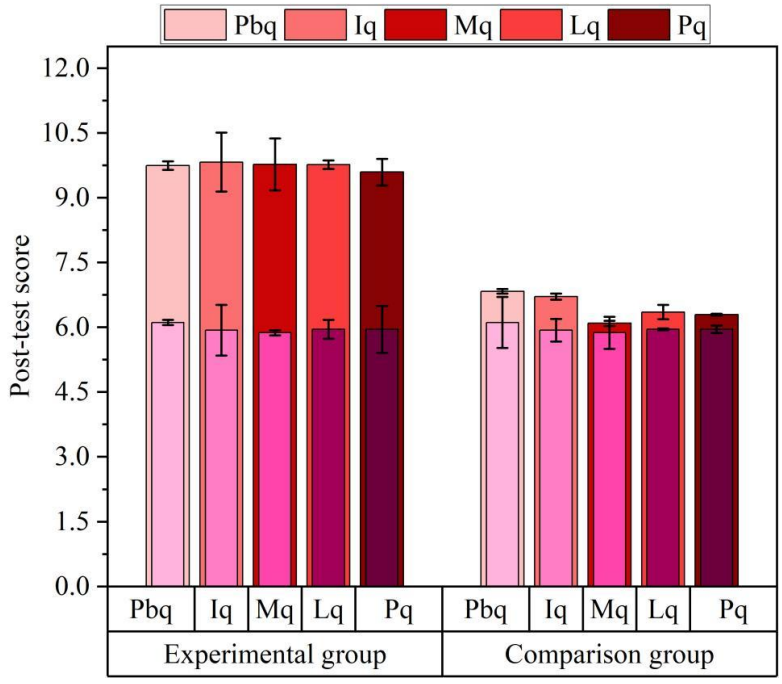

Figure 7. Comparison of literacy levels between the post-test groups.

5.3. Comparison of Party Building and Civic Literacy in Pre- and Post-tests of Experimental Groups

In order to further test the effect of this study on the specific enhancement of college students' party building and civic education literacy, the pre- and post-test data of the experimental group were subjected to independent samples t-test. Table 3 shows the test results. The results of the independent sample t-test of the pre- and post-tests of the experimental group students show that the P-value of the five qualities is 0.000, which is less than 0.001, indicating that the difference between the pre- and post-test scores is statistically significant. Carrying out the activities of collaborative education mechanism of party building and ideology education in colleges and universities in the experimental group has a significant promotion effect on the improvement of students' party building and ideology quality.

Table 3. Independent sample t-test before and after measurement in experimental.

Dependent variable	Independent variable	Sample size	Average value	Standard deviation	P
Party building quality	Pre-test	200	5.83	0.00683	0.000
	Post-test	200	9.74	0.09824	
Ideological quality	Pre-test	200	5.79	0.71896	0.000
	Post-test	200	9.82	0.68186	
Moral quality	Pre-test	200	5.73	0.63971	0.000
	Post-test	200	9.77	0.60261	
Legal quality	Pre-test	200	5.81	0.13594	0.000
	Post-test	200	9.76	0.09884	
Political quality	Pre-test	200	5.79	0.34593	0.000
	Post-test	200	9.59	0.30883	

6. Conclusion

This paper analyzes the association between Party building and Civic and political education and students' literacy through data mining technology to improve the quality of collaborative parenting mechanism. In the association rule with confidence level ≧ 0.80, the higher the synergy between party building and ideological education, the stronger the comprehensive literacy of students. After optimizing the synergistic parenting mechanism according to the obtained rules, the comprehensive quality of students in the experimental group is significantly improved (the average score of five qualities is improved by about 4 points). Improving the collaborative parenting mechanism of party building and civic education in colleges and universities through data mining technology is of great significance in guiding students to participate in extracurricular activities and realize self-development in the activities.

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