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Research on the Path of Enhancing the Effect of Digital Educational Resources Integration Strategy on Civic and Political Education of College Students Based on Multidimensional Data Fusion and Optimization Algorithm

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ABSTRACT

Influenced by the backward management methods and other factors, the integration and sharing of digital educational resources in colleges and universities have certain problems, and cannot give full play to the advantages of digital educational resources in colleges and universities. Based on this, this study proposes a targeted digital education resources integration strategy, using particle swarm algorithm to optimize the sorting of digital education resources, to obtain high-quality digital education resources, introducing fuzzy clustering algorithm and combining with the principle of decision tree, to accurately classify and integrate digital education resources. On the basis of realizing the integration and classification of digital educational resources, a digital educational resource sharing model is formed to promote the effective use of digital educational resources. The digital educational resources integration strategy proposed in this paper is adopted to carry out the application practice of digital educational resources integration and sharing in S colleges and universities. The mean values of the three dimensions of students' learning attitude, teachers' teaching, and teaching effect in S colleges and universities reached 3.48, 3.97, and 3.74, respectively, and this paper's digital educational resources integration strategy method has a positive positive impact on the dimensions of students' learning attitudes, teachers' teaching, and teaching effect in Civic and Political Education in S colleges and universities.

Keywords: particle swarm algorithm, fuzzy clustering algorithm, decision tree, digital educational resources

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1. Introduction

In today's society, colleges and universities, as an important position for knowledge dissemination and talent cultivation, have an irreplaceable role in ideological and political education for cultivating qualified socialist builders and successors [1-2]. With the rapid development of society and the wide application of information technology, ideological and political education in colleges and universities is facing new challenges and opportunities, based on which, the integration and utilization of digital educational resources for ideological and political education in colleges and universities has become the key to improve the quality and effect of education [3-6].

At present, the integration of resources in the civic and political education in colleges and universities is characterized by diversification. This includes traditional classroom teaching resources, network and digital education resources, and social practice activity resources, etc., however, there are significant differences in the utilization efficiency and effectiveness of these resources [7-10]. For example, although digital and network resources provide a new way for ideological education, the integration and optimal use of these resources still needs to be improved in practical application, and although colleges and universities have abundant digital educational resources and traditional teaching resources, there is a lack of effective connection between the two [11-14]. Traditional classroom teaching still adopts a one-way lecture mode, while digital educational resources mostly stay at the level of information dissemination, lacking in-depth integration with classroom teaching, although a series of online courses and educational software are provided to enrich students' learning resources [15-18]. However, due to the lack of close integration with classroom content, these resources are not fully utilized, and students are often confused when facing a large amount of online information, making it difficult for them to effectively filter and absorb relevant knowledge [19-22]. In addition, the current universities in the integration of civic and political education resources, the lack of targeted and innovative strategies, especially in the efficiency of resource utilization and the innovation of teaching methods of the inadequacy of these problems led to a reduction in the effectiveness of education, reflecting the universities in the integration of civic and political education resources in the urgent need for improvement and innovation [23-26].

In this paper, the integration strategy of digital educational resources is formulated by integrating multidimensional data from the three aspects of optimized sequencing, integration and sharing of digital teaching resources. Using a search engine to collect a large number of digital educational resources on the Internet, we propose a particle swarm algorithm based on the optimization of digital educational resources sorting method, each digital educational resource is considered as a particle, and the fitness function of each particle is calculated. According to the fitness function of each particle, the individual extreme value and global extreme value are determined, and the final particle swarm is obtained through continuous updating and iteration to determine the final high-quality digital educational resources. To integrate and classify the obtained high-quality digital educational resources, eliminate the influence of resources through standardization, introduce fuzzy clustering algorithm, establish fuzzy equivalence matrix based on the similarity results, establish the fuzzy cluster analysis model based on the objective function, and solve the model to achieve the final classification of resources. Through the decision tree pruning to improve the function of fuzzy clustering, to obtain the optimal node of resource integration, to realize the integration of digital education resources. After completing the integration and classification of digital educational resources, a digital educational resource sharing model is established. After receiving the user's retrieval demand, the GUI program is executed and the results are fed back to the user through the user interface, and the management, sharing and distribution of digital educational resources are realized by virtue of the functional modules. We carry out the application practice of digital education resources integration and sharing in S university to explore the digital education resources optimization sorting method and digital education resources integration method proposed in this paper, and analyze the impact of the digital education resources sharing model constructed in this paper on the actual Civics and Political Science teaching.

2. Digital Education Resources Integration Strategy

Under the premise of the current development of information technology, digital educational resources in colleges and universities are becoming increasingly rich, showing rapid growth, and playing an increasingly important role in the reform of talent cultivation and civic and political teaching methods. However, under the influence of management concepts and other factors, there are certain problems in the integration and sharing of digital educational resources in colleges and universities, which can't give full play to the advantages of college digital resources in civic and political education, reduce the efficiency of resource utilization, and affect the cultivation of talents and the development of schools. In order to realize the integration and sharing of digital education resources and enhance the existing level of Civic and political education, this paper will integrate multi-dimensional data, combined with various optimization algorithms, and put forward the following strategies and methods.

1) The optimization sorting method of digital educational resources based on particle swarm algorithm is proposed to obtain high-quality teaching resources among many digital teaching resources quickly and efficiently.

2) On the basis of obtaining the obtained high-quality teaching resources, introduce the fuzzy clustering algorithm and design the digital educational resources integration method based on decision tree to accurately integrate and classify the teaching resources.

3) After realizing the integration and classification of digital educational resources, a digital educational resource sharing model is constructed to provide feedback on resource search and sharing results based on user's resource demand, so as to promote the effective use of digital educational resources in Civic and Political Education.

3. Digital Educational Resources Access

With the rapid development of information technology, the emergence of search engine function makes it possible for people to obtain a large number of relevant digital teaching resources on the network, but the search results can not be effective screening of digital teaching resources. In this chapter, particle swarm algorithm will be used to optimize the sorting of the searched digital educational resources, which provides the basis for the integration and sharing of the subsequent digital educational resources.

3.1. The process of searching and acquiring digital educational resources

The process of searching and obtaining high-quality digital educational resources can be divided into the following steps. First of all, to determine the target teaching content, and then use a general search engine to obtain teaching resources on the network with a certain degree of relevance to the target teaching content on this basis, the teaching resources obtained on the network for optimization of sorting, from which to select the target teaching content with a high degree of relevance and high quality of high-quality teaching resources, and ultimately, the obtained high-quality teaching resources applied to the teaching process.

3.2. Comprehensive evaluation indicators for digital educational resources

Teaching resources available on the network are huge in number, variety and quality, if you want to get quality teaching resources in these large number of resources, first of all, we need to give certain evaluation indexes to each teaching resource, and use these indexes to comprehensively evaluate whether the resources are of high quality or not. This paper comprehensively evaluates whether the teaching resources are of high quality from five aspects: the content of the teaching resources matches with the target content of Civics teaching, the quality of the teaching resources, the network environment of the teaching resources, the cost of the teaching resources, and the friendliness of the operation of the teaching resources, and so on.

3.3. Optimized Sorting of Digital Educational Resources Based on Particle Swarm Algorithm

Particle swarm algorithms originated from the simulation of bird feeding behavior, and the search for optimal solutions is achieved through collaboration and competition between individuals using multiple iterations. Particle swarm algorithms are free of complex computation and programming such as crossover and mutation, and therefore have the advantages of simple concept, fast search speed, and easy implementation [27].

The particle swarm algorithm employs a search method with velocity updating and position updating, where each particle serves as a feasible candidate solution in the search space, and a fitness function is used to characterize the degree of fitness of the solution. $v_i(i=1,\cdots,n)$ represents the running speed of each particle, where n is the number of particles.

$x_i(i=1,\cdots,n)$ denotes the position of each particle.

The particle swarm algorithm first initializes the population and then changes the population through continuous iterations. During each update of the population, each particle constantly updates its speed and position by tracking the individual extremes and global extremes.

Individual extreme value $p_i^{(d)}$ (d is the number of iterations) is the optimal solution generated by searching the particles from the initial state to the current number of iterations, and global extreme value $g^{(d)}$ is the optimal solution among all the current particle populations. The following equation (1) is used to update the velocity and position of each particle and thus the population:

$$v_i = v_i + \beta_1 r_1 \left(p_i - x_i\right) + \beta_2 r_2 \left(g - x_i\right) x_i = x_i + v_i \tag{1}$$

where β_1 and β_2 are learning factors; r_1 and r_2 are arbitrary values between 0 and 1.

Through the above continuous iteration until the maximum number of iterations is reached or the optimal solution is obtained.

According to the comprehensive evaluation index of digital educational resources, this section uses particle swarm algorithm to optimize the ranking of digital educational resources, and its main steps are as follows.

Step 1: Each digital educational resource is regarded as a particle and the fitness function of each particle is calculated using Equation (3):

$$F = c_1 a_1 + c_2 a_2 + c_3 a_3 + c_4 a_4 + c_5 a_5 \tag{2}$$

where a_1 represents the degree of match between the content of digital educational resources and the target teaching content; a_2 represents the quality of digital educational resources; a_3 represents the network environment of digital educational resources; a_4 represents the cost of digital educational resources; a_5 represents the operation friendliness of digital educational resources.

$c_i(i=1,\ldots,5)$ is the weight coefficient, according to the different importance of each evaluation index in the previous section, in this paper $c_1 = 0.35, c_2 = 0.3, c_1 = 0.15, c_2 = 0.1, c_1 = 0.1$

Step 2: According to the fitness function of each particle, the individual extreme value p_i and global extreme value g are determined.

Step 3: Update the velocity and position of each particle using Eqs. (1) and (2), thus updating the particle swarm.

Step 4: If the number of iterations reaches the maximum number of times or the individual extreme values and global extreme values of the particles reach the desired requirements, the search is stopped, otherwise go to step three.

Step 5: After steps one to four, the particle with the optimal extreme value can be obtained, and the digital educational resource represented by this particle is the quality teaching resource we want to obtain.

4. Methods of integrating digital educational resources

After completing the optimized ranking of digital educational resources in the previous chapter, this chapter will investigate a digital educational resources integration method under the guidance of fuzzy clustering algorithm [28].

4.1. Classification of resources based on fuzzy clustering algorithm

As there are many factors affecting the integration of digital educational resources, and the correlation between each factor and the integration of digital teaching resources is large. Considering the influence of different aspects comprehensively, and following the representativeness and comparability in the process of resource classification, the clustering object and related indicators are determined. Assuming that there are n types of classification of digital educational resources, the clustering center is selected, which is the basis for the selection of resource classification. In the process of fuzzy clustering, the number of clusters is mainly determined by the resource users, and a number of local resources are randomly selected to constitute the initial clustering center, which will be represented as $\langle \omega_1, \omega_2, \cdots, \omega_n \rangle$. Digital educational resources need to be standardized for the resource data in the fuzzy clustering classification process in this paper, due to the fact that the data corresponding to different classification indexes are different though the syllabus is different, and in order to ensure the effect of the clustering, it is necessary to carry out the data standardized processing, eliminate the influence of the quantitative outline between digital teaching resources, in order to facilitate the distance comparison with the clustering center. According to the fuzzy matrix for the data requirements, the data value of each educational resource is compressed to [0, 1] between the commonly used standardization methods, this paper uses the polar deviation transformation method to achieve the standardization of data processing. The calculation process is shown in the following equation:

$$x'_{ik} = \frac{\omega_n (x_{ik} - \min_{i \le i \le m} \{x_{ik}\})}{\max_{1 \le i \le m} \{x_{ik}\} - \min_{1 \le i \le m} \{x_{ik}\}} \tag{3}$$

In the process of fuzzy clustering, the first step is to construct a data matrix, assuming that the number of digital educational resources that need to be integrated is x, utilizing set $Q = \{Q_t, Q_z, \cdots, Q_x\}$. For set Q, each resource Q_i in the set has certain attributes of its own, which are represented by utilizing vector set $Q_i = \{Q_{i1}, Q_{i2}, \cdots, Q_{ij})$. Introducing the similarity variable r, a fuzzy similarity matrix can be established by calculating the similarity between any two educational resources Q_i and Q_j. The similarity is calculated by Euclidean distance method with the formula:

$$d(Q_i, Q_j) = \sqrt{\sum_{k=1}^{m} (Q_{ik} - Q_{jk})} \tag{4}$$

According to equation (2) can get the fuzzy similarity matrix, the matrix of itself for multiplication calculation, until the conditions are satisfied, can get the fuzzy equivalence matrix. In the process of clustering processing, fuzzy cluster analysis method is to establish an objective function, then the objective function in the fuzzy mean clustering algorithm established in this paper is shown in equation (v):

$$T(U,c_1,\ldots,c_s)=\sum_{i=1}^{c}T_i \tag{5}$$

Eq. (5) can be transformed into:

$$T(U,c_1,\ldots,c_s)=\sum_{i=1}^{c}\sum_{j}^{n}u_{ij}^{m}d_{ij}^{2} \tag{6}$$

In Eq. (6), u_i denotes the degree of affiliation of element Q_j belonging to i, and n denotes the weighted index, which is also the smoothing index of the curvilinear model, which can reflect the relationship between the resources and the clustering centers, and the constraints are denoted as:

$$\sum_{i=1}^{c}u_{ij}=1,\forall j=1,\ldots,n \tag{7}$$

In the constraints, the sum of the distances between each digital resource and each clustering center is 1. At this time, the clustering centers are in an independent state, and are less sensitive to noisy data.

In the above established fuzzy cluster analysis model based on the objective function, it is also necessary to solve the model in order to realize the final resource classification. In set $Q=\{Q_i,Q_2,\cdots,Q_x\}$, in the fuzzy clustering algorithm, the number of clusters and the maximum number of iterations in the losing classification and the allowable error, after determining the initial clustering center, in the first iteration, the degree of affiliation and the clustering center are computed, and after the error is computed, the magnitude between the error and the degree of affiliation is judged. If the error is less than the degree of affiliation, then the matrix and clustering center can be obtained; if the error is greater than the degree of affiliation, then recalculate the degree of affiliation, clustering center and error.

The fuzzy clustering algorithm chosen in this paper is able to take into account the clustering between the digital resources and each clustering center, and it is also able to take into account the relationship between the same type of clustering centers and digital educational resources.

4.2. Decision Tree Based Resource Integration

Without considering the noise, the real resource data that has been classified may have some field mutilations or errors; in the state of high noise, it will interfere with the analyzing effect of the fuzzy clustering method, so that it is necessary to use the decision tree and prune it, which can improve the function of the fuzzy clustering, and make it more easy to use [29].

Firstly, according to the requirements of resource integration, a decision tree is constructed, and then measurement is carried out in a classification node to complete the functional evaluation of the node. In the process of measurement and evaluation, the obtained test results with strong functions are taken as the optimal node for resource integration, through which the node is classified and similar resources are integrated. In this process, the information gain rate needs to be calculated. In this paper, the information gain rate function is used in the evaluation process, which has the following form:

$$\begin{cases} gainratio=\dfrac{gain(A)}{spliti(A)} \\ spliti(A)=\displaystyle\sum_{1}^{v}\frac{p_i}{m}\log\left(\frac{p_i}{m}\right) \end{cases} \tag{8}$$

In Eq. (6), $gain(A)$ denotes the information gain, utilizing A as the attribute of the decision tree, v denotes the number of discrete values of A, and p_i denotes the number of positive examples.

For digital educational resources, all of them have their fixed IP locations, and considering factors such as operating costs and using download speeds, it is necessary to select resource platforms within the same LAN or within a certain range as the integration environment.

5. Digital Educational Resources Sharing Modeling System

Due to the slow updating of resource libraries and untimely promotion of high-quality teaching resources, the development of teaching resource sharing is seriously lagging behind. This chapter will build a digital education resource sharing model on the basis of the digital education resource integration realized in the previous section. The main target of this model is teachers and students, and it is a platform that combines teaching and learning of Civic and Political Education, as well as resources, interaction and display. The specific functions of the model are specifically shown in Table 1.

Table 1. Specific function of digital education resource sharing model

Model	First-level column	Secondary column
Digital education resource sharing model	Curriculum construction	Course study
		Curriculum discussion
		Teaching resources
		Synchronous teaching
	Teaching Online	Boutique resources
		The subject is online
	Teaching and Research Blog	Teaching method discussion
		Training Center
	Special column	-
	Member homepage	-

5.1. Digital Educational Resources Sharing Model

To establish a central database, it is necessary to integrate all the data in the sharing model into the central database and categorize the digital educational resources according to certain classification standards. The composition of the digital educational resources sharing model is shown in Figure 1. In the figure, the digital educational resources sharing model is built on the basis of physical resources. It provides additional services and functions by virtualizing various actual resources in the physical layer, such as general-purpose middleware, scientific research database, teaching database, management database, database administrator, workflow administrator and so on. On the physical grid, servers, storage and real networks are used to provide services for the sharing process, such as the exchange and cooperation of learning resources and the mining of the latest information of the Civics program. At the same time, all the grid resources above the physical resources serve for modeling and ensure that they are not integrated and called by other applications. The functions realized by each layer are as follows.

1) Foundation Layer. The base layer consists of the shared resource base and the data of each system that provides data for the shared resource base.

2) Environment Layer. It realizes the specific application of the model and executes the operation command after receiving the user's search request.

3) Application layer. It consists of two parts: the teaching media and the Civics teaching environment, and it is the interface part that feeds the results to the users. In the case that the complexity and the degree of change of the shared requirements are not very large, the reuse of the database is used, and the more the number of times of reuse, the greater the cost of reuse; in the case that the complexity and the degree of change of the shared requirements are large, the reuse of knowledge reuse is used, and the cost of reuse remains unchanged no matter how many times of reuse it is. In general, the teaching resource sharing model developed through the structure can promote the effective utilization of resources and make the management of the model easy.

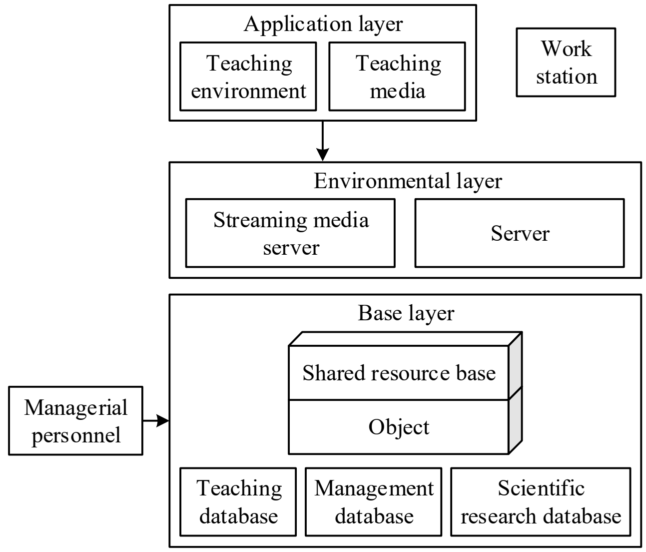

Fig. 1. Teaching resource sharing model

5.2. *Digital Educational Resources Sharing Model Functional Module*

The functional module of the digital educational resource sharing model realizes the demand for the common sharing of teaching resources. The functional module of the teaching resources sharing model is shown in Figure 2. The functional modules are specifically analyzed as follows.

1) System management module. Teachers can modify, delete and update the resources in the model, and they can divide the resources into groups and set the weights of the groups.

2) Standard Management Module. The standard management module determines the unified standard of the model, selects teaching resources according to the standard, and modifies or deletes unsuitable resources according to the standard.

3) Media Material Module. According to the professional characteristics of Civics, the teaching resources are classified according to different standards and divided into 5 categories, such as text, audio and video, animation and image.

4) Online course module. Online courses are online teaching environments constructed according to different teaching strategies and objectives. The online course module has two parts: the content of Civics teaching according to teaching objectives and teaching strategies; and the online environment.

5) Test bank module. The test bank module is a collection of subject questions realized in the computer system according to certain educational measurement theories, with the functions of searching, entering, deleting, modifying and approving the score statistics of the test questions.

6) Courseware library module. The courseware is formulated according to the teaching objectives of Civics and Political Science, reflecting the teaching contents and teaching strategies.

7) Case Library Module. The cases in the case library module are mainly provided by experts and scholars or experienced teachers. Teachers can select high-quality Civics teaching cases from the case library module to enhance students' enthusiasm for learning.

8) Catalog Indexing Module. The directory index module makes use of various strategies to synchronize the course resources stored in the distributed storage, so as to realize the rapid retrieval and positioning of Civics teaching resources in different resource libraries.

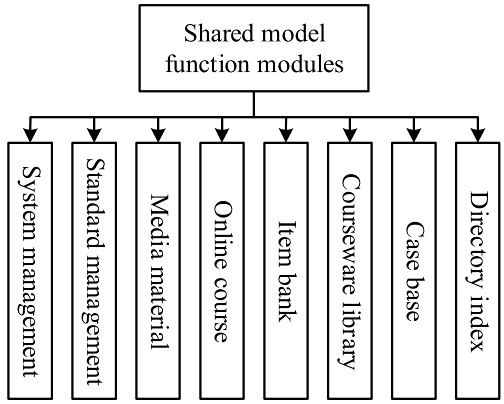

Fig. 2. Functional module

6. Digital Education Resources Integration and Sharing Application Practice

S University in Guangdong Province, China, was selected as the research site for this experiment, and the digital educational resources were collected and optimally sorted and integrated using the digital educational resources optimization sorting method and digital educational resources integration method proposed in this paper. Applying the digital educational resources sharing model proposed in this paper, the optimized sorted and integrated high-quality digital educational resources are shared and transmitted in the microcourse platform environment of University S to explore the impact of digital educational resources sharing on the teaching of ideology and politics.

6.1. Analysis of the effect of optimized sequencing and integration of digital educational resources

Setting digital educational resources as the test variable, the BIC results are used to determine the best classification, and the BIC automatic clustering results are shown in Table 2. In general, the smaller the BIC value obtained by the fuzzy clustering algorithm in this paper, the better the clustering performance of the algorithm and the highest quality of the generated clustered data. It can be seen that when the number of clusters is increased, the obtained BIC value decreases, so the distance measurement ratio and the BIC change rate need to be measured to determine the optimal number of clusters. The clustering case is optimal when the clustering measurement ratio results are higher and the BIC change rate is also higher. From the experimental results, it can be seen that when the obtained clustering category is 4, the highest clustering measurement ratio is obtained through clustering, which is 8.594, and at the same time the highest BIC rate of change is reached to 1. Therefore, the digital educational resources are categorized into 4 categories.

Table 2. Clustering results

Number of categories	BIC standard	BIC change rate	Distance measurement ratio
1	1118956.52	0.073	1.867
2	69524.13	0.056	1.849
3	71526.45	0.026	1.652
4	72354.65	1	8.594
5	73245.52	-0.025	1.542
6	75645.82	-0.015	1.668
7	76845.25	-0.085	1.452
8	78945.62	-0.062	1.325
9	80456.25	-0.089	1.845
10	82648.22	-0.094	1.468

The size of the digital education resources collected in this experiment is 5.88GB. The digital educational resources integration algorithm based on K-means algorithm (referred to as "Method A") and the digital educational resources integration algorithm based on KNN algorithm (referred to as "Method B") are selected as comparison methods, and the optimal ranking and integration of digital educational resources by different methods are shown in Table 3. As can be seen from the table, the effective integration and classification of digital teaching resources can be realized by using all three methods. Based on the results of BIC change rate as well as distance measurement ratio, the method of this paper classifies digital educational resources into four categories, and each category accounts for 29.42%, 36.22%, 15.48%, and 18.88% of the total number, respectively.

Table 3. Result of digital education resources integration

Category serial number	Method of this article		Method A		Method B	
	Size(GB)	Proportion(%)	Size(GB)	Proportion(%)	Size(GB)	Proportion(%)
1	1.73	29.42%	1.79	30.44%	1.92	32.65%
2	2.13	36.22%	2.24	38.10%	2.28	38.78%
3	0.91	15.48%	0.85	14.46%	1.12	19.05%
4	1.11	18.88%	1	17.01%	0.56	9.52%
Total	5.88	100%	5.88	100%	5.88	100%

Statistics in different window size, this paper's method, method A, method B on the integration of digital educational resources classification efficiency, the comparison results are shown in Figure 3. As can be seen from the figure, the running time of different methods for merging and classifying digital teaching resources shows a decreasing trend with the increase of window size. When the window size is higher than 600, the running time of different methods for integrating and classifying digital teaching resources is improved. The main reason is that when the operation window is too small, the methods need to extract data from the buffer area, which takes up too much time. When the operation window size is too large, the feature decomposition time of digital teaching resources is elevated. Therefore, when the window interval is in the range of 300~600, the efficiency of digital teaching resources subsumption and classification is the best. Compared with the other two methods, the integration classification efficiency of this paper's method is the highest when the different window sizes are small, indicating that the computational efficiency of this paper's method is higher than the other two methods.

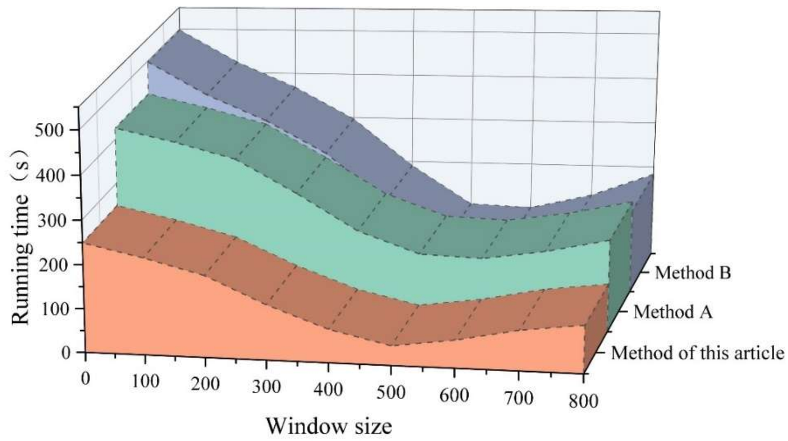

Fig. 3. The influence of window size on the efficiency of merging classification

Evaluation metrics such as check completeness, accuracy, and F1 estimation value are used to further evaluate the integration accuracy of digital educational resources of this paper's method. In the integration and classification of digital educational resources, when the F1 estimation value is higher than 90%, it indicates that the method has a high integration and classification efficiency. The statistical results of the integration classification of digital educational resources using the method of this paper are shown in Table 4. The experimental results show that the accuracy as well as the degree of checking completeness of this paper's method in are higher than 98%, and the F1 estimation values are higher than 93%. The statistical results show that the optimized sorting method of digital educational resources and the integration method of digital educational resources proposed in this paper have high performance of classification and integration of digital resources, have high accuracy rate, and have high applicability in the actual Civics teaching activities.

Table 4. Statistical result

Category serial number	Accuracy(%)	Completeness(%)	F1 estimate(%)
1	98.49	98.53	97.19
2	98.76	98.69	96.47
3	98.81	99.4	93.75
4	99.16	99.6	94.44

6.2. Analysis of the effect of sharing digital education resources

The digital educational resource sharing model proposed in this paper is compared with the MOOC-based digital educational resource sharing model (“Model 1”) and the blockchain-based digital educational resource sharing model (“Model 2”). The microcourse platform of S-college is used to simulate the digital education resource sharing scenario, including multiple clients and servers. The server side is responsible for handling the sharing and transmission of Civics teaching resources, while the clients simulate user behaviors, such as sending requests and receiving resources.

6.2.1. Transmission delay. The transmission delay of using different digital educational resources sharing models is shown in Table 5. As can be seen from the table, the overall transmission delay is higher when the model of this paper is used to start sharing, but with the increase of transmission volume, the transmission delay decreases rapidly and tends to stabilize. When model 1 is used, the transmission delay is close to that of the proposed method, but the transmission delay stabilizes slower, while when model 2 is used, the transmission delay decreases slower and the overall transmission delay is higher. The transmission delay of the digital educational resources sharing model proposed in this paper is always shorter, and the transmission delay can be as low as 0.06s, which can effectively improve the efficiency of secure sharing of digital educational resources.

Table 5. Transmission delay

Resources(GB)	Transmission delay(s)		
	Model of this article	Model 1	Model 2
20	0.13	0.58	4.11
40	0.07	0.28	0.43
60	0.19	0.26	0.41
80	0.08	0.17	0.29
100	0.06	0.14	0.36
120	0.06	0.15	0.33
140	0.15	0.27	0.36

6.2.2. Shared success rate. The sharing success rates of different models are compared, and the comparison results are shown in Fig. 4. As can be seen from the figure, with the change of transmission time, the sharing success rate of model 1 and model 2 is 8.8% and 70.6% respectively, and shows more obvious fluctuation. The sharing success rate of the model in this paper is 78.8%, and has been stabilized without significant fluctuations. Obviously, the digital educational resources sharing model proposed in this paper always has a high success rate of digital educational resources data sharing.

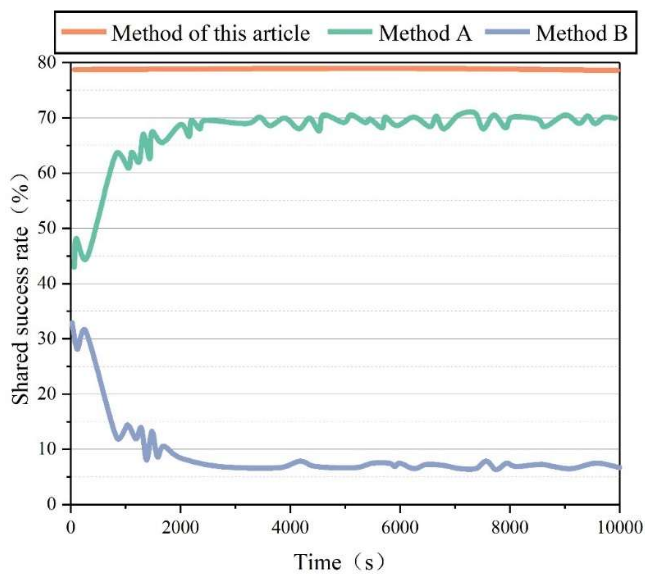

Fig. 4. Shared success rate

6.3. *Analysis of the Effectiveness of Civic and Political Education*

Within S university, the digital educational resources integration strategy approach proposed in this paper is applied to carry out a 3-month practice of integrating, categorizing and sharing digital educational resources. At the end of the practice, the impact of this paper's digital educational resources integration strategy approach on the teaching of Civics and Politics is analyzed from three dimensions: students' learning attitude, teachers' teaching, and teaching effect.

6.3.1. Effectiveness of Civics Teaching in General. The three dimensions of students' learning attitude, teachers' teaching, and teaching effect in Civics learning in S colleges and universities were analyzed descriptively, and the results are shown in Table 6. The results showed that the overall situation of students' learning attitudes, teachers' teaching, and teaching effectiveness in S colleges and universities was good. Among them, the mean value of teachers' teaching was the highest (M±SD=3.97±0.70), and the mean value of students' learning attitude dimension was relatively the lowest (M±SD=3.48±0.66).

Table 6. Overall situation of teaching effect

	Students ' learning attitude	Teacher teaching	Teaching effect
M±SD	3.48±0.66	3.97±0.70	3.74±0.68

6.3.2. A study of differences in the effectiveness of Civics teaching and learning:

1) Differential study of gender. In order to test whether there are differences between different genders in students' learning attitudes, teachers' teaching and teaching effectiveness in Civics learning, the author conducted independent samples t-tests on the scores of male and female gender groups on three dimensions respectively, and the results are shown in Table 7. The results show that there are differences between male and female students in terms of students' learning attitudes, teachers' teaching and teaching effectiveness. The most significant differences between male and female students were found in the areas of students' attitudes toward learning (p = 0.001) and teaching effectiveness (p = 0.002). The scores of male students in each dimension are significantly higher than those of female students, indicating that male students are more motivated to learn in this experiment and gain more from Civics learning with the help of this paper's digital educational resources integration strategy approach.

Table 7. Gender independent sample t test

Dimensions	Gender	M±SD	T	P
Students' learning attitude	Male	3.51±0.65	3.312**	0.001
	Female	3.42±0.68		
Teacher teaching	Male	3.97±0.84	2.322*	0.02
	Female	3.9±0.66		
Teaching effect	Male	3.83±0.82	3.182**	0.002
	Female	3.71±0.52		
* P<0.05 ** P<0.01 *** P<0.001				

2) Research on the differences between students of different majors. In order to test whether there are differences in students' learning attitude, teachers' evaluation and teaching effect among students of different majors in this digital education resources integration and sharing application practice, a multifactor ANOVA was conducted to analyze the scores of the teaching effect of the Civics class of different majors in various dimensions, and a two-factor ANOVA was carried out with the scores of different majors as the independent variable and the scores of the three dimensions as the dependent variable, and the results are shown in Table 8. There were significant main effects of student learning attitudes, teacher teaching and teaching effectiveness in different majors, with differences in the three dimensions of student learning attitudes (P = 0.000), teacher teaching (P = 0.000), and teaching effectiveness (P = 0.000). Further analysis found that, in addition to other majors, engineering majors scored significantly higher than students in arts, science, agriculture and medicine on all dimensions, and that this paper's digital education resource integration strategy approach can provide greater civic teaching assistance for engineering majors.

Table 8. Variance analysis of teaching quality of different majors

-	-	Students' learning attitude	Teacher teaching	Teaching effect
Professional type	Liberal arts majors	3.46±0.05	3.92±0.06	3.76±0.08
	Science major	3.42±0.03	3.96±0.05	3.78±0.03
	Engineering	3.56±0.04	4.05±0.04	3.85±0.04
	Agronomy	3.55±0.08	3.85±0.11	3.79±0.13
	Medical profession	3.34±0.03	3.83±0.03	3.66±0.03
	Other	3.57±0.06	4.02±0.05	3.91±0.05
The main effect of professional type	F	8.26***	6.26***	5.77***
	Sig	0	0	0
* P<0.05 ** P<0.01 *** P<0.001				

6.3.3. Correlation and regression analysis. In order to test whether students' "learning" and teachers' "teaching" will affect the teaching effect of this digital educational resources integration and sharing application practice, this paper carries out Pearson correlation analysis on the scores of students' learning attitudes, teachers' teaching, and teaching effect, which are shown in Table 9. The results are shown in Table 9. The results show that there is a significant positive correlation between the three dimensions of students' learning attitude, teachers' teaching and teaching effectiveness. The correlation coefficient between students' learning attitudes and teachers' teaching was $r = 0.61$ ($P < 0.01$); the correlation coefficient between students' learning attitudes and teaching effectiveness was $r = 0.66$ ($P < 0.01$); and the correlation coefficient between teachers' teaching and teaching effectiveness was $r = 0.72$ ($P < 0.01$).

Table 9. Standard deviation and correlation coefficient

	M±SD	1	2	3
Students' learning attitude	3.48±0.66	-		
Teacher teaching	3.97±0.70	0.61**	-	
Teaching effect	3.74±0.68	0.66**	0.72**	-
* P<0.05 ** P<0.01 *** P<0.001				

The correlation analysis shows that there is a significant positive correlation between students' learning attitudes, teachers' teaching and teaching effectiveness, and there is also a significant positive correlation between students' learning attitudes and teachers' teaching. In order to investigate the significant degree of the influence of students' learning attitudes and teachers' teaching on teaching effectiveness, the relationship between students' learning attitudes and teachers' teaching was examined by using hierarchical regression analysis with the two factors as predictor variables and the teaching effectiveness factor as dependent variable. The first step of the regression equation puts in the control variables, mainly the demographic variables of grade, major, and gender; the second layer puts in the two factors of students' learning attitudes and teachers' teaching in order to examine the predictive effect of students' learning attitudes and teachers' teaching on teaching effectiveness by excluding the influence of the three demographic variables of grade, major, and gender, and the specific results are shown in Table 10. The results of the study showed that when student learning attitudes and teacher teaching were put into the regression equation, student learning attitudes (β =0.366, $P < 0.001$) predicted teaching effectiveness, and teacher teaching also predicted teaching effectiveness (β

=0.489, P < 0.001). Teachers' teaching has a higher degree of influence on the teaching effectiveness of this digital education resources integration and sharing application practice than the influence of students' learning status on the teaching effectiveness of this digital education resources integration and sharing application practice. Students' “learning” and teachers' “teaching” are both important factors affecting the effectiveness of the practical teaching of this application, but the influence of teachers' “teaching” is more important.

Table 10. Hierarchical regression analysis

-	-	Teaching efficiency
First step	Gender	-
	Grade	-
	Professional	-
AdjustR^2		0.003
Second step	Student learning attitude	0.366***
	Teacher teaching	0.489***
AdjustR^2		0.582
$\triangle R^2$		0.586
* P<0.05 ** P<0.01 *** P<0.001		

On the whole, the use of the digital education resources integration strategy proposed in this paper can have a positive impact on students' learning attitude, teachers' teaching, teaching effect and other dimensions in ideological and political learning, but there are differences in gender and professional type, and students' "learning" and teachers' "teaching" have an impact on the practical application effect of digital education resources integration strategy and method. In the application of this paper digital educational resources integration strategy and method to the reality of the teaching activities, according to the students' gender, professional situation according to the teaching, play the teacher's enthusiasm, initiative, creativity, to help students to better integrate the digital resources integration and sharing and learning integration, innovation of the students' learning methods and the teacher's Civics and Political Science teaching methods.

7. Conclusion

In order to solve the problems of confusing classification and low sharing efficiency of digital educational resources integration, this paper proposes a targeted digital educational resources integration strategy, using particle swarm algorithm to obtain high-quality teaching resources quickly and efficiently, introducing fuzzy clustering algorithm and designing digital teaching resources integration method, and constructing a digital educational resources sharing model to improve the efficiency of resource sharing. The digital educational resources integration strategy proposed in this paper is applied to the teaching in colleges and universities, and the practice of digital educational resources integration and sharing is carried out in S colleges and universities. In terms of the optimization and integration effect of digital educational resources, comparing the digital educational resources integration algorithm based on K-means algorithm and the digital educational resources integration algorithm based on KNN algorithm, the digital educational resources integration algorithm of this paper has the lowest total running time in different window sizes, and it has the highest computational efficiency. Both in terms of transmission delay and sharing success rate, the digital resource sharing model in this paper has the best performance. As the amount of resources grows, the transmission delay of this paper's digital resource sharing model is always lower than that of the

MOOC-based digital educational resource sharing model and the blockchain-based digital educational resource sharing model as a comparison, and it has the highest sharing success rate of 78.8%. After applying the digital educational resources integration strategy in this paper, the overall performance of teaching effectiveness in college S is better, with the mean values of the dimensions of students' learning attitude, teachers' teaching, and teaching effectiveness reaching 3.47, 3.97, and 3.74, respectively. Exploring the differences in teaching effectiveness during the experiment, it was found that the mean scores of male students were higher than those of female students in the dimensions of students' learning attitudes, teachers' teaching, and teaching effectiveness, showing a significant difference ($P<0.01$), and that the mean scores of engineering students in all dimensions were higher than those of students of other majors such as arts, sciences, agriculture, and medicine, and there was a difference ($P<0.01$). Through correlation analysis and regression analysis, it is proved that students' "learning" and teachers' "teaching" are both important factors affecting the teaching effect of ideological and political courses, but the influence of teachers' "teaching" on the teaching effect of ideological and political courses is more important.

In general, the digital educational resources integration strategy and the corresponding digital educational resources optimization sorting, integration and sharing methods proposed in this paper can actively promote the teaching work in colleges and universities, but the differences in gender, specialty and other factors will have an impact on its teaching role. In the application process, we can understand the differences between different genders and majors, optimize the design of teaching content combined with digital educational resources sharing, strengthen the quality of the teaching team, and innovate teaching methods.

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