

# Research on the effectiveness of new media platforms in improving college students' online ideological and political education

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## Abstract:

Education is the foundation of national development. General Secretary Xi Jinping pointed out at the National Education Conference that the development of education should be given priority. The development of education is an important cornerstone for realizing the great rejuvenation of the Chinese nation. Youth is the future of the country. Only by educating the youth well can the country's development and progress be better promoted. In the context of the new crown pneumonia epidemic, online ideological and political education has received attention, and the "Internet + education" model has been widely used. Facing the rapid development of network science and technology, the ideological and political Educational work models and methods need to be improved urgently. With continuous development of "Internet +", the rise and rapid development of online education using the Internet as the medium of distance education has brought unprecedented opportunities for the development and utilization of high-quality teaching resources. Based on the research on the course recommendation method of higher education network teaching, this paper designs and develops a higher education network teaching platform and its role in the network ideological and political education of college students.

**Keywords:** *Ideological and political education, network media, association rules, course recommendation, collaborative filtering*

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## I. INTRODUCTION

New media platforms have rich features such as interactivity, diversity, and spontaneity. In the process of the development of ideological and political education in colleges and universities, schools are not only faced with abundant development opportunities, but also need to deal with challenges from various aspects. Educators should face up to such problems, actively understand and study the development law of We-Media, combine it with the actual progress, make the best use of the situation, and carry out ideological and political education more efficiently. This article discusses the current hot issue of how to effectively use the new media platform to do a good job in ideological and political education.

The rapid development of modern network new media technology has gradually become the mainstream of the times. The "Statistical Report on Internet Development in China (2019)" conducted a

study on the scale of Chinese Internet users. Relevant data show that the penetration rate of Internet users in my country in 2019 has reached 61.2%, and the total number of people is close to 854 million. The research results show that most of China's current netizens are in the young and middle-aged age, with the largest proportion of netizens between the ages of 20 and 29. Among them, students account for the highest proportion, and the overall proportion has reached 26%<sup>[1]</sup>. It is not difficult to see from this that the life of the Chinese people is greatly affected by the Internet, especially the student group, who are more likely to have psychological changes due to the influence of the Internet. After the human society has gradually merged with new media tools, the limitations of time and space have been greatly reduced, and various forms of information resources can be rapidly disseminated through relevant channels. Therefore, education methods such as live online courses and self-study websites have also emerged, and the scope of ideological and political education audiences in colleges and universities has also continued to expand. The course itself has the characteristics of networking and innovation.

In the process of promoting ideological and political education, educators can use and learn from interdisciplinary research as an educational concept. With the continuous development and maturity of the Internet, the dissemination channels of ideological and political education are constantly enriched, the combination of mass media and university education is becoming more and more closely, and there are more and more interdisciplinary studies in this area. more important. Through comprehensive research on the network environment, information dissemination, and ideological/political education in colleges and universities, researchers will eventually propose more innovative teaching methods and methods for this type of educational content, so that ideological/political education can play a role. Universities are signaling the arrival of new opportunities for growth. The education of college students is an important subject and prerequisite for social development. The combination of new media tools and ideological and political education meets the requirements of the times. In the face of the development and changes of new media tools, educators make rational use of various educational resources, continuously expand the scope of students' ideological and political learning, and use more abundant educational tools to teach learning and the overall work of ideological and political education. In the context of the new era, new media is being integrated into all aspects of social life, and the technological advantages of new media tools are gradually emerging, especially in the process of college education. With the gradual maturity of Internet technology, the ideological and political education activities in colleges and universities can better reflect the characteristics of education in the new era. How to better and more effectively integrate new media into daily ideological education in colleges and universities is an important issue that educators need to face. In the process of carrying out ideological and political education activities, educators recognize and face up to the limitations of educational activities, combine educational activities with new media activities, integrate them into ideological and political education activities in colleges and universities, and have the courage to give new features and meanings . Colleges and universities in the new era should promote it to complete the work entrusted to them by the times and society [2]. With the development of new media technology, new media such as Weibo, WeChat, and short video platforms are being accepted in various fields. Faced with learning tools with novel shapes and diverse contents, students can also enter the learning process faster. The attractiveness of new media tools highlights the necessity of combining ideological and political education in colleges and universities with network tools.

Today, with the rise of the Internet age and driven by "Internet +", all walks of life are actively

undergoing digital, networked and informatized transformations <sup>[2,3]</sup>. In field of education, the Internet to study and life has also become a boom. In this context, a series of online education and training institutions such as MOOCs have emerged, and through continuous improvement, they continue to provide students with more personalized and intelligent teaching services. The predecessor of online education is a teaching form that transmits knowledge through paper as a medium, that is, the first generation of distance education. It originated in 1840 and was first implemented in the United Kingdom, and has grown rapidly in adult higher education around the world. The second-generation distance education is a form of distance education using television as a medium. With development of Internet, the third generation of modern distance education, namely online education, emerged and developed rapidly <sup>[4-6]</sup>. Networking started relatively early in foreign countries. The College of Arts and Sciences at the University of Colorado proposed an online distance learning plan. More and more colleges and universities in the United States are bringing their teaching resources to the society in the form of online courses. Colleges and universities have become the main driving force for promoting the network of education, and the idea of network teaching and related technologies have been fully promoted and developed. In the early 21st century, the Massachusetts Institute of Technology started a plan to open up courseware resources, which blew the clarion call for the world open educational resources movement and gradually attracted more and more universities to join <sup>[7-10]</sup>. More than 40 U.S. colleges and universities currently offer free online courses in partnership with Coursera <sup>[11,13]</sup>. So far, more than 30% of students in higher education in the United States have learned at least one course from online teaching during their school days <sup>[14]</sup>. Moreover, the number of students participating in online education has grown rapidly, and the growth in the number of registrations has exceeded that of the ordinary teaching mode in the same period. It can be seen that the form of online teaching will inevitably become one of the main teaching forms in the future. In my country, online education started relatively late. Today, although online education has risen and developed rapidly, education in my country is still dominated by local colleges and universities. Local colleges account for 90% of all colleges and universities. It is the main body of my country's higher education institutions, responsible for most of the teaching tasks in the country, and the task of providing sufficient talents for social development. Major local colleges also undertake huge tasks in the field of adult higher education <sup>[15]</sup>. But with so many local colleges and universities, only a few are participating in distance education pilots. There is not enough experience in teaching and building courses in the distance teaching of adult higher education in China. In addition, there is a big gap between the handling of local colleges and the construction of online teaching pilots <sup>[16]</sup>, such as teaching resources, funds, network resources, etc.

The Internet has the characteristics of convenience, rapidity, strong interactivity, high efficiency, rich media, and user resource sharing, etc., and has been rapidly popularized and developed continuously. Many colleges and universities and well-known colleges have used the Internet to build distance teaching courses, thereby sharing learning resources. Especially since 2012, there has been a worldwide upsurge in the construction and development of MOOCs <sup>[17]</sup>. This provides the feasibility of using the online teaching method to solve the educational problems of adult executives at this stage. Through the characteristics of the Internet combined with reasonable and scientific arrangements and high-quality teaching resources, the "contradiction between engineering and learning" can be alleviated <sup>[18]</sup>. Therefore, by using the Internet as a medium of distance education - online teaching is an effective way for adult higher education to solve the outstanding problems faced today. This paper draws the conclusion that online education is one of the

effective ways to solve the dilemma faced by higher education at this stage, and proposes and realizes online education in line with higher education according to the existing theories and technologies. Platform (taking our university's higher education network teaching platform as an example), and from a long-term plan, improve the existing recommendation algorithm, and propose a course recommendation algorithm that is in line with higher education.

## II. MATERIALS AND METHODS

### 1. Collaborative Filtering Algorithm

Its main feature is that it is not limited by the nature and content of specific commodities. However, collaborative filtering from the problem of data sparseness.

The principle of collaborative filtering algorithm: The recommendation is regarded as an information transfer process, and one user may transfer something of interest to another user. The recommended user can save the time of browsing other product information, just choose whether to accept the recommender's suggestion. Collaborative filtering simulates such a process. Different people tend to have similar interests and preferences, often related to similarities in their upbringings. Therefore, we can make predictions and recommendations based on this similarity of interests. Then applied to such as business recommendation. Collaborative filtering algorithm compared to other recommendation algorithms, it can discover the new interests of users, and the recommendation is more personalized, and it can realize the jumping recommendation.

Memory-based collaborative filtering algorithms are divided into two categories: collaborative filtering algorithms based on user similarity and collaborative filtering algorithms. The algorithm based on user similarity needs to comprehensively refer to the historical evaluation information of all users that can be provided in the system, first calculate the similar users, and then find the ones that the user has not selected through the historical evaluation information of similar users. , as shown in Figure 1. In order to improve the timeliness of collaborative filtering algorithm based on user similarity, a collaborative filtering algorithm based on item similarity is designed. The similarity of items is relatively stable, so the algorithm can pre-calculate the similarity between items to reduce real-time calculation time. The general collaborative filtering algorithm can be divided into three steps: (1) Score representation. Before making a recommendation, it is necessary to find the user's historical information. According to the management of the algorithm, the algebraic form of the association matrix is generally used, and the scoring data of the user is found in a unified format according to the corresponding data of the demand. (2) Calculation of similarity.

The methods for finding similarity can be classified into two categories: distance calculation and angle calculation. kind:

- (1) **Rating indicated.** Before making recommendations, you need to find the user's historical information, and follow collaborative filtering. The management of the algorithm generally adopts the form of association matrix algebra, and the user's score data is found in a unified format according to the corresponding data according to the needs.
- (2) **Calculation of similarity.** The methods for finding similarity can be classified into two categories: distance calculation and angle calculation. kind:

① **Euclidean distance.** The Euclidean distance originates from solving distance in the two-dimensional space. Assuming that there are two points  $a(x_a, y_a), b(x_b, y_b)$  in the two-dimensional space, then the distance between the two points  $a$  and  $b$  is

$$d_{ab} = \sqrt{(x_a - x_b)^2 + (y_a - y_b)^2} \quad (1)$$

When two  $n$ -dimensional vectors  $a(x_{a1}, x_{a2}, \dots, x_{ai}, \dots, x_{a(n-1)}, x_{an}), b(x_{b1}, x_{b2}, \dots, x_{bi}, \dots, x_{b(n-1)}, x_{bn})$  calculate the distance

$$d_{ab} = \sqrt{\sum_{i=1}^n (x_{ai} - x_{bi})^2} \quad (2)$$

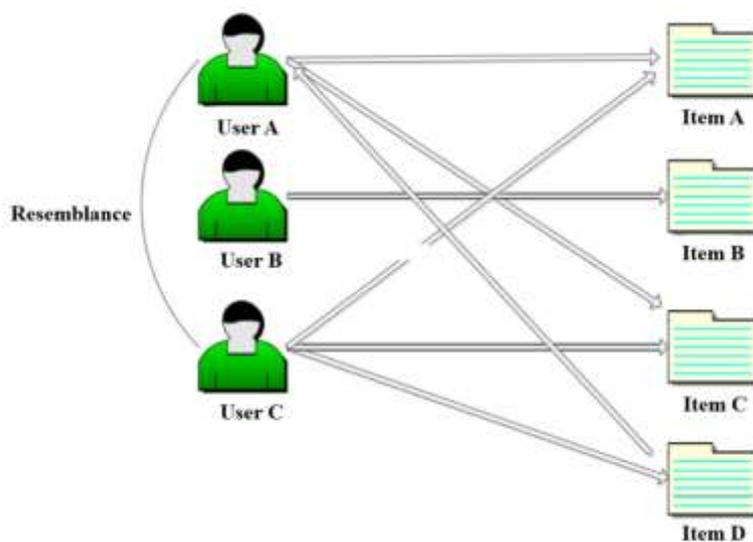


Fig1: Collaborative filtering algorithm based on user similarity

② **Harmanton distance.** Two  $n$ -dimensional vectors  $a(x_{a1}, x_{a2}, \dots, x_{ai}, \dots, x_{a(n-1)}, x_{an}), b(x_{b1}, x_{b2}, \dots, x_{bi}, \dots, x_{b(n-1)}, x_{bn})$  calculate distance

$$d_{ab} = \sum_{i=1}^n |x_{ai} - x_{bi}| \quad (3)$$

(3) **The pinch theorem.** Use the pinch theorem to convert the maximum distance between two vectors into the distance between two vectors. Two  $n$ -dimensional vectors

$a(x_{a1}, x_{a2}, \dots, x_{ai}, \dots, x_{a(n-1)}, x_{an}), b(x_{b1}, x_{b2}, \dots, x_{bi}, \dots, x_{b(n-1)}, x_{bn})$  calculate distance

$$\max |x_{ai} - x_{bi}| = \lim_{k \rightarrow \infty} \sqrt[k]{\sum_{i=1}^n |x_{ai} - x_{bi}|^k} \quad (4)$$

(4) **Cosine similarity.** The user's rating of the item can be regarded as an  $m$ -dimensional vector, and the similarity of the two items is calculated by the cosine value of the angle between them. Assuming that the similarity of the two items  $i$  and  $j$  is required, and the scoring vectors of the two items obtained from the above are  $i, j$ , the similarity of the two items is as follows:

$$\cos(i,j) = \frac{igj}{|i|*|j|} = \frac{\sum_{x=1}^m R(x,i) * R(x,j)}{\sqrt{\sum_{x=1}^m R^2(x,i)} * \sqrt{\sum_{x=1}^m R^2(x,j)}} \quad (5)$$

(5) **Generate recommendations.** The idea of the item-based collaborative filtering algorithm is as follows: based on the user's preference for the item, find the ratings of other users for the item, predict the user's rating, and recommend the user based on the collaborative filtering algorithm. The situation can be described as formula 6.

$$\forall c \in C, i'c = \arg \max_{i \in I} f(c, s) \quad (6)$$

Then, the main purpose of being a recommender system is to find an item  $i \in I$  that maximizes the utility value for each  $c \in C$ . Therefore, for the collaborative filtering algorithm, given an  $i$ , calculate the utility value of multiple item  $i$  and all  $c \in C$ , and on this basis, find the  $i$  with the largest utility value as the final recommendation result.

The algorithm assumes that the ratings between two items satisfy a linear  $y = ax + b$  regression relationship. The ratings for item 2 by user 3 shown in Figure 1 can then be inferred from the linear relationship.

**TABLE I. Items and Users**

| User   | Item 1 | Item 2 |
|--------|--------|--------|
| User 1 | 5      | 3      |
| User 2 | 4      | 3      |
| User 3 | 4      | -      |

The collaborative filtering algorithm has its original recommendation advantages and has been studied and applied in different fields. It has become the most widely used recommendation algorithm in all walks of life. However, with the rapid development of the Internet and the increase in the complexity of site structure, the collaborative recommendation algorithm still encounters some problems. (1) The sparse problem of the matrix. (2) Cold start problem. (3) The scalability problem. (4) Accuracy issues. (5) Diversity issues.

## 2. K-means

Clustering analysis is a kind of data mining method. Clustering algorithms can be divided into hierarchical clustering, grid-based clustering, density-based clustering and model-based clustering according to different application fields. Among all the clustering algorithms, the K-means algorithm is used the most times and has the widest range of applications. The K-means algorithm itself also has some problems. It has a great dependence on the selection of the initial K center points. If the initial initial center selection is not appropriate, it will easily generate the problem of local optimal solution, which will as a result, the number of iterations is increased and the execution efficiency is reduced.

The main idea of K-means is: In space, K points are used as center points for clustering, and the objects with the closest distance are classified. Then, in an iterative manner, the value of each cluster center is continuously adjusted until the final cluster center converges.

In this paper, the Euclidean distance is used to calculate the gap between the probability of course selection, which is the same as the above  $M_i$ .

$$D = \|X - C\| = \sqrt{\sum_{i=1}^n (X_i - C_i)^2} \quad (7)$$

Since this paper only involves the dimensional data of the probability of course selection, the distance formula is

$$D = \|X_i - C_j\| = \sqrt{(X_i - C_j)^2} \quad (8)$$

### 3. Platform design

Referring to the actual functional requirements of the development of the system, this system adopts the Web-based B/S structure mode, starts the web service through IIS, and selects Visual Studio, Dreamweaver and other tools as the development tools. The three-layer development model is adopted for system design and development, and the system is divided into three layers: display layer, business logic layer and data layer. Since the functional modules of each layer are independent of each other, the three-layer architecture The pattern has the effect of good extensibility. As shown in Figure 2.

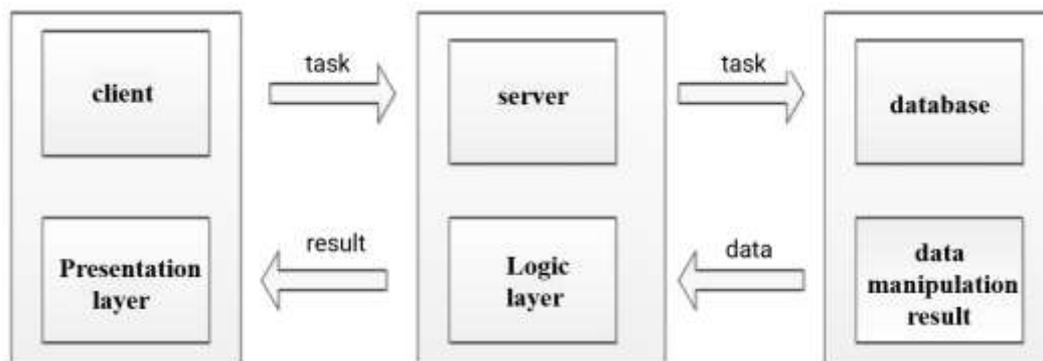


Fig 2: System Frame Design

First of all, when designing a course recommendation algorithm, it is necessary to clarify the purpose and key issues of the algorithm. The purpose of the course recommendation algorithm is to help students find the courses they need or like among a wide variety of courses. The principle of the recommendation algorithm is to select several courses for students through the algorithm, and then students decide whether to adopt the recommended courses according to their personal preferences and needs. If students take the recommended courses it will save time spent navigating through a lot of course information. If students find in the learning process that the courses recommended by the recommendation algorithm meet their own preferences or needs, the course recommendation algorithm is helpful for students to quickly find a wide variety of courses that meet their needs, which greatly improves the student learning efficiency. Then the key problems of the course recommendation algorithm are: ① how to let students choose the recommended courses; ② how to find the courses that students like. Different algorithms designed according to different problems achieve different results.

According to these two key issues, this paper proposes two recommendation algorithm indicators: ① the selection rate, that is, the probability that the course is selected by students; ② the degree of

preference, that is, the degree to which the course is liked by the students. When a course with a higher selection rate is recommended for a student, the recommended course will have a higher probability of being selected by the student. Similarly, when recommending a course with a high degree of preference to a student, the probability that the recommended course can be selected and liked by the student is also high. The recommendation algorithms of most courses today refer to commercial product recommendation algorithms. The first step in designing a recommendation algorithm is to find suitable data. Most of the course recommendation algorithms select the data of students' course selection and the data of students' course ratings based on the user's rating data on the product and the user's purchased product data in the product recommendation algorithm.

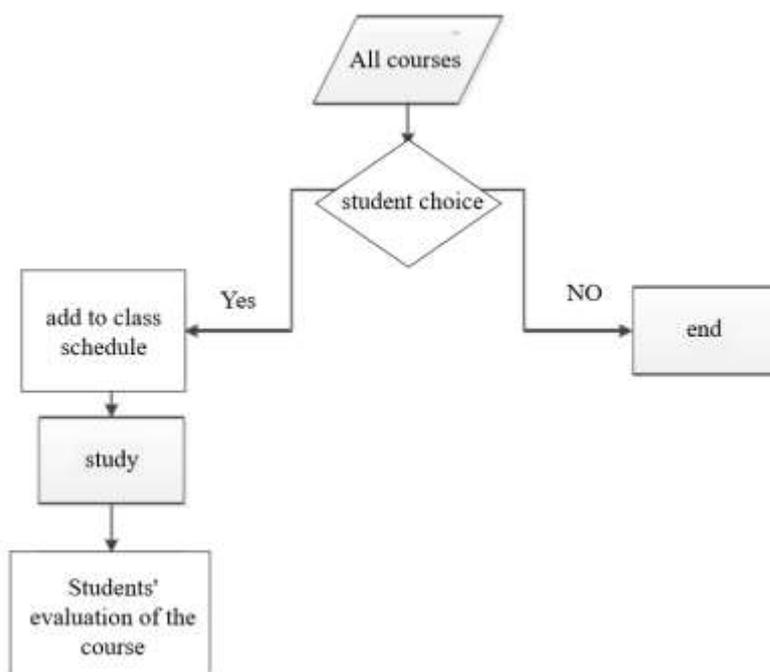


Fig 3: Student course selection process

Student's course selection data: When students choose a course, they select the data according to the course information given by the teaching platform and combined with their own needs. Students' choice preferences during course selection can be obtained through the student's course selection data. For example, if a student's course selection records include: advanced mathematics, linear algebra, and de-calculation mathematics, then it can be inferred that the student prefers to choose mathematics courses when choosing courses. Student's rating data for a course: A student's rating data for a course represents the student's learning experience when studying the course. This feeling is affected by factors such as student interest and course quality. Students' preferences for course content can also be obtained based on students' rating data for courses. There is no student's rating data for courses in conventional teaching platforms. In order to optimize teaching resources and combine course recommendation, some platforms have designed a student's rating system. The early personalized course recommendation algorithm is to analyze the course selection data of students and find the courses with high selection rate of students. The more classic algorithm is to use the association algorithm to find the association rules between courses, or the association corresponding to different combinations of several key attributes.

Rules and then recommend courses for students. Later, I began to pay attention to students' preference

for courses, and use students' rating data for courses to recommend courses for students. This recommendation method is called course recommendation based on students' interest. A common course recommendation algorithm is to use collaborative filtering algorithm to analyze student rating data, find the "nearest neighbors" of courses or students, and then get the recommended results according to the recommended methods such as TOP. This collaborative filtering-based course recommendation algorithm is recommended based on "ratings". In theory, courses with higher student ratings can be obtained. Some people propose to mix the two ideas through training weighting to obtain an appropriate ratio, and then according to the ratio Calculate the recommended result.

The average accuracy rate *MAP*, the average of the recommended accuracy rates of all students, refers to the average of the ratio of the number of courses selected by each student to all the recommended courses in the recommended courses.

$$MAP = \sum_1^n \left( \frac{N1}{N} + \frac{N2}{N} + \dots + \frac{N(n-1)}{N} + \frac{Nn}{N} \right) * \frac{1}{n} \quad (9)$$

In the formula

*N1* is the number selected by student 1 in the recommendation result in the recommendation algorithm;

*Nn* is the number selected by *n* students in the recommendation result in the recommendation algorithm;

*N* is the recommended number for each student set by the recommendation algorithm;

*n* is the number of students.

The comprehensive portal website has a wider range of information, more information content, and has obvious diversification characteristics. Colleges and universities can use such websites to assist teaching, and subtly influence them by setting up web pages that are close to the life and study of college students, such as college students' mental health, postgraduate entrance examination preparation counseling, etc., so that college students can receive more comprehensive and comprehensive information. Colleges and universities themselves should actively build official media platforms based on the actual needs of students, integrate ideological and political education work with college students' life and study on the premise of improving information security work, do a job in public opinion guidance, strictly control the dissemination content of official media. and form, so that college students can form a healthier outlook on life and values. A communication service window can be built, where students can comment, forward, and like, and background managers can show wonderful comments. In the learning stage of students, counselors can play a greater guiding role, so it can also be considered that the work ability of counselors will also impact education in colleges and universities to a certain extent, and their comprehensive work ability will eventually affect its performance. Counselors should play the role of guides, guide students to automatically filter out bad information.

**TABLE II. Course Association Rules**

| Course ID | Confidence | Support% |
|-----------|------------|----------|
| 21=>16    | 5.17       | 0.56     |
| 7=>16     | 5.00       | 0.56     |
| 12=>16    | 5.51       | 0.92     |
| 27=>16    | 8.53       | 0.57     |

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|       |      |      |
|-------|------|------|
| 9=>18 | 5.51 | 0.52 |
|-------|------|------|

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Although the current online environment is relatively free, students can usually obtain first-hand materials that are helpful for learning by collecting online information, but the content and form of online information are very diverse, and there are many negative and negative information mixed in them. Some inflammatory remarks and political extreme thoughts Young students' world outlook and outlook on life are immature. Once they are constantly exposed to such harmful information, their ideological system will inevitably be affected, so as to actively communicate and communicate with students, and timely discover some problems and psychological changes in their lives. Only by building a good and healthy psychological environment and life mentality for students can they be able to rationally screen when they come into contact with negative online information.

### III. CONCLUSION

The Internet is a double-edged sword in the age of information dissemination. The effective use of new media platforms for the smooth functioning of the ideological and political research network is a priority for colleges and institutes. Let's take advantage of the Internet. And accurately respond to complex network data issues. In the process of developing the ideological and political education work, the ideological and political education workers of colleges and technical institutes should recognize the special advantages of the Internet as a medium of education and make full use of the Internet and the work ideological and political. Contribute to the healthy and comprehensive development of ideological and political education. raised The network is not a decisive factor in the network of ideological and political research. The objective of the work of teachers of collective farms is to carry out ideological and political educational work through the network. They also need to understand the online environment and laws that are actively changing. Use the web as a tool to teach and understand the dynamics of student thinking.

In order to carry out the management and education work, the colleges and universities themselves should pay special attention to "Internet +", to organize ideological and political educators to study the teaching tools of the Internet. Familiar with network environment. Improve network information capabilities. Master the use of Internet tools for ideological and political research and use the positive energy influence function of the Internet to educate students to deal with negative information from the Internet with a rational approach. Minimize exposure and hide negative information as much as possible. Ideological and political research to work better and healthier. Ideological and political educators in technical colleges and universities must adapt to the new situation on the Internet. In response to new changes in the Internet environment, the Internet has become a powerful tool for the positive development of ideological and political education. The advantages of online and offline education have created a new format of ideological and political educational work. This document details the development of online higher education platforms and key technologies. The current state of higher education for adults is presented. He noted that the use of the education network is a solution to the problems faced by universities. Data overload issues in higher education and the need for individual course recommendations are analyzed.

This article analyzes the need for e-learning platforms usable for adult education. The following four systems are designed: (1) a comprehensive higher education management system that can be used to manage the educational work of students and teachers; (2) manage educational resources to provide students

with online learning; (3) Selection of courses for students based on individual course recommendations The system is used to offer individual courses to students to achieve personal development. (4) The mobile program provides students with a supportive learning environment. The network learning model is designed based on push mode and multi-terminal support, and the key functions of the four systems mentioned above are derived from demand analysis. The second is the introduction of a didactic algorithm. And analyze the shortcomings of these algorithms and then develop a course recommendation algorithm based on associative and collaborative filters. The algorithm considers two criteria when selecting and evaluating student courses. It can also meet the actual requirements of the centralized course selection algorithm, and ultimately use the functions of the designed system.

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