



Construction of Online Ideological and Political Education Platform Based on Artificial Intelligence Technology

Huijuan Li^(✉) and Xiuying Dong

College of Marxism, Changchun University of Finance and Economics, Changchun 130122, China

lihuijuan11090@163.com

Abstract. Because the current online ideological and political education platform is difficult to build a virtual learning environment, and it is difficult to ensure that users can access the network regardless of time and place through the mobile network, resulting in the decline of teaching quality, this paper puts forward the construction method of online ideological and political education platform based on artificial intelligence technology. Artificial intelligence technology is used to collect and store massive ideological and political information, build a database, and optimize the functional structure of the teaching platform in combination with mobile technology, so as to build a virtual learning environment based on artificial intelligence, so as to ensure that users can access the network without time and place restrictions through the mobile network and realize the goal of educational resource sharing, complete the construction of online ideological and political education platform. The experimental results show that the average score of students' curriculum knowledge test after application has increased by 47.1 compared with that before application. The online ideological and political education platform is very dissatisfied with 3.2%, dissatisfied with 8.9%, generally 18%, satisfied with 61% and relatively satisfied with 8.9%. It shows that the online ideological and political education platform designed in this paper has higher practicability in practical application, can effectively improve the teaching quality and fully meet the research requirements.

Keywords: Artificial intelligence · Ideological and political · Education platform

1 Introduction

With the rapid development of Internet technology, the large-scale popularization of smart terminal devices such as smart phones and tablets and the gradual enrichment of mobile network resources, the digital and mobile online learning methods are more and more accepted by people. The market scale of online education industry is increasing year by year, and the impact of online education on users is also expanding [1]. At the

same time, there are still many problems in online education, such as poor learning effect, difficult enterprise profitability and so on. Based on this, this study takes the learning platform of artificial intelligence technology as the research situation. On the basis of combing relevant research and theories, through interview and social network analysis methods, this study explores that platform design, interaction design, teaching resources and teachers are the factors affecting the learning effect of users of online education platform. On this basis, this paper constructs the theoretical model of influencing factors of user learning effect of artificial intelligence technology online education platform. The structural equation model method of confirmatory factor analysis is used to empirically test the theoretical hypothesis, and further explore the influence degree of different influencing factors. The influence of interaction design platform design, teaching resources and teachers on the learning effect of online education platform users decreases in turn. Finally, based on the above research, this paper puts forward the strategies to improve the learning effect of online education users. This research has innovation in research methods and research contents. After the experimental research on the theoretical model, it further explores the influence degree of various influencing factors, and explores and expands the online education theory to a certain extent.

Because the current online ideological and political education platform is difficult to build a virtual learning environment, and it is difficult to ensure that users can access the network regardless of time and place through the mobile network, resulting in the decline of teaching quality, this paper puts forward the construction method of online ideological and political education platform based on artificial intelligence technology.

2 Online Ideological and Political Education Platform Construction

Based on the analysis of the functional structure of the online ideological and political education platform, this paper uses the analytic hierarchy process to design the online ideological and political education quality evaluation algorithm, and realizes the construction of the online ideological and political education platform by designing the information screening process of political teaching resources, the functional activity process of curriculum management stage, and the functional relationship of the online ideological and political education platform.

2.1 Function Structure of Online Ideological and Political Education Platform

Taking the online education platform as the research object, this paper discusses the theoretical research on the interactive relationship among users, platform and continuous use intention. With the development of the Internet and the progress of science and technology, artificial intelligence online education is constantly changing, and the use needs of users are constantly improving and changing with the mature application of user experience research, and new influencing factors are constantly introduced into the research. The overall design of Online Ideological and political education platform is the first stage of the software design process. The main task of this stage is to divide the whole platform into reasonable modules according to the demand analysis of the platform and the module division idea of high cohesion and low coupling, so as to facilitate the later

detailed design. At this stage, we also need to design the overall architecture of the platform, and finally complete the design of the database. The specific structure is as follows (Fig. 1):

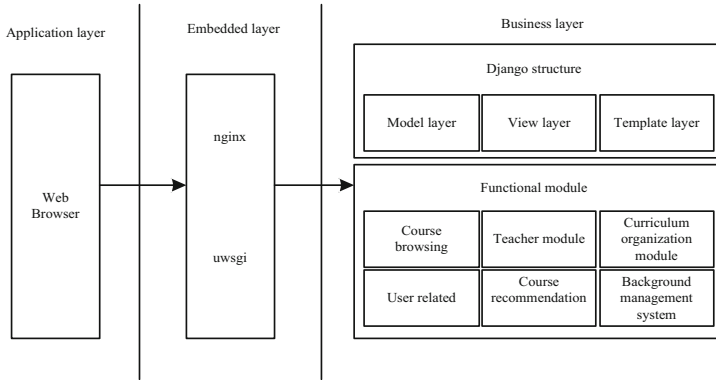


Fig. 1. The overall architecture of an online ideological and political teaching platform based on artificial intelligence

The online ideological and political teaching platform based on artificial intelligence is divided into three layers: application layer, embedded layer and business layer. The application layer takes the browser as the core, the embedded layer takes uwsgi and nginx as the support, and the business layer is divided into Django structure and function modules, so as to provide support for the good operation of the online ideological and political teaching platform based on artificial intelligence.

Good design is the premise of developing a good platform. The ultimate purpose of platform development is to provide users with a scientific and efficient network teaching platform. More and more online education platforms begin to carry out knowledge sharing mode. Initial adoption is the first step to obtain potential users. The influencing factors of initial adoption have a direct correlation with whether users are willing to experience and try, but initial adoption can not benefit the platform. Whether users can insist on using and voluntarily manage the course is the most critical step, It depends on whether the user has the intention of continuous use. User related functions are divided into login registration module and personal center module because of the difference of functions. By combing the information service content, several classifications of online education related information content are obtained, as shown below:

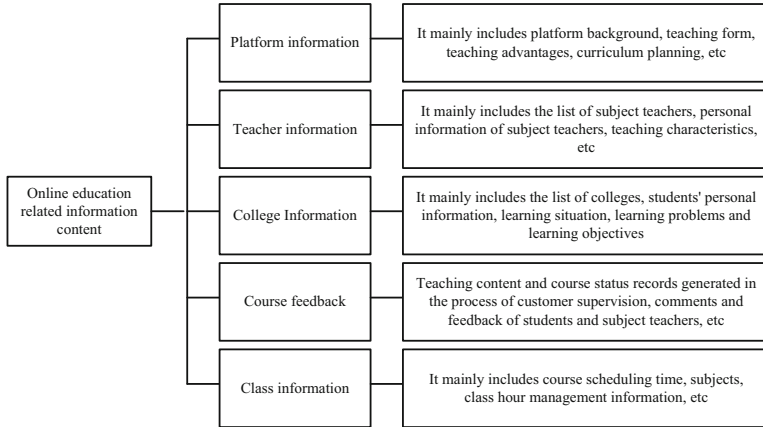


Fig. 2. Ideological and political online education related information content

It can be seen from the analysis of Fig. 2 that the information related to ideological and political online education includes platform information, teacher information, college information, course feedback, class information, etc. The two functional groups of course institution and course lecturer are responsible for the information processing of institutions and lecturers. Because lecturers and institutions are nested internally, and their basic functions and implementation methods are basically the same, in order to reduce the coupling between modules, the two functions are combined into one module, namely institution and lecturer module. The course module is used to process the business functions of the relevant functional groups of the course, It realizes the functions of shopping cart and order management. The course recommendation module is responsible for realizing the relevant functions of statistical based course recommendation and personalized recommendation. The relevant processing logic of the background management sub platform converges to the background module. Finally, the platform is divided into seven modules: login registration module, organization and lecturer module, course module, single transaction module, center module, course recommendation module Background management module [2]. The platform function module structure is shown in the figure below (Fig. 3):

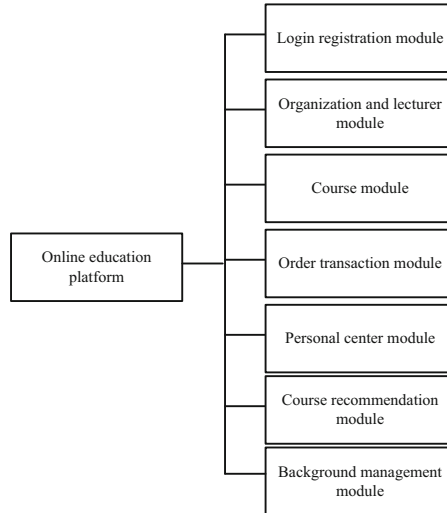


Fig. 3. Platform module functional structure

The homepage of the online education platform provides courses personalized and recommended by the platform for users. The curriculum recommendation function is mainly based on the user's behavior data, so to achieve personalized recommendation, first obtain the user's behavior data, and then build a suitable recommendation engine based on the data. Obtain the user's participated courses, favorite courses and course scoring data from the MYSQL database. When the user selects courses or collects 3 courses in total, the personalized course recommendation process is triggered. This article uses artificial intelligence technology as the recommendation algorithm for personalized courses [3]. All recommended courses are directly saved in Redis. When a user logs in, the platform randomly selects 5 courses from Redis as personalized recommendations and displays them on the platform's homepage. Course recommendation based on artificial intelligence technology is obtained by executing SQL calculations through timed tasks every day.

2.2 Ideological and Political Online Teaching Quality Evaluation Algorithm

In order to improve the performance of the online ideological and political education platform based on artificial intelligence technology constructed in this paper, the analytic hierarchy process is used to design the ideological and political online teaching quality evaluation algorithm, which is mainly based on the expert judgment matrix and according to the score deviation between courses and the user's historical score, predicts the score of the courses that are not scored after the user's learning, so as to evaluate the ideological and political online teaching quality. The algorithm is applied to the function evaluation model of information teaching platform to improve the efficiency and quality of online ideological and political education quality evaluation, and promote the further improvement of the performance of online ideological and political education platform.

The scale in the judgment matrix of ideological and political online teaching quality evaluation refers to the comparison of the superiority or importance of every two evaluation elements between each level in the criterion layer and the measure layer. The degree of comparison between the importance of the element “i” and the latter element “j” is mainly divided into the 19 (and its reciprocal) scale method, which is a pairwise comparison of the first-level evaluation index (user experience dimension) in the evaluation system model, and the second-level evaluation Pairwise comparison of indicators, 1–9 (and its reciprocal) specifically refers to the relative importance of the two indicators that are compared. When the current element is more important than the latter element, it is represented by an integer of 1–9, and vice versa. The reciprocal of 1–9 is shown in the table for details (Table 1).

Table 1. Judgment matrix scale table

Scale (aij)	Meaning
1	The importance of the former and the latter is “equal”
3	The degree of importance of the former and the latter is “slightly important”
5	The importance of the former and the latter is “obviously important”
7	The importance of the former and the latter is “very important”
9	The importance of the former and the latter is “absolutely important”
2, 4, 6, 8	The importance of the two is between the adjacent quantitative standards
Reciprocal	The comparison between the latter and the former is 1/(aij)

According to the index elements in the expert judgment matrix questionnaire, the comprehensive judgment matrix analysis is carried out. The expert only needs to score one of the triangles in the lower left or upper right corner of the questionnaire, which is marked as α , and the corresponding other Half is the reciprocal β of the expert scale. Assuming that the relative weight vector of the element is $A = (a_1, a_2, \dots, a_n)$, the calculation method of the relative weight is as follows:

$$s_i = \sum_j^n \frac{n(\alpha - 1)}{\sum_{k=1}^n A(\prod^n \beta_{ij} - 1)} - \frac{n(\beta + 1)}{\sum_{i=1}^n \left(\prod_{j=1}^n \alpha_{ij} + 1\right)^{\frac{1}{n}}} \tag{1}$$

The slopone collaborative filtering algorithm in the recommendation algorithm is further used to make personalized course recommendations to users. The advantage of this algorithm lies in its simple structure, easy implementation, high execution efficiency, and small amount of storage required [4]. At the same time, the accuracy of the recommendation is relatively high. The algorithm also has a relatively high-quality recommendation accuracy. Even if the user’s participation on the platform is small, they should be able to obtain effective recommendations. This paper uses the user’s score k on the course after learning as the calculation data recommended by the slopone algorithm.

Essentially, this method uses a simpler form of regression expression and a single free parameter, such as the formula:

$$f(x) = k \sum s_i(x + b) - n \tag{2}$$

If user r 's ratings of course i and course j are 1 and 1.5, respectively, j is 0.5 points more than i . When the user learns course i and scores it 2, the platform refers to user A 's ratings of courses i and j . It is derived that the user's possible score for the course j is 2.5 points. Calculate the average score difference between courses, the calculation result is recorded as the score deviation between courses, the calculation formula is as follows:

$$R(x) = \frac{\sum (r_{ui} - r_{uj})}{|f(x) - s_i|} - r_a \tag{3}$$

where r_a is the rating of user r on course i , and r_{ui} is the rating of user u on course j . T_{ij} is the user who has overrated the object, H_{ij} is the user who has rated both the course i and the course j , $N(u)$ is the number of users who have rated both the course i and the course j , according to the score deviation between courses and the user's history scoring, predicting the score of unrated courses after users study. The calculation process is shown in the formula.

$$P_{uj} = \frac{\sum_{i \in N(u)} |T_{ij} - H_{ij}| - R(x)}{\sum_{i \in N(u)} |N(u) - 1|} - \gamma \tag{4}$$

Among them, γ is the course rated by user u . The information platform success model is mainly applied to the evaluation research of various information platforms, including library retrieval platforms, e-government, competitive intelligence platforms, social networking sites, online document sharing platforms, etc. In the article, the online education platform has its own characteristics compared with the general information platform.

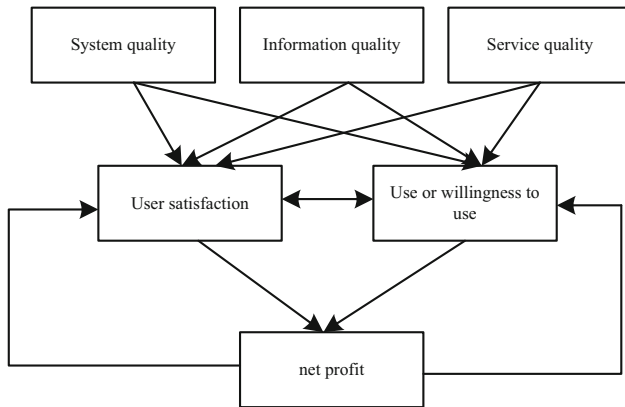


Fig. 4. Improved function evaluation model of information teaching platform

According to the data in Fig. 4, the improved information teaching platform function evaluation model mainly evaluates the system quality, information quality and service quality from the perspective of user satisfaction, net profit and use intention. The most important thing of online education platform is to transmit educational information resources. Therefore, information quality, that is, curriculum quality, is the focus of evaluating online education platform [5]. Secondly, the platform provides online education services, and its responsiveness, functionality and other platform quality factors also affect the development of the platform. Finally, the online education platform mainly provides services through two aspects: one is the video, notes, retrieval and other functional services provided by the platform itself; the other is that teachers provide course content services through class, homework and communication. The functional service quality can be reflected by the platform quality, and most of the content service quality can be measured by the information quality. However, combined with the characteristics of education, the interaction between students and teachers and the interaction between students are important influencing factors, which can not be included in the platform quality or information quality. To sum up, this paper will evaluate the online education platform from the perspective of platform quality, course quality and interaction.

2.3 Realization of Online Ideological and Political Education

The user enters the course list page through the navigation bar, and arranges the courses in a pagination method for a large number of courses. The courses on each page show 3*6 courses. In the right column of the course list, there will be a popular course recommendation based on the number of clicks of the course, showing three courses ranked at the top. The page is also sorted according to the number of new favorites and the number of learners. The course list process is shown in the figure:

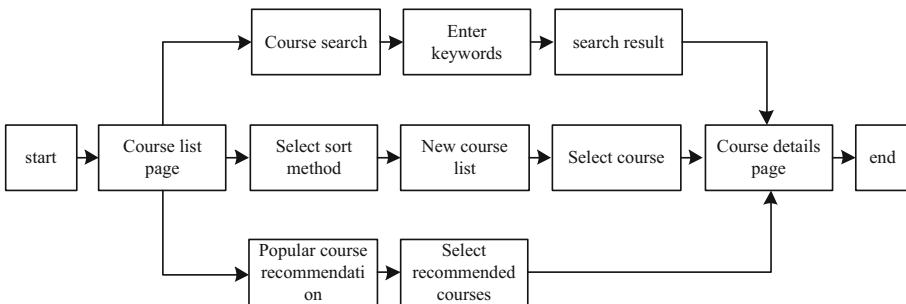


Fig. 5. Ideological and political teaching resource information screening process

By analyzing the data in Fig. 5, it can be seen that after users search keywords in-depth on the online ideological and political education platform, a course list will be generated in the platform, and a new course list will be generated by selecting and sorting. The course details page will be presented to users through the selected courses and course recommendations. The right column of the page is mainly composed of two parts: introduction to the course organization and relevant course recommendations. The course

institution column mainly displays the institution name, number of courses, number of lecturers and region, and can collect institutions here [6]. The course scheduling stage is the stage of arranging formal courses for formal students, and following up the formal return visit and daily maintenance of students. In this stage, the key needs of students and subject teachers are the interaction of course arrangement, pre class reminder and post class evaluation feedback. Enterprise staff need to reward students who have made progress in learning and continue to urge them to learn. The specific course management process is as follows:

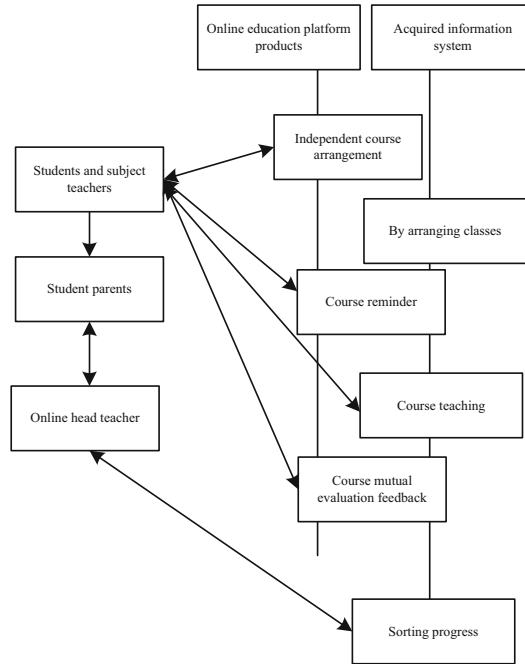


Fig. 6. The functional activity process of the course management stage

By analyzing the data in Fig. 6, it can be seen that the curriculum management is related to the roles of students, subject teachers, students’ parents and head teachers. The curriculum arrangement is obtained through the online education platform, and the teachers and students are reminded of the curriculum. The students give the curriculum feedback, and send the curriculum feedback results to the teachers. The head teachers can obtain the sorting progress, and feed it back to the parents, students and teachers. The freedom of online education class changes the course arrangement from passive to active. The online head teacher informs the students and subject teachers of the course scheduling notice. The students and subject teachers respectively choose the class time on the products of the online education platform. The course schedule is recorded on the background information platform. The course scheduling academic affairs will remind the class 20 min before the class after screening the overlapping time and confirming the course schedule. After the course, students and subject teachers evaluate each other,

and the evaluation feedback of both parties is recorded in the course records of both parties. The online head teacher shall store the course supervision records in the course records at the same time, and regularly sort them out and send them to the students' parents. The online head teacher collects the feedback on the progress of students, and can also view the relevant courses recommended by the platform. The relevant courses in this department are also based on feature statistics. Mainly by adding course labels to the course model, three courses with the same labels as this course are searched in the database in the form of labels [7]. Online education information service refers to providing information services for students or enterprise staff in the process of online education service experience. Specific information services include the dissemination of information on the online education platform, the collection, storage and feedback of students' information, and the exchange of course related information. In the existing online education information service platform, the functions related to students are mostly information storage functions, there are few activities in information interaction. The online education information service platform optimized and designed by the author is active and interactive, which increases the interactive operation between students and enterprise staff and promotes the mutual relationship, so as to improve the enthusiasm of students to actively obtain information and improve the work efficiency of enterprise staff.

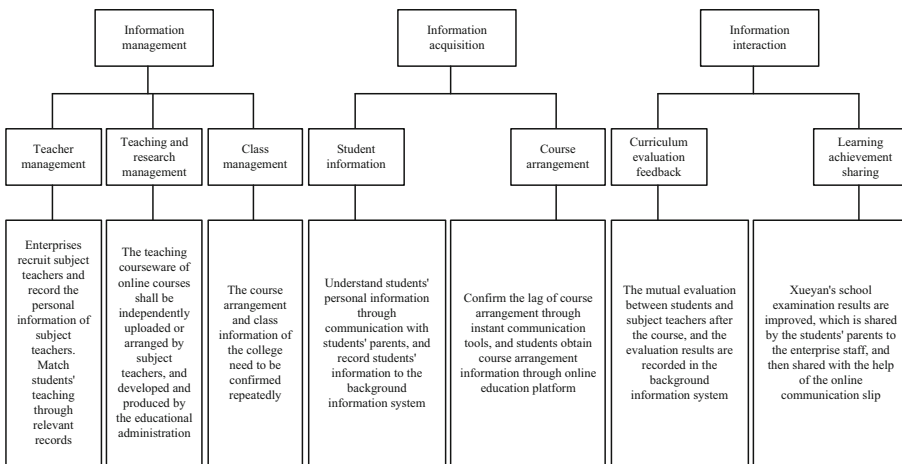


Fig. 7. Basic concepts of online education information services

According to Fig. 7, the basic concepts of online education information service include information management, information acquisition and information interaction. Information management includes teacher management, teaching and research management and class management; Information acquisition includes extracting student information and course arrangement; Information exchange includes course evaluation feedback and learning achievement sharing. Online education information service platform can help students and enterprise staff establish good information transmission and communication. The relevant teaching information, student information, learning

situation information, learning objectives, curriculum planning information and other information involved in this topic will be integrated and unified in a complete information service platform. The design of online education information service platform is to meet the information services of stakeholders in the product service platform. In order to achieve the goal, it is necessary to fully understand the information function requirements and platform process of stakeholders in the platform, as well as the content and form of each contact. The architecture of the education and teaching integrated platform is designed into a multi-layer development model according to the needs. Its main modules are: user presentation layer, business logic layer, data persistence layer and database layer [8, 9]. In order to develop the architecture of the platform in more detail and show the functions and connections of each layer more clearly. The following figure is obtained by analyzing the functional relationship of the education and teaching platform in the platform.

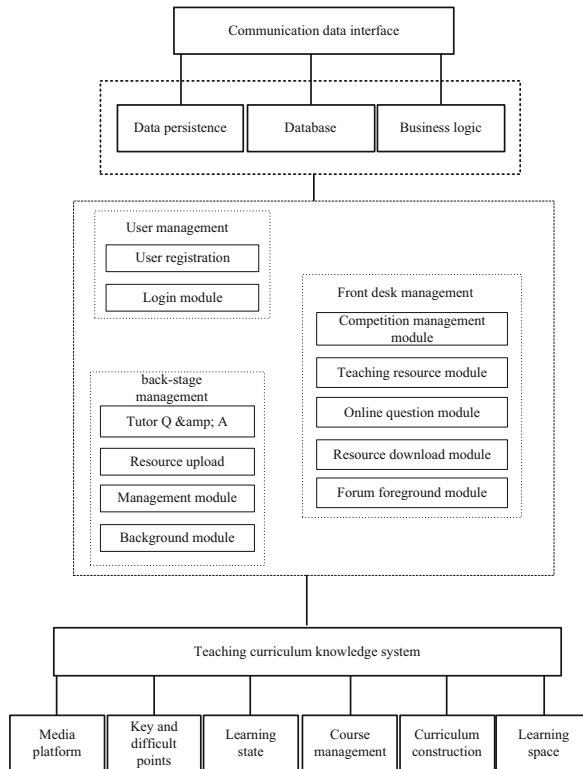


Fig. 8. Ideological and political online teaching platform functional relationship

As shown in the Fig. 8, the educational teaching platform provides many convenient conditions for computer teaching. Any application or learning service provided through the teaching platform is a service from the educational teaching platform. The education and teaching platform can mobilize various resources in the network according to

the user's real-time location, course time, learning purpose and other information, and provide customers with convenient and fast services to meet customer needs [10]. From the perspective of platform functions, it can integrate scattered resources to meet the various needs of different users. Integrating various educational information resources together, using an educational teaching platform can provide conditions for the smooth implementation of online teaching activities, and the platform can complete educational and teaching activities.

3 Analysis of Experimental Results

In order to test the actual use effect of this platform, students log on to this platform through mobile devices equipped with WiFi to learn and participate in periodic tests of related courses. The traditional online ideological and political education platform design method is to develop a small database of medical students' Ideological and political education knowledge competition based on python, use the small program online knowledge competition answer platform to infiltrate the ideological and political education in stages, and guide students to actively scan and participate in answer learning with their usual grades as rewards, so as to improve students' autonomous learning ability. The crawler technology is used to obtain the data of the education platform, and the data is integrated to remove the noise in the data. Finally, the obtained data is 4.56 GB. The obtained data is divided into experimental set and test set. The data in the test set is input into the simulation platform for testing to obtain the optimal operating parameters and ensure the authenticity and reliability of the experimental results. In this paper, the functional testing mainly uses the black box testing method to carry out testing and test case design. Functional testing is mainly to test the specific functions that each functional module of the platform should achieve. By selecting different test data corresponding to it, it is judged whether the program has reached the expected goal, and finally a complete test report is formed according to the test results. Part of the test the results are shown in the table (Table 2):

Table 2. Some functional test results of the platform

Test items	Function description	Test result
User login	Check whether the user name, password and verification code are correct	It can normally verify user login, and has prompt function to respond immediately
Enter course	Enter the new course information to check whether the information is correct	It can increase courses normally and respond immediately

(continued)

Table 2. (continued)

Test items	Function description	Test result
Modify course information	Modify course information	Can normally query the progress of corresponding courses and respond immediately
New test paper	Enter the new test paper information and check whether the information is correct	It can add test papers normally and respond immediately
Score query	Query the examination results of students in each course	The query of scores runs normally and responds immediately

According to the process of module function, test cases are used to verify the platform function. The following will start with the four main functions of course browsing, personal center, background management and order transaction. The design of test cases mainly focuses on the main function points of the module and divides the test points in the function points. According to the results of the normal operation of the platform, the expected results of the test point are obtained, and finally the test results of the test point are obtained to complete the test. In order to determine that the course browsing module can operate normally, the test cases of the course browsing module are designed. According to the test results, the course browsing module can provide services normally. Course browsing module test table (Table 3):

Table 3. Test cases of course browsing module

Function point	Test point	Expected results	Test result
Course search	Invalid character entered	Search failed, no course list returned	Adopt
	Enter valid characters	Search succeeded, return to the course list	Adopt
Course ranking	Can courses be sorted by most collections	In order	Adopt
Course details page	Can I enter the course normally from the course list	Enter the course details page and display the full function	Adopt
Introduction to teaching institutions	Whether it can be displayed normally	Can collect parity stocks	Adopt

In order to make sure that a background management module can run normally, corresponding test cases are designed. According to the test results, the background

module can provide services normally. Example table for back-end management module test (Table 4):

Table 4. Test cases of platform background information management

Function point	Test point	Expected results	Test result
Administrator account	Can the administrator get permission	The administrator can operate the background system	Adopt
Operation of user information	Can you add, delete, modify and check completely and normally	Be able to manage the basic information of users and return results successfully	Adopt
Operation of course information	Can you complete the addition, deletion, modification and query of the course	Be able to manage basic course information and return results successfully	Adopt
Operation of institutions and lecturers	Can you complete the addition, deletion, modification and query of institutions and lecturers	Be able to manage basic information and return results successfully	Adopt
Authority unit management	Allocation of different permissions	Use different accounts to set different permissions	Adopt
Log function	Is the corresponding log generated	Log record successfully displayed	Adopt

Single-factor inter-subject room design, independent variable is the teaching method, including two cases, the control class adopts the conventional teaching method, and the experimental class adopts the F online education platform learning method. The duration is one semester, and the closed-book examination will be conducted after the end of the course. A one-way analysis of variance was performed on the test scores, and the results showed significant differences in test scores after participating in learning, as shown in the table (Table 5).

Table 5. Means and standard deviations of students' curriculum knowledge test scores under different teaching methods

	Pre test scores	Post test results
Control class	48.85 (6.98)	89.65 (5.59)
Experimental class	49.55 (6.25)	96.65 (6.35)

The average score of students' curriculum knowledge test after application has increased by 47.1 compared with that before application. It can be seen that the scores of

students who use online education platform are significantly better than those of students who use traditional teaching methods. In addition, the results of the investigation on the learning effect of the two classes after the course are shown in the table (Table 6).

Table 6. Comparison of learning effect tracking

Satisfaction object	Extremely dissatisfied	Dissatisfied	Commonly	Satisfied	Quite satisfied
Control team (38 persons)	6.2%	15.6%	30.5%	42.5%	5.2%
Experimental class (38 persons)	3.2%	8.9%	18%	61%	8.9%

The online ideological and political education platform is very dissatisfied, accounting for 3.2%, dissatisfied, 8.9%, generally 18%, satisfied, 61%, and relatively satisfied, accounting for 8.9%. It can be seen from the test and survey results that the learning effect of students in the experimental class is significantly better than that in the control class. In other words, the data mining algorithm used to track students' learning behavior and effect has played a role. The platform tracks and records students' learning behavior data, analyzes students' online learning status, and uses the decision tree method to let students predict and understand their cognitive ability, so as to help students improve their learning ability, strengthen learning management, and finally enhance the effect of learning. This platform basically realizes mobile, intelligent and personalized teaching, and gradually teaches students according to their aptitude.

4 Conclusion

After the online education platform of Ideological and political course based on artificial intelligence, the resource sharing and teacher-student interaction of the course become convenient and fast. Students practice and self-test after class through the course practice and test platform, which stimulates their learning enthusiasm and autonomy. The teaching work is greatly facilitated based on website survey and automatic statistics. The online ideological and political education platform based on computational thinking makes full use of the advantages of network resources, reasonably designs and implements the online education platform, and improves the teaching effect to a certain extent.

Fund Project

1. National Social Science Foundation Ideological and Political Course Special Project for Colleges and Universities (No. 21VSZ78).

2. Research project of higher education teaching reform in Jilin Province: Research and practice of halving classroom teaching mode of ideological and political courses in private colleges and universities (project number: JLJY202192348402).
3. Jilin Province Higher Education Society Project: Research on the Path of Improving Undergraduates' Sense of Ideological and Political Courses Based on the Perspective of Students (No.: JGJX2021D514).

References

1. Dama, C., Langford, M., Dan, U.: Teachers' agency and online education in times of crisis. *Comput. Hum. Behav.* **121**(3), 106793 (2021)
2. Sun, L., Tang, Y., Zuo, W.: Coronavirus pushes education online. *Nat. Mater.* **19**(6), 1 (2020)
3. Ht, A., Xiang, Y.B., Hty, C.: Learning-related soft skills among online business students in higher education: grade level and managerial role differences in self-regulation, motivation, and social skill. *Comput. Hum. Behav.* **95**(3), 179–186 (2019)
4. Trussell, H.J., Gumpertz, M.L.: Comparison of the effectiveness of online homework with handwritten homework in electrical and computer engineering classes. *IEEE Trans. Educ.* **PP**(99), 1–7 (2020)
5. Heyden, E., Küchenhof, J., Greve, E., et al.: Development of a design education platform for an interdisciplinary teaching concept. *Procedia CIRP* **91**(3), 553–558 (2020)
6. Kaw, A., Clark, R., Delgado, E., et al.: Analyzing the use of adaptive learning in a flipped classroom for preclass learning. *Comput. Appl. Eng. Educ.* **27**(3), 663–678 (2019)
7. Liang, C., Fan, R., Lu, W., et al.: Personalized recommendation based on CNN-LFM model. *Comput. Simul.* **37**(3), 6–12 (2020)
8. Xu, Y.H., Jin, G.Q.: Artificial intelligence matching simulation of multi feature cascaded image database. *Comput. Simul.* **38**(3), 437–441 (2021)
9. Liu, J., Sun, H., Guo, D., et al.: Design and implementation of online education platform based on spring MVC and mybatis framework. *J. Shenyang Norm. Univ. (Nat. Sci. Ed.)* **37**(3), 268–273 (2019)
10. Peng, X.H., Li, K.L., Zhong, L.H., Liao, P.: Design of an online education platform for multi concurrent high-speed communication. *Mod. Electron. Technol.* **44**(18), 92–96 (2021)