



Multi Mode Interactive Information Processing Method in Online Education System of Ideological and Political Course

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Abstract. In order to optimize the traditional online teaching mode, taking the basic course of Ideological and political online teaching design as an example, this paper proposes a multi-mode interactive information processing method in the online education system of Ideological and political courses. Through live broadcast and interactive communication, we organize and carry out online distance courses, and actively explore and practice online live broadcast, online question answering, group discussion, bullet screen communication, real-time interaction and other teaching forms, so as to obtain real-time and efficient teaching effect. It also provides new ideas for the new teaching mode of Internet plus teaching. Meanwhile, the transformation of teaching mode has set up a new concept for forming diversified and multi type teaching contents and curriculum system.

Keywords: Ideological and political course · Online education · Interactive information · Classroom interaction

1 Introduction

With the application of information technology in Ideological and political classroom teaching, the interaction behavior of Ideological and political classroom teaching is more diverse. The interaction of Ideological and political classroom teaching is no longer just the interaction between people, but supplemented by the interaction between people and technology [1, 2]. In recent years, with the new education mode online education (e-learning) and MOOC (massive openonline courses), the large-scale open online courses are proposed and gradually popularized, which makes more learners have the opportunity to study on the online platform. Accordingly, the platform has accumulated a large amount of teaching behavior data and knowledge resources, which provides a good foundation for the platform to update and improve itself [3, 4]. Under this background, this paper explores the characteristics, performance and rules of the interaction of Ideological and political classroom teaching under the application of information technology supported teaching media, and puts forward the multi-mode interactive information processing method in the online education system of Ideological and political courses. Aiming at the particularity of learning structure and learning situation of local colleges

and universities, according to the teaching object and course nature, we actively explore and design the online teaching mode and teaching organization strategy in line with our students' learning rules, so as to ensure the teaching effect and quality.

2 Multi Mode Interactive Information Processing in Online Education of Ideological and Political Courses

2.1 Multi Mode Interactive Structure of Online Education of Ideological and Political Courses

Compared with the traditional ideological and political classroom mode, the synchronous interactive elements of Ideological and political classroom in the online education system of Ideological and political courses are more complex, which mainly consists of five elements: the lecturer, the assistant teacher, the local students, the online students and the interactive teaching terminal. Among them, the lecturer is the core of synchronous ideological and political classroom teaching, undertaking the task of Ideological and political classroom teaching. Online synchronous ideological and political classroom is a kind of distance education in terms of teaching nature. The essence of Ideological and political distance education is a cross school, cross regional education system and teaching mode. Its characteristics are: students and teachers separated from each other, using a specific transmission system and media for teaching, teaching interactive information in the process of communication is two-way, dynamic. In the online synchronous ideological and political classroom, the lecturer and online students are separated from each other in space. They teach through Internet technology, and the video transmission process is bidirectional and real-time. As a result, online synchronous ideological and political classroom is different from traditional ideological and political classroom in teaching interaction. In the traditional ideological and political classroom teaching process, teachers and students are in the same space, teaching interaction is face-to-face, a teacher only teaches one class of students [5]. In the online synchronous ideological and political classroom, teachers and students are separated in space, which leads to teachers' inability to manage online students effectively. Therefore, teachers need to assist teachers to organize and manage online students in the teaching process. Figure 1 shows the structure of the interaction relationship between online synchronous ideological and political classroom based on information interaction.

In the online synchronous ideological and political classroom, the interaction between the lecturer and the local students is face-to-face, and the interaction between the lecturer and the online students is realized through Internet technology. The online synchronous ideological and political classroom completes the video collection of local and online ideological and political classroom through multimedia devices such as cameras and pickups, and completes the teaching work of Ideological and political classroom through video interaction [6]. The main feature of online synchronous ideological and political classroom teaching is the combination of interactive mode.

The types of interaction can be divided into three categories, namely, the interaction between students and teachers, the interaction between students and learning content and the interaction between students and other students. The subjects of Ideological and

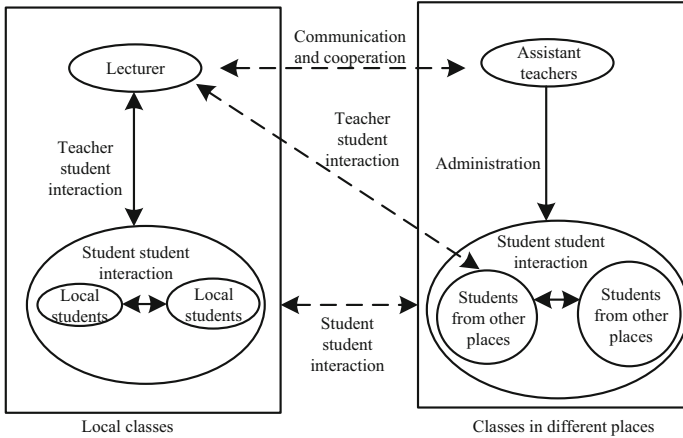


Fig. 1. Interaction structure of online synchronous ideological and political classroom

political classroom interaction are mainly teachers, students and student groups. Five types of interaction can be obtained by combining the three subjects [7]. The five types of interaction are summarized as shown in Table 1.

Table 1. Interaction behavior of Online Ideological and political classroom based on teaching subject

Interaction type	Interactive behavior
Individual teacher and individual student	Organizing teaching; classroom narration; classroom questioning; classroom practice; classroom evaluation
Individual teachers and student groups	Questions and answers; requirements and responses; evaluation and feedback; individual counseling; direct contact
Individual student and individual student	Communication and discussion among students in the process of classroom teaching, class practice and class discussion
Individual student and student group	Group discussion: discussion, communication and opinion evaluation between middle school students and the whole group of students
Student group and student group	Discussion and interaction between individual students and the whole class when demonstrating or expressing opinions

In the process of online teaching, ideological and political classroom teaching interaction is not only the original single interpersonal interaction, but also the human-computer interaction between teachers and students and information technology. The

use of subject tools in Ideological and political classroom teaching can improve students' initiative, teaching interactivity and generativity [8]. Based on this, this paper further studies the interactive content of Ideological and political classroom teaching in the information technology environment, further improves the teacher language and student language, and adds the category of technology on the basis of Table 1. The details are shown in Table 2.

Table 2. Interactive content of online teaching in Ideological and political class

Classification	Code	Formulation	Content
Teacher's speech	Indirect impact	1 Teachers accept emotion	Accept and clarify students' attitude or emotional tone in a non threatening way
		2 Teachers encourage praise	Praise or encourage the action or behavior of a student
		3 Adoption of opinions	Recognize the student's statement; modify or restate the student's statement; apply it to solve the problem; summarize what the student said
		4 Ask open questions	Based on Teachers' opinions or ideas, ask students questions and look forward to their answers
		5 Asking closed questions	
	Direct influence	6 Teach	Provide facts or opinions on the content or steps; express the teacher's own opinion, put forward the teacher's own explanation, or quote the opinion of an authority (not the student)
		7 Instructions	Instructing or ordering students to do something has the function of expecting students to obey

(continued)

Table 2. (continued)

Classification	Code	Formulation	Content
		8 Criticism	The content of the statement is to attempt to change the behavior of students, from unacceptable to acceptable; to scold students; to explain why teachers take such behavior; and to refer to themselves extremely
Speech students	9	Response (passive response)	Students respond to what the teacher says. Teachers make students answer questions, or lead students to speak, or construct dialogue situation. Students are limited to express their ideas freely
	10	Response (active response)	Students' answers go beyond the answers to the questions, express their own ideas, initiate new topics, and freely express their opinions and ideas, such as raising thinking questions and open structure
	11	Ask questions on your own initiative	Ask questions and express your opinions freely
	12	Discuss with peers	Discussion and exchange of views
Quiet	13	It is not conducive to the confusion of teaching	A brief pause, quiet, or confusion. So that the observer can not understand the communication between teachers and students
	14	Ponder a problem	Students think about problems

(continued)

Table 2. (continued)

Classification	Code	Formulation	Content
	15	Do exercises	Students do classroom exercises
Technology	16	Teachers' operation technology	Teachers use technology to present teaching content and explain opinions
	17	Student operation technology	To make use of the teaching content
	18	The role of technology in students	Students observe media presentation

Based on Table 2, the MySQL service module is added to the system. Provide a master and slave database cluster mode. When the system enters the title and submits the data to the master database, the master database sends the transaction to each slave database and waits for the response from the slave database. When the slave database is ready, it sends a confirmation message to the master database. When all the slave databases send a confirmation message to the master database, the master database will send a commit transaction message to all the slave databases. At this time, the title will be entered into the master-slave database to complete a data writing process [9]. Compared with a single MySQL server, the database cluster will be slightly slower in data update. However, when the interactive teaching system reads more data than it writes, the sacrifice is acceptable. By describing the average load of teaching information, we can see the difference between single database and database cluster. The formula of the average load of the system can be described as.

$$\text{AverageLoad} = (\Sigma \text{WriteData} + \Sigma \text{ReadData}) / \Sigma \text{Capacity} \quad (1)$$

In formula (1), Average Load is the average load of the system, Write Data is the load of writing data, Read Data is the load of reading data, and Capacity is the total transaction volume of the system. Through different database forms, we can see the average load of the system, assuming that the number of transactions per second of each database is 20000, the number of read data transactions is 16000, and the number of write data transactions is 4000. Since synchronous replication is also required from the database, the number of write data transactions is multiplied by the number of database clusters.

2.2 Interactive Processing Function of Online Teaching Information in Ideological and Political Classroom

According to the dissemination mode of information in the teaching process, this paper analyzes the process of students' knowledge self construction, and optimizes the interactive function of teaching information. In the learning process, students can not only acquire knowledge through the learning tasks issued by teachers, they can choose the

form of e-learning materials for auxiliary learning, and these learning materials are large in quantity and variety, so the function of interactive information management module is to centralize the management of these teaching interactive information [10]. According to the analysis of the functional requirements of the interactive teaching system, the interactive teaching system is divided into five functional modules: question bank management, homework management, interactive information management, online chat and system management [11–13]. Next, five functional modules will be designed in detail. Figure 2 shows the functional tree diagram of information processing of interactive teaching system.

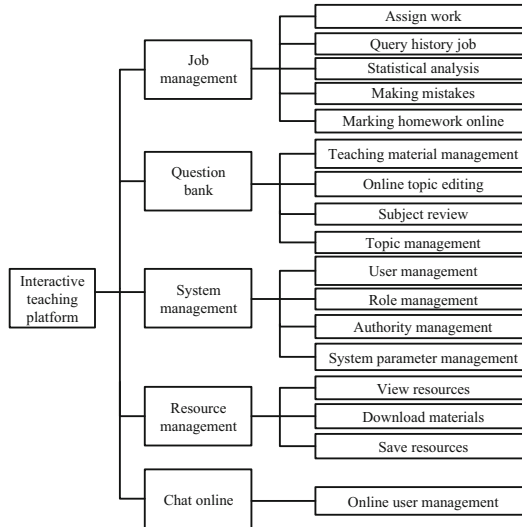


Fig. 2. Information processing function of Ideological and political education interactive system

Aiming at the problem of scattered teaching interactive information, this paper attempts to establish an interactive information sharing system with the help of SAE cloud storage service. Through the research of the current teaching interactive information system, this paper summarizes two schemes of the current interactive information sharing [14]. The first is to share interactive information by uploading interactive information. The operation mode of this kind of interactive information system is: each interactive information corresponds to a score. When users download interactive information, they have to deduct the corresponding interactive information score, while the user's score comes from uploading interactive information. Through this mode to achieve a virtuous circle of interactive information. The second is that administrators upload interactive information, and users download interactive information directly. There is no user interaction in this form. Users only need to find the interactive information they want.

In the first method, interactive information is stored in the cloud for centralized management of interactive information. If users are allowed to upload interactive information freely, the quality of interactive information will not be guaranteed, and the centralization

of high-quality interactive information will be meaningless [15]. Therefore, the second solution is more suitable for the cloud. Aiming at the problem of insufficient user interaction in the second scheme, the interactive information sharing scheme is improved. Due to the huge amount of interactive information in the cloud, users need a certain amount of energy to find the appropriate interactive information. Therefore, a module is added to realize the sharing of interactive information among users and help other users find the appropriate interactive information faster. At the same time, the system provides users with personal interactive information space to save users' interactive information.

At the beginning of the design, we need to consider whether we can open up a file domain name in SAE storage space to store user interaction information. After analysis, it is considered that using data table to link interactive information can save more space. For users, the content of interactive information is the same, but the interactive information cannot be managed. If there are no special needs, users are not required to manage the interactive information. In addition, although the cloud storage space is large, but beyond a certain limit, it will also increase the deployment cost of interactive teaching system.

Through the above analysis, combined with the characteristics of cloud storage, the interactive information sharing system of Ideological and political online teaching system is proposed, as shown in Fig. 3. The interactive information of teaching interactive system is divided into two parts: private interactive information and open interactive information. The privacy interaction information is used to store the privacy interaction information of the system itself, which is controlled by the cloud administrator. Open interactive information, as a centralized system of interactive information, provides users with interactive teaching information. Interactive information is stored persistently through SAE's cloud storage service, and users' sharing and personalized interactive information space design are realized in the form of interactive information URL.

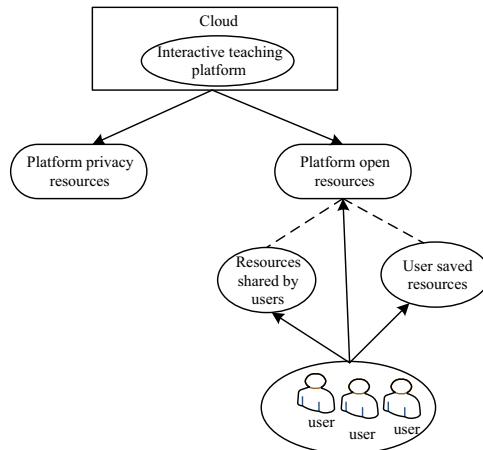


Fig. 3. Interactive information sharing platform of Ideological and political online teaching system

According to the interactive information sharing system of teaching interactive system, the system is mainly divided into two sub modules: view/download interactive information and user interactive information. And the interactive information sharing resource processing process is optimized, the specific steps are shown in Fig. 4.

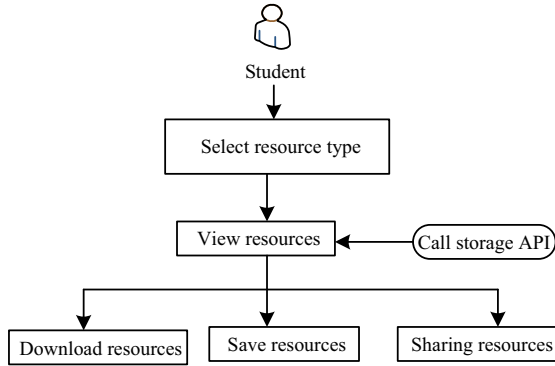


Fig. 4. Interactive information sharing resource processing flow

Furthermore, NVivo 8.0 developed by QSR International company is used as the video analysis system of Ideological and political classroom to process and analyze the ideological and political classroom teaching video under the background of deep integration of information technology and teaching. Using NVivo 8.0 software to analyze different types of data, such as text, pictures, audio and video, has great advantages in processing teaching information analysis. When observing the interactive files of teaching letters, you can change the playback speed, cycle a part continuously, rewind or skip a part. You can create your own script for the video file, or create a script or other comments for a part of the video. You can view the relevant video parts by clicking the script. NvivoB. 0 can also create and export professional models or graphs based on project information, such as bar chart, column chart and pie chart, and use charts to view data from a new perspective. In order to achieve the effective processing of multi-mode interactive information in the ideological and political online education system and improve the speed of information processing.

2.3 Realization of Multi Mode Interactive Information Processing

According to the textbook knowledge points and curriculum design plan, the knowledge is made into various courseware and sent to the teaching system. students can learn online according to their personal needs. This is a one-way process, teachers are not in the process of information processing, need to understand the learning situation of students and the use of interactive information. Students can quickly obtain these interactive information, effectively break the separation of regional interactive information, so that more learners have the opportunity to obtain better interactive information, and promote education equity. In order to better realize the processing of interactive information, the static learning and dynamic learning mode are further optimized, as shown in Fig. 5.

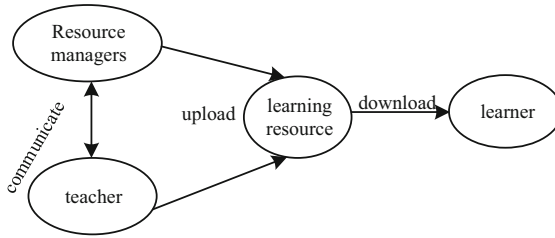


Fig. 5. Interactive information processing principle under static learning mode

With the development of more and more teaching systems, how to make better interaction between learners and learners, learners and teachers, learners and learning information has become a new research field. Based on the problem of insufficient interaction of static learning application mode, dynamic interactive application mode began to appear. The specific principle is shown in Fig. 6.

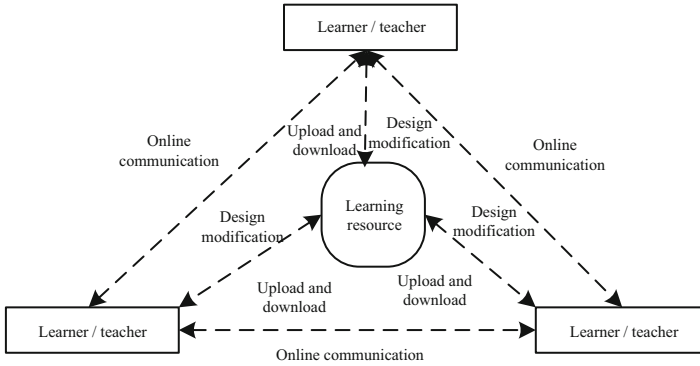


Fig. 6. Interactive information processing principle under dynamic learning mode

The question bank system of interactive teaching system, like other systems, has much more query operations on the database than update and add operations. For example, the administrator can input most of the test questions at one time through batch import and other tools, and then the maintenance of the question bank is reduced, only a small number of test questions are input, while the operating system is constantly reading the data from the database. The openness of the system will allow many users to access at the same time, which puts forward certain requirements for the performance of the database. Through the way of database cluster to achieve query load, it can effectively deal with the performance bottleneck of database. Through the systematic analysis of different disciplines to determine the breadth of students' knowledge and the breadth of interactive information involved, and each discipline is subdivided into different knowledge points a, further refining the scope of students' knowledge and the scope of interactive information. Therefore, a vector matching model of students'

interactive information knowledge breadth is proposed.

$$ka = \{a_0, a_1, a_2, a_3, a_4, a_5\} \quad (2)$$

This paper calculates the degree of problem and interactive information knowledge model of students and interactive information from two levels of breadth and depth. In this paper, the angle cosine formula is used to calculate the similarity between the two vectors. $X = (X_1, X_2, X_3, \dots, X_n)$ and $Y = (Y_1, Y_2, Y_3, \dots, Y_n)$ represent the knowledge breadth vector and depth vector of data source respectively.

$$\cos \theta = \frac{X \cdot Y}{ka + |X| + |Y|} \quad (3)$$

When the angle is larger and the cosine value is smaller, the matching degree between students and interactive information is lower. Combined with Gaussian distribution probability density function, the knowledge depth model matching between students and interactive information is quantified.

$$F(M, N) = \frac{1}{\sqrt{2\pi} \cos \theta} \exp\left(-\frac{(X - Y)^2}{2 \cos \theta}\right) \quad (4)$$

Interactive teaching system provides two learning mechanisms, one is “I want to learn”, the other is “I want to learn”. The operation mode provided by the interactive teaching system provides an asynchronous interactive learning mechanism for students and teachers. The interaction level is mainly between teachers and students, and the whole learning effect is two-way docking with teachers and students. The interactive information mode of learning attachment provided by the interactive teaching system provides an asynchronous interactive “I want to learn” learning mechanism between students. The instructional designer uploads the interactive information of learning attachment to the system. Students actively search for interactive information for learning, students can share interactive information to other students, help other students find interactive information, form a benign flow of interactive information between students, online chat system, provide synchronous communication between students and teachers, students and students. Teachers can answer questions for students in time and help them solve problems in the process of learning. Students use the power of group wisdom to exchange learning experience and solve practical problems. Sina cloud system SAE is selected as the deployment environment of the interactive teaching system, and the interactive information of the question bank is stored in the cloud database by using the distributed database Mysql service. Using the persistent file storage service, the interactive information of learning attachment is stored in the cloud storage, and the learning interactive information of the teaching interactive system is built in the cloud for management. It saves the cost of infrastructure purchase and abandons the disadvantages of repeated construction of interactive information. SAE provides a dynamic scaling mechanism of multiple virtual machines, which can calculate according to the visits of teachers and students, increase the flexibility of interactive information, and enhance the interaction of teaching interactive system. SAE has the heterogeneous characteristics of cloud computing, students can use mobile devices in their spare time to complete homework and check wrong questions, which improves students’ learning efficiency.

3 Experimental Results and Analysis

In order to verify the feasibility of the multi-mode interactive information processing method in the online education system of Ideological and political courses proposed in this paper, questionnaires were distributed in the pilot schools and data were collected. The survey of students' use mainly starts from the following aspects: whether the system operation is simple, whether it needs open analysis after the homework is completed, whether it can effectively complete the homework, and whether it can understand the mastery of knowledge through the homework. The results are shown in Fig. 7.

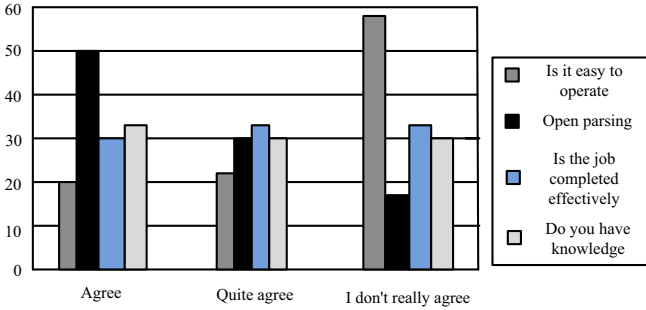


Fig. 7. Survey of students' satisfaction with using

As can be seen from Fig. 7, students are not very satisfied with the operation, but basically agree with the open analytic answers. At the same time, most of the students agree whether they can complete the homework effectively, only a few students think that they can not complete the homework better in the system. Most of the students think that they can understand the mastery of knowledge through homework.

The survey of teachers' use is mainly carried out from the following aspects: whether it is in line with teaching habits, whether the function setting is reasonable, whether it can cover the knowledge points of teaching materials, and whether it is difficult to choose topics. The results are shown in Fig. 8.

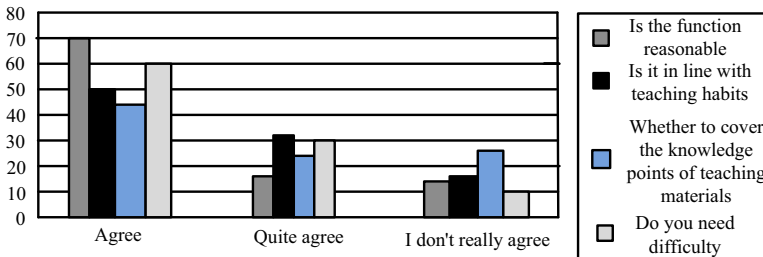


Fig. 8. Survey of teachers' satisfaction

It can be seen from Fig. 8 that teachers are quite satisfied with the system functions. Basically covers the teaching methods of teachers, but also basically in line with

the teaching habits. The textbook is divided into chapters, which basically covers the knowledge points of the textbook. At the same time, the difficulty of the topic is distinguished, which helps teachers to achieve multi effect homework design. Teachers are quite satisfied with this. In general, the proposed interactive system of Ideological and political education is safer, more stable, more reliable and more efficient than the traditional teaching application.

In order to further verify the information processing performance of this method in online teaching of Ideological and political course, the online learning duration of 30 students in a high school was tested under the same experimental environment. The reference [3] and reference [4] methods were used as the control group to test the total daily online learning time of the three methods. The higher the online time, the better the students' evaluation of the model. The specific experimental results are shown in Fig. 9.

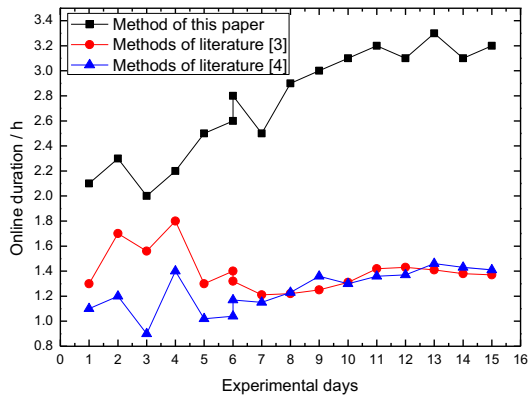


Fig. 9. Comparison of online learning duration

According to the analysis of Fig. 9, the online learning time of students using this method is generally on the rise, and the maximum learning time is up to 3.3 h, which is far higher than that of the two comparative methods. It shows that this method has advantages in online learning of Ideological and political courses.

4 Conclusion

Through the effective management and transmission of massive teaching information, the online teaching effect of Ideological and political education can be better improved and the teaching interaction can be better carried out. Including interactive information sharing, learning exchange, interactive chat, so that any student and teacher can enjoy the latest interactive information and services, break the barriers of uneven distribution of interactive information, promote education equity, and lead the continuous innovation of teaching technology. The future research on this topic can be carried out from the following methods. Improve the definition and practical application of learner centered education model, because the starting point of this model is to improve the problems

existing in the current online education platform. Therefore, its definition and application scenarios are still incomplete, and it needs to be improved in the future to improve its use value.

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